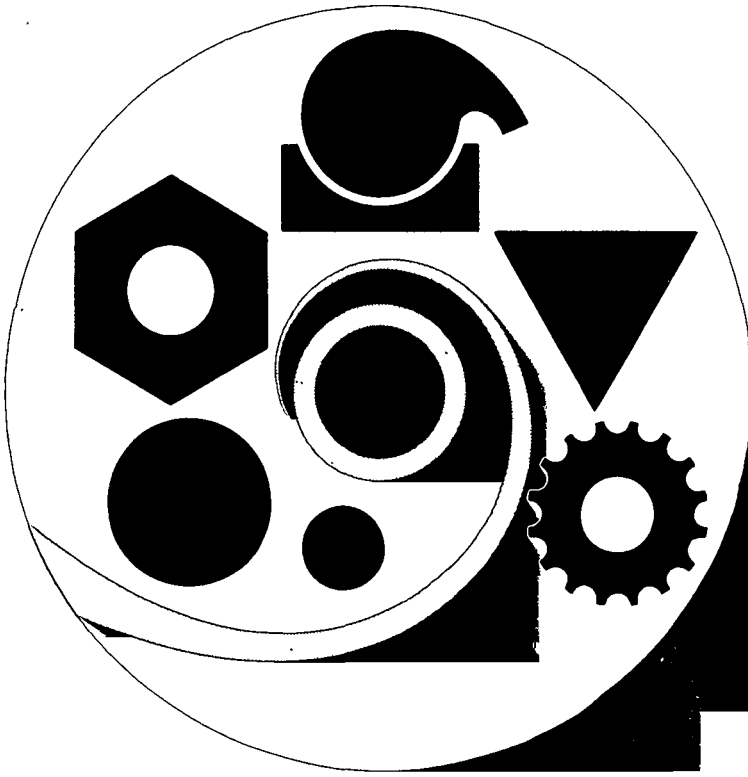
Industrial development

ASIA and the FAR EAST



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UNITED NATIONS

ECONOMIC COMMISSION
FOR ASIA AND THE FAR EAST
Bangkok, Thailand

INDUSTRIAL DEVELOPMENTS IN ASIA AND THE FAR EAST

Vol. I – Progress and problems of industrialization

Selected documents presented to the Asian Conference on Industrialization

Manila, 6–20 December 1965

UNITED NATIONS
New York, 1966

NOTE

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E/CN.11/752-Vol I
E/CONF.54/R.B.P./2

UNITED NATIONS PUBLICATION

Sales No.: 66.II.B.19

Price: US$5.00 or equivalent in other currencies

PREFACE

This publication contains the principal documents constituting the Supplement entitled Industrial Developments in Asia and the Far East pertaining to the Asian Conference on Industrialization[1] which was held at Manila, Philippines, from 6 to 20 December 1965, under the sponsorship of the Economic Commission for Asia and the Far East (ECAFE) with the co-operation of the United Nations Centre for Industrial Development.

The publication consists of four volumes:

Volume I contains background documentation.

Volumes II and III contain twenty-two country studies prepared by the countries of the region and the secretariat.

Volume IV contains sectoral studies on the development of thirteen key industries in the ECAFE region.

In the case of translations and in some instances where the English of the original papers appeared to need clarification, some paraphrasing has been found necessary; explanatory footnotes have been added where deemed necessary or helpful to the maintenance of consistency in technical terminology.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country or territory or of its authorities, or concerning the delimitation of the frontiers of any country or territory.

[1] Originally known as the ECAFE Regional Symposium on Industrialization. However, in view of the importance of industrialization to the developing countries of Asia and the Far East, the Economic Commission for Asia and the Far East, at its twenty-first session in 1965, felt that the proposed symposium should be raised to the level of a conference, thus making it feasible for the governments to send high level officials who were concerned with both the policy and technical aspects of industrial development in their countries. The Commission, therefore, decided to change the name of the Symposium to the Asian Conference on Industrialization.

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OVERALL EVALUATION OF THE PROGRESS AND PROBLEMS OF INDUSTRIALIZATION IN THE ECAFE REGION

Prepared by the ECAFE Secretariat

INTRODUCTION

This survey of progress and problems of industrialization in the ECAFE region describes the salient trends in the industrial growth of the ECAFE countries and identifies the basic problems which have accompanied this process of industrialization. The paper focuses attention on the more significant aspects of the region's industrial growth and its attendant problems, so as to provide the basis for fuller inquiry and discussion at the Conference on Industrialization.

In examining the present level of industrialization in the region, it has been necessary to trace the development of the industrial sector over a period of years, and therefore the survey of industrial growth in this paper includes reference to plans and programmes of industrialization prepared and implemented by ECAFE countries from the early years of the past decade. Within the limitations of the amount of data available, an effort has been made to up-date the survey to 1964. However, the comparisons and assessments generally relate to the period between 1953-1963.

Part 1 of the paper discusses the industrial growth of the ECAFE region. Chapter 1 examines the region's share of world industrial output and the contribution of individual countries to the regional output, and gives a brief account of the relative rates of growth in the region and in the countries. Chapter 2 deals with the patterns of industrialization. An attempt is made to examine the level of industrialization in the different countries, ascertain the strength and viability of the industrial structures that are being developed in these countries, and determine the extent to which the industrial sectors contain those elements which create a self-impelling process of growth. The significance of the industrial sector in the economy is discussed in relation to the structural changes that have occurred, the volume of capital formation in industry, the change in the composition of imports and exports, and the change in patterns of employment and skill demand. Chapter 3 contains a brief review of planned targets for industrialization in selected countries of the ECAFE region and performance in relation to those targets.

Part II of the paper selects for discussion some of the typical problems of industrialization in the ECAFE region. Chapter 1 discusses in broad outline the strategies of development; it examines some of the sectoral interrelations which have a decisive impact on the process of industrialization, and briefly discusses the problems relating to the design of industrial development, and the co-ordination of investments within the industrial sector. This chapter also refers to the place of intermediate technology, and small scale production within the broad strategy of industrial planning. It next examines the organization of industry in the countries of the region and the relative importance of the public and private sectors as agencies of industrial development in the ECAFE region.

Chapter 2 deals with the problems of industrial planning and plan-implementation, the need for more precise tools of statistical analysis and more comprehensive techniques of programming and progress control in the preparation and execution of industrial plans. It also examines the methods, adopted for the evaluation of performance in relation to planned targets, and discusses the under-utilization of industrial capacity in the region with reference to selected countries. The chapter also contains a brief discussion of the paramount need for adequate manpower planning which is basic to the successful implementation of any industrial plans.

Chapter 3 deals with the problems of financing the programmes of industrialization in the region, with special reference to the capacity for domestic savings in the countries of the region and the place of external assistance. As these subjects are dealt with more comprehensively in separate papers, the discussion in this paper is in the nature of introductory comment and serves to emphasize the overriding problem of capital resources to which the other problems of industrialization have to be related.

Chapter 4 of this paper discusses the regional prospectives and the potential for both regional cooperation and harmony between national development plans, for the purpose of accelerating the process of industrialization in the ECAFE region.

The term 'industry' as used in this report generally denotes mining, manufacturing, electricity and gas, but the main discussion in the paper relates to the manufacturing sector, where the growth of industrial

activity and the advancement of technology can be best examined and evaluated. However, some of the productive activities included by certain countries in their manufacturing sectors are excluded by others. Examples are rice milling, production of copra, sawmills, processing of rubber latex, and manufacture of tea. Therefore, it should be noted that the statistical data for the different countries are not always strictly comparable.

Part I

THE PROGRESS OF INDUSTRIALIZATION IN THE ECAFE REGION

I. THE INDUSTRIAL OUTPUT AND GROWTH IN THE ECAFE REGION

1. *The regional share in world industrial output*

An account of the industrial growth in the ECAFE region can appropriately commence with a brief examination of the region's contribution to world industrial output. Such an examination will necessarily be perfunctory in a study of this kind but will serve to direct attention initially to the level of industrialization in the region as a whole and place the region's industrial output within the context of world industry.

Table 1 contains a comparative statement of the share of world industrial output in 1958 for the ECAFE region and two other developing regions. The total contribution made by the ECAFE region including the more developed countries of the region Japan, Australia and New Zealand, amounts to only 5.5 per cent in 1958. When the advanced countries of the region are excluded, the contribution of developing countries declines to 1.7 per cent in 1958, in comparison with 3.0 per cent for Latin America, and 2 per cent for the Middle East and Africa taken together. The contribution by the developing region in the Middle East and Africa, excluding South Africa and Israel, amounts to approximately 1.3 per cent. Estimates of the ECAFE region's contribution to world output in 1964 could be made only tentatively on the basis of the industrial growth reflected in the industrial indexes of production. While the index of world industrial output moved from 100 in 1958 to 156 in 1964, on the same base the index of industrial production of the region including Japan and excluding Australia and New Zealand rose to 225, and for the developing region alone from 100 to 170. Of course, the indexes themselves, based as they are on the weight for different industries given in 1958, may not accurately reflect the changed structure in 1963. But as a broad measurement of the increases of output, the region's indices which are above the world average denote the likely increase in the region's share of world output, and can be considered for the purpose of completing the picture of the region's industrial activity within the global framework.

The comparative figures immediately direct one's attention to two aspects. They underscore the efforts at industrialization which have been made in the region as a whole; at the same time they reveal in striking contrast the paucity of the means of industrial production presently available to the developing countries in the region. The statistical comparison by itself may not adequately reflect the extent or intensity of the efforts at industrialization in the region. What this implies in terms of the rate of growth for the in-

TABLE 1

	Percentage share of added value of world industrial output (1958)	*Percentage share of added value of industrial output of less industrialized nations[c] (1958)*	*Index number of industrial production*							
							1964			
			1958	*1961*	*1963*	*1964*	*1st*	*2nd*	*3rd*	*4th*
World[a]	100		100	126	144	156				
ECAFE region	5.5									
Developing region in ECAFE	1.7	12.8	100	130	156	170	167	161	171	179
Japan	2.6		100	178	212	248	241	245	247	258
Developing ECAFE region and Japan	4.3		100	164	197	225	219	220	226	235
Australia, New Zealand, South Pacific Islands	1.3	Australia[b]	100	111	121	129	144	138	142	146
		New Zealand[b]	100	110	125	138				
Latin America	3.0	38.6	100	121	128	137				
Africa and Middle East	2.0	16.9	100							
Less industrialized nations[c]	7.8	100	100	130	149	163				

Sources: United Nations, Statistical Yearbook, 1965, Economic Survey of Asia and the Far East, 1965.

[a] Excludes Albania, Mongolia, mainland China, North Viet-Nam, North Korea.
[b] For manufacturing only (1958/59 = 100).
[c] Includes Developing ECAFE Region. Latin America, Africa and Middle East (excluding Israel and South Africa) and southern Europe, excluding Italy.

dustrial sector is discussed later. At this point, it will suffice to note the fact that the region's share of world output (and this applies to the developing countries as well) appears to have increased in a context of uninterrupted expansion of the industrialized economies. While the rate of expansion from an already industrlialized base will not normally lend itself for comparison with the rate that could be achieved by a developing region starting from a much narrower base, it is necessary to recognize that the developing ECAFE region had to sustain an appreciably high rate of industrial growth in order to increase its share of world output.

These figures relating to the percentage increase in industrial output for the ECAFE region should not be allowed to obscure the fact that the level of industrialization in the ECAFE region remains depressingly low. The capacities in the industrial sectors of the developing countries taken together are as yet extremely limited. The developing countries of the region included in table 1 contain among themselves approximately 28 per cent of the world's population; for this population the share of world industrial output, on the basis of the 1958 industrial structure, is an insignificant 1.7 per cent. On this basis, the per capita industrial outputs in this region are among the lowest in the world, lower than the average for Latin America or the developing regions of Africa. Table 2 gives some comparative figures of per capita industrial output for the region and selected countries outside the region; it also shows the per capita consumption of energy cement and steel, which is helpful in measuring the level of industrial activity in the region. The information provided in table is discussed in greater detail in a later section of the paper.

While per capita industrial production has increased for most of the countries in the region, the enormous disparity that still exists between the industrial output of the region and the outputs of advanced countries demonstrates the rudimentary character of industrial activity and the correspondingly low level of technology in the developing ECAFE region, bringing into sharp focus the magnitude and intensity of the effort that will be necessary before the region can create the capacity to satisfy a significant portion of its current demand for industrial goods which is met by imports.

The composition of the imports and exports of the developing region provides another broad indication of the level of industrial production in the region.

The imports under items 5-9, (chemicals, manufactured goods, and so on) amount to 58.8 per cent of the total value of imports by the developing ECAFE region, or 5,334 million US dollars. The imports of those goods from developing member countries constitute only a negligible portion of the total imports, and amount to less than ten per cent of the total value of imports in respect of these items. These figures do not take into account the industrial products included in item 0-4 which, if included, would reflect a greater dependence of the region on the net imports of industrial goods.

The small portion of inter-trade in those items among the developing countries themselves is a symptom of the extremely meagre capacity of the industrial sectors in these countries. It emphasizes the dependence of the developing countries on the advanced countries within and outside the region for the supply of the required manufactured goods. This can also be illustrated by comparing the imports of manufac-

TABLE 2. PER CAPITA INDUSTRIAL OUTPUT AND PER CAPITA CONSUMPTION OF ENERGY, STEEL, CEMENT IN ECAFE COUNTRIES

	US$ 1952-1954	(at 1960 prices) 1961-1963	Energy-kWh 1960	Energy-kWh 1963	Steel-Kg 1953-1955	Steel-Kg 1963	Cement Kg 1955	Cement Kg 1962
Burma	5	9	53	55			6.8	7.8
Cambodia		7.7	35	48				29.6
Ceylon	6	7	110	114	5.6	8.9	22.9	28.6
China (Taiwan)	18	31	513	573	14	34	75.4	119.0
India	10	12	140	170	6	16	11.6	19.0
Indonesia (1958)	5	4	134	111	3.2	2.3	6.0	6.5
Iran			344	352	8.1	21	10.8	36.3
Koera, Republic of	7	14	261	391			6.4	36.6
Malaysia	29	36	241[a]	285[a]		28.33	62.5	85.8
Pakistan	7	8	68	83	3	7.5	9.2	14.8
Philippines	17	30	143	191	11	10	17.4	33.1
Thailand	10	12	62	84	8.5	13	21.8	29.3
Viet-Nam, Republic of		10	52	62		4.7	12.2	26.9
Japan	58	163	1,166	1,532	77	258	105.1	242.6
Australia	361	424	3,918	4,213	291	389	227.8	273.1
New Zealand			2,029	2,069	168	201	191.3	255.1
Argentina		83 (1962)						
Chile		65 (1962)						

Sources: Economic Survey for Asia and the Far East, 1964, United Nations, Statistical Yearbook, 1964, United Nations, Yearbook of National Accounts Statistics.

[a] Figures are for Malaya only.

tured goods with the domestic production in the manufacturing sector. The table below shows the imports of manufactured goods as a percentage of gross domestic product of the manufacturing sector, for selected countries.

TABLE 3. IMPORTS OF DEVELOPING COUNTRIES — ECAFE REGION, 1962
(Million U.S. dollars)

Section of SITC revised	*(1) Value of imports from world*	*(2) Percentage of total imports from world*	*(3) Value of imports from developing countries*	*(3) as per cent of (1)*	*Value of imports from advanced countries of the ECAFE region*[a]
0. Food and live animals	1,529	16.8	627	41	180
1. Beverages and tobacco	117	1.3	23	19.6	2
2. Oxide minerals except fuels ..	1,144	12.6	651	56.9	71
3. Mineral fuels, etc.	845	9.3	501	59.3	21
4. Animal and vegetable oils and fats	106	1.2	31	29.2	9
5. Chemicals ...	780	8.6	57	7.3	120
6. Manufactured goods classified chiefly by material	1,865	20.5	276	14.8	567
7. Machinery and equipment	2,132	23.5	42	2	320
8. Miscellaneous manufactured articles	391	4.3	94	24	73
9. Unclassified ..	166	1.9	28	16	7
Total	9,076	100	2,331	25.7	1,369

Source: Economic Survey for Asia and the Far East, 1964.

[a] Australia, Japan and New Zealand.

TABLE 4

Country	*Imports of Manufactured Goods as percentage of Gross Domestic Product in Manufacturing Sector*	
	1953/54	1961/62
Burma	76	48
Ceylon	77	81
China (Taiwan)	19	24
India	7	8
Malaya	62	58
Philippines	43	63
Thailand	34	34

Source: Economic Survey of Asia and the Far East, 1963.

These figures must be considered together with the correspondingly insignificant volume of exports in manufactured goods for the developing region. Moreover, they have to be related to the prevailing shortage of foreign exchange as well as to the low income levels and correspondingly low consumption of industrial goods in order to assess the level of industrial output in these countries. Otherwise, interpretation of the data may convey a misleading impression regarding the degree of industrial self-sufficiency in countries

TABLE 5

	INDUSTRIAL PRODUCTION (Mining, Manufacturing, electricity, gas)	*Crude*	*Coal*	*Metal*	*Manufacturing total*	*Light manufacturing*	*Heavy manufacturing*	*Food and beverages*	*Textiles*	*Clothing, footwear, etc.*	*Wood products*	*Paper and paper products*	*Chemicals, petroleum, coal products*	*Non-metallic mineral products*	*Metal products*	*Basic metals*	*Electricity, gas*
	(a) Weights in world index 1958																
1. World	100																
2. ECAFE region including Japan excluding Australia and New Zealand	5.8	9.0	7.6	6.5	5.6	6.9	4.8	6.5	12.7	3.4	6.6	4.4	6.1	6.0	4.2	5.3	6.1
3. ECAFE region excluding Japan	2.3	2.7	5.1	6.4	2.1	3.5	1.1	3.8	6.4	2.4	2.9	0.6	2.2	2	0.8	1.1	2.6
	(b) Weights in regional index 1958																
1. ECAFE region including Japan excluding Australia and New Zealand	100	3.8	1.9	4.7	83.6	40.5	43.1	13.7	10.7	2.5	4.2	2.3	9.8	3.8	20.9	6.3	5.4
2. ECAFE region excluding Japan	100	2.8	3.1	11.6	78.4	51.9	26.5	20.2	13.7	4.5	4.5	0.8	9.0	3.2	16.3	3.2	3.2
	Index number of industrial production in 1963 (1958 = 100)																
1. World 1963	148	101	129	155	149	134	159	125	133	134	138	145	172	148	158	154	161
2. ECAFE region excluding Australia and New Zealand	225	123	137	178	236	165	301	138	148			221	228	212	369	278	210
3. ECAFE developing region	170	173	144	175	168	150	204	135	140			195	183	174	224	236	211

Sources: United Nations, Statistical Yearbook, 1965, Monthly Bulletin of Statistics, May 1966.

TABLE 6. PRODUCTION OF SELECTED COMMODITIES(

Year		*Steel ('000 metric tons)*	*Aluminium ('000 metric tons)*	*Nitrogenous fertilizer (N content) ('000 tons)*	*Cement ('000 metric tons)*	*Petroleum ('000 metric tons)*	*Paper including newsprint ('000 tons)*	*Newsprint ('000 metric tons)*	*Textiles cotton yarn ('000 metric tons)*
Developing ECAFE Region	1958	1,964			10,800		260		1,048
	1963	6,325		467	16,600		520		1,346
	1964	6,240			17,200		520		1,544
Afghanistan	1958				20.4				
	1963				103.2				
Burma	1958				36.0	367			2.4
	1963				123.6	598			5.0
Cambodia	1958								
	1963								
Ceylon	1958				80.4				
	1963				78.0				
China (Taiwan)	1958	106.8	8.64	30.3	1,015.2	810	72.0		27.6
	1963	214.8	11.88	92.5	2,239.2	1,413	105.6		48.0
	1964								
India	1958	1,848	8.28	80.8	6,168	4,489	157.2		764.4
	1963	5,976	53.88	220.9	9,360	7,163	298.8		892.8
Indonesia	1958				298.8	10,804			
	1963				511	10,056			
Iran	1958				410.4	14,922			
	1963				745.0	18,487			
Korea, South	1958	19.2			295.2		12.0	12	44.4
	1963	159.6		38.0	778.8		42.0	42	62.4
Malaysia	1958				110.4	2,357			
	1963				361.2	2,066			
Pakistan	1958	10.8		10.1	1,089.6	267	16.8		156.0
	1963	12.0			1,500.0	1,998	20.4		213.6
Philippines	1958			14.0	642.0	1,142			8.8
	1963				951.6	3,737			8.8
Thailand	1958				499.2		2.76		
	1963				997.2		9.00		
Viet-Nam, South	1958								
	1963								6.8
Japan	1958	12,120	107.52[a]	986.3	14,988	13,346	1,768.8	571.2	439.2
	1963	31,500	313.2	1,279.3	29,952	46,925	3,289.2	1,022.4	482.4
Australia	1958	3,180	14.5[a]	25.1	2,460	9,553	84		19.8
	1963	4,416	41.9	19.8	3,120		93.6		21.2
New Zealand	1958			3.4	564	14,461	78.0		
	1963			4.0	720		188.4		
World	1959	273,600	2,870	9,800	263,000	700,600	40,000 (metric tons)	11,860	
	1963	386,600	4,360	14,000	368,000	985,200	53,720 (metric tons)	14,540	

Source: United Nations, *Statistical Yearbook* Regional Statistics — *Economic Survey for Asia and the Far East*, 1964.
[a] Includes both primary and secondary.

such as India. The statistics throw light on the scope and extent of the market for industrial goods in the developing region, its potential for expansion, and the wide gap in the productive capacity of the industrial sector in these countries to meet these needs.

The position of the industrial sector in the region can be depicted in more concrete terms by examining the production of selected manufactured commodities. Table 5 is a statement which shows the classification of industrial output for the region and the region's share of the world output under this classification.

In 1958, among the industries of the region, the industry which had the largest share of world output was the textile industry. Its regional position in the world index was 6.4 per cent for the developing countries, and 12.7 per cent for the region including Japan. The only other industry in the developing region which had a weight of over 3 per cent in the world index was 'food and beverages' which had 3.8 per cent. Wood products came next with 2.9 per cent, followed by clothing, footwear, 2.4 per cent and chemicals 2.2 per cent. The levels of regional output in relation to world output for basic metals, metal products and paper are insignificant. The weight of industrial production in the developing region in relation to world production of course confirms the simple level of technology and the relatively greater emphasis on light manufacturing industries in the region. The composition of industrial output for the region indicates the low weightage that industries such as paper, basic metals and non-metallic mineral products bear in the industrial sector in the region. As already noted, the industrial structure inclined heavily towards the light consumer goods industry. In 1958, food industries came first with a weightage of 20.2 per cent and textiles with a weightage of 13.7 per cent. Chemicals and metal products however occupy a relatively significant position in the regional industrial structure with 9 per cent and 16.3 per cent respectively.

By 1964, the picture had altered in a few significant details. The index of the developing region in each case had moved higher than the world index, indicating a growth which was likely to increase its weightage in the world index. The increases were lowest in the food, beverage, and textile industries which had the highest proportion of output in the developing region. Basic metals, paper, metal products, chemicals and electricity had shown substantial increases thereby growing in importance within the industrial structure of the region, as well as contributing a larger share of world output than in 1958. These developments indicate the shifts that have taken place in the industrial activity in the region, and its gradual entry into the producer goods and heavy manufacturing sector. However, the figures for the ECAFE region including Japan provide a comparison of the total output of the developing region in relation to that of a single advanced country in the region — a comparison which dramatically demonstrates how small the advance made by the region appears, when viewed against the productive strength of one developed economy.

TABLE 7

	Percentage share of added value of regional industrial output (1958)		*Index numbers of industrial production (1958=100)*					
			1959	*1960*	*1961*	*1962*	*1963*	*1964*
	Mining and Manufacturing							
Japan	59.7	48.2	120	149	178	193	212	248
Burma	0.8							
Ceylon	0.8		95	118	124	133	140	149
China (Taiwan)	1.0		113	129	144	163	179	226
India	18.1		109	121	129	139	152	162
Indonesia	3.1	30.9						
Korea, South	2.7		115	125	132	154	175	189
Malaysia:								
Former Federation of Malaya	1.5							
Pakistan	3.2		112	119	126	150	171	185
Philippines	2.1		108[a]	112[a]	119[a]	126[a]	134[a]	145[a]
Thailand	1.1							
Rest[1]	5.9							
ECAFE Region excluding Australia and New Zealand	100							
Australia	78.3		(1958/59 = 100)	110[a]	111[a]	110[a]	121[a]	129[a]
New Zealand	20.3	21.9	(1958/59 = 100)	104[a]	110[a]	119[a]	125[a]	138[a]
Rest[2]	1.4							

Source: United Nations, Statistical Yearbook, 1965, Economic Survey of Asia and the Far East, 1965.

[1] Afghanistan, Brunei, Hong Kong, Iran, South Viet-Nam, Sarawak and West Irian.
[2] Fiji Islands, French Polynesia, Guam, Hawaii, New Caledonia, New Guinea.
[a] Manufacturing only.

1963 PRODUCTION) IN THE ECAFE REGION

Cotton fabrics (million metres)	*Rayon or acetate filament ('000 metric ton)*	*Rayon or acetate fabrics (million metres)*	*Soda ash ('000 metric tons)*	*Caustic soda ('000 metric tons)*	*Sulphuric acid ('000 metric tons)*	*Sugar ('000 metric tons)*	*Tobacco cigarettes products (million)*	*Electricity (million kWh)*
5,578								24,000
6,108			339,911	207,575	749,415			42,200
6,264								48,400
21.6						5		53
36.0						9		
						44	991	220.8
						65	962	
								45.2
								85.4
6.0[a]							1,588	240.0
						5	1,638	408.0
146.4	2.16	2.64	3.1	25.7	35	899	11,205	2,880
222.0	4.68	18.12	12.5	45.3	102	738	12,400	5,016
4,500	28.28	400.8	90.9	58.1	230	2,166	29,840	12,372
4,428	65.52	651.6	267.0	152.3	568	2,502	40,736	24,790
55.2						769	17,395	1,008
						652		1,335
						111	7,158	
						154		
177.6[a] m.sq.m.	17.16 m. sq. m.			0.2	1		13,933	1,512
246.0[a]	48.96			3.9	12		19,129	2,208
							1,310	1,467.6
							5,821	2,475.6
526.8	7.44				7	172	7,468	1,224
6,684.4	17.28			5,655	19	316	16,267	2,904
129.6				3.4	2	1,242	17,859	1,284
124.8						1,501		2,484
13.44						73	8,463	276
117.12				440		125	10,134	648
						5		240
						28		384
41.28								
2,652[a] (mn.sq.	325.2	1,612		592	3,802	119	102,526	85,416
2,940[a] meters)	467.0	1,629		1,082	4,991	375	151,174	153,948
38.28				40.1	1,008	1,378	14,660	20,448
47.16				57.2	1,269	1,706		30,636
							2,343	5,628
							3,756	8,808
	1,087					47,035	1,743,000	
	1,220					51,899	2,023,000	

This account of industrial production in the region would not be complete without statement of output in quantitive terms for selected products. The table below contains the figures for a number of major industries of the region. It compares the regional output for the years 1958 and 1963 with the world output where data are available.

The table indicates the growth in specific industries for the period 1958-1963. In crude steel, the production of the developing region more than trebled during this period. The output of cement increased by over 50 per cent; production of paper in 1964 was double that of 1958. The aluminium industry has recorded one of the highest rates of growth for the region including Japan and Australia. Both Japan and Australia achieved an output in 1963 which was nearly thrice that of 1958, while India increased its production from 8,000 tons in 1958 to 53,000 tons in 1964. A high rate of growth was also maintained by the alkali chemical industries. The figures for the textile industry, however, illustrate the comment made earlier regarding the relatively slow rate of growth in this industry. If one selects a few of the industries given in the table and compares the capacity in the developing region with the consumption, the shortfall in capacities will be effectively demonstrated. In steel, while the production in the developing region was 6.325 million tons in 1963, the consumption was 11.026 million tons; similarly the developing region produced approximately 467,000 tons (N content) of nitrogenous fertilizer while the consumption was in the region of 1.0775 million tons.

2. *The share of individual countries in the region's industrial output*

It will be seen from table 7 that, in 1958, Japan was responsible for 48.2 per cent of the total manufacturing output in the region; Australia and New Zealand, the other two developed countries of the region, accounted for another 21.9 per cent. The balance of 29.9 per cent was shared among the remaining 15 ECAFE member countries. Of these countries, the dominant position was held by India, which contributed approximately half of the remaining 30 per cent. By 1964, however, the pattern had altered and as a result of the remarkably high rate of growth achieved by Japan during this period, its share of regional manufacturing output increased while those of Australia and New Zealand and of developing countries had fallen.

Within the developing region itself China (Taiwan), the Republic of Korea, and Pakistan increased their shares, while the shares of other countries including India correspondingly declined. Table 8 shows the distribution of industrial production in the region in terms of the weights given to each country for the various branches of industry in the regional index of industrial production. The production in the developing region was highest for food industries and textiles; while if Japan had been included, it would be seen that the overwhelmingly preponderant share of heavy manufacturing industry fell to that country. When specific branches of industries are examined, it is apparent that it is only for food and textile industries that the developing countries taken together have a higher weightage in the regional index than Japan's. Japan was able to increase its share in the textile industry by 1962 and exceeded the output of the developing region, though it failed to catch up in food industries. In heavy manufacturing, Japan had the overwhelmingly preponderant share, while the developing region contributed only 18 per cent of the output for the ECAFE region (excluding Australia and New Zealand). In 1963, Japan's growth in every one of these industries outpaced the growth of the developing region. Between 1958 and 1963, Japan more than trebled its output of metal products, and more than doubled its volume of exports of manufactured goods. Meanwhile, the composition of industrial output in the developing regions had undergone significant changes. The increase in the output of steel in the developing region has been almost entirely due to the increase of production in India. India also increased its share of paper, petroleum products, aluminium and heavy machinery. Its contribution to the regional output in the heavy manufacturing sector has, together with the industrial production of China (Taiwan) and Pakistan, increased the share of heavy manufacturing in the region's industrial production.

TABLE 8. ECAFE REGION: INDEXES OF MANUFACTURING OUTPUTS, 1958-1963

(ECAFE Region 1958 = 100)

(Sectional indexes are comparable both vertically and horizontally)

Group	*Country*	*1958*	*1959*	*1960*	*1961*	*1962*	*First half*	
							1962	*1963*
Manufacturing	India	15.3	16.5	18.3	19.5	20.9	20.5	21.8
	Pakistan	2.9	3.3	3.5	3.6	4.2	4.2	...
	Korea, Rep. of	2.1	2.3	2.4	2.5	2.9	3.3	3.9
	Philippines	1.7	1.8	1.9	2.0	2.1	2.2	2.3
	China (Taiwan)	0.8	0.9	1.0	1.1	1.3	1.3	1.4
	Developing ECAFE region	28.8	31.1	34.8	37.4	40.3	39.6	43.4
	Japan	48.0	60.2	77.2	93.0	101.5	103.0	105.4
	Australia	18.4	19.7	20.6	19.3	21.9	21.7	22.8
	New Zealand	4.6	4.8	5.2	5.5	...	...	...
	ECAFE region	100.0	116	138	155	172[a]	172[a]	180[a]

Food, beverages and tobacco (weight 16.3%)	India	23.5	24.2	26.0	28.4	28.4	28.6	24.6
	Pakistan	3.6	4.1	4.3	5.1	6.2	5.9	7.6
	Korea, Rep. of	4.2	4.2	4.3	4.7	4.7	4.2	5.2
	Philippines	4.2	4.6	4.8	5.0	5.4	5.4	5.6
	China (Taiwan)	1.9	1.9	2.1	2.4	2.3	2.6	3.1
	Developing ECAFE region	45.2	47.0	50.7	54.7	55.6	57.0	55.9
	Japan	32.1	34.2	36.0	38.9	41.9	48.2	47.4
	Australia	14.9	15.3	15.4	15.7	16.8	17.8	16.9
	New Zealand	5.9	6.1	6.3	6.7	...	...	...
	ECAFE region	100.0	104	110	118	124[a]	133[a]	130[a]
Textiles (weight 11.1%)	India	28.4	29.3	29.6	31.0	32.1	31.8	33.0
	Pakistan	7.8	9.1	9.8	10.1	11.4	11.3	12.3
	Korea, Rep. of	3.8	4.0	3.9	3.5	4.0	3.7	4.0
	Philippines	1.0	1.2	1.3	1.3	1.4	1.5	1.6
	China (Taiwan)	0.7	0.9	1.0	1.2	1.3	1.2	1.2
	Developing ECAFE region	44.8	47.4	49.2	50.6	54.2	52.4	55.3
	Japan	44.0	50.2	60.9	65.7	69.3	67.9	71.3
	Australia	9.5	9.6	9.8	9.6	10.3	10.3	10.4
	New Zealand	1.7	1.9	2.0	2.4	...	...	...
	ECAFE region	100.0	111	122	128	136[a]	133[a]	139[a]
Wood products (weight 5.7%)	India	15.5	20.2	21.8	22.7	23.9	24.9	28.9
	Pakistan	2.9	—	—	—	—	—	—
	Korea, Rep. of	1.4	1.5	1.5	1.4	1.7	1.5	1.9
	Philippines	2.0	2.5	1.9	1.7	1.8	1.9	2.0
	China (Taiwan)	0.8	0.9	1.0	1.4	1.7	1.7	1.8
	Developing ECAFE region	30.2	38.1	39.9	41.4	44.3	45.7	52.1
	Japan	38.5	41.2	45.9	48.6	49.3	48.2	49.3
	Australia	22.0	23.1	22.9	19.8	21.4	20.5	20.7
	New Zealand	9.2	9.6	10.3	10.3	—	—	—
	ECAFE region	100.0	112.0	119.0	120.0	125[a]	122[a]	131[a]
Paper and paper products (weight 2.9%)	India	4.8	5.4	6.5	6.8	7.1	7.0	7.9
	Pakistan	1.4	1.7	2.8	3.5	3.7	3.8	3.4
	Korea, Rep. of	1.0	1.4	1.8	2.2	2.6	2.6	2.9
	Philippines	1.1	1.3	1.4	1.5	1.8	2.1	2.3
	China (Taiwan)	0.6	0.7	0.8	0.9	1.0	0.9	1.0
	Developing ECAFE region	9.8	11.2	13.0	14.4	15.6	15.7	17.4
	Japan	62.3	78.2	91.6	107.5	112.1	109.8	116.8
	Australia	19.3	21.4	22.3	19.8	23.3	22.9	25.6
	New Zealand	8.6	9.2	10.0	10.4	...	...	...
	ECAFE	100.0	120	137	152	165[a]	162[a]	175[a]
Chemicals (weight 11.1%)	India	8.4	9.3	10.7	11.9	12.6	11.8	14.0
	Pakistan	1.8	2.3	2.5	2.7	4.3	5.8	12.1
	Korea, Rep. of	1.2	1.9	3.9	4.9	5.8	5.7	6.8
	Philippines	1.2	1.3	1.3	1.3	1.4	4.1	1.4
	China (Taiwan)	1.0	1.2	1.4	1.4	1.9	1.9	2.1
	Developing ECAFE region	29.7	32.7	36.3	38.4	41.9	40.1	46.5
	Japan	52.7	61.2	73.4	85.3	95.7	93.8	108.4
	Australia	15.5	16.3	16.4	15.4	16.9	16.4	17.7
	New Zealand	2.1	2.3	2.5	2.6	...	...	...
	ECAFE region	100.0	113	129	142	158[a]	154[a]	176[a]
Base metals (weight 7.4%)	India	13.4	17.4	22.7	23.2	28.7	26.0	32.9
	Pakistan[b]	0.8	0.7	0.6	0.7	0.5	0.5	0.4
	Korea, Rep. of	0.9	1.2	1.3	1.1	1.6	1.5	1.8
	Philippines	0.2	...	...	...	...	...	...
	China (Taiwan)	0.2	0.3	0.4	0.3	0.4	0.3	0.4
	Developing ECAFE region	16.2	20.7	26.4	26.7	32.7	31.1	37.4
	Japan	61.8	81.4	104.6	130.7	129.4	132.2	133.7
	Australia	21.3	23.2	25.4	26.7	29.4	28.8	31.1
	New Zealand	0.7	...	...	...	...	...	...
	ECAFE region	100.0	126	157	185	193[a]	193[a]	204[a]
Metal products (weight 26.8%)	India	8.1	8.8	11.0	12.2	13.8	13.6	15.0
	Pakistan	1.2	...	...	...	...	...	...
	Korea, Rep. of	0.8	0.7	0.7	1.0	1.2	1.1	1.6
	Philippines	0.6	0.7	0.6	0.9	1.0	0.9	1.1
	China (Taiwan)	0.4	0.6	0.6	0.6	0.7	0.7	0.8
	Developing ECAFE region	13.8	14.9	17.9	20.4	23.0	22.5	25.7
	Japan	58.6	75.6	103.8	133.7	151.8	151.8	153.0
	Australia	22.7	25.2	26.8	24.1	28.2	27.0	28.9
	New Zealand	4.9	5.1	6.2	6.9	...	...	...
	ECAFE region	100.0	130	173	208	239[a]	240[a]	244[a]

Sources: Compiled by the ECAFE secretariat from national publications except for developing ECAFE region indices which are taken from United Nations, Economic Survey for Asia and the Far East, United Nations, Statistical Yearbooks and Monthly Bulletin of Statistics, February 1964.

[a] Excluding New Zealand.

[b] Steel ingots only.

In order to view the industrial growth of the region, and of the developing region in particular, in the proper perspective, it is necessary to take into account the industrial output of the centrally planned economies in the region — mainland China, North Korea, North Viet-Nam. It is difficult to make an accurate assessment of the industrial output of these countries, but, according to the official data available in 1960 for a few selected commodities, the production in mainland China exceeded the total production of all other developing countries of the region in steel, paper, cotton fabrics and cement.[1] North Korea's production of chemical fertilizer exceeded that of India. From the data available, the per capita industrial product of these three countries can be tentatively estimated at aproximately US$20.

3. *Rates of industrial growth in the ECAFE region*

The data provided in tables 1-8 indicate in broad terms the trends in industrial growth in the ECAFE region. In 1964, the world industrial index stood at 156, the index for the ECAFE region including Japan, and excluding Australia and New Zealand was 225, while the industrial index for the developing region alone was 170. The manufacturing indices for Australia and New Zealand were 129 and 138 respectively. The increase in the region's share of industrial production, which has already been discussed, has been primarily due to the exceptional growth of the industrial sector in Japan.

In regard to the developing ECAFE region, the expansion of industries has been most rapid in China (Taiwan), Pakistan, and South Korea. (1958=100) China (Taiwan) has reached 212 at the end of 1964, an increase of 20 per cent over the 1963 production. Next to Japan, China (Taiwan) has been able to maintain the highest rate of industrial growth for the region approximating to an annual average of 14 per cent for the period 1958 to 1964. Pakistan's index for industrial production (excluding manufactured gas and electricity) stood at 171 at the end of 1963; the average annual rate of growth of the industrial sector for 1958-63 was approximately 12 per cent. The Republic of Korea had an index of 189 for industrial production in 1964, with an annual average growth rate of approximately 11 per cent.

India's index at 152 in 1963 was below the regional index. Although the tempo of growth was slower than that of China (Taiwan), Pakistan and the Republic of Korea, a steady rate of progress was maintained in the industrial sector, the annual rates of industrial growth from 1958-1964 showing an average of approximately 10 per cent for this period. The significance of India's industrial growth has also to be measured in terms of the growth of strategic industries and the heavy manufacturing sector, for which comparatively high rates of growth were achieved.

[1] United Nations, Yearbook of National Accounts Statistics, 1963.

The rate of industrial growth for the remaining countries in the developing region have been below the average. The Philippines had an average of 6 per cent for the period 1958-63 for its manufacturing sector.[1] For the same period, Ceylon showed a marginally higher rate of 6.7 per cent. The former Federation of Malaya enjoyed a comparable rate of growth for its industrial sector, during this period, and for the years 1960-62 increased its industrial output at an average rate of 6.5 per cent.[2] For the period 1955-60, for which the manufacturing sector figures are not separately available as they are combined with construction figures, the rate of growth appears to have been lower owing to the marked decline in the net product from mining during the years 1958 and 1959. The manufacturing and construction sectors together grew at a rate of approximately 3 per cent during this period. Sarawak, however, expanded the base of its domestic industry and, in 1961, had a net product from the manufacturing sector valued at 33.4 million Malayan dollars compared to 1.2 million in 1955. In Thailand, the industrial sector grew at an annual rate of approximately 5.6 per cent during the period 1956-1962.[3] Its growth was, however, singularly uneven, industrial production showing a decline in 1955 and 1957 and increasing at a rapid rate in 1958 and 1962 with a relatively slow pace of growth in the intervening period. Burma increased the gross domestic product from its manufacturing sector by approximately 5 per cent during the period 1958/59 to 1962/63, after a spurt of rapid growth in this sector in 1956 and 1957, during which the increases were in the region of 15 per cent.[4] In Iran, the net domestic product for mining and manufacturing in 1961 showed an increase of 4.8 per cent over that of 1959.

The process of industrial growth in the ECAFE region, the capacity or incapacity of countries to sustain a high rate of growth, can be observed over a longer period if one examines the following table. These figures indicate that, according to the increases of production achieved over a 10-year period, Pakistan, the Republic of Korea and China (Taiwan) among the developing countries were able to maintain an annual average above 10 per cent. Pakistan enjoyed the highest rate of increase in the developing region for this period with 12.9 per cent, followed by the Republic of Korea and China (Taiwan) which had 12.6 per cent and 11.5 per cent. The more advanced

[1] Increases of net product from industry.

Source: United Nations, Yearbook of National Accounts Statistics, 1963.

[2] United Nations, Yearbook of National Accounts Statistics, 1963.

[3] Calculated on increases of gross product for mining and manufacturing at 1956 market prices. United Nations, Yearbook of National Accounts Statistics, 1963.

[4] The figures given here are calculated on the industrial origin of GDP at current prices Economic Survey of Burma 1963, Ministry of National Planning, Government of the Union of Burma. These figures do not include rice processing which is normally included in industrial production and accounts for about 20 per cent of the gross product from industry.

countries, Australia and New Zealand, enjoyed 5.6 per cent and 5.7 per cent increase while Japan led with the quite exceptional rate of 15 per cent.

In all the countries for which the required statistical information is available, the growth of the industrial sector has exceeded that of the agricultural sector. This by itself has no special significance, as a higher rate of growth is to be expected when there is planned investment on a large scale in a comparatively undeveloped sector. But the higher rate of growth of the industrial sector relative to the non-industrial sector is significant in that it reflects the distribution of national effort among the various sectors and the emphasis that has been given to industry.

TABLE 9. RATE OF INCREASE OF INDUSTRIAL AND MANUFACTURING PRODUCTION 1952-1954 TO 1961-1963 FOR SELECTED COUNTRIES OF THE ECAFE REGION

	Industrial (per cent)	*Manufacturing (per cent)*
Ceylon	5.2	5.0
China (Taiwan)	11.0	11.5
India	7.4	7.0
Korea, Republic of	14.0	12.6
Pakistan	12.7	12.9
Philippines	—	8.9
Japan	14.1	15.0
Australia	—	5.6
New Zealand	—	5.7

Source: Economic Survey of Asia and the Far East, 1964.

Although the industrial index by itself cannot be regarded as a complete measurement of the country's efforts at industrialization or its capacity for expansion in the industrial sector, a country in the first stage of industrialization could show a rate of growth which by itself might appear exceptionally high.

A slow or diminishing rate of growth in the industrial sector in developing countries may indicate that the initial process of industrialization has exhausted its potential, or that the industrial sector has not yet become an effective lever of economic growth in these ocuntries. Where rapid rates of expansion were achieved initially in the production of non-durable consumer goods industries for substitution of imports, they subsequently tended to decline, when the scope offered by these light import-substitute industries had been exploited.

Where the strategies for diversification of the industrial structure had not been evolved in time and where an advance from the light consumer goods industries had not been adequately developed, the process of industrialization could not be accelerated. For example, the initial spurt of industrial activity of the Burmese private sector in the field of light consumer industry, could not be sustained at the same rate when their capacity quickly met or even exceeded domestic demand. A more recent example of the same experience is to be seen in Ceylon. The rates of growth achieved by the Philippines in the initial stages of import substitution have not been sustained in recent years. Between 1952-1958 the Philippines maintained an annual growth rate of approximately 11.5 per cent for industry compared with 6 per cent for the period 1958 to 1963.[1] The pace of growth of the industrial sector and its capacity to stimulate and sustain its own expansion, would depend among other things on the type of industrial activity that has developed, and the extent to which such activity has been consciously and adequately promoted and has been energetically supported by the governments. The less industrialized countries of the region, in which the industrial sector has developed at a comparatively sluggish pace, appear to be those in which the investments are not co-ordinated under a long-term strategy for creating an inter-dependent industrial structure of increasing technological variety and depth. Therefore, the investments which have occurred in individual branches of industry have a more or less fragmentary character. Consequently they have not been able to impel their industrial sectors forward, with the same conscious direction and co-ordination of investments, and the same energetic programming, as the countries which achieved higher rates of industrial growth have done. This aspect could be discussed in greater detail by examining the patterns of industrialization, and the industrial structures that have been established in the countries of the region with particular reference to the developing countries.

TABLE 10. MANUFACTURING AND MINING SECTOR IN ECAFE COUNTRIES AVERAGE PERCENTAGE SHARE OF GROSS NATIONAL PRODUCT

Country	*Manufacturing*		*Mining*		*Ratio of gross product from agricultural sector to gross product from manufacturing sector*	
	1952-1954	*1961-1963*	*1952-1954*	*1961-1963*	*1952-1954*	*1961-1963*
Indonesia	8.5	6.9	2.3	2.6	6.7	8.9
Pakistan	9.8	10.0	0.2	0.3	5.9	5.18
Ceylon	4.6	5.1	0.1	0.1	11.6	9.19
Malaysia	11.2	12.6	6.5	6.1	3.5	2.9
Thailand	11.8	11.4	1.8	1.6	3.5	3.19
Viet-Nam Rep. of	9.6	11.2	0.2	0.5	3.04	2.9
Korea, Rep. of	7.0	11.3	1.0	2.9	5.8	3.1
Philippines	11.2	16.1	1.5	1.6	3.8	2.02
Burma	10.4	14.8	1.0	0.8	4.4	2.19
China (Taiwan)	15.5	20.3	1.7	2.2	2.3	1.4
Japan	23.7	30.5	3.2	1.5	0.9	0.4
Australia	26.8	28.2	2.2	1.6	0.6	0.4
India	15.6	15.8	0.9	1.2	3.14	2.7

Source: Economic Survey of Asia and the Far East, 1964.

II. THE PATTERNS OF INDUSTRIALIZATION IN THE ECAFE REGION

1. *The place of the industrial sector in the national economies*

In table 10, containing the changes in the contribution of the industrial sector to gross national pro-

[1] United Nations, Yearbook of National Accounts Statistics.

duct, it can be observed that, in almost all the developing countries, the industrial sector has increased its share of gross domestic product. The rate of expansion of this sector has outpaced the rate of overall economic growth for those countries. However, before the figures are discussed, it should be noted that the figures for different countries are not strictly tion, conversion to constant prices, and so on. comparable owing to differences in the basis of estima- They should therefore be accepted with qualification for the purpose of comparing the economic structures or assessing the relative industrial capacities of the different countries. Among other things, the composition of manufacturing output in some countries will contain certain items which are not included in the manufacturing sector of other countries. For example, Ceylon does not include the processing of plantation products such as tea and rubber in its manufacturing sector, while the tea industry has a weight of 7.4 per cent in India's industrial production. Similarly, processing of rubber latex and rice milling is included as an industrial activity by certain countries and omitted by others. Again, figures for India include construction. Such variations can lead to over- or under-estimations of industrial production, thereby making a considerable difference to the gross product from industries for several of these countries, and altering the total picture of their economic structures.

In discussing the structural changes reflected in the table, it is necessary to determine whether, in the developing countries in the region, the industrial sector has acquired a strategic income-generating position in their economies. Only three developing countries in the region have industrial sectors which contribute more than 15 per cent of the gross domestic product. Over the ten years, only China (Taiwan), the Philippines, and Burma have increased the share of industrial product by over 4 per cent. By themselves, these figures do not imply the importance of the industrial sector in these economies; for this purpose, it would be necessary to examine, among other aspects, the composition of industrial output and the technological complexity of industrial activities; but it would appear from the data available that an appreciable shift in the wealth-creating capacities has occurred in a number of developing countries. It is most notable in China (Taiwan), where the ratio of income from agriculture to the income from manufacturing industry altered from 2.3:1 in 1952-54 to 1.4:1 in 1961-63 and the manufacturing component rose from 18 per cent of net domestic product in 1958 to 22 per cent in 1963. According to the data available for 1964, the share of net industrial product including construction rose from 29.9 per cent of net domestic product in 1963 to 33 per cent in 1964. This increase is all the more remarkable because it occurred during a period of steady expansion in the agricultural sector. The recent trends in structural change in the economies of the Republic of Korea and Pakistan reflect an increasing rate of change. In Pakistan, the industrial sector (including mining and electricity) increased its share to approximately 13 per cent in 1964-1965. In the Republic of Korea, the percentage share of industry in 1963 itself diminished due to a remarkable increase in agricultural production for that year, but the rate of growth of the industrial sector in 1963 was higher than in 1962. In 1964, the manufacturing sector claimed 13 per cent[1] of the gross domestic product, at at current market prices.

India's industrial sector increased its share in the gross domestic product marginally by 0.2 per cent, while the share of the agricultural sector declined during this period from 49 per cent to 44 per cent. Burma and the Philippines have both registered appreciable increases in the contribution made by the industrial sector to the gross domestic product of their economies. In the Philippines, the rate of agricultural product to manufacturing product changed from 3.8:1 to 2:1 and in Burma from 4.4:1 to 2.2:1. In Ceylon, the share of industrial production remains as yet among the lowest in the developing region. Nevertheless, this has to be viewed in conjunction with the comments already made in regard to the composition of industrial output. The percentage distribution of the gross domestic product among the sectors, by itself, will not reflect the state of the economy, its income levels, and its capacity for growth. Burma where the industrial sector (excluding rice milling) claims 10.5 per cent of the GDP[2] has a per capita industrial product a little higher than that of Ceylon. However, the rising contribution of industry to the production in these economies clearly demonstrates a definite trend toward a structural change, small though it may be in absolute terms. In many developing countries of the region, the shift in economic activity is designed to employ the industrial sector increasingly as a dynamic agent for the transformation of the economy.

The comparative changes that have occurred in mainland China are a useful point of reference. The data available for mainland China are not adequate to permit reliable conclusions in regard to the structural changes that have taken place within its economy. It is known from the available estimates that the first phase of industrialization produced dramatic and far-reaching structural changes, increasing modern industry's contribution to net domestic product from 11.5 per cent in 1952 to approximately 20 per cent in 1957 and 25 per cent in 1959.[3] Economic activity was consciously shifted until the industrial sector advanced into the position where it could effectively steer the economic growth of the country. The rate of increase in gross national product reached an annual average of 17.5 per cent during the four years 1956-1960.[4] The crisis which overtook the economy in

[1] Korean Year Book of Statistics 1965.
[2] Economic Survey of Burma — 1953.
[3] Estimates prepared by Liu & Yeh in the Economy of the Chinese mainland 1933-1959.
[4] National Accounts-Economic Survey of Asia and Far East 1964.

TABLE 11. GROSS CAPITAL FORMATION IN INDUSTRY AND PLANNED INVESTMENT IN INDUSTRY FOR SELECTED ECAFE COUNTRIES

	Fixed Capital Formation as per cent of G.D.P.				*Fixed Capital Formation in Industry as per cent of Total*				*Fixed Capital Formation*
	1956	*1958*	*1960*	*1962*	*1956*	*1958*	*1960*	*1962*	
China (Taiwan)	12.4	15.3	17.7	16.5	24.0	26.9	22.9	24.8	
Korea, South	10.6	12.8	11.8	13.8	14.4	18.4	15.02	14.7	
Philippines	8.1	8.08	9.9	12.5	20.5	27.4	21.6	28.6	
Thailand	12.3	15.9	16.2	17.9	25.3	26.7	25.7	24.8	
					Investment in Industry as per cent of Plan Outlay				
Afghanistan					1st Five-year Plan[a] 27.5%			2nd Five-year Plan[a] 33.5%	
Burma	18.4	21.1	16.2	14.5	1st Four-year Plan 9.7%			2nd Four-year Plan 10.6%	
Ceylon	10.7	12.05	14.3	14.3	6-year Plan 4.39%		10-year Plan 19.95%	3-year Imp. Pl. 23.29%	
India	—	—	—	—	1st 5-yr Plan 7.6%		2nd 5-yr Plan 22.6%	3rd 5-yr Pl. 29%	
Malaysia	11.01	11.9	12.4						
Pakistan	—	—	—	—			2nd 5-yr Plan 22%	3rd 5-yr Pl. 25%	
Nepal									
Australia	22.9	23.9	24.5	24.5					
Japan	22.6	26.6	30.7	34.3					

Sources: United Nations Yearbook of National Account Statistics, and National Sources. National plan of countries.

[a] Includes electricity.

1960 led immediately to a marked deceleration of industrial growth, but the industrial sector recovered, after a period of re-adjustment and consolidation, to make steady gains particularly in heavy industry, during 1964.

The need to effect rapid structural changes in the economy, and to make the industrial sector the prime mover in the technical transformation of all sectors, does not need special emphasis. The rates of structural change for the majority of the developing countries, however, indicate that the process is as still slow and irregular; but the longer industry remains a relatively powerless and peripheral activity, the longer and more protracted will the process of technical transformation b

In the foregoing comments, the discussion has been focussed on the developing countries of the region, and the advanced countries of the region have not been included. Japan and Australia have developed industrial sectors which contribute more than 25 per cent of the national product. Japan's manufacturing sector increased its share of gross national product, from 23.7 per cent in 1952-54 to 30.5 per cent in 1961-1963. Australia increased it from 26.8 to 28.2 per cent during the same period. These countries have already created a capacity in the industrial sector which enables it to occupy a strategic position in determining the pattern of growth in the country.

2. *Investment in industry in the ECAFE region*

The emphasis given to industrial development in the ECAFE region and the industrial growth which the countries have sought to generate can be partly measured by an examination of the fixed capital formation in industry during the period 1958-1963 and the weight enjoyed by the industrial sector in regard to national investment. Table 11 contains data on fixed capital formation in industry for selected countries in the region. In the case of countries for which the relevant data are not available, the table gives the planned investment in industry in comparison with the total investment. The figures confirm that, relative to the resources available, many of the developing countries have made a determined attempt to increase their stock of fixed assets in industry and create added means of industrial production to expand their capacity for the manufacture of goods. The pattern of capital formation indicates that, in most countries, the emphasis in investment has shifted so that the industrial sector now absorbs one of the largest segments if not the largest one of the total investment. In China (Taiwan) from 1951 to 1955 the principal place in capital formation was taken by the agricultural sector, with capital formation in industry following closely on its heels; in 1955, capital formation in industry began steadily gaining on the agricultural sector until, in 1956 and the following years, it took the primary place in the

total national investment. The fixed capital formation in the manufacturing sector alone was 3,089 million N.T. dollars in 1963 as against 2,301 million N.T. dollars in agriculture; the manufacturing sector enjoyed between 20 and 25 per cent of the fixed capital formation during the period 1956-1963. The magnitude of investment can be assessed from the fact that fixed capital formation in the manufacturing sector consisted of approximately 4.5 per cent of the national income.[1]

In the Republic of Korea in 1953-54, the capital formation in industry and agriculture did not show any pronounced trends, industry claiming a marginally higher portion than agriculture. But, after 1955, it is evident from the trends in capital formation that the volume of investment in industry in relation to most of the sectors increased steadily. In 1964, the fixed capital formation in industry claimed almost 22 per cent of the total fixed capital formation, which amounted to approximately 4 per cent of the net national product.

In Thailand the share of the manufacturing sector in fixed capital formation showed a decline in the period 1960-1963 after a steady rate of increase from 1956 to 1960, a pattern which reflects the pace of industrialization in the country. In the Philippines, fixed capital formation in manufacturing industries rose to approximately 30 per cent of the total in 1961 and 1962, from approximately 25 per cent for the year 1959, 1960.

The figures of planned investment for India, Pakistan and Ceylon reflect the same intensification of effort to augment the capacities of the industrial sector. In Ceylon, the planned investment in industry rose from 4.39 per cent in the six-year programme to 19.95 per cent in the ten-year plan and finally to 23.29 per cent in the short term implementation plan. In India, the magnitudes of investment in industry, shown as a percentage of the total plan outlay, increased from 7.6 per cent in the first-year plan to 22.6 per cent in the second and 29 per cent in the third five-year plan. In Pakistan, the investment in industry in the third five-year plan is projected at more than double the investment in the second five-year plan, and accounts for 25 per cent of the total investment contemplated under the plan as against 22 per cent in the second plan. In Afghanistan, the allocation for industry and power increased from 27.5 per cent in the first five-year plan to 33.5 per cent in the second plan. In both Nepal and Afghanistan, the development priorities have required a heavy outlay for improvement of infrastructure; transport and power together claim the major share of plan allocations.

The pattern of capital formation and the emphasis given to the employment of resources for the development of industry emerge clearly enough from a cursory examination of the data on capital formation and planned investment in the region. The accretions to national income as a result of these investments, and the strategy of investment within the industrial sector itself would have to be examined in greater detail in order to evaluate the progress of industrization in the region. The volume of investment by itself does not serve as a reliable criterion, if there has been a misallocation of resources in establishing industries which have failed to operate efficiently or economically; examples of such misallocation are to be found in the countries of the region. But the general trend of an increasing rate of investment in industry, in the private sector as well as the public sector, cannot but be interpreted as a growing accumulation of industrial capacity. In certain countries in the ECAFE region, notably Taiwan and Pakistan, the progressively increasing rate of investment (particularly in the private sector) is an indication of the capacity in the sector to generate savings to finance investment, and further expand the capacity to generate savings for investment. In Pakistan, large-scale industry has been able to plough back a major portion of its profits for new investment in the industrial sector. The following table provides detailed information in regard to added value derived from the manufacturing industry and the fixed capital formation in this sector in the Republic of Korea and China (Taiwan).

The pattern of increases in capital formation generally following increases in added value is an interesting feature in this series. There is no attempt here to find any causative connexion between the two; but, in discussing capital formation in industry, it is necessary to emphasize the cumulative character of capital formation that is inherent in the industrial process. With the growth of the industrial sector in developing countries, a base is created for the transformation of savings into productive capital, and the ready augmentation of the stocks of productive fixed assets. The agricultural surplus of the Taiwan economy could flow into productive capital uses, as a result of the simultaneous growth of the industrial structure. With the growth of the industrial structure in China (Taiwan), the capital formation has continued at a progressively increasing rate, and the industrial sector has become the main instrument of capital formation in the national economy. What has been stated can be illustrated in a different way by examining the important role played in capital formation by the provisions made for depreciation or consumption of fixed assets. In China (Taiwan), nearly 30 per cent of the gross domestic capital formation consisted of provisions for consumption of fixed capital. Of this, a substantial portion will fall into the industrial sector.

TABLE 12. GROSS FIXED CAPITAL FORMATION AND VALUE ADDED, IN THE MANUFACTURING SECTOR
(Current Prices)

Year	South Korea (in billion Won)		China (Taiwan) (N.T.$ million)	
	Value added	Capital formation	Value added	Capital formation
1955	10.77	2.07	4,211	839
1956	14.27	3.72	5,084	974

[1] Country Study and Statistical Year Book — China (Taiwan). The magnitude is slightly less if it is calculated directly from table 11.

1957	18.04	4.17	6,314	1,300
1958	20.70	4.30	6,510	1,720
1959	24.54	4.01	8,231	1,877
1960	27.81	4.44	9,522	2,428
1961	30.49	5.78	10,943	2,670
1962	39.87	7.93	12,395	2,966
1963	50.04	12.07	16,159	3,089
1964	69.78	16.54		

Sources: Country Studies for the Asian Regional Symposium. Statistical Year Books China (Taiwan) and Economic Surveys, Republic of Korea.

TABLE 13. SOURCES OF GROSS DOMESTIC CAPITAL FORMATION — TAIWAN
(N.T.$ million)

	1958	*1959*	*1960*	*1961*	*1962*	*1963*
Provisions for consumption of fixed capital .	2,613	3,132	4,039	4,616	4,640	5,284
Not saving ...	1,909	2,277	4,227	4,849	5,965	9,583
United States aid and foreign loans	3,111	4,505	4,817	5,082	4,679	929
Statistical discrepancy	59	196	94	61	35	65
Gross domestic capital formation	7,574	9,718	12,989	14,608	15,249	15,861

Source: Country Study for Asian Conference on Industrialization.

In Japan, corporate-retained earnings and depreciation provided 32.6 per cent of the total supply of industrial capital in 1963.[1] These aspects of industrial growth are discussed in a later chapter.

Tables 14-1 to 14-10

Note

The following tables give a list of major industries for selected countries in the ECAFE developing region. Where data are available, the production is shown in quantitative terms. In other instances, the sale value or value added is given. In the cases of countries with a relatively complex industrial sector which contains major industries, only the major industries are shown in order to indicate the level of industrialization. For other countries, light consumer products have been included to indicate the product-mix in the industrial sectors and to show that major industries are relatively few — such as Afghanistan, Nepal, Ceylon, and Burma. These tables are intended to be broadly descriptive of the industrial activity in the countries.

Source: Country Studies, National Plans, and Country documents.

[1] Country Study for Asian Conference on Industrialization; Economic Survey of Japan 1963-1964.

TABLE 14-1. AFGHANISTAN

	Food	*Textiles*	*Wood products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity (million kWh)*
1.	Wheat flour 47,000 tons Sugar 7,100 tons Vegetable oil 3,000 tons	Cotton yarn 1,000 tons Cotton fabric 35 million metres Rayon fabric 338,000 metres Wool fabric 190,000 metres	Paper, rubber furniture 39.5 million	Soap 119 million pieces	Cement 103,000 tons		Metal products 17.6 million Afghanis	158
2.	Expansion of sugar industry	Expansion of cotton ginning and textiles	Paper mill	Nitrogenous fertilizer plant; 100,000 tons Caustic soda plant				

1. Existing industries (1963 production)
2. Planned industries (1968 production)

TABLE 14-2. BURMA[1]

mill =)
m =) million

	Food	*Textiles*	*Wood products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1.	Tobacco 9.4 mill kyats Aerated water 2.5 mill dozen bottles Biscuits 3,040 tons Confectionery 6,000 tons Rice bran oil 6,600 tons Flour mill 22,000 tons Sugar 60,000 tons Condensed milk 31,000 cases	Cotton yarn 11 mill lbs Cotton and rayon 9.5 mill yds (Power loom) Handloom 115 mill yds Nylon fabric 715 mill yds Thread, tape, ribbon, hosiery, garments, footwear 45 mill kyat sale value	Furniture and fixtures 2.4 mill kyats Paper box, Joss paper, Toilet paper — 1.7m kyat	Petroleum products 598,000 tons Detergents, toothpaste, paints, polish, toilet preparations approx. 76 mill kyat	Cement 107,000 tons Brick 15 mill pieces Tiles 286,000 pcs Glass bottles		Aluminium hollowware, Buckets, Locks, Wire products, Trunks, Tin cans — 37 m kyat Light engineering manufactures, Repairing light machinery — 3.7 m kyat	million kWh 244

1. Existing industries
2. Planned industries

TABLE 14-3. CHINA (TAIWAN)

I. Existing Industries (1963 production)

II. Planned Industries (1968 production)

Food	*Textiles*	*Wood products, paper, rubber,*	*Chemical and Petroleum products*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1. Sugar 904,000 T	Cotton yarn 50 (1,000 T)	Plywood 66 mill.m.^{2} 3.3 mill. pieces	Caustic soda 57 (1,000 T)	Cement 2,350 2,000 T	Steel products 330 (1,000 T)	Textile machinery 1,400 sets	5,000 mill. kWh
2. Alcoholic beverages 1 mill. HL	Woollen yarn 29 (1,000 T)	Paper 126 (1,000 T)	Soda ash 14 (1,000 T)	Sheet glass 392 (1,000 boxes)	Steel 214 (1,000 T)	Printing presses 200 sets	
3. Canned foods — pineapple mushrooms etc. 4 mill. cases	Rayon filament) staple) 5,000 T Cotton fabrics 241 mill. metres	Paper 43 (1,000 T) Auto tyres 312,000 pieces Bicycle tyres 1.1 million pieces	Sulphuric acid 202 (1,000 T) Hydrochloric 79 (1,000 T) Fertilizer N. 148 (1,000 T)	Glass 57 1,000 T Enamel tiles Fire bricks Asbestos tiles etc.	Aluminium 20 ingots 1,000 Sheet alminium 7.8 1,000	Chemical industry machinery 3,600 T Transformers 8,900 sets	
4. Cigarettes 12.8 mill. pcs.	Synthetic fabrics 28 mill.m.		P_2O_5 34		Aluminium extrusion 2.9	Motor vehicles 1,797 sets	
5. Yeast 4,370 T	Made up textile		Plastic power 23		1,000 T	Bicycle 22,000 sets	
6. M.S.G. 11,200 T	garments, apparel footwear, etc.		(1,000 T) Petroleum Products 1,400 (1,000 T)		Aluminium 2.3 products (other)	Ship building 13,000 T (1963, 1962 output)	
			Asphalt 40 (1,000 T)			Water pumps	
			Paints, soaps, detergents and light consumer goods.			Sewing machines Motors, refrigerators, fans, cookers.	
T = tons							
II							
Further Expansion of food processing industry	Synthetic addl. 52,000 T fibres Cotton yarn) Rayon yarn) 115,000 bales Worsted) 4.1 mill. Woollen) lbs	Plywood 300 M. sq. ft Paper, paper board 150,000 T Chemical woodpulp 74,000 T Bagasses pulp 45,000 T Automobile tyres 30,000 sets	Fertilizer N100,000 T Calcium Cyanamide 100,000 T Caustic soda 60,000T Hydrochloric Acid 30,000 T Synthetic Plastic 75,000 T Resin, etc. 30,000 T Petrochemicals 5,000 T Polyester 4,000 T Methanol 25,000 T	Cement 600,000 T Sheet glass 675,000 cases	Iron and steel Integrated mills 350,000 T Aluminium Sheet rolling 25,000 T Machinery production (textiles, chemicals electrical, etc.)		

TABLE 14-4. CAMBODIA

1. Existing Industries (1963 Production)

2. Planned Industries (1968 Production)

Food	*Textiles*	*Wood products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1. Beverages, tobacco	Cotton yarn 1,450 tons Fabric 54 mill. metres (capacity) Cotton ginning 30,000 tons	Paper, rubber plywood 90,000 sq metres Paper, Paper board, etc. 5,000 tons	Detergents	Cement 50,000 tons			79 million kWh
2. Sugar 15,000 tons		Tyres 135,000 pieces	Nitrogenous fertilizer 100,000 tons Caustic soda 15,000 tons			Tractor assembly 600 units	

Source: Country Study.

TABLE 14-5. CEYLON

(Sale value of output in million rupees — 1964)

	Food	*Textiles*	*Rubber, leather Wood products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1.	Miscellaneous food preparations Rs 160.7 Canned fruits and vegetables Rs 4.5 Biscuits and confectionery Rs 30.9 Aerated water Rs 13.9 Beer and stout Rs 2.7 Tobacco 46.2	Cotton yarn approx. 5 million lbs Cotton fabric 30 million yds Garments Rs 54.0 10 million yds synthetic textiles	Paper and articles of paper and paperboard Rs 30.1 (paper 9,000 tons) Plywood Rs 3.9 (15 million sq ft) Footwear and leather products Rs 23.4 Rubber products— 17 (excluding footwear)	Miscellaneous Chemical products, soaps, detergents, toothpaste, toilet preparations 73.7 Basic industrial chemicals Rs 1.0	Cement and cement products Rs 23.0 Ceramics) 2.4 kaolin) (Rs) Iloneute) .9 (Rs) Graphite Tiles — approx. 30 million pieces		Metal products (Aluminium hollow ware, metal pressings, containers, electrical accessories, kerosene cookers, tea and rubber machinery, barbed wire, wire nails, etc.) Rs 49.5	405 million kWh
				Quantities are given for certain commodities				
2.		Spinning — additional capacity 42 million lbs Cotton textiles — Plans already approved to increase weaving to 165 million yards by 1970	Plywood[a] 20 million sq ft Hardboard 7,500 tons Paperboard 9,000 tons Newsprint 15,000 tons Tyre and tubes[a] 250,000 pieces	Salt-based chemical complex-caustic soda chlorine by-products chlorinated rubber — 400 tons soda ash, etc. 34,000 tons Petroleum refinery 1.7 million tons Nitrogenous fertilizer — N content 60,000 tons	Ceramics 1,600[a] tons Glass Cement[a] 350,000 tons Rutile[a] 8,000 tons Zircon	Steel rolling mill 60,000 tons	Hardware[a] — agricultural implements, small hand tools, building hardware, etc.	

Source: Report Central Bank of Ceylon 1964 and Country Study.
[a] Work on these projects is in progress.

TABLE 14-6. INDIA[1]

Food	*Textiles*	*Wood products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
Vegetable oils (Vanaspati) 391,000 tons Other oils Sugar 3.6 m tons Tobacco products Wide range of other food prod. Biscuits Confectionery, etc.	Cotton yarn 965 m kilos Fabric 7.700 m metres Rayon and acetate filament 65,000 tons Non-cellulosic fibre 730 tons Synthetic fabrics 651 mill. metres Jute 1,249,000 tons	Paper 490,000 tons Plywood	Nitrog. fertilizer 222,000 tons Phosp. fert. 107,000 tons Caustic soda 152,000 tons Soda ash 295,000 tons Sulphuric acid 568,000 tons Petrochemicals, polyethylene, benzene, ethylene oxide and derived chemicals PVC acetone etc. under construction wide range of other alkali chemical productions Drugs and pharmaceuticals — 1,000 mill. Rs Dyestuffs — 160 million Rs	Cement 9.75 million Glass	Special steel 30,000 tons Steel ingots 5.9 million tons Aluminium 56,000 t Copper 9,500 tons	Machine tools 280 million Rs Textile machinery 220 million Rs Jute machinery 34 million Rs Cement machinery 12 plants of 200,000 ton capacity p.a. Paper and pulp machinery 70 million Rs Chemical and mining machinery electric motors — 1.32 million h.p. Transformers — 3 million kVA Rly. equipment Ship bldg. 109,400 grt (1960-65)	24,790 million kWh
2.		Paper 620,000 tons	1.2 million tons (N content) of nitrogenous fertilizer 500,000 tons of phosphatic fertilizer Caustic soda 210,00 tons Soda ash 150,000 tons	Cement 15 million tons	Steel 6.6 million tons Aluminium 132,000 tons Copper 38,000 tons	Shipbuilding 1.2 g.r.t. Additional outlay on heavy machinery production	

[1] 1964 production.

			5 million tons — petroleum products 2 refineries Petrochemical complex for production of benzene toulene vynyl chloride polymo-polyetheline, etc.				

Source: Country Study, Third Five-Year Plan.

TABLE 14-7. KOREA, REPUBLIC OF
Value Added by Sub-Group of Manufacturing-1960 prices
(In million won)

1. Existing Industries.
2. Planned Industries.

Food, beverage	*Textiles*	*Wood, leather*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1. Tobacco 1964 Food industries 5,438 Beverage industries 2,258 Tobacco Manufacturing 5,192	Garments etc. Textiles 7,736 Footwear, other wearing apparel & made-up textile products 1,059	Rubber products Wood & cork 630 Furniture & fixtures 135 Paper & paper products 1,044 Leather & leather products 359 Rubber products 1,189	Chemical Chemical products 2,949 Petroleum & coal products 1,095	Mineral products clay, glass & store products 1,669	Basic metal industries 1,179	Metal products 602 Machinery 617 Electrical Machinery Appliances 689 Transport equipment 1,871 Miscellaneous Manufacturing industries 521	Million kWh 2,208
1(a)	1(a) Cotton yarn 62 m lcg. Cotton cloth 147 m sq metres		1(a) Urea fertilizer 97,000 tons Refinery 35,000 barrels a day	1(a) Cement 778,000 tons	1(a) Steel ingots 106,000 tons Steel bars 53,000 tons	1(a) Kerosene & diesel engines 7,302 nos. Water pumps 20,000 Transformers 27,000 Motors 11,000	
2. Food industries investment 3.04 billion won			Urea fertilizer 268,000 Planned investment for cement 4.3 billion won Petroleum 4.27 billion won		New integrated Steel works being planned Iron & steel investment 7.38 billion won	2 Machinery investment 15.94 billion won	

Sources: Country Study; First Five-Year Plan.
1(a) gives quantities for certain commodities.

TABLE 14-8. NEPAL

1. Existing Industries.
2. Planned Industries.

Food, tobacco	*Textiles, jutes etc.*	*Rubber, leather and wood products (including paper)*	*Chemicals*	*Non-metallic*	*Base metals*	*Metal products*	*Electricity*
1. Beverages Sugar 200 tons Cigarette 1.2 mill pieces	Jute 52 tons Cotton yarn 1.4 mill lbs. Cotton fabric 6.3 mill yds.		Matches 1,700 gross				10,000 kWh
2. (Capacities are not available as plans have not been finalized)		Paper	Soap detergents Nitrogenous fertilizer	Cement, Brick & Tile		Agricultural Tools	

Source: Country Study.

TABLE 14-9. PAKISTAN[1]
(Existing Industries)

Food, beverages, tobacco	*Textiles, garment, etc.*	*Wood, leather rubber products*	*Chemicals*[1]	*Non-metallic mineral products*	*Base metals*	*Metallic products*	*Electricity kWh*
1. Sugar 338,000 t. Vegetable oil 91,000 t. Tobacco 18 mill pieces Fish canning 57,000 t. Food & vegetable processing 15,000 t.	Cotton yarn 506 mill lbs. Cotton cloth 790 mill yds. Jute goods 315,000 t. Polyester[1] fibre plant 1,750 t. Acetate rayon plant 3,000 t. Viscose rayon plant	Tyres & tubes — cycles 3.5 mill pcs. Motor cycles tyres 110,000 pcs. Cars & heavy vehicle tyres 168,000 pcs. Newsprint & paper prod. approx. 150,000 t. Paper board 150,000 t.	Soda ash 142,000 t. Sulphuric acid 177,000 t. Caustic soda 39,000 t. Calcium carbide 12,000 t. Ammonian chloride 61,000 t. Hydrochloride acid 2,400 Nitric acid 9,700	Cement 1.5 mill tons Glass 25,850 tons		Re-rolling 373,000 t. Wire Rods 47,000 t. G.I. Pipes 73,900 t. Centrifugal pumps 14,600 nos. Marine engines Diesel engines Sewing Mach. Cycles Machine tools	2,882 mill

			Chemical & chemical fertilizers 291,000 t.			Ship building 10,000 t. Electric motors Transformers, wires & cables		
			(Planned Industries)					
2. Sugar 320,000 tons	Cotton yarn approx. 200 mill lbs. Fabric 850 mill yds.	Paper 70,000 t. Newsprint 20,000 t.	Petroleum products 2.1 mill PVC 4,950 t. Urea formaldehyde 24,000 t. Nitrogenous fertilizer 2 mill t. Phosphatic fertilizer 550,000 Soda ash 75,000 Caustic soda 40,000 Sulphuric acid 335,000	Cement 2 mill tons	Steel 650,000 tons	Machine tools 100 mill Rs. Heavy machinery 400 mill Rs.	1. Installed capacities 2. Planned targets for third five-year plan	

Source: Country Study, Third Five-Year Plan.
[1] Existing industries.
[2] Planned industries.
t = tons
mill = millions

TABLE 14-9(a). PHILIPPINES
Value Added by Major Manufacturing Industry
(in thousand US dollars)

1. Existing Industries.							2. Planned Industries.
Food, beverages, tobacco	*Textiles, garments*	*Wood, leather rubber products*	*Chemicals*	*Non-metallic mineral products*	*Base metals*	*Metallic products*	*Electricity kWh*
1. Food manufactures 209,737 Tobacco manuf. 44,194 1(a) Milk processing Bottling plants 22,256 thou kg Canned evaporated milk 367,817 thou. kg Powdered milk manuf. 1,364 Oil (1963) 95,000 a day	Textile manufactures 46,390 1(a) Integrated textile mills 1962 339,000,000 yds. a year Weaving & fishing 6,000,000 yds. a year	Paper and paper products 20,817 Rubber 26,563 Wood & cork prod. except furniture 31,003 1(a) Leather tanning 19,000 thou. sq. ft. a day Plywood 1,903 sq. ft. a day Veneer 1,072 sq. ft. a day Lumber 54.2 a day Logs 188.91 m... a day Pulp & Paper 139,420 t.a.yr. Tyres 501,470 pieces a year	Chemical & chemic. products 79,019 1(a) Caustic soda 22,500 t.a.yr. Polyvinvyl chloride 5,900 t Acetic Acid 1,350 t. Milk compound 850,000 lbs. Soda ash 40,000 t. Industrial explosives 6M-8Mt. yr. Hydrogen peroxide 1,200 t.a. yr. Carbide 5,490 Ammonium sulphate 109,000 Mixed fertilizers 92,000 Triple super phosphate 12,300	1(a) Ceramics 2,680,000 p.p.y. Sanitary 305,000 Structural clay 2,953,000 p.p.y. Glazed & vitrified tiles 37,700,000 p.p.y. Dinner-wear 602,000,000 p.p.y.	1(a) Iron & steel melting & rolling plants 211,000 t.a. yr. Galvanizing plant 210,000 tons Tinning plants 72,000 t. Gold rolling mill 120,000 t. Tube & Pipe mills 34,800	Electrical machinery app. appl. Supplies 22,782 Machinery except electrical 13,103 Metal products except machinery & transportation equipment 41,788 Transportation equipment 18,108	2,484 million
2. Integrated Fishing & canning 1.4 mill US$[1]			Urea mixed fertilizer 30.7 mill[1] US$ Liquid oxygen .64 m. US$[1] Gas 620,000 cu. ft. Liquid 3.34 liters Explosives 1.5 million kgs. Compost fertilizer 7,000 tons Compost 33,000 tons			Merchant bars & flats 128.2 mill[1] US$	

kg. — kilograms
t.a.yr. — tons a year
p.p.y. — pieces per year
1(a) gives in quantities the production capacities of selected industries

Source: Country Study.
[1] Estimated investment.

TABLE 14-10. THAILAND
Estimated Value Added of Manufacturing Products

1. Existing Industries (Thousand Baht) 2. Planned Industries

	Food, beverages, tobacco	*Textiles, garment, etc.*	*Wood, leather rubber products*	*Chemicals*	*Non-metallic*	*Base metals*	*Metallic products*	*Electricity*
1.	Food 2,510,800 Beverages 880.8 Tobacco 1,008,500 1(a) Rice milling Beer 6,974 litres Sugar 125,031 tons Tobacco products 10,148 tons	Footwear, other wearing apparel & made-up textile goods 419,800 1(a) Cotton textiles 109 million sq. yds.	Wood & cork products 451,194 Furniture & fixtures 110,121 Paper & paper products 23,252 Printing, publishing & allied industries 155,828 Leather & leather products except footwear 124,434 Rubber products 228,840 1(a) Paper 7,101 tons	Chemicals & chemical products 418,725 1(a) Oil refinery 36,000 barrels a day	Mineral Products Non-metallic mineral products except products of petroleum & coal 470,152 1(a) Cement 1.013 million tons	Basic metal industries 5,019	Electrical machinery apparatus, appliances & supplies 46,722 Transport equipment 253,974 metal, machinery & others 330,028	660 million kWh
2.		Manufacture of Synthetic Textiles Factories for production of gunny bags	45,000 tons of Kraft paper				1(a) gives quantities for selected commodities 2 collected from data published in Thailand Facts & Figures 1965	

Source: National Income Statistics of Thailand 1964 and 1965; Thailand Facts and Figures 1965.

3. *The structure of industry in ECAFE countries*

The vitality of the industrial sector in the developing countries of the ECAFE region, its capacity to stimulate the growth of the entire economy, and sustain its own growth at a high rate will depend on the type of industrial structure that is being erected in these countries and the strategy adopted by the different countries in making their investments in industry. This aspect can be considered best if some detailed attention is given to the composition of the industrial output of the various countries in the region. Even at the risk of presenting a tedious and voluminous statistical statement, this paper has to itemize some of the major industrial activities of selected countries in order to give a more concrete idea of the industrial sectors in these countries. The tables that follow table 14 list the major industries in the various countries.

From the configurations of industry that emerge from these tables, it is not difficult to identify different approaches to industrial development and its needs. Among the various factors which have given an impetus to industrialization in developing countries, the adverse movement in the terms of trade of the primary-commodity producing countries and the emphasis on import substitution are generally regarded as having been major determinants.

However, the term "import substitution" narrowly interpreted could obscure the impulse and the creative effort which have strengthened and diversified the industrial process in countries such as India, China (Taiwan), Pakistan, and mainland China. The negative approach of creating capacity to meet the demand for imported products has obviously not been the only or even the major factor in their programmes of industrialization. Initially, their policies have been shaped by the more positive objective of developing an efficient industrial productive machine which could have a decisive impact on economic growth. An "import substitution" approach to industrialization, in the strict sense of the term, would be determined largely by the existing market demands and the consumption patterns that have grown within a primary product economy — a pattern which will not provide the base for the rapid growth of a complex industrial structure, and will not be consciously oriented to the needs and problems inherent in the process of such an industrial growth. The countries which have approached the task of industrialization from a purely "import substituting" objective and have not had a long-term perspective beyond it have established industries which satisfy particular segments of market demand in the economy. Such industries are often comparatively isolated units of production scattered throughout the economy. On the other hand, countries in which the programmes of industrialization have been primarily concerned with increasing the productive capacity of the industrial sector as a whole, and with developing the efficiency and potential of the means of industrial production available to them, have been able to develop industrial sectors in which there is an interdependence of production and a greater level of integration. These generalizations are discussed more fully under problems of industrialization, as the strategy of investment in developing countries becomes critical during their endeavours to create a successful industrial sector.

At this point, it will be sufficient if the distinction that is drawn here is applied to the composition of industrial output as given in the tables. It will be observed that Taiwan, India, Pakistan, and Korea have created or are in the process of creating an industrial sector with a "product-mix" which includes capital, intermediate and consumer goods. The list of items contains heavy machines and equipment, electrical goods, heavy chemicals, and durable and non-durable consumer goods. There has been an attempt to create an industrial structure which is balanced, with its parts to some extent inter-related and complementary. The resulting industrial sector is such that every individual investment in it is likely to have a multiple impact on the economy.

The extent to which such a structure has been developed varies for each one of the countries that have been named; but an examination of the industries that have grown or are planned will show clearly that the industrial sector is expanding into all the strategic areas. The textile industries and the food processing industries continue to enjoy a high weight in the industrial output. Of course the textile industry and the food processing industries, providing as they did comparatively substantial markets and requiring relatively simple technology, gave all the developing countries an industrial base for rapid and extensive growth. But the industries which have had the fastest rate of growth in these countries during the period 1958-1963 are the other industries, the paper and paper products group, the chemicals group, the base metals group and the metal products group (see table 8).

The growth rate of the whole group itself will not give any reliable indication of the growth of industries with advanced technologies. The chemical group in Ceylon has a weightage of 44.9 in the country's industrial index, but there is no production of nitrogenous fertilizers, and other petro-chemical products, and the production of alkalis is limited to a small output of caustic soda and chlorine. The Philippine chemical industry includes a relatively small heavy chemical element. It will be therefore necessary to examine the growth of individual industries as well, before assessing the level of industrialization.

In China (Taiwan), Pakistan, India and the Republic of Korea, it is evident that industrial growth is being consciously stimulated in fields of advanced and complex technology. While in India the metal industries have made considerable progress, a beginning has been made in the other countries. Machine tools, durable consumer goods and heavy equipment are being produced in most of these countries. Inter-

mediate chemical industries have been established, including alkalis and nitrogenous fertilizers. The base for manufacture of petroleum products and growth of petro-chemical industries has been laid in all these countries. The electrical goods industries are being developed. The investments that have been made in industry have, therefore, been able to raise the level of technology in these countries, which in turn can provide the base for quicker industrial growth.

At the initial stages, this process has not necessarily been linked with the growth of heavy industry. In the early phase of its industrialization, China (Taiwan) demonstrated how the food processing industry could, with a series of judiciously co-ordinated investments, become a strong efficient industrial complex. The emphasis on this group of industries also enabled China (Taiwan) to maintain an extremely valuable balance between the development of the industrial and agricultural sectors. The sugar industry proliferated into a group of by-product industries, and sizable quantities of alcohol, yeast, monosodium glutamate, and pulp and board from begasse were produced. A similar process is seen in the growth of the chemical industries and chemical consuming industries; the industrial base for production of alkalis expanded simultaneously with the growth of the chemical consuming industries. The production capacities for soda ash, caustic soda, chlorine, hydrochloric acid and alcohol developed apace with the complementary growth in detergents, paints, paper, textile, polyvinyl chlorine, glass, and so on. In the period 1958-1960, the annual average rate of growth of the food processing industry was only 6 per cent as against 16.9 per cent for the chemical industry, 18.2 per cent for the base metals and 13.4 per cent for the metal products.

In India and Pakistan, growth in the industrial sector has been dictated by similar strategies of complementary development of industries. India has set itself the objective of creating an industrial sector which includes as wide a range of the productive capacities of modern industry as possible: a capital goods sector, a wide range of intermediate goods, and a large variety of consumer durables and non-durables. India has succeeded in establishing a complementary industrial base for the manufacture of heavy plant and equipment and has now built up a considerable capacity for the manufacture of machinery for the oil milling, sugar, cement, textile, paper and pulp, and chemical industries. The growth of the Pakistani chemical complex again provides an example of the conscious creation of a whole complex of industries by simultaneous investments in related fields. Commencing from an altogether negligible base in 1952, a whole group of inter-related chemical and chemical-consuming industries have emerged. Pakistan, too, has now planned substantial outlays for the creation of a heavy machinery complex which is expected to produce manufacturing plant and heavy electrical goods.

In later sections of the paper the impact of industrial growth on the composition of imports and exports as well as the strain on the foreign exchange budget is examined in some detail. At this stage it is relevant to note how, with the growing industrialization of these countries, the dependence on imports of industrial goods has shifted from consumer goods to capital goods. The import content in the investment for development presented itself as a major factor in the economic growth of these countries. The investment in heavy industries in both India and Pakistan could be described as partly a response to this challenge. The strategy here appears to be somewhat different from the strategies adopted in centrally planned economies. There "the production of the means of production", became one of the first tasks of industrial development and was undertaken in the initial stages as an indispensable pre-requisite to growth, and as the prime mover n the expansion of productive capacity. In India and Pakistan, the production of heavy machinery is following on the expansion of the consumer goods and intermediate goods sectors. In examining the level of industrialization of the countries that have so far been discussed, attention has been paid to the range of productive capacities that have been created within the industrial sector. The capacities are also an indication of the level of technology that they have been able to achieve. The 'product-mix' in these countries provides the scope for growing inter-industrial relationships within industry and therefore provides to a greater or lesser degree the capacity for sustained growth.

The information available for the other developing countries of the region presents a somewhat different pattern of growth. Countries such as Afghanistan and Nepal are as yet at a rudimentary level of industrialization. The other countries have considerable volumes of industrial output; the Philippines in particular had a weight of 1.7 in the industrial index for the region in 1958, as against Taiwan's 0.8, although its industrial growth has not followed the same rapid diversification of industrial capacity and technology. In Ceylon and Burma, import-substitution in light consumer goods has made some progress. The inevitable tendency to explore ways and means of import-substitution as import capacity is reduced has resulted in the creation of a host of industrial units which meet the demand for goods which were once imported. But in most of these industries, the technology and manufacturing processes are extremely simple, and are confined to the final stage of manufacture such as asembly of imported parts, pressings, simple extrusions, and the like. Investment from the private sector was easily forthcoming for such industries in the case of those which had already established markets protected by import policies and where good profits were assured. In regard to production and industry, these units were heavily dependent on foreign industries for both raw materials and components.

In the early stages of their industrialization, both Burma and Ceylon established a few selected industries

in the state sector. Burma established a steel plant, a pharmaceutical industry, and spinning and weaving mill, a mill for production of gunnybags, brick and tile plant and a cement plant. Among other units, Ceylon had in its public sector a plywood factory, a paper factory, two sugar factories, a caustic soda plant, an oil mill, a footwear factory, a ceramic factory and a cement plant. Both countries initially experienced serious difficulties in operating them as profitable ventures. In Burma, the pharmaceutical unit found it difficult to dispose of its products for a long period owing to errors of judgement in their initial programmes of production. The brick and tile unit, which started production after long delays, was confronted with a sharp decline in demand for tiles. The steel plant fell far short of the rated capacity of 20,000 tons. In Ceylon, the paper mill operated at a heavy loss for a long period. The oil mill, which was designed for oil extraction from local poonac containing a high residue of oil, could not operate efficiently or economically. Failures in coordination between the agricultural and manufacturing activities led to serious under-utilization of capacity in the sugar factories. Management inefficiencies, and the absence of development policies consciously directed to the creation of an industrial sector left these as individual isolated projects in the periphery of the economy; hence they did not form part of a long-term and large-scale programme of industrialization.

The private sector in both countries directed its attention to light consumer industries. In Ceylon, the steady depletion of external assets with continuing adverse terms of trade compelled the adoption of stringent import controls. In this context, there was a ready flow of investment to industries producing the goods which came under import restrictions. These very industries, however, are the industries which have a high import content in their production; a large majority of the goods themselves would have a low priority as regards their essentiality for the economy and their imports would have been curtailed in a period of foreign exchange scarcity. In Ceylon, the production of consumer goods, such as aluminium holloware, plastics, confectionery, and so on, has expanded at a very high rate. In 1964 and early 1965 these industries have been compelled to work appreciably below installed capacity because the Government, in the allocation of scarce foreign exchange, has been unable to release the full quotas required by many of these industries for the full utilization of their market capacities. Both in Burma and Ceylon, a large number of the industries have to operate below rated capacities, as these are well above the existing market demand. In Ceylon, this situation exists for many industries that have been licensed in the private sector, including aluminum holloware, garments, asbestos roofing material, footwear, and radio assembly. In Burma, industrial production in the private sector, which grew rapidly after import controls were applied in the mid-1950s and was largely confined to a varied assortment of light consumer goods, "remained more or less constant in 62/63". There was evidence of excess capacity and under-utilization in a large number of these industries.[1]

From both these examples, it is evident that the national policies were originally not designed to give the industrial sector a strategic role in the growth of the economy. At the initial stage, individual projects were started to meet existing market demands and because they had possibilities of economic production as well the case with major state projects. Subsequently factors not directly related to industrial growth created conditions for a new spurt of industrial activity, as was the case with light consumer industry in the private sector. It cannot be said that the growth of these industries took place as a result of conscious direction of investment into essential sectors; nor as a result of an attempt to create production capacities which were complementary and could have led to the establishment of an interrelated industrial sector capable of expansion.

In the Philippines, the industrial sector for major industries contains chemicals processing industries, caustic soda, polyvinyl chloride, acetic acid, soda ash, and so on, a substantial capacity for chemical fertilizers steel plants, pulp and paper mills and an integrated textile industry. The major component of its industrial output, however, still remains food manufactures which claim nearly one-third of the total value added from industry. In fact, food manufactures continue to be one of the major earners among the Philippines' industrial exports and provide it with a base which might enable it to stimulate a process of development similar to China (Taiwan)'s. Industrial growth, however, has remained comparatively slow as here again the deliberate investments in areas which impel the industrial sector forward, as in India, Pakistan, and China (Taiwan) have been yet been systematically undertaken. The existing industries in all these countries contain considerable potential for further import substitution over a long time. Ceylon has planned to increase its outputs of cement, plywood and paper for which the capacities installed in the early nineteen-fifties have not yet been appreciably augmented. The integration of the textile industries, for which weaving capacity has been well ahead of spinning capacity for some time, it now being undertaken. In the Philippines, production of chemical fertilizer has remained more or less constant since 1956, providing less than 10 per cent of the total demand. Burma and Ceylon, both heavily dependent on agriculture, have as yet no domestic capacity for production of chemical fertilizer. Possible links between the existing petroleum industries in Burma and petrochemical products including fertilizer have yet to be forged. The plans of these countries for the future development of the industrial sector include a number of major projects. The Philippines has begun on the construction of an integ-

[1] Economic Survey of Burma 1963, table 39, page 60.

rated steel mill of medium size, and has planned additional production of chemical fertilizers. Ceylon is constructing a steel rolling mill, a tyre factory, and a factory for the production of hardware. It has planned for an integrated refinery and chemical fertilizer plant. However, for various reasons, the early and rapid expansion of industrial capacities for which there were practical possibilities in these countries has not become a compelling national objective. As a result, the plans for expansion of the industrial sector have not matured with the same celerity to be found in conditions which industrialization became a major national goal.

In Thailand and Malaysia, the industrial sector has continued to expand. In regard to both the structure of industry and the emphasis given to industrialization, the growth in these countries has followed the familiar pattern in import substitution. In both countries, food, beverages and tobacco and light chemical products such as detergents claim over 40 per cent of the added value in manufactures. The industrial sectors contain a few major industries such as cement, sugar, petroleum products in Thailand, and cement and rubber products in the former Federation of Malaysia. However the immediate plans for industrialization have not been designed to establish the industrial sector as a powerful agent in the economic development of the country. Afghanistan and Nepal are as yet at a rudimentary level of industrialization. Afghanistan has begun investing in a programme of industrialization and its industrial sector already includes growing textile, cement, and sugar industries.

From the data available, it is difficult to draw any reliable conclusions about the growth of industry in North Korea and North Viet-Nam; it is apparent, however, that the industrial sector in those two countries has given a significant place to the growth of heavy and basic industries. In North Viet-Nam, steady progress is reported in the machinery and fertilizer industries. Production of chemical fertilizer rose to 193,000 tons in 1963, that of superphosphates to 120,000 tons and of phosphate fertilizer to 20,000 tons. An integrated steel plant was under construction and two additional nitrate fertilizer plants were being planned. In North Korea, the production of steel was in the region of 1.167 million tons in 1963, which was third highest for the developing region in Asia, after mainland China and India. North Korea's production in the textile industry in 1963 was 300 million metres of textiles and 34,000 tons of chemical fibres. Production of chemical fertilizer was reported to be approximately 950,000 tons which again higher than production in India, Pakistan, or China (Taiwan). Official statistics for North Korea industry indicate a high rate of growth for the machine building industry which is reported to contribute 21.3 per cent of the total industrial output, producing tractors, trucks, farm machines, and so forth. From the information available, it would appear that North Korea is successfully building an industrial structure with a wide range of productive capacity in capital goods and consumer goods industries. Some of the targets of production for 1967 envisage an increase in production of steel to 2.5 million tons, chemical fertilizer to 1.7 million tons, synthetic fibres to 100,000 tons, cement to 4.5 million tons, synthetic rubber to 20,000 tons.

In the countries where growth of major industries is confined to a few projects in comparatively unrelated branches of industry, and where the bulk of the industrial activity is devoted to the end processes of manufacture such as assembly, canning, pressing, and the like, industrial technology is yet at a relatively low and simple level. Industrial growth of such a character has provided only a very narrow base for the advancement of technology, and in turn tends to restrict the entry into new and more complex industrial activities.

This section has not dealt with the advanced economies of the region in which the industrial sectors are developed and can draw on their own resources. The spectacular achievement of the Japanese economy, and of the industrial sector in particular, in outstripping the growth rates of most other countries in the world is reflected in the structural changes in Japan's industry; the process of building up a heavy industry and capital goods sector which is internationally competitive has been successfully accomplished. Japan has therefore equipped itself to assume a major role as a supplier of capital goods for the developing countries of the region, including complete plants for heavy industries. In the manufacturing industry in Australia, durable goods have a higher weight than the non-durable goods. Australia has continued to expand its metal products industry, including the manufacture of motor vehicles and of appliances, which rose by over 1/6th in 1964.

Another indication of the pattern of industrialisation is the change in the composition of imports and exports of the ECAFE countries during the last few years (see tables 15 and 16).

TABLE 15. LIST OF MANUFACTURED EXPORTS FOR SELECTED COUNTRIES OF THE DEVELOPING ECAFE REGION—1962

(1,000 US$)

	Chemicals	*Machinery & transport equipment*	*Miscellaneous manufactured articles*	*Manufactured goods classified chiefly by material*
Burma				52
Ceylon	1,259	..	1,589	516
China (Taiwan)	15,621	3,783	66,894	14,581
India	15,676	9,225	555,394	24,779
Korea, Rep. of			6,177	1,954
Pakistan	684	3,473	86,803	6,295
Philippines	2,125	290	22,045	1,140
Thailand	389	140	6,945	6,295

This table excludes the exports of processed food products, beverages, tobacco, crude material, oils, fats and fruits.

Source: Compiled by ECAFE secretariat from country reports.

TABLE 16. CONSUMPTION OF IMPORTS AND EXPORTS — PERCENTAGE DISTRIBUTION

		Imports					*Exports*			
		Consumption goods		*Material for consumption goods*	*Material for capital goods*	*Capital goods*	*Consumption goods*	*Material for consumption*	*Material for capital goods*	*Capital goods*
	Cons.	*Food*	*Others*							
Develop. ECAFE	1958	21.7	18.6	21.5	11.2	27.0				
Region	1963	18.1	15.6	24.0	8.8	33.5				
Burma	1958	12.4	22.0	15.7	9.1	40.8				
	1963									
Cambodia	1958	10.5	39.1	11.0	12.7	26.7				
	1963	8.3	38.6	8.1	17.4	27.6				
Ceylon	1958	40.4	23.0	9.2	8.8	18.6				
	1963	42.1	12.9	13.8	9.9	21.3				
China (Taiwan)	1958	10.0	6.1	46.1	6.5	31.3				
	1963	10.3	5.4	45.1	10.4	28.8				
India	1958	20.7	7.1	18.2	13.0	41.0	67.6	22.4	9.3	0.7
	1963	14.9	7.0	23.2	8.3	46.6	69.4	20.6	8.7	1.2
Indonesia	1958	23.0	20.3	20.0	9.4	27.3				
		...	...	...	...	...				
Korea, Rep. of	1958	17.6	9.2	41.6	16.0	15.6				
	1963	21.5	4.1	37.2	10.1	27.1				
Malaysia										
(and Singapore)	1958	24.1	29.2	22.2	13.5	13.0	22.3	60.1	14.4	3.2
	1963	22.8	20.8	20.8	11.7	21.1	19.5	51.4	25.2	3.9
Pakistan	1958	29.7	6.9	9.7	16.1	37.6				
	1963	16.9	6.6	18.1	10.4	48.0				
Philippines	1958	21.0	17.3	20.5	7.6	33.6				
	1963	16.9	9.2	25.4	4.1	44.4				
Thailand	1958	9.6	31.5	12.3	10.6	36.0				
	1963	6.4	25.0	14.3	10.1	44.2				
Viet-Nam,										
Republic of	1958	10.2	37.0	15.9	11.5	25.4				
	1963	15.7	15.3	26.3	14.2	28.5				
Australia	1958	4.7	23.6	30.5	5.1	36.1	31.1	52.6	9.7	6.6
	1963	4.1	21.8	29.4	5.2	39.5	41.6	42.4	9.9	6.1
Japan	1958	17.2	2.0	50.2	17.4	13.2	46.5	12.6	6.0	34.9
	1963	15.6	3.0	46.7	21.6	13.1	35.9	14.3	4.7	45.1

Source: External Trade Statistics, Economic Survey for Asia and the Far East 1964.

In the case of Japan, the composition of exports shows a remarkable increase in the component relating to machinery and equipment, reflecting the shifts that have taken place within Japanese industry. While exports of base metals, chemicals and textiles did not record major increases, the value of machinery exports tripled during the period 1958 to 1963, exports of transport equipment rose by approximately 70 per cent in value, and exports of other manufactured goods more than doubled. The percentage distribution for exports shows the substantial increase in the value of capital goods exports.

In regard to the developing countries two salient features can be distinguished. Almost all the developing countries, except Burma and Ceylon, show an increasing percentage of imports of capital goods. As was pointed out earlier, the dependence of the developing countries on the advanced economies is changing from dependence on the supply of consumer goods to the supply of the means of production. This, of course, reflects the increasing emphasis on capital development, and particularly on investment in the industrial sector.

In the case of a few developing countries however, the change in the composition of exports reflects in a recognizable manner the structural change in the economy. Manufactured gods claim a steadily increasing share in the exports of these countries, although they form an appreciable portion only in the case of China (Taiwan), India, the Republic of Korea and Pakistan. In these countries, too, a significant change in the pattern of export earnings, and a distinct shift from dependence on traditional agricultural and primary commodity exports to increasing dependence on exports of manufactures, is evident only in the case of China (Taiwan), and to a lesser degree, the Republic of Korea. India, while increasing the total volume of its manufactured and semi-manufactured exports, did not significantly increase its share in the total exports. The value of its exports of manufactured goods (including sugar and cashew kernel) was Rupees 27,130 million in 1961-1962, 29,130 million in 1962-63, and 34,295 million in 1963-64, which accounted for nearly 40 per cent of its export trade. The major portion of the export trade in manufactures consisted of jute products which have continued to form the most important item of India's export of industrial goods. In 1963-64, jute manufactures claimed approximately 47 per cent of the export trade in manufactured goods, textiles 22 per cent, and sugar and cashew kernel approximately 14 per cent. The significant changes in the pattern of

India's export trade in manufactured goods were the increase in the export of metal manufacture from 18.7 million Rupees in 1960/61 to 38 million Rupees in 1963/64, and the export of machinery and transport equipment from 36.8 million Rupees in 1960/61 to 59.2 million Rupees in 1963/64.[1] Pakistan's exports are as yet largely confined to semi-manufactured products such as hides and skins, cotton yarn, woolen yarn, jute yarn, and the like. In 1963, the Republic of Korea showed a substantial increase in the export of manufactured goods, and its pattern of export earnings show increasing reliance on the industrial sector. In 1958, exports of food and crude materials amounted to approximately 13.2 million US$ accounting for nearly 84 per cent of the exports chemicals and manufactures earned the balance of 16 per cent amounting to 2.52 million dollars. In 1963, the export of food and crude materials rose to 42.28 million and exports of chemicals and manufactured goods to 35.52 million, increasing the relative share in exports from 16 per cent to 46 per cent.[2] In the exports of Philippines, the most significant increase of industrial products is to be found in the food processing industry which increased its export earnings from 1.69 million US$ in 1958, to 217 US$ million in 1963; exports of textile manufactures however dropped from 17 million US$ in 1954 to 11.7 million US$ in 1958 and 3.8 million US$ in 1963.[3]

In the developing ECAFE region, Hong Kong presents an example of successful industrialization based on an export market, but the course of its development has not been typical of the developing region. Being almost entirely a metropolitan economy, without the complexities of economic growth to be found in larger economies, Hong Kong has industrialized for export and developed a wide variety of light consumer industries. Exports of domestic products were in the region of 500 million US$ in 1964, the total value being second only to that of India's exports from among countries in the developing ECAFE region. Hong Kong's industrial sector rests largely on its textile industry which accounts for approximately 52 per cent of its exports. Next in importance are plastic ware and light metal products, which account for approximately 30 per cent of the exports.

The industrial growth in Singapore in similar conditions of entrepot trade has assumed different dimensions. It has been initially oriented to the neighbouring markets and has begun establishing a diversified industrial structure with a wide range of both heavy and consumer industries. The new industries which have been given pioneer status include a modern shipyard, a steel mill, cement mills, oil refineries, integrated textile mills, a basic chemical complex, an integrated fertilizer plant, and a tyre plant. Both Hong Kong and Singapore indicate in varying degrees how an economy consisting largely of a modern commercial sector, and without the complicating factors of a large economy, can industrialize itself or start industrialization programmes on an effective scale, making full use of its only resources — a comparatively ready flow of capital and manpower which has already reached certain levels of skill. However, these factors, which created favourable conditions for industry in Hong Kong and Singapore, are absent from the predominantly agrarian economies of the developing region.

For the developing region, China (Taiwan) offers the most relevant example. It has shown rapid changes in the patterns of export trade, reflecting dynamic modifications in its economic structure. The export figures clearly indicate the decreasing dependence on traditional exports — sugar and rice, and the growing volume of manufactured goods in its export

[1] Country Study —

[2] External Trade Statistics: Economic Survey for Asia and the Far East 1964.

[3] Country Study —

TABLE 17. EXPORTS OF MANUFACTURED GOODS BY CHINA (TAIWAN)

US$ million

	1958	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*
A. Manufactured goods:							
cement and Building materials	4,930	2,452	2,303	6,855	11,355	17,105	17,700
Paper	840	2,748	2,512	3,698	3,896	3,389	5,036
Chemicals	1,671	3,019	6,764	15,759	20,551	19,355	23,031
Ores, metals and machinery	2,221	3,887	6,197	12,067	13,282	21,971	27,631
Cigarettes and wines	84	124	368	1,096	1,910	1,205	1,140
Textiles	2,083	12,127	21,164	27,787	38,058	44,409	61,051
B. Other industrial products including processed agricultural products:							
Sugar	34,689	65,929	74,401	61,096	49,588	105,983	135,403
Citronella oil	3,546	3,242	3,446	3,828	5,226	6,911	4,853
Canned pineapple	7,454	8,349	8,486	12,103	10,859	11,589	13,907
Canned mushrooms	1	3	150	1,798	8,508	16,218	15,822
Preserved fruit	114	328	872	2,179	2,022	3,271	6,188
Coal and asphalt	800	1,269	4,118	3,890	3,373	2,867	2,443
Camphor	241	183	271	296	475	828	1,140
Salt	2,425	2,298	2,464	2,401	1,922	2,299	3,647

Source: Country Study.

trade. In 1963 exports of industrial products, excluding sugar and processed farm products, totalled 141 million US$, making up almost 40 per cent of the total exports; and, in 1964, the value of exported industrial products rose to 187 million US$. Between 1961 and 1964, China (Taiwan) nearly trebled its exports of cement, more than trebled its export of chemicals and increased its exports of metals and machinery fourfold. During this period, it also succeeded in developing a new major export-earner, canned mushrooms, which brought in 15 million US dollars in 1964 compared to 150,000 dollars in 1960 (see table 17).

These figures indicate the quality and extent of the diversified industrial sector that has been developing in China (Taiwan). If the motivation for industrial growth is the need to overcome the instability of economies whose import capacities are conditioned by the uncertainties of the market for primary exports, import substitution becomes only a stage in the solution of the problem. A diversification of the economy must be followed by a diversification of the export trade; the "transitional" pattern of trading primary commodities for industrial goods will have to be replaced by a growing inter-regional and intra-regional trade in industrial goods. It is in these directions that the developing countries with a faster rate of industrial growth are consciously steering their economies; but a much greater intensification of the industrial process is required before the more or less introverted industrial structure in the region can look outwards to external markets. Trade in manufactured goods among the developing countries of the region is still of negligible proportions, indicating that inward-looking industrial growth has taken place. The effects of individual countries in the direction of greater industrial interdependence and trade in manufactures will have to be consciously supported at a regional and international level if the complementarities in production which will achieve this are to be built into their growing industrial sectors. These aspects are discussed further in relation to regional harmonization in a later section of this paper, as well as in a separate paper on foreign trade and industrialization.

4. *Changes in Employment Patterns and Skill Demands*

The impact industrial growth has made on the developing economies can be assessed in terms of the changes brought about in the occupational structure in the countries. One of the invariable characteristics of the developing economies in the region is the abundance or excess of unskilled manpower and the corresponding scarcity of skills required for industry. Just as much as the process of development depends on the availability of those skills, the presence and growth of the required skills are themselves determined by the level of development. To that extent, the increase of skilled manpower in these countries indicates the levels of technological development they have been able to achieve, and the effective manpower resources that are available to provide a technological base capable of generating a high rate of industrial growth. Table 18 gives the available statistical data for a number of ECAFE countries.

In most of the developing countries in the region, changes have occurred in the occupational structure of the populations, reflecting the expansion of the industrial sector. Although employment in the industrial sector has increased, the increases as well as changes in the occupational structure of the economically active population are marginal compared to the magnitude of the changes that have to take place. The reallocation of the work-force from the primary products sector to the industrial and the manufacturing sectors has become a key factor in the economic growth of the countries. Many of the countries in the region in their development plans have recognized the need for maximizing the employment growth in the industrial sector, but it has been seen as ancillary to growth, and as a means of increasing employment opportunities. Seldom has it been approached as a planned shift of the workforce to more productive economic activity and as a systematic absorption of labour into industry from the surplus in the agricultural sector as it increases its productivity.

Most countries of the region are deficient in statistics regarding the distribution of manpower in industry, or in manpower forecasts in relation to their programmes of development. (This aspect is examined in a later section of the paper.) From the data available, it is evident that, in those countries where the economic growth and the growth of the industrial sector are being systematically planned, increasing attention is being given to the development of the managerial and professional cadres as well as the other skilled workers that are strategic to industrialization. However, it is difficult to assess to what extent the supply of industrial skills in the developing countries has been able to meet the demand generated by new capacities that have been created. It would appear that, in most countries, the stock of technical skills has not kept pace with the volume of investment in industry and the creation of new fixed assets. To the extent that the complementary development of human assets has lagged behind, the full and efficient use of the newly created capacities in the economies has not been possible. Afghanistan reports that its textile industry has been able to achieve only 43.3 per cent utilization of rated capacity during 1961-1964 and ascribes this to the lack of trained personnel for efficient operation. Burma had the same experience when her major state projects were completed in 1957-1961. The available statistics given in table 19 indicate the negligible proportion of trained personnel available in the developing countries. Such personnel form the strategic cadres, and the extent to which they are available will be an important contributing factor in the rate and the quality of industrial growth.

TABLE 18. PERCENTAGE OF ECONOMICALLY ACTIVE POPULATION IN AGRICULTURE AND INDUSTRY AND NUMBERS OF PROFESSIONAL, TECHNICAL AND ADMINISTRATIVE WORKERS IN SELECTED COUNTRIES

		Percentage of Economically Active Population		*Professional & Technical & Related Workers*	*Administrative Executive Managerial Workers*
		Agriculture Forestry Hunting Fishing	*Mining Manufac-turing*		
Ceylon	1953	52.9	10.5[a]		
China (Taiwan)	1956	50.1	12.4		
India	1961	72.9	9.9	3,237,571	1,814,387
	1951				
Indonesia	1961	71.8	5.9		
Iran	1956	54.8	13.8	94,262	182,678
Japan	1963	28.9	24.7	2,210,000	970,000
	1957				
Malaysia	1957	57.4	8.9		
Nepal	52-54	93.4	1.9		
Pakistan	1961	74.9	8.2	414,107	131,817
Philippines	1962	57.4	10.6	285,000	358,000
Korea, South	1963	58.03	7.9	196,000	60,000
Thailand	1960	81.1	3.6	173,960	26,196

Source: ILO Year Book 1964.
[a] Including mining, manufacturing, construction, electricity, gas, water and sanitary services.

TABLE 19. PERCENTAGE SIZE OF THE GROUP OF PROFESSIONAL, TECHNICAL AND RELATED WORKERS IN RELATION TO TOTAL WORK FORCE

Country	*Year*	*Professional, technical and related workers*
Asia:		
Japan	1955	4.9
Singapore	1957	4.8
Ryukyu Islands	1955	3.1
Philippines	1958	2.3
Korea, South	1955	1.7
India	1951	1.6
Indonesia	1958	1.1
Pakistan	1951	1.0
Thailand	1947	1.0
Other:		
United States	1950	8.0
New Zealand	1951	7.2
United Kingdom	1951	6.3
Australia	1947	5.3

Source: Data compiled by the International Labour Office and published in *International Labour Review*, October 1962, p.365.

TABLE 20. A COMPARISON OF PLAN TARGETS IN THE INDUSTRIAL SECTOR WITH PERFORMANCE FOR SELECTED ECAFE COUNTRIES

		Plan Targets		*Actuals*
Afghanistan[a] (Selected projects)	First five-year plan (1956/57 to 1960/61)			
	Investment	2,624 million Afghanis		2,030 million approx.
	Textiles	75 million metres		25 million approx.
	Glass factory			Postponed for second five-year plan
	Cement factory	200 tons a day		Capacity increased above plan target to 300 tons a day
	Alcohol factory			Postponed
	Fruit factory			Plans altered completed 1961
	Matches			Capacity reduced
Burma[b]	Eight-year plan (1952/53 to 1959/60)			
	Pharmaceutical factory			Completed—production programme had to be altered
	Steel	20,000 tons		6,000 tons
	Jute	24 million gunnies		12 million
	Sugar 2 mills	34,000 tons		22,000 tons
	Bricks	8 million		1.2 million
	Tiles	6 million		.6 million
	Second four-year plan (1961/62 to 1964/65)			
	Cotton yarn	(000 lbs.)	6,335	8,591
	Fabric	(000 yards)	37,920	31,060
	Sugar	(000 tons)	57	38
	Cement	(000 tons)	55	44
	Bricks	(million)	4	11.6
	Steel	(000 tons)	20	8
	Jute gunnies	(million)	24	13.4
Ceylon[c]	Ten-year plan (1959 to 1968) Planned date of completion			
	Ilmenite	60,000 tons	(1959/60)	60,000 in 1964
	Nitile	8,000 tons	,,	Nil ,,
	Zircon	4,000 tons	,,	Nil ,,
	Cotton spinning	2.2 million lbs.	,,	3.5
	Salt	500,000 tons	(1960/61)	50,000 tons ,,
	Gypsum	15,000 tons		Nil ,,
	Potash	7,000 tons		Nil ,,
	Kaolin refinery	5,000 tons		Completed and in production

	Tiles (five factories)	5,000 tons		(1962/63)	1 completed 1963 3 „ 1964
	Two cotton spinning and weaving million	30 million yds		(1962/63)	1 weaving mill — 10 m. yds. (1965)
	Second ceramic factory			(1961/62)	Under construction
	Cement —	225,000 tons		(1962)	Plant to be commissioned in 1965
		450,000 tons	1st kiln	(1963)	Work commenced in 1964
			2nd kiln	(1965)	
			3rd kiln	(1966)	
	Fertilizer	400,000 tons		(1964)	Work not commenced
	Steel rolling mill	60,000 tons		Not in plan	Under construction
	Tyre & tube factory	250,000 pcs		„	„ „
	Hardware factory (agricultural implements)			„	„ „
China (Taiwan)[d]	Third four-year plan (1961 to 1964) Rated of growth 12%				Exceeded
	Fertilizer N	170,000	Percentage of GOP. 23%		Fulfilled 130,000
	P_2O_5	62,000			31,300
	Cement	(1,000 tons)		2,160	2,340
	Paper „	„		149	126
	Canned pineapple	(„ cases)		3,500	3,600
	Steel products	(„ tons)		378	330
	Sugar	(„ tons)		870	795
	Cotton yarn	(„ bales)		350	274
	Ocean freight			31	40
India[e]	First five-year plan (1951 to 1956)				
	Investment	3,380 million Rs.			1,790
	Second five-year plan (1956 to 1961)				194
	Steel ingots	million tons		4.3	3.1 million tons
	Aluminium	(000 tons)		25	18.5
	Caustic soda	„		135	100
	Sulphuric acid	„		470	363
	Nitrogenous fertilizers	„		290	110
	Phosphatic fertilizers	„		120	55
	Paper board	„		350	350
	Soda ash	„		230	145
					1963/64 Likely achievement production
	Third five-year plan (1961 to 1966)				
	Steel	(Million tons)		6.8	4.3 5.8
	Aluminium	(000 tons)		80	50 68
	Machine tools	„		30	14.5 25
	Nitrogenous fertilizers	„		800	240 500
	Phosphate fertilizers	„		400	111.5 200
	Sulphuric acid	(000 tons)		1,500	539 1,200
	Soda ash	„		450	284 350
	Caustic soda	„		340	210 340
	Cement	„		13	9.3 12
	Iron ore	(million tons)		30	12.6 (1961–62) 25
Korea, South[f]	First five-year plan (1962 to 1966)				*1964* *1964*
	Food — value added		(million won)		4,330 5,438
	Textiles		„		7,720 7,736
	Paper and paper products		„		850 1,044
	Chemical and chemical products		„		3,690 2,949
	Base metal		„		1,990 1,179
	Metal products		„		1,140 602
	Machinery		„		760 617
Pakistan[g]	First five-year plan (1955 to 1960)				
	Investment target	(million)	3,215 million Rs		1,850 million Rs
	Sugar	„	235,000 tons		1959-60 production 150,000 tons
	Textiles	„	2.2		1.95 spindles
			38,700 looms		29,000 looms
	Cement	„	1.3		1.28 tons
	Second five-year plan (1960 to 1965)				1964 production
	Sugar	(million)		500 tons	338 tons
	Cotton yarn	„		520 lb.	506 lb.
	Paper board	„		106 tons	93 tons
	Fertilizer nitrogenous	„		550 tons	291 tons

Soda ash	,,	74 tons	142 tons (installed and sanctioned capacity)
Caustic soda	,,	35 tons	39 tons (— do —)
Sulphuric acid	,,	65 tons	177 tons (— do —)
Cement	,,	3,000 tons	1,538 tons
Steel (ingots)	,,	550 tons	12 tons

[a] Source: Survey of Progress 1961/1962 Ministry of Planning.
[b] Source: Second Four-Year Plan.
[c] Source: The Ten-Year Plan.
[d] Source: Third four-year plan and country study.
[e] Source: Mid-term appraisal of Third Five-Year Plan, Second Five Year Plan.
[f] Source: First Five-Year Plan and Country Study.
[g] Source: Outline of Third Five-Year Plan, Second Five-Year Plan, Country Study.

III. PLAN TARGETS AND ACHIEVEMENTS IN INDUSTRY IN THE ECAFE REGION

The performance in the industrial sector of the countries in the ECAFE region can also be assessed from the achievement of objectives and targets contained in their national plans of economic development. Table 20 contains the data for selected countries in the ECAFE region for which targets of investment or production were available.

In Japan, the actual performance during 1958-62 exceeded the targets fixed in the long range economic plan 1958-62, the average growth rate reaching as high a figure as 11 per cent when the projected rate was approximately 6.5 per cent. Savings which were estimated at 32 per cent for 1962, actually rose to 38 per cent for that year. The revision of targets in the Plan for Doubling the National Income in Ten Years again proved to be a low estimate, as the growth rate from 1961-63 continued at 11 per cent compared to the estimated rate of 7 to 8 per cent. The performance of the private sector's investment in industry was particularly impressive, as the targets projected for 1970 for certain sectors were achieved during the early years of the plan.[1]

In India the implementation of the second five-year plan fell short of targets in a number of important industries. The shortfalls varied from over 50 per cent in chemical fertilizers, paper and textile machinery, newsprint and steel to over 25 per cent for cement, caustic soda and soda ash. For a number of other items such as power driven pumps, diesel engines, electric motors, sugar, and so on, plan targets were exceeded, but the shortfalls in two basic sectors, chemical fertilizers and steel, could only have a retarding effect on the rates of growth projected in the plan.

Under the third five-year plan, during the first two years India was able to achieve a rate of industrial growth of approximately 6.5 per cent and 8 per cent respectively when the target had been 11 per cent. It will be seen from the figures given in the table that shortfalls are anticipated in certain crucial sectors such as steel, pig iron, fertilizers, and so forth, and that consequently the fourth plan will commence on a comparatively lower base than originally estimated.[1]

In Pakistan's second five-year plan, the quantitative magnitudes given as targets were tentative, and performance by 1964 indicates that, for several items, the original estimates would not be realized. For example, the projected production of 550 thousand tons of steel ingots has not materialized. Cement production, which increased by approximately 50 per cent from 1960, was still far below the tentative target of 3 million tons fixed for 1965, although capacity, installed and sanctioned for installation, had reached 3 million tons. Production of chemical fertilizer which was to be 550,000 tons in 1965 was 300,000 tons in 1964, but the installed capacity is expected to reach the target figure by end of 1965. Although in individual industries the targets of production may not be reached, the index of industrial production reached 156.5 by the end of 1963, a performance which appears to have improved on the planned target of a 60 per cent increase on the industrial production of 1960 by the end of the plan period in 1965.

In Burma, the state projects started under the first eight-year plan could not be completed and operated according to the predetermined targets. The construction of the steel project, the brick and tile plant extended beyond the planned date of completion and, when manufacturing operations commenced, output fell well below rated capacities. The growth in the private sector, which in 1963 accounted for a substantial portion of industrial output, was not a development which had been programmed.

In Ceylon, the investment in the industrial sector did not take place as envisaged in the ten-year plan. In 1964, work had not yet been started on the fertilizer project and cement production remained at the 1958 output of 80,000 tons. However, during the period 1961-63, the volume of investment in the private sector exceeded expectation and individual investors established a host of light consumer industries to provide substitutes for imported products with surprising alacrity.

In China (Taiwan), although the performance on the first two four-year plans did not enable the country

[1] Country Study.

[1] Report on Currency and Finance 1963-64 — Reserve Bank of India.

to fulfil the planned investment and output in their entirety, the main objective of a substantial growth rate was achieved. Investment in the first four-year plan fell short of the actual target of approximately 1,000 million New Taiwan dollars; and, in the second four-year plan, the industrial output was below the planned increase. Under the third four-year plan, the actual production in 1963 compared with planned production indicates that outputs have rarely fallen below 80 per cent of the target and that in many important items, they have exceeded the plan figures. This performance itself was all the more creditable as natural calamities affected production during 1963 and typhoons accounted for physical damage estimated at 340 million New Taiwan dollars. The growth in industry during the third four-year plan period was maintained at the rate of approximately 14 per cent up to 1963 and was 25 per cent in 1964, whereas the projected rate was 12 per cent.[1]

In the Republic of Korea, performance in a number of industrial branches has approximated to the targets fixed, although the increase in the value added by manufacture for 1964 was only 5 per cent as against a projected 15 per cent in the plan. The overall performance in industry for 1962 and 1963, however, fulfilled the targets fixed in the plan, the increases being 11 per cent and 15 per cent as envisaged in the plan. The principal items on which shortfalls were recorded were base metals, metal products, footwear and wearing apparel, while the performance in the textile industry, chemical industry, food industries, machinery, electrical machinery and transport equipment came close to targets or even, in certain instances, exceeded them.

In Afghanistan, the first five-year plan was modified in regard to investment in industry; either projects originally included in the plan were dropped on a more detailed economic appraisal, or new projects were included and planned projects expanded in capacity. The shortfall in investment at the end of the plan period was due largely to the shortfall in the electricity programme and the postponement of a few projects. In the second four-year plan, the proposal for a fertilizer and refinery project has not yet matured.

The disparity between the projections for industrial production in the national plans of the countries in the region and the results actually achieved does not necessarily reflect a poor performance of the economies. In certain instances, as in China (Taiwan), the marginal shortfalls in the first two plans have not seriously affected the forecasted growth of the industrial sector. Targets may be set in such a manner that, while they are not unrealistic, they employ maximum national effort and make optimum use of resources; marginal failures to attain the original targets do not reflect unsatisfactory performance. But a survey of plans and plan fulfilment in the developing countries do indicate failures of various types. In most cases, the long periods of gestation for major projects and the equally long period which established plants take to achieve rated capacity have resulted in a considerable retardation of the rate of growth. The experience in the steel and fertilizer industries in India illustrates this aspect. In many countries, while resources were allocated and capital made available for investment, the capacity of related sectors to absorb the investment has been limited and has resulted in delays which were not anticipated. In Ceylon, funds allocated for investment in public sector industry have been underspent by 20-30 per cent annually, as the expansion of the construction industry has failed to keep pace with demands arising from the planned investment in the industrial sector. These examples underscore the intimate relationship between plan formulation and plan implementation, and draw attention to the problems relating to managerial and other capacities for execution of a plan. They also emphasize the need for techniques for continuously reviewing performance and for adjustment of targets. Not a few of the disparities between plan estimates and actuals arise from failures in the management of the plans.

One's conclusions in regard to the over-all progress of industrialization in the developing ECAFE region will vary according to the projections made of the desirable level of industrial growth for the region. Whatever composite evaluation is made of the progress, employing as has been done the rates of growth, the structural changes in the economy, the changes in the patterns of import and export trade, the level of industrialization and the productive capacities that have been created, the flow of investment into industry, the changes in occupational structure, and fulfilment of plans, one's final assessment will largely depend on what is regarded as the level that should have been achieved. Such a projection of the desired rate of industrial growth and the contribution it should make to the over-all economic growth for the rapid transformation of the less developed economies is possible and may have some limited value as a framework of reference. This is attempted in a later section of the paper. For the present, it is enough to examine the progress as it has been recorded, and make generalized judgements of its character and rapidity. The percentage increases in the developing region's production from 1958 to 1963 were 9 per cent, 11.9 per cent, 7.3 per cent and 10.6 per cent respectively. It has to be remembered, however, that these indices are based on the weights given according to the structure of industry in 1958, in which the food and textile industries claimed the preponderant share in output. However, it is precisely these industries which have had a low rate of growth. India, which has the highest weight in the index in the developing region, recorded increases of production in capital and intermediate goods industries which were larger than that for all industries

[1] Country documents, and Third Four-Year Plan, Republic of China, Annual Report on Taiwan's Economy Council for International Economic Co-operation and Development.

taken together. The increase in output in the consumer industries, which have a large weight in the industrial index in India, has been relatively small, and this would account for the moderate increase in the general index.[1] Therefore it is likely that the developing region's performance in the industrial sector during this period is better than what is reflected in the index of industrial production.

Even so, it might be agreed that a rate of industrial growth for the region, which is below or in the region of 10 per cent and thus lower than the Development Decade norm of 13 per cent, has barely begun to make an impact on the immensity of the region's economic problems. By contrast, Japan's index of industrial production reflects a dynamic upward movement. The less developed among the centrally planned economies of Eastern Europe had rates of industrial growth in the region of 15 per cent: 15.9 per cent for Bulgaria over the period 1956-60 and 11.7 per cent and 11.1 per cent for 1961 and 1962; 11.1 per cent for Rumania over the period 1956-1960 and 15.3 per cent and 14.8 per cent for 1961 and 1963.[2] The need to accelerate the pace of industrial growth in the developing ECAFE region hardly needs emphasis. For example, if Burma with a present population of some 25 million and that of approximately 30 million in 1970 were to attempt an increase of *per capita* gross industrial product from the present $9 to $13.5, which would still be among the lowest in the world, it would have to sustain an annual rate of industrial growth of approximately 15 per cent. The process of industrial growth will have to be very rapid if the transformation of a low-productivity economy and the improvement of income levels is to be effectively realized within a reasonably short period.

Part II

PROBLEMS OF INDUSTRIALIZATION IN THE ECAFE REGION

I. STRATEGIES OF INDUSTRIAL DEVELOPMENT IN ECAFE COUNTRIES

The classical formulation of the problems relating to priorities of development in the primary commodity producing countries, and the question as to whether they should concentrate their development efforts on the agricultural or industrial sector has lost much of its controversial character today. The programmes of development in all the developing countries and the proportion of national investment that flows into the industrial sector demonstrate the importance attached by these countries to their programmes of industrialization. All of them appear to have recognized the basic need to build into their economies a capacity for the extensive application of modern science and technology to their productive activities, if they are to achieve a substantial and rapid improvement in their standards of living. The principal motive force for the systematic and self-reliant application of modern technology for such an economic transformation is seen by these countries as the creation of the means of industrial production within their own economies.

The dynamism needed for the transformation of agriculture itself from its peasant subsistence base to a modern surplus-creating sector is provided partly by the radial impact of industry on agriculture. This is seen in the manner in which the production of agricultural raw materials for industry has introduced new organizational and entrepreneurial elements into the agricultural sector of developing countries. Agricultural production for the food processing industries in China (Taiwan), the cultivation of tobacco for cigarette manufacture in Ceylon, and the cultivation of sugar cane for the sugar industry in India illustrate now the demands of industry impose new disciplines and disseminate new techniques in the agricultural sector or seek to do so. The presence within the economy of a modern industrial sector which uses locally produced raw-material has usually provided the motivation for the organization and improvement of the raw-material supplying sector. Here it is pertinent to recall that the entrepreneurial modern organization of agriculture in countries such as Denmark or New Zealand grew mainly out of the industrial impulse and application of managerial and technical skills that are nourished by the industrial economy.

This paper does not propose to discuss in detail the economic reasons which induce developing countries to make industrialization a major goal of their national policies. The United Nations Conference on Trade and Development emphasized the instability of the developing economies which are dependent on the export of primary commodities, the adverse movement in their terms of trade, and the rationale for the diversification of these economies. Having regard to the vital need for industrialization in the developing countries, this paper examines the strategies of industrial development in selected countries of the region.

The strategies of various countries in relation to industry itself, that is, selection of specific industries for development and the composition of industrial activities within the sector, depend partly on the resource endowment of each particular country and partly on prevailing political philosophy. Once allowance is made for this, it is helpful to examine the strategy adopted by selected countries in relation to (i) problems of co-ordinating development in different sectors as they affect industrial growth and (ii) problems of co-ordination within the industrial sector.

1. *Problems of balanced sectoral growth*

The allocation of resources and the distribution of national effort among the different sectors of the economy have had a varied impact on the industrial growth rates of the different countries in the region.

[1] Report on Currency & Finance — 1963-64. Reserve Bank of India.

[2] United Nations World Economic Survey — 1963.

The sectoral inter-dependence in the development of industry can be of a more direct character as in the case of the infrastructure for industry, or it can have growth effects of a more complex nature as in the case of the relationship of agricultural growth to industry.

Generally, the plans of developing countries place proper emphasis on the expansion of infrastructure facilities such as transport and power as a precursor to and an accompaniment of industrial growth. In certain countries, heavy outlays have to be made for creating and improving the infrastructure for the growth of industry. The initial programmes of development both in Afghanistan and Nepal allocate a substantial portion of the total investment of their plans for the development of infrastructural facilities. In Nepal, the total power generation has been only 10,000 kW which is reported to be highly inadequate for industrial use. Its first three five-year plans have therefore allocated to power and transport 40 per cent, 35 per cent, and 44 per cent of the total investment. In Afghanistan, the first plan provided 49 per cent of its outlay for transport and communications while the investment in power claimed the major portion of the 29 per cent given to industry and power together. Similarly, the second plan provided for substantial outlays on the improvement of infrastructure. Investment in countries with a poor infrastructure such as Nepal and Afghanistan follow the usual priorities in planning for infrastructural development on a large scale to create conditions for industrialization.

The problems of infrastructural development for the developing economies are largely problems of programming. There is a danger that the infrastructure development and the development of the productive sectors will be treated as distinct and largely consecutive stages of growth. If the productive investments are not planned simultaneously, the productive utilization of the infrastructural facilities will not follow fast enough, and the heavy investments in them with their inflationary pressures will be a burden on the economy. These problems of programming are most relevant for the countries at the initial stages of industrialization, where the tendency is to make large allocations for improvements of the infrastructure and comparatively small investments in the productive sector. In these conditions, the possibilities of more integrated growth through improved programming of investments need to be carefully explored.

On the other hand, infrastructural problems in industrialization have also flowed from failures in implementation whereby the planned increases in supply of power, and so on, were not made achieved due to inefficiencies in the execution of the plan. Such failures in co-ordination have had the opposite effect of limiting the capacity already available in the productive sectors. These, however, are problems of plan implementation which will be discussed separately.

The study of country experience in the ECAFE region which would be most rewarding is that of the interflow of 'growth' effects between the agricultural and the industrial sectors. The interrelations of industry and agriculture in Australia and New Zealand do not offer us examples which are very relevant for the process of growth in the developing countries of the region; on the one hand, Australia and New Zealand were not confronted with the problem of transforming a traditional agricultural sector; and, on the other, the immigrant population was a product of the growing industrial economy of the West, and was therefore better able to create the environment of skill and technology for the growth of industries. The relevant example is of course Japan, but here, too, the conditions of its growth in the late 19th and early 20th century, both domestic and international, are very different from the conditions confronting developing countries today. Therefore, in designing the strategies for the development of their economies, the developing countries would do well to study in closer detail the more recent experiences of the other countries in the region.

Problems that have occurred at certain stages of industrial growth in mainland China and India reiterate the familiar theme that imbalances in the development of different sectors in the economy, and particularly in the interrelations of agricultural and industrial growth, can impede the growth of the economy as a whole. In both cases, the investment in the industrial sector and the concentration of effort in erecting a structure of heavy industry had not been accompanied by a sufficient expansion of the agricultural sector. The problems in regard to the lag in agricultural growth have generally taken two forms. One has been the outflow of foreign exchange on the import of food, restricting the procurement of capital goods for development; and the other has been the failure of the agricultural sector to generate incomes able to produce an expansion of the domestic market, complementary to the expansion of the industrial sector. The first problem may be temporarily overcome by a heavy inflow of external assistance, aid imports and the like, but the second problem would still remain unsolved, leaving a growing modern industrial structure by the side of a relatively stagnant and primitive agriculture — an agriculture incapable of generating the necessary consuming power and creating the markets for industry on the one hand, or of maintaining an efficient supply of agricultural raw materials to indusry and food for the population, on the other. The recognition of the need to correct these sectoral imbalances and, in certain essential details, to revise the strategy of development is evident from the efforts made by mainland China and India. In mainland China, a sharp deceleration of effort in the heavy industrial sector and the transfer of the work force to the land followed the crop failures in 1958. The central direction of the economy permitted mainland China to effect a

rapid shift of resources to correct the imbalance in its economy.

In India, the planning authorities have shown grave concern over the sluggish rate of growth in the agricultural sector which has aggravated the problems of financing its programmes of development. The average annual growth rate in the agricultural sector was 2.2 per cent from 1960-1963 and 2.8 per cent from 1960-1964. There have been significant shortfalls in the planned targets in the agricultural sector. Fertilizer inputs have been well below plan estimates and the implementation of programmes for use of improved seeds, soil conservation and plant protection have been far behind schedule. It has been estimated that the demand for foodgrains by the growing urban population has increased by approximately 30 to 40 per cent, while the marketed surplus of the agricultural sector does not appear to have kept pace with demand. The import of cereals during 1957-1963 averaged 6.1 per cent of the cereal output during the same period.[1] The resultant pressures on India's balance of payments and the shortage of foreign exchange for imports of capital goods and industrial raw materials have had retarding effects on the growth of its industrial sector, both in regard to new investments and to utilization of existing capacity. In these circumstances, a more vigorous effort is being made to accelerate growth in the agricultural sector. With the deterioration of the food situation in 1963, allocations for soil conservation and other agricultural improvements in the sector were increased by 50 per cent and imports of fertilizer were further increased for the final two years of the third five-year plan — a development which again underscored the need for accelerating the growth of the agro-chemical industries.

The problem of sectoral imbalance and its relation to industrial growth is illustrated in a different way by the experience of Ceylon. Agricultural policies have been largely directed toward import substitution of rice. Heavy investments in irrigation projects, an efficiently organized guaranteed price scheme which assured cultivators a price well above that of imported rice, together with subsidies on fertilizer, resulted in a substantial increase in rice outputs, and a steady increase in rural incomes. The heavy expenditure incurred by the state on food subsidies, free medical and educational facilities contributed further to the amelioration of living standards in the rural sector. However, although the food imports remained stationary or showed a marginal decline during this period, in spite of a rapidly rising population, the country speedily ran down its accumulated external assets through increased imports of industrial goods and moved into a serious foreign exchange crisis in 1961. It was at this stage that Ceylon made systematic attempts to establish industries for import substitution, and create a domestic source of supply of light consumer industrial goods. Had a complementary industrial structure, even on a thin base of import-substitution, grown simultaneously with the rise in income levels in the agricultural sector, it is possible that the rigours of the foreign exchange crisis and the impact of the adverse movement in the terms of trade would have been somewhat mitigated. Certain assumptions are of course implied in this argument. It is assumed that the capacity of the agricultural sector to absorb any increase in inputs would have been limited, and that prospects for further substitution of any agricultural imports would not have been bright. The increase in the area of paddy production from 1952/1953 to 1962/1963 was approximately 65 per cent and the increase of output was nearly 75 per cent. In these circumstances, the growth of new capacity in the domestic industrial sector would have been the more dynamic and could have made some impact on its problems of foreign exchange. The timely substitution of imports through local industry would have siphoned part of the surplus incomes in the rural sector into local industry, and provided a source of domestic capital formation in place of the outflow through imports of industrial goods.

These provide two examples, one of an economy directing its resources more energetically to the industrial sector to the detriment of the agricultural sector, and the other directing its energies to the agricultural sector without creating new capacities in the industrial sector. Presented in this manner, the complexities of inter-sectoral relations in industrial growth may tend to appear unduly simplified. But it is sufficient to identify the broad strategies and recognize some of the resultant problems.

China (Taiwan) presents an appropriate example of balanced sectoral growth resulting in a steady rise of national income and a steady transformation into a well equipped industrial economy. The rate of agricultural growth 1960-1964 was approximately 6 per cent and industrial growth was approximately 15 per cent. The three-step programme of tenurial reforms provided the agrarian structure for the effective implementation of the plan for agricultural development. A diversified agriculture based on a number of crops with export potential, as well as livestock, resulted in a steady rise in agricultural incomes. While the acreage under wheat fell from 14,582 hectares in 1952 to 9,411 hectares in 1964, maize rose from 5,246 hectares to 20,000 hectares during the same period; production of sweet potatoes increased from 2.2 million tons to 3.3 million tons, cassava from 98,000 tons to 241,000 tons. Livestock production recorded similar increases. The index of agricultural productivity rose from 100 in 1948 to 110 in 1963 in the case of rice, and 120 in the case of sugar. The average family incomes in the agricultural sector increased appreciably. A sample survey of 110 farm families in 1963 showed an increase of nearly 60 per cent on 1948 incomes.[1]

Simultaneously with the expansion of agricultural incomes, an industrial sector was fostered in close

[1] Economic Survey of Asia and the Far East 1964.

[1] Statistical Yearbooks and country documents.

relation to agriculture. During this period the food industries grew at a consistent pace. The canning industry included pineapples, fruits, vegetables and meat, and provided considerable export earnings. The canning industry in the case of bananas, pineapples, mushrooms, and the like, was able to build up a thriving export market and registered a spectacular expansion from 1955-1964 (vide table 17). Internally, the sugar and canning industries were able to provide agriculturists with new entrepreneurial attitudes and perforce had to integrate them into their activities as reliable suppliers of raw material. In such a context, new techniques, quality control of products, increased productivity, and entrepreneurial management of agricultural activities gradually make their impact on agriculture. Similarly, the sugar industry developed its link with the agricultural sector in divers ways; while it relied for its own inputs on domestic cultivation of sugar-cane, it provided animal food for the livestock industry. The Taiwan Sugar Corporation was able to organize approximately 150,000 contract farmers, introduce new techniques of farm management, pest control, harvesting and increase the yield to 65.7 metric tons per hectare in 1961/62, with an extraction rate of 12.6 per cent. The performance in the sugar industry emphasizes the impact of modern industry on a traditional agricultural base. Similar developments occurred in other agro-industries such as canning of pineapples, mushrooms, vegetables, and the like. Production of yeast increased from 46 tons in 1952 to 7,289 tons in 1957. Priority was given to the cotton textile industry; agricultural production of cotton increased from 900 tons in 1952 to 2,000 tons in 1955, and cotton fabrics from 87 mn metres in 1952 to 167 mn metres in 1955. At the same time, the agro-chemical industries were developed apace, and from an almost non-existent base in 1950, production of nitrogenous and phosphatic fertilizer exceeded 500,000 tons in 1965, sufficient to meet its requirements and leave a surplus for export. The expansion of the agricultural sector resulted not only in a larger intake of intermediate and investment goods, but also in a change in the consumption levels providing a ready market for consumer industrial goods. Saving in the agricultural sectors increased from about 469 million N.T. dollars in 1952 to 2,065 million N.T. dollars in 1962.

The strategy of development in China (Taiwan) is also evident in the progress of capital formation in the two sectors. Reference has already been made in chapter 2 (ii) part 1, to the greater emphasis on agriculture evident in the early stages of development and gradual increase in the proportion of the industrial component in the total capital formation in the succeeding period. As the agricultural sector expanded and the surpluses in the sector increased, the growing industrial sector absorbed these savings in productive capital formation, and increased its capacity to supply the industrial goods that were required by the growing economy. Mention has already been made of the crucial role that industry must play in the process of capital formation in the transitional stages of growth. In China (Taiwan) the complementary growth of an industrial sector was helpful in transforming the savings into productive assets and building into the economy the 'capital deepening' process which is par excellence the character of industrial growth. In such a context, the development of the agricultural sector will nourish the growth of industry; national policies can be then directed at the balanced development of both sectors; and a conscious effort can be made to use a viable and expanding agricultural sector as a base for the development of an industrial sector which will gradually assume the dynamic and dominant role in the economy.

There is also another aspect of the relationship of China (Taiwan)'s agricultural sector with industry. The growth of the industrial sector has not eased the problems of an increasing population in the agricultural sector and the steady diminution of farm size. Although the manufacturing output increased from 4,448 million N.T.$ in 1956 to 14,556 million N.T.$ in 1963, the proportion of the economically active population in industry increased by only 2.5 per cent, from 9.2 per cent in 1954 to 11.7 per cent in 1963, an increment of approximately 150,000 workers.[1] The capacity of the industrial sector to absorb the increases in the work force has been limited, and this may bear some relation to the choice of techniques and the relative capital intensity in the process of industrialization that took place — an aspect which is discussed in a later section of this paper. The imperatives of growth in the agricultural sector have already resulted in a land consolidation programme, which in its turn must bring its concomitant problems of a surplus agricultural population and the urgent need for rapid expansion of the industrial sector in order to absorb the surplus.

2. *Problems of balanced growth in industry*

Reference has already been made to the composition of industrial output in the various countries of the ECAFE region, and the character of the industrial sector in these countries. The approach to industrialization, and the selection of industrial investments vary widely among the developing countries of the region.

In many of the developing countries in the ECAFE region, the process of industrialization has started with the industries which supply goods for mass consumption: textiles, food products such as sugar, and building materials such as cement. This phase of industrialization has been characterized by the familiar drive for substitution of imports and the growth of a variety of light consumer industries. However, where such a process of industrialization has not formed part of a well-conceived plan for diversification of industrial activity, for assimilation of the advanced technologies and progress into the more complex and heavier indus-

[1] Statistical Yearbook — China (Taiwan) 1963.

tries, the initial process of import substitution tends to exhaust its potential; the pace of industrial growth tends to slacken. The industrial investments from the early stages have to be related to some projection of an industrial sector which the country is planning to create. This emphasizes the need for co-ordination of investments. The co-ordination of investments itself becomes not merely an instrument for achieving the greatest possible economies for industry, but also a means of giving direction to the process of industrial and technological growth. It involves the appropriate choice of industries and the selection of processes which will create an increasingly interrelated industrial sector, deepen and extend the input and output relationships in industry and maximize the use of local output.

It is possible to distinguish between the countries whose plans are consciously patterned by what might be termed an 'industrialization ideology', and others in which industrial activity, though substantial, does not provide the decisive motivating force in their development plans. In the countries for whom rapid industrialization and the quick and effective acquisition of modern technology are the prime goals, there has been a conscious effort to set up an interrelated industrial structure. This may manifest itself in different strategies, as in the case of mainland China and India on the one hand or China (Taiwan) and Pakistan on the other. In the former case, the countries have placed the emphasis on the metal and machine building sector which will produce the means of production, increase the supply of capital goods and accelerate the growth of the economy. The emphasis is, of course, more pronounced in the case of mainland China. The motivating impulse here is that of creating the whole range of productive capacities which constitute an industrial economy. In the case of Pakistan and China (Taiwan), the initial emphasis has been on the creation of an interrelated sector of intermediate and consumer goods to be followed by expansion into heavy industry in the later stage. This is explicit in the draft four-year plan of China (Taiwan) and the third five-year plan of Pakistan.

"The goal that we pursue is the establishment of advanced industries requiring heavy capital investment and modern technology. Our industrial development must reach such a stage before we can have a modern industrialized economy. Petrochemical steel, ship-building, machines and metals are the industries marked for intensive development." (Report by Minister K. T. Li, Vice-Chairman, Council for Economic Development 6.3.65.)

"The major objective of the industrial programme during the third five-year plan will be to shift the emphasis from consumer goods industry to the establishment of basic capital and producer goods industries to reduce the country's dependence on foreign assistance for the import of capital goods." (Outline for Third Five-Year Plan, Pakistan).

But in each of these cases, what is significant is the manner in which the investments within industry have been planned or directed. Efforts have been made to co-ordinate industrial investment so that industries grow up in subsectors or groups which are related technologically as well as through inputs and outputs. This is evident if one examines the growth of the sugar industry and its by-products in China (Taiwan), where molasses and yeast went into the livestock industry, monosodium blutamate went into the food processing industries, and bagasse into board and pulp. Similarly China (Taiwan) built up capacity for the whole range of alkali and heavy chemical industries which were industrially dependent on each other — sulphuric acid, nitric acid, hydrochloric acid, caustic soda, chlorine, soda ash, aluminium sulphate, bleaching powder, industrial D.D.T., carbide, plate glass, and so on. The same phenomenon is observed in Pakistan where a complex of mutually supporting chemical and chemical-user industries were established within a brief time span during the second five-year plan period. It would be useful to study in greater depth than is possible in this paper the impact of such a process of growth on the level of technology in the country and the economies of individual industries within the group.

It is necessary to bear in mind that the growth in the advanced economies was from the very beginning a process which was more self-reliant than that in the developing countries. Every new development and investment in the advanced economy drew largely on the technological and productive resources available within the economy, whether capital or intermediate goods. For the growth of a new industry, the industrial sector in the country had to develop its technology and equipment in a more integrated manner than is necessary for developing countries. Even when it drew on the resources of other advanced economies, the relationship was one of interdependence of technologically equal or nearly equal partners and not one of complete dependence. In such circumstances, the technological skills and the production capacities are all the time built and accumulated for the expansion and growth of new industry. In a developing country when an industrial investment is made, the indigenous industrial sector seldom has the capacity to supply the capital goods. A number of intermediate goods required for production, spares for maintenance, and so on, also have to be imported from abroad. The technological skill that is developed therefore only applies to a fraction of the industries; its industrial dependence and interrelations are largely with a more sophisticated economy abroad. The countries which deliberately set about creating an industrial apparatus have generally sought to avoid the fragmentary piecemeal investment in unrelated industrial projects. They have to some extent to simulate the process of industrial growth of advanced economies in so far as investments have to be co-ordinated and a concerted advance has to be made in industrial technology and capacity. Such an advance can begin with sub-sectors

and branches of industry and expand over a wider area. It is in such a situation that industrial investments are best adapted to transmit their benefits to various sections of the economy, and create the cumulative process of growth characteristic of industry.

It it also true that, in many industries, the economies and efficiencies which become available when a group of related industries are taken together are not available when each project is considered singly as an isolated investment. In Ceylon, the expansion of the plywood industry, which now supplies only 20 per cent of the local requirements, and the establishment of the chipboard industry from plywood waste, may increase the consumption of synthetic resins and justify a resin plant; but such a plant would have to await the establishment of the fertilizer factory and the refinery. If the investments are seen in their configuration — the relationship of plywood to the major tea industry, of fertilizer to the domestic and export agriculture which now heavily depends on imports, and the by-product link in synthetic resin — a programme of co-ordinated investments might be justifiable. Similarly developing countries provide other examples where the "dynamic external economies" offered by co-ordinated investment decisions, have not been fully exploited when investments are viewed singly. In an unsophisticated economy, the caustic soda plant (using the electrolysis process) may become uneconomical if no uses can be found for its chlorine. The complex of industrial activities round caustic soda and the detergents, chlorine and by-products, such as hydrochloric acid, ferrichloride, and so on, must grow together to render each investment economical. But the economies of production relate to one aspect of the strategy; equally or more important is the industrial aspect, the deepening of the technological base through the growth of a complex of industries. Where the strategy of industrialization in developing countries has succeeded in co-ordinating investment and creates capacities which are industrially interdependent and technologically allied, it has been able to raise the level of technology and provide a base which stimulates and generates further industrial growth. It is then seen that the principal factor has not been "imported substitution" to satisfy an existing demand, but a more dynamic approach to industrialization governed by the overriding objective of creating an efficient and resourceful industrial sector within the economy. Such a process creates new demands, and alters the established patterns of consumption; industrial investments in developing countries have to be seen in the context of such a dynamic demand-creating growth.

Where the primary consideration has been one of import substitution and where the investments decisions have not been systematically co-ordinated to build industrial capacity in interrelated fields, there emerge a large number of assorted industries, largely light consumer industries requiring simple technologies and having very little complementarity among themselves. In Burma and Ceylon, for example, the few large-scale projects each satisfy a given market demand with little or no industrial interdependence, and lead to a growth of consumer industries in the private sector which illustrates the comment made. If there were no planning in these countries to carry forward the industrialization process, they would exhaust their potential to advance industrial technology and stimulate the diversification of industry, as the structure in itself does not contain the elements which would impel such an advance.

It has been noted that the growth of industrial investment in the developing countries has, to an appreciable degree, shifted its dependence on advanced economies from the consumer goods sector to the capital goods sector. Reference was made to this aspect in the discussion of table 16. On the other hand, this new pattern of dependence has not radically altered the vulnerable position of the developing economies in regard to their export earnings and import capacity. Their industrial sectors remain dependent on external sources for the means of production. The countries with larger resources have therefore already made or have planned large outlays to build into their economies the capacity to manufacture the heavy machines and equipment required by their industrial sector. From the very outset, mainland China gave high priority to the need to create this capacity within its economy. India already possesses considerable capacity for production of plant and equipment for a number of industries. Pakistan and China (Taiwan) have plans for the establishment of heavy engineering industries. The development here is not to be regarded as one in the direction of an autarchic economy, but as a development designed to assimilate into the economy all the resources of industrial technology and alter its relations from one of dependence on advanced economies to one of interdependence. One of the industrial branches whose growth is crucial to this process is the manufacture of the capital goods and heavy machinery in the developing region.

It is obvious that the industrial structures will be largely fashioned by the resources endowments of the various economies. However, the expansion of industrialization in developed and developing countries indicates that limitation or paucity of natural resources does not inevitably rule out or impose severe limits on industrialization programmes. Limitations of resources can create their own pattern of industrialization, as has been seen in Hong Kong and Japan, or even in China (Taiwan), which is relatively poor in natural resources. What has been relevant for these countries has been the choice of industry and the techniques of industrialization; their achievements indicate that, with the will to industrialize, hard work and the necessary enterprise, a country could develop its own industrial pattern notwithstanding limitations of natural resources.

Within the limits of this paper, it is not possible to deal comprehensively with all the problems relating

to the strategies of balanced industrial growth in the developing ECAFE region. General observations have been made on the following aspects: (a) the need to plan the initial "import substitution" within the larger framework of an adequate industrial structure for the country; (b) the need to co-ordinate investments and develop configurations or complexes of industrial activity so that the growth of industry becomes an organic process, where there is an interflow of economies among investments and a deepening of the technological base; (c) the need for balanced industrial growth to enable the countries to acquire a wide range of productive capacities in capital intermediate and consumer goods, and technological capacities in engineering, chemical, electrical, industries, and so on.

Another important aspect in the strategy of industrialization is the pattern of trade which it projects. If industrial development in developing countries is to rescue them from their dependence on advanced economies, it must result in an increasing exchange of industrial goods. In order to achieve this, a number of developing countries have built into their industrial plans an export component, and embarked on bold programmes of industrialization for export. The data available do not permit an informed study of such developments in all countries of the developing ECAFE region. However, the programmes for China (Taiwan) and the Republic of Korea indicate targets of exports in manufactures for a large variety of products. China (Taiwan) is planning for an exportable surplus of a wide range of industrial products including exports of processed food products, textiles, synthetic fibres, paper, cement, chemicals, and machinery. The Republic of Korea has planned the expansion of the machine industry and the textile industry to include an export potential.

India expects to increase its export earnings from manufactured products. A more than three-fold increase in export potential is anticipated in the engineering goods industries during the fourth plan period; the present export earnings of 160 million rupees from exports of engineering goods are expected to reach 500 milllion in 1970-71.[1] The target of exports of manufactured goods for Pakistan in 1960-1970 is approximately 2,457 million rupees, an increase of more than 300 per cent on the present 746 million rupees. The composition of the planned exports indicates that Pakistan will continue to rely heavily on the traditional exports of jute and textile products which will account for nearly 1,480 million rupees.

Many of the developing countries have made some headway by processing the industrial raw materials which had been previously exported, and exporting them in processed or semi-manufactured form. This applies to the jute manufactures exported by India and Pakistan and the vegetable oil exported from the region, particularly by Ceylon and Philippines. The potential for further expansion of these industries for exports is substantial, particularly in the case of the vegetable oil industries, where, although exports of coconut oil went up from 253.2 thousand tons in 1957 to 332,000 tons in 1963, as much as one million tons of copra are still being exported. Development on these lines calls for supporting measures from the advanced countries in regard to removal of trade restrictions and for tariff liberalization.

The development of export-industries is related to the over-all problems of international trade[1] and regional harmonization. At present, the countries which are investing in industries for export seek to enter the international markets in the normal manner and expect to meet the new demands that are being continuously generated within and outside the region. Some of the implications of these problems are discussed in relation to regional harmonization in a later section of this paper.

Finally, any strategy of industrialization must take into full account both the short-term and long-term employment problems. The data available show that the contribution made by industry to employment in the developing countries has not been significant in relation to the magnitude of the under-employed and unemployed work force as well as the annual increase in the work force. The key role played by the increasing productivity in the primary product sector in any strategy of balanced sectoral growth has certain consequences on the deployment of manpower. The increasing productivity in the agricultural sector normally results in an increasing surplus of manpower in the primary producing sectors: this in turn generates the need for increasing the rate and volume of absorption of the work force in secondary and tertiary sectors.

It has been tentatively estimated that the agricultural population in China (Taiwan) that would have to be re-allocated to other sectors on the basis of an optimal consolidated holding would be in the region of two million.[2] This example emphasizes the need for rapid expansion of the industrial sector in most of the developing economies. At the same time it draws attention to the urgent need for techniques of industrialization to maximize the utilization of manpower. The problems of industrial growth arising out of this situation in the developing countries are manifold. The factor inherent in a process of rapid industrialization may require emphasis on capital and producer goods industries which are normally capital intensive. Furthermore, it is not possible to reduce the quality of the technology in order to achieve maximum labour inputs. In a labour-intensive technique, the process of capital formation may be relatively sluggish and may have

[1] Country Study for the Asian Conference on Industrialization.

[1] These problems are discussed in the paper on Industrialization and Foreign Trade.

[2] Land Reform and Its Impact on Economic and Social Progress in Taiwan — Yen Ten Chang.

long-term effects of slackening the employment-generating growth. All these are related on the one hand to the scarcity of capital and on the other to the volume of the work force and its steady increase.

The problem is also linked with the use a developing country makes of the small-scale industry sector, which is generally more labour-intensive, and the efforts it makes for the development of efficient small-scale technology. On the one hand, it has to examine carefully the comparative benefits of organizing production in small units with labour-intensive techniques. An example is the dispersal of the weaving industry in Ceylon in a large number of power loom units. On the other hand, a country has to examine the possibilities of adapting modern technology and developing new and efficient technologies for small-scale operations which are less capital-intensive and more employment generating.

A great deal of discussion has taken place on the use of 'intermediate technology' in the production techniques of newly industrializing countries. The adaptation of modern technology or the development of new technologies, which will be less capital consuming, will make maximum use of the meagre stock of technical skills in a developing economy, and increase the capacity of industry to absorb labour, could certainly play an important role in the industrialization of developing countries. But the technical and economic feasibility of what is termed 'intermediate technology' needs to be demonstrated on an effective scale. It is an area in which the initiative has to come from the developing countries themselves, as there is little motivation for technical innovations of this nature in the developed countries with full or nearly full employment. It is, therefore, a field for systematic study and investigation on a regional basis.

However, in considering 'intermediate technology' and the small-scale sector it is necessary to be aware of the possible pitfalls of small-scale labour-intensive development. For one thing, where the small-scale sector is a supplier of intermediate goods to the large-scale sector, the difficulties of standardization, quality control and production efficiency may cause serious bottlenecks. The manner in which these problems were reduced to a minimum in the excellent use of the small-scale sector in the industrial growth of Japan provides a useful guide for the developing countries in the region.

II. PROBLEMS OF INDUSTRIAL PLANNING AND PLAN IMPLEMENTATION

1. *The organization for industrial planning*

The goals of planning and the methods and instruments of plan implementation vary according to the socio-political systems in the ECAFE countries, but the planners in all these countries recognize the need to set targets of economic growth for a specific period, translate them into quantitative terms in as detailed a manner as possible, and organize the resources for the achievement of the objectives. There is, however, a wide disparity in the methodology and planning in the different countries and in the extent of detailed programming that is done. The inadequacies of planning, regardless of the economic system, become most apparent and most injurious in industry in the developing economies. The rapid and intensive development desired by the developing countries requires an increasing co-ordination of decisions in all sectors, whether such decisions entail the programming of state investments or the direction of activity in the private sector. The needs for adequate planning and direction of investment in the private sector and for co-ordination of the motives in private investment with the over-all economic objectives have been generally accepted in the region. Such co-ordination is naturally most essential in the industrial sector where the activities are or have to be closely interrelated, where production links are constantly being formed and where any disequilibrium can have cumulative effects.

In whatever stage of development a country may be, the formulation and implementation of realistic plans of industrial growth require a planning apparatus and planning techniques which are of the highest quality and reliable as possible. It is sometimes argued that the less developed countries should adopt simpler techniques in their planning; but, while the selection of techniques will be limited by various factors such as the level of statistical information and the like, it would be unwise to assume that countries which are less developed will not require the most precise tools for the analysis and development of their economic activities. When the planning methodology has resulted in an incomplete or imprecise diagram of the economy as it is, and of its projected growth, developing countries in the region have had to encounter various problems in their programmes of industrialization, such as shortfalls in the growth of related sectors, or the growth of uneconomic activities in a particular sector. It is therefore advisable for the developing countries to perfect as far as possible their planning techniques as an important instrument for promoting rapid and sustained industrial growth.

Although a full discussion of this aspect cannot be attempted within the scope of this paper,[1] it is pertinent to draw attention to two salient problems as they affect the industrialization programmes in the developing countries. In many countries, the statistical data for the preparation of detailed programmes of industrial development are not adequate. While the available data may be sufficient for a programme which consists of a few projects, the statistical background for the preparation of programmes for the development of industry as a sector is incomplete. National income statistics are not compiled in some countries of the region. Capital formation data in

[1] This subject is discussed fully in a separate paper entitled "Institutional Arrangements for Industrial Development."

the industrial sector are not readily available for a few countries, including Afghanistan, Nepal, Ceylon, Burma, Pakistan and India. In a number of countries, there is need to collect adequate information on the industrial sector itself, for example, information relating to the industry-wise contribution of value added, the import content of existing industries, the capital formation in the private sector including the small-scale sector, and the investment efficiencies in the different industries. While such information may be available for collection in various organizations, its statistical processing in a centralized manner for the task of planning is not adequate. To quote a few example, in India, "data on capital investment in industry are very inadequate"; in Nepal, "in the absence of a census of manufactures it is very difficult if not impossible to make an assessment of the capital investment in industries by sector"; in Afghanistan, "no data are available on national income, savings, or investment."[1] On account of the character of their economic activity and productive systems, the centrally planned economies as well as such market economies as Japan found it necessary to amass the statistical data which gave a total picture in as minute a detail as possible of the entire economy. This ensures that each investment decision is take with a framework of comprehensive information and in co-ordination with a multiplicity of related decisions. The statistical apparatus provides the material for planning and, where the material is incomplete, the planning is necessarily inadequate. The preparation of plans in such detail will obviously not be required by most of the economic systems in the developing region; but, even where the state sector is comparatively small, the planning authority needs comprehensive and accurate statistical data to guide the movement of the economy.

While almost all countries of the region prepare plans for the growth and development of their economy, the detailed planning and programming that is done for the industrial sector in particular varies in quality and extent. In many instances, the plans are programmes of investment indicating an over-all rate of growth. They do not forecast the increase in net domestic product by sectors as a result of the investment, or, when they do so, they do not provide a more detailed quantitative breakdown of the production targets by principal commodities. In some cases where the targets for public sector projects are given in some detail, no projections of developments in the private sector industry are attempted. In such instances, the links between planning and the practical efforts for realization of the objectives contained in the plan are necessarily tenuous. The more elaborate planning and programming technique in countries such as India, Pakistan, China (Taiwan) and South Korea, which provide a more graphic forecast of the economy and the industrial sector as planned year by year, are better suited to rapidly industrializing countries. The productive levels in each major industry, the consumer demand itemized in as much detail as possible, the material balances, the inter-industrial relationship, and the programme of imports and exports have all become essential parts of industrial planning. For example, the Republic of Korea's second five-year plan contains a detailed programming of production in quantitative terms and in terms of value added year by year, and give details of the corresponding import-export programme, thus providing a detailed forecast of the foreign exchange position. China (Taiwan)'s third five-year plan gives similar projections for the economy while the plan is in operation (see tables 21 and 22).

The strategies of industrial development and the choice of investment in the industrial sector depend to a large extent on the presence of an adequately detailed plan of activities, in short, a plan translated into programmes. In the context of rapid industrialization, investment choice has to be guided by projections of demand in a continously changing economy. Where growth of the market cannot be foreseen, it is natural that investment particularly in the private sector will be sluggish and will tend to minimize risks to itself. In such a context, the flow of investment to the area for substitution of light consumer goods imports with an assured market and the simplest of technologies is an inevitable phenomenon; it has occurred to some extent in the private sector growth in Ceylon. On the other hand, where the future industrial inputs and outputs are forecast and where a pattern of future industrial activity and consumer demand is available as a reference, investment in the private sector is likely to be more vigorous. This has been evident in China (Taiwan) and Pakistan.

These comments direct attention to what has already been said regarding the effects of planning industry as an interdependent and interrelated production system. As an example, reference can be made to the framework of industrial planning in India where the Subject Branches in the Planning Commission and the Development Councils for selected industries examine the desired growth of branches of industry and plan for their development as an interactive whole. In countries at a less sophisticated stage of industrial planning and development, the project is related to the individual investment, whether it be a refinery, a large factory, or a flour mill; there is no attempt to plan in terms of configurations of related investments. Industrial planning in the majority of developing countries (the eight-year plan in Burma, the ten-year plan in Ceylon, the plans in Afghanistan and Nepal, the Philippines and Thailand) to a greater or lesser degree illustrates this approach. Ceylon has undertaken the re-organization of the planning machinery as a whole, including industrial planning. In the proposed scheme,[1] Industry panels will plan in a co-ordinated manner for various groups of inter-

[1] Quotations from Country Studies for the Asian Regional Conference.

[1] Country Study for Asian Regional Conference.

TABLE 21. CHINA (TAIWAN): FOREIGN EXCHANGE SAVING IN THE INDUSTRIAL SECTOR ESTIMATED IN THE THIRD FOUR-YEAR PLAN, 1961-1964

(Value in million U.S. dollars)

Industry	*Foreign exchange component of capital requirement (per cent)*	*Foreign exchange saving in 4 years*				*Cost of imported equipment*	*Exchange saving in final year 1964*	*Exchange saving in 1964 as per cent of cost of imported equipment (per cent)*	*Out-put capital ratio (1964 net output to total investment) (per cent)*	*Employment-capital rate (number per million US dollars)*
		Decrease of goods imports finished	*Increase in export of finished goods*	*Increase in import of raw material*	*Net saving*					
1. Grand total										
Including power	47	150.7	185.1	100.3	252.4	269.1	108.6	40	24	217[a]
Excluding power	45	150.7	185.1	103.3	252.4	156.8	108.6	69	38	349[a]
2. General chemicals	54	76.1	29.2	10.9	94.3	37.5	43.6	116	38	148
a. Fertilizer	57	52.7	- 5.8	13.0	33.9	19.0	19.7	104	24	65
b. Alkalis and chlorine	40	5.6	—	1.3	4.4	3.5	1.8	50	33	166
c. Paper	57	—	14.1	- 2.6	16.7	6.2	6.6	107	66	176
d. Plastics	76	—	16.8	4.2	12.6	3.2	5.7	180	83	687
e. Pharmaceuticals	60	7.3	—	- 7.9	15.2	2.1	5.2	250	96	91
f. Leather	37	2.7	4.1	3.0	3.8	0.7	1.7	249	27	737
g. Other chemicals	42	7.7	—	—	7.7	2.9	3.0	102	12	24
Basic metal & machinery mfg.	59	54.0	11.7	15.5	67.2	43.4	29.4	68	37	95
a. Iron & steel	71	...	...	...	16.8	35.0	9.2	26	33	56
b. Aluminum	38	—	11.7	3.1	8.7	3.9	2.9	75	26	22
c. Machinery mfg.	29	26.1	—	2.8	23.3	2.1	9.5	452	48	316
d. Electrical machinery & appliances	36	27.9	—	9.6	18.4	2.4	7.8	320	70	252
Other industries	12	1.4	18.9	4.8	15.5	2.5	6.8	266	78	1,949
a. Handicrafts	4	—	11.2	1.6	9.6	0.3	4.3	1,237	132	4,384
b. Rubber & wood products	18	1.4	7.7	3.1	6.0	2.2	2.5	114	39	168

Source: Third Four-Year Plan.

[a] 204 persons excluding power and handicrafts; 137 persons including power but excluding handicrafts.

related industries; the investment proposals of these panels will be evaluated by a Planning Unit for Industry, and will be finally incorporated into national plans.

The need for co-ordination of investment proposals and a thorough examination of inter-industrial relations becomes evident when one examines how sometimes even the choice of a particular process can affect the economies of another existing industry. The bleaching process in the textile industry may be designed to use a by-product from the surplus chlorine in an existing caustic soda plant, or the soda ash process for caustic soda may be selected because it fits into a soda-ash, caustic soda, glass complex, and because chlorine consuming industries are few.

Thus the choice of investments and the evaluation of investment proposals in the field of industry become integral parts of industrial planning. Such an evaluation of individual investments for their net contribution to national income is possible only within a clearly planned framework of economic growth. Where such a framework is not available, evaluation of any industrial proposal will inevitably be of an *ad hoc* nature, and its final impact on national income and growth will be analysable only in very approximate and vague terms. This was evident when rapid import-substitution took place in industries which gave immediate profits to the private investor. The short-term benefits of foreign exchange saving obscured some of the limitations that were inherent in the process, particularly during the "import-substituting" industrial growth in some of the developing countries in the region. In the absence of a framework within which individual investment proposals can be evaluated and without a comprehensive appraisal of their impact on the foreign exchange budget, industrial capacity has been built in relatively inessential and foreign exchange consuming areas, thereby aggravating foreign exchange problems.

A different example can be drawn from China (Taiwan) where the programme of industrial investment and production in the third four-year plan was subject to careful analysis in relation to their effect on the foreign exchange position of the country. The net recurrent foreign exchange saving and the period of recovery of the foreign component in the investments were calculated so that the country's commitments and their effect on the balance of payment were anticipated (table 21). The developing countries need to give priority to the improvement of their planning apparatus and the refinement of their methodologies to plan for optimal development; this is particularly applicable to the industrial sector.

2. *Problems of implementation of industrial plans*

The brief review of performance in comparison with planned targets given in chapter 3 of part 1 of this paper drew attention to some of the failures and shortfalls in the implementation of industrial plans in developing countries of the region. The execution and management of the plans, as distinct from the plan formulation, make the severest demands on the scarce managerial resources of the developing countries. The wide discrepancy between achievement and objectives at the end of the plan period (the distinction here is limited to the industrial programmes) has been largely due to failures in sectoral co-ordination and effective direction of the plan. In some instances, planned targets may have over-estimated existing capacities; but, allowing for this factor, the skill in assembling resources and ensuring that the execution of the various components of the plan are correctly phased has a great deal to do with the final results of the plans.

The rate of industrial progress in developing countries is significantly influenced by their capacity and executive efficiency. The efficiency of their executive apparatus, from the highest level down, will generally determine the time taken from the original proposal to the final commissioning of a plant. In many cases, the period is obviously excessive, even after one has taken account of the limitation in skills and resources. Negotiations for aid, contract procedures, and so on, and to the delays contributing to shortfalls in critical areas. The fourth steel plant and the growth of the chemical fertilizer industry illustrate these comments in regard to India. In the Philippines, work on the integrated steel mill began in July 1964 after six years of protracted negotiations for credit. In Ceylon, work has not yet started on the newsprint mill and the fertilizer plant which are both included in the ten-year plan.

The procedures for inclusion of projects in the plan will vary from country to country. But generally the administrative delays from the time feasibility surveys are undertaken up to the time when a project is accepted for implementation are considerable in many developing countries of the region. The next stage, when engineering surveys and final project reports are prepared and contracts for supply of equipment and construction of plant are finalized, is often beset with involved administrative procedures in regard to the public sector. Data regarding the private sector are not available, but many of the countries report examples where additional capacity has been sanctioned for the private sector, but has not been made available during the plan period. The construction period itself depends on the efficiencies of the construction industry, its capacity to programme a large volume of work in conformity with modern techniques of programming construction work, and its managerial and technical ability. At all these critical points of plan execution, a careful analysis of the methods of work and identification of the bottlenecks has to be continuously undertaken to reduce the period of gestation of industrial activity in the developing countries.

TABLE 22. UNDER-UTILIZATION OF CAPACITY IN INDUSTRY IN SELECTED ECAFE COUNTRIES

Afghanistan[a] (1963)	Capacity utilized in Textile industry	43%
Burma[b] (1963)	Capacity utilized in Condensed milk factories	85.2%
	Capacity utilized in Oil mills	20.0%
	Capacity utilized in Hosiery industry	46.9%
	Capacity utilized in Fruit canning and preserving factories	59.6%
	Capacity utilized in Cigarette factories	75.2%
	Capacity utilized in Coir mills	51.5%
Ceylon (1964)	Under-utilization of capacity in light consumer industry in the private sector during 1964 estimated at approximately 60%	
China (Taiwan)[c] (1962)	Capacity utilization in cement industry	94.47%
	Capacity utilization in sheet glass industry	91.37%
	Capacity utilization in asbestos tile industry	87.30%
	Capacity utilization in paints industry	31.40%
	Capacity utilization in soap industry	53.88%
	Capacity utilization in soda ash industry	61.58%
	Capacity utilization in caustic soda industry	85.38%
India	Under-utilization of capacity in industry is estimated at 17%	

[a] Country Study.
[b] Economic Survey for Burma 1963.
[c] Country Study.

Apart from the execution of the plan itself, the shortfalls in operating efficiencies in the new industries is another important factor in the disparity between performance and plans. Detailed information is not available on the under-utilization of capacities in the industries of the region; but table 22 gives some information for Burma, Ceylon, China (Taiwan), Afghanistan and India. The under-utilization of capacity has been due to different causes, partly to foreign exchange difficulties resulting in a reduction of the imports required by industry, partly due to failures in sectoral co-ordination outside the control of the industries themselves, and partly due to inefficiencies within the industry resulting in output below rated capacity. The under-utilization of capacity, however, becomes a serious problem in a developing country which allocates its scarce capital to projects after a strenuous mobilization of its resources.

These conditions emphasize the importance of machinery for effective and co-ordinated management of plans, including industrial plans, and the evaluation of efficiency and performance in industry. Many of the

countries in the region have periodic appraisals of the progress on their plans, and other economic surveys which draw attention to weak links in their execution. These include annual surveys (Burma, the Republic of Korea and China (Taiwan), and periodic appraisals of plan implementation (India, Pakistan and Afghanistan). Apart from this, some countries have regular machinery built into the administrative structure for continuous review of their plans. India, for example, has a progress unit in the Plan Co-ordination Section of the Planning Commission which collects the important data on the various programmes and presents them to the Commission. The National Planning Department of Ceylon has adopted a system of quarterly reporting on the progress on planned projects. China (Taiwan) reviews the implementation of the plan through the co-ordination committees working under the direction of the CLECD. In the Republic of Korea, the Office of the Economic Planning Board evaluates the progress on the plan and submits half-yearly reports on the results of the plan to the Prime Minister. In Pakistan, the Planning Commission is vested with the function of maintaining a review of the over-all progress on the plan, while the Planning Cell in the Central Ministry of Industries co-ordinates the activities under the industrial plan, prepares the investment schedules for the private sector, and examines and reports on the progress of all projects sanctioned in the private and public sector. In the case of industry, an effective evaluation of progress made with the plan, to be meaningful and to enable the planning authorities to identify and critical failures and shortfalls in given strategic projects and in sectoral co-ordination, requires highly developed and refined techniques of progress control. India has devised what it items "the line of balance technology" for a quick and effective evaluation of progress on individual projects. For the evaluation of progress in a whole sector, the adaptation of methods of programme evaluation and review will be necessary. The modern techniques of CPM (Critical Path Method) and PERT (Progress Evaluation and Review Techniques) which are largely relevant to individual projects could be appropriately adapted and simplified for use in progress reviews of industrial plans. What is required in many of the countries in developing regions is the detailed breakdown of plans into their components and the determination of their relationships, the identification of the critical points in the programme which can affect the over-all plan, and a continuous vigilance over these critical interrelations of the plan. These components are particularly relevant for the public sector programme; but, even in the private sector for which targets are in effect forecasts and where the activity is not rigidly bound by the projected figures, the movement of the sector's activity in relation to projections can always be appropriately evaluated.

Some of the countries in the region have established machinery to evaluate the performance of industries and assess their efficiencies. The Government of India has two special bodies, the Committee on Plan Projects and the Programme Evaluation Organization. However, the majority of the countries in the region do not maintain a continuing organization which, by the utilization of capacity, productivity and operating efficiencies, can keep costs and economies in imports, and so on under review. Such a review will provide some over-all picture of the efficiency of different industrial branches in the economy. For example, it will assist the planning authorities in identifying those inefficiencies which flow into industry from other sectors, such as transportation and power, and also isolate and give more specific attention to the inefficiencies in particular industries which impede the growth of the sector as a whole. For example, in Ceylon, the high cost of transportation and power inflates the cost in industry; and, in an industry such as cement, will affect its competitiveness in the international market if and when it produces for export. China (Taiwan) in its industrial surveys, as pointed out earlier, collects detailed information on the industries in relation to capacity, utilization, productivity, financial ratio, and so forth. In the Republic of Korea, a continuous review of industry of a similar character is maintained. Ceylon is introducing a system of measurement of efficiency in public sector industries. Sufficient data are not available for the other countries of the region in regard to the machinery for evaluation. For effective evaluation of efficiencies, however, the norms of efficiency have to be satisfactorily determined and, for this purpose, the exchange of information regarding standards of performance in the region and their comparison with the standards of advanced economies will be of great assistance to developing countries. It will enable them to deal more effectively with the high cost structure of some of their industries and the wide disparities that exist in costs and imports even among the developing countries themselves, such as the difference in costs of heavy chemicals between India and Pakistan, or costs of soda ash between Pakistan and Taiwan, and so forth.

3. *Manpower development for industrial growth*

The problems of plan implementation in the developing countries focus attention on one of the more significant factors in the region's industrial growth—the availability of skilled manpower. The exact correlation between skilled manpower and development may not be easily determinable, but the composite index prepared by Harbison and Myers presents an interesting basis for comparison between the developed and developing countries (see table 25). The availability of capital resources is in itself evidently of limited value if the manpower for the proper organization and utilization of these resources is not available in proportion. Under-utilization of installed capacities as well as delays in implementation have often had their sources in the shortage of skilled manpower, and one of the major problems of industrialization in the

region is that of creating the skills in the proportion required for the programmes of industrialization that are envisaged. "The major capital stock of an industrially advanced country is not its physical equipment, it is the body of knowledge amassed from tested findings and the capacity and training of the population to use this knowledge effectively". This comment from Simon Kuznets reiterates the importance of the level of technology in a country's industrial growth, and its basis—the fund of trained skills within the country. This is well illustrated in the quick economic recovery of Federal Republic of Germany and Japan after the extensive destruction of their physical assets.

The index of human resources development worked out by Harbison and Myers on the basis of 14 indicators divides the countries into four level of development. According to this classification, the majority of countries are at levels I and II, South Korea at level III and Japan at the level of advanced countries. The information on one of the key indicators—"scientists and engineers per 10,000 population" is given only for mainland China, China (Taiwan) and India. While China (Taiwan) shows 30 for this indicator, mainland China and India have 3.1 and 2.6. A straight comparison of these indicators between small and large countries is of course misleading because the larger countries with a smaller per capita cadre of scientists and engineers will still have in absolute terms a sufficient number of them to build a complex industrial base for development beyond the capacity of the smaller countries. But the index reveals the varying intensities in the application of science and technology which is the initiating force in industrialization, and the very wide disparities that exist between advanced and developing countries and among developing countries themselves.

TABLE 23-1. INDICATORS OF HUMAN RESOURCE AND ECONOMIC DEVELOPMENT

(Average)

Indicator	*Level I 17 countries*	*Level II 21 countries*	*Level III 21 countries*	*Level IV 16 countries*
1. Composite index	3	21	50	115
2. NP per capita (US$)	84	182	380	1,100
3. Percentage of Active population in agriculture	83	65	52	23
4. Teachers first and second level per 10,000 population	17	38	53	80
5. Scientists and engineers per 10,000 population	0.6	3	25	42
6. Physicians and dentists per 10,000 population	0.5	3	8	15
7. First level enrollment ratio (unadjusted)	22	42	62	73
8. First and second level enrollment ratio (adjusted)	20	45	66	89
9. Second level enrollment ratio (adjusted)	2.7	12	27	59
10. Third level enrollment ratio	0.15	1.6	5	11
11. Percentage enrolled in scientific and technical faculties	24	28	26	28
12. Percentage enrolled in humanities, fine arts and law faculties	34	39	33	32
13. Public expenditure on education as percentage of national income	3.7	2.1	3.1	4.2
14. Percentage in age group 5-14	24	24	22	18

Source: Education Man Power and Economic Growth: Strategies of Human Resource Development by Harbison and Myers, 1963.

Table 18 gave the numbers of professional and technical personnel for selected developing ECAFE countries and advanced countries. The paucity of technically trained personnel is evident from these figures. Developing countries have, however, not given the same detailed care to manpower planning as they have to other factors of development. The assessments of manpower needs for the implementation of plans including industrialization programmes have been ancillary to the projects themselves, and training of cadres is very often carried out only at the project level. The first few development plans in many of the coun-

TABLE 23-2. INDICATORS OF DEVELOPMENT FOR ASIAN COUNTRIES

Country Indicator	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*
Afghanistan	1.9	50	85	3.3	n.a.	n.a.	4	4	1.2	0.14	21.3	33.7	n.a.	n.a.
Indonesia	10.7	131	75	29.4	n.a.	0.2	39	39	7.3	0.7	22.6	30.9	0.8	20.1
Burma	14.2	57	n.a.	n.a.	n.a.	1.0	31	45	10.7	0.7	40.9	46.2	3.6	23.6
Iran	17.3	108	80	24.6	n.a.	1.3	26	28	11.8	1.1	16.3	47.4	n.a.	23.9
China (Mainland)	19.5	73	69	24.0	3.1	2.6	36	35	14.2	1.0	55.7	n.a.	n.a.	20.6
Malaya, Former Fed. of	23.6	356	56	69.2	n.a.	1.8	58	62	21.0	0.5	26.0	34.9	n.a.	26.9
Pakistan	25.2	70	65	20.2	n.a.	0.1	20	29	16.2	1.8	29.9	42.4	1.2	n.a.
Thailand	35.1	96	85	57.4	n.a.	2.0	51	55	22.1	2.6	12.2	29.7	2.7	27.8
India	35.2	73	71	30.2	2.4	1.5	24	35	24.2	2.2	27.3	57.9	1.7	24.1
China (Taiwan)	48.4	161	63	52.3	30.0	3.6	63	69	30.9	3.5	39.6	25.1	3.3	23.5
Korea, South	55.0	144	75	34.6	n.a.	2.8	59	62	26.5	5.7	30.3	25.3	4.1	25.3
Japan	111.4	306	39	75.3	n.a.	13.5	62	96	79.4	8.4	22.1	26.6	5.7	22.7

tries of the region, including India, Pakistan and Ceylon, do not provide detailed manpower plans for the different branches of economic activity. The assessment of manpower needs and long-term manpower planning will of course be possible only when specific plans of development are available. Then, more or less accurate projection of the demand for skills can be made for different sections of the economy and, in the case of industry, for different branches of industry. Such a demand projection for key categories of personnel is made in India's fourth five-year plan. These projections include forecasts for a few segments of industry as well, such as coal, iron and steel and power.

While training programmes have been prepared and extensive training facilities made available, China (Taiwan) has made no such forecast of manpower needs. In the case of the Republic of Korea, priority has been given to the development of human resources for the execution of the plan. The first five-year development plan included a five-year technical development plan for the preparation of which the Government carried out a nationwide survey of employed technical manpower in August 1961, and again in 1963. Thereafter annual manpower requirements were determined in relation to the various investment projects, production increase ratios, percentage increases in value added. According to these estimates, the technical manpower in the country will increase from 300,000 to 350,000 in the first year of the plan, and thereafter increase during the plan period by 40 per cent, 66 per cent, 84 per cent and 101 per cent of the original number, amounting to 601,763 in the target year. Table 24 shows the breakdown of "annual technical manpower requirements" by category. The Republic of Korea therefore offers an appropriate example of detailed manpower planning as an integral part of an industrialization and economic development programme.

In Nepal, a manpower survey was conducted in 1957 with the assistance of UNTAA and ILO. In the first five-year plan, special emphasis is given to training technical personnel and an average of about five per cent of the budget of each department over the five-year period is to be spent on training. However, the manpower planning in Nepal for the future needs of economic development is as yet at the nascent stage, as only the immediate requirements for eliminating bottlenecks in the implementation of the plans have been studied.

In Ceylon, the Technical Education Commission 1961 stressed the urgent need for long-term planning of manpower resources. The training programmes, however, are directly organized at the project level, and the co-ordination of education and training at different levels with the programmes of development has not yet been undertaken on a comprehensive scale.

In Japan, the population census and employment status survey give detailed statistical information on the labour force of the country. Monthly labour force surveys report on the change in the situation on the basis of the first two surveys. In its medium-term economic plan, Japan has prepared estimates of the demand for skilled personnel during the ten-year period. With the spectacularly high rate of expansion of the Japanese economy, the effective supply of skilled managerial and technical manpower to sustain the growth of the economy is one of the major problems.

TABLE 24. ANNEX 2-1. TECHNICAL MANPOWER RESOURCE REQUIREMENTS — BY YEAR, KIND OF BUSINESS AND RANK — (unit: person)

Year	Grand Total	Engineers							
		Total	Mining	Textile	Metal	Machine	Elec.	Civ. Eng.	Chemical	Other
1961	299,414	8,616	310	493	185	846	1,492	3,018	1,118	1,154
1962	349,436	10,994	420	593	218	1,062	1,911	3,914	1,386	1,490
1963	418,164	12,814	479	703	320	1,308	2,222	4,467	1,616	1,699
1964	495,632	15,032	558	842	402	1,559	2,604	5,200	1,892	1,975
1965	549,768	17,055	638	867	514	1,821	2,971	5,927	2,072	2,245
1966	601,763	19,411	717	895	612	2,083	3,408	6,866	2,237	2,593
		Technicians								
1961	—	11,128	1,292	2,143	564	1,240	549	2,622	2,085	633
1962	—	55,509	7,255	10,195	2,659	5,936	2,777	13,338	10,152	3,197
1963	—	66,219	8,080	12,131	3,851	8,173	3,314	15,367	11,580	3,723
1964	—	78,266	9,245	14,623	4,805	10,036	3,917	17,934	13,348	4,358
1965	—	87,739	10,398	14,913	6,060	12,430	4,504	20,271	14,292	4,871
1966	—	97,059	11,429	15,221	7,139	14,555	5,151	23,098	15,061	5,405
		Craftsmen								
1961	—	279,670	24,498	80,100	13,012	29,386	14,565	36,420	61,277	20,412
1962	—	282,933	28,299	78,280	12,556	28,770	15,173	37,506	61,424	20,925
1963	—	339,131	31,490	93,292	18,328	39,958	18,149	43,535	70,176	24,203
1964	—	402,334	36,018	112,667	22,892	49,159	21,455	50,901	81,101	28,141
1965	—	444,974	40,493	114,574	29,016	61,116	24,914	56,917	86,752	31,192
1966	—	485,293	44,482	116,659	34,273	71,646	28,799	63,576	91,553	34,305

Source: First Five-Year Plan for Technical Development, Republic of Korea.

In the Philippines, the National Science Development Board proposes to conduct a survey of technical manpower. Several surveys have been conducted to assess the training needs of the country. However, while recommending the establishment of training centres; these surveys do not identify the fields of vocational training and technical skill and the extent of the training required.

In Burma, Malaysia, and Thailand, programmes of technical training extension of training facilities with the establishment of additional institutions have been undertaken. Manpower surveys and forecasts of manpower in the various segments of the economy have not been carried out. In Malaysia and Thailand, such detailed manpower programmes will be possibly only within a more elaborate framework of planning in which the development programmes of the various sections are available.

This brief review of the manpower development in the industrializing countries of the region stresses the importance of comprehensive manpower development programmes as part of industrialization plans. External assistance has been available to many countries for training personnel but, in order to use such assistance purposefully, the specific manpower needs of the country must receive prior assessment. The major role of manpower in the programmes of external assistance is seen in the early phase of industrialization in mainland China; the project assistance given was of an integrated kind: there was, as it were, a transfer of the main factors, including skilled manpower, required for a speedy break-through. In the rapid and extensive creation of the technical manpower required for industrialization, the advanced economies could render aid to the developing region; and, with more comprehensive manpower planning in the region, a massive effort could be made with the assistance of advanced countries to create the necessary fund of technical and managerial skills.

4. *Agencies of development in the industrial sector*

The agencies for the implementation of industrial plans in the developing ECAFE countries, and their relative importance are, in the last analysis, determined by the economic systems of the countries. The countries in favour of private enterprise in industry have permitted the state to enter industrial activity largely as a pioneering agency and an agency of development. The final objective is the transfer of these industrial enterprises to the private sector after they have established their viability. This procedure has been adopted in Pakistan and to some extent in China (Taiwan) and the Republic of Korea. In the Philippines, Malaysia, Thailand, Nepal, and Afghanistan, industrial investment is left to the private sector, the state functioning mainly in a promotional role. In Ceylon, Cambodia, and India, the industrial sector contains the features of a mixed economy, and includes state investments in varying proportions. In the mixed economies of India, Ceylon, and Cambodia, the areas for investment by the public and private sectors have been demarcated mainly on the principle that industries which are strategic to national development and have a commanding influence over the growth of the economy should be in the state sector. The economic system contemplates the co-existence of an economically powerful public sector and a vigorous and expanding private sector. Burma's recent approach to ownership in industry as declared in the Industries Nationalization Law, 1964, indicates that the private sector in that country will progressively diminish in importance, and that productive enterprise will be predominantly state-owned. In mainland China, North Viet-Nam and North Korea, all important economic activities are managed by the state.

Regardless of the ideological framework and the system of ownership adopted by the different countries, the process of industrialization in the developing countries indicates in no uncertain terms the major role that the state assumes. Even when the countries have attempted to give the dominant role to the private sector, the state has played the role of midwife for a large number of industries for which investment was not forthcoming, and resources had to be organized at a level not within the capacity of the private sector. The Industrial Development Corporations of Pakistan illustrate the role of the state in pioneering development in the industrial sector in order to create a self-reliant and viable private sector in industry. The West Pakistan Industrial Development Corporation has completed 70 industrial projects at a cost of 860 million rupees. The total investments of the East Pakistan Development Corporation totalled rupees 837.7 million at the end of 1963-1964. Twenty-four state projects in Pakistan had been converted into public companies with a paid up capital of Rs 560 million.[1] In the second five-year plan, public sector investment is in the region of 1,496 million as against 4,304 million in the private sector. In the third plan the proposed investment in the public sector is 4,750 million against 8,300 million rupees in the private sector.[2]

In China (Taiwan), the government investment has covered not only public utilities and services but also a number of productive enterprises, such as the Taiwan Sugar Corporation, the Taiwan Aluminium Corporation, and the Chinese Petroleum Corporation. The industrial output of the public sector amounted to 31.4 per cent of the total in 1964. Its share had declined from 60.5 per cent in 1952.[3]

In both countries it has been demonstrated how the process of industrialization can be accelerated by the active enterprise of the state; and that, even where private sector ownership is the objective, the private sector needs to be supported by the state and developed as an entrepreneurial class.

[1] Country Study for Asian Conference on Industrialization.
[2] Outline of the Third Five-Year Plan.
[3] Country Study.

Between the two extremes of a predominantly private sector industry and state-owned industry, the mixed economies have problems of their own. Even in these mixed economies, the industrial output of the private sector claims by far the major share of total production. The structure of ownership in India's industrial sector can be ascertained to some extent from the pattern of investments in its three plans. In the first plan, the investment was predominantly in the private sector, the public sector being allocated only 600 million rupees or 15 per cent of the total for industry. In the second plan, nearly 48 per cent was allocated to the public sectors; and, in the third plan, 51 per cent.[1] The ten-year plan in Ceylon projects and investment of 1,280 million rupees in the public sector and 530 million rupees in the private sector. In the actual implementation of the plan however, the investment in the private sector since 1961 has exceeded the target for the period. In Cambodia, the public sector investment in industry up to 1964 has been approximately 1,414 million riels and, in the private sector, 2,769 million riels for the period 1955-1959. A number of enterprises with a capital of 434 million riels, including a cigarette factory, fishing and canning enterprise are owned jointly[2] by the public and private sectors.

Uncertainty about the future of the private sector can affect the rate and scale of investment of the private entrepreneur. While the forms of ownership of industrial enterprise are finally a socio-political choice, it has to be noted that, whatever agencies of development the country may choose, whether the private or public sector, its policies must be defined with adequate clarity and its objectives explicit enough to ensure that each sector knows its distinctive role in the growth of the economy. The government has to strengthen and maximize the effectiveness and confidence of the agency or agencies it selects.

Most countries of the region have attempted to create a suitable investment climate for the private sector through concessionary taxation, protective and preferential fiscal measures, and credit and financing institutions. Tax exemptions ranging from two years to ten years are granted to approved or 'pioneer' industries. Pakistan has made the tax holiday an instrument to regulate the location of industry by providing for tax holidays on a scale ranging from two to six years depending on the location. Nepal, in its Industrial Enterprise Act of 1961, offers new industries tax exemptions for ten years. The Act also contains provision to guarantee five per cent profits for any specified iron industry for a period of five years. Most of the other countries restrict the tax exemption to five years. Rebate on investments in approved industries are offered by most countries of the region. New industries are generally protected from competition from imports, and also from an excessive inflow of investments into any given industry.

However, the conditions of private sector enterprise in a developing economy have to be so defined and regulated, that its growth at no stage becomes inimical to the over-all development of the economy. One aspect of private sector growth receives comment in Pakistan's outline of the third plan. "In a period of rapid economic growth in which private enterprise has a major role to play, some concentration of economic power and wealth is unavoidable because the process of capital formation depends mainly on corporate profits, and it is easier for well established firms to expand their size and enter new fields of enterprise; but the growth of large firms or industrial groups is useful only up to a certain point. Carried too far it can expose the social and political structure to new strains and tensions which may in the long run adversely affect the entire development effort." In Pakistan, the Capital Issues Act is employed as an instrument for control of the capital structure of private sector enterprise. Companies with capital above two million rupees are persuaded to change their status to that of public companies. In this way, the medium of capital issues is used to broaden the base of share holdings. Fifty per cent of shares offered to the public are reserved for individual holdings not exceeding 100; this is intended to ensure participation by middle class investors. Pakistan's policy statements focus attention on the political and social factors which underpin any programmes of economic development. In such a context, the structure of ownership itself has to be such that it does not interfere with the planned objective of mobilizing national effort on the broadest possible base.

China (Taiwan) draws attention to a problem which is the obverse of what has been discussed. It is reported that one of the impediments to the promotion of private investment is the preponderance of the traditional owner-manager system and the narrowness and instability of the stock market. These conditions militate against the development of big modern corporations which can increase the efficiency and pioneering capacity of the private sector.[1]

The numerous problems that are part of the growth of private sector industry in conditions of development cannot be discussed comprehensively in this paper. But attention is drawn to the problems of pricing and their inflationary impact on the economy and on the cost-structure of industry itself. A high cost structure in industry is likely at the early stages of industrialization and will reflect the over-all factor costs in the economy. However, over and above this, the protected markets enjoyed by industries can raise the general price level both for the consumer and for other industries in the case of intermediate goods generating an inflationary process which will retard growth. In these circumstances, measures for price control and stabilization are proposed by some of the countries in

[1] Country Study.
[2] Country Study.

[1] Country Study.

which the problem is acute. In a recent study of the problem in India, proposals have made for the establishment of machinery for continuous review of the price level and for necessary stabilization of prices.

The problems of public sector industry in the region have been primarily those of managerial inefficiencies. The early experience with state-owned enterprise in many of the developing countries has frequently been unfortunate; but both Burma and Ceylon, where the problem was most pronounced, and reported to have overcome the initial difficulties, and to be operating the majority of the state enterprises profitably. Public sector enterprise in the developing regions has learned heavily on government practice and procedure, and created conditions which inhibit operations on commercial and industrial lines. Public sector enterprise in a developing economy, unlike nationalized undertakings or public utilities in developed countries, is a pioneering agency and is employed as an instrument of development. Its characteristics will vary according to its political and economic environment, according to whether its main task is one of pioneering for the private sector as in Pakistan, or whether it is a permanent element in a mixed economy, or whether it is a part of an integrated state-owned economy. In a mixed economy, the problems of the public sector require careful analysis. It has to find appropriate substitutes for the ideological drive given by the state-owned system, or the individual enterprise and profit motivation given by the private sector.

III. PROBLEMS OF FINANCING PROGRAMMES OF INDUSTRIALIZATION

Tables 11 and 12, which give an indication of the capital formation in industry and the planned outlays on industrialization for selected countries in the region, throw light on the magnitude of the investment required if the countries are to achieve any significant expansion of the industrial sector. From the data available, it is difficult to derive any definite norms for the average outputs resulting from industrial investment in the region. However, the investment plans of some of the developing countries and the projected growth in the industrial sector give a general indication of the magnitudes of investment required in the industrial sector to sustain a high rate of growth.

In the third four-year plan, China (Taiwan) assumed a capital output ratio of approximately 2.6 for industry excluding power. The Republic of Korea in its first five-year plan, projected an increase of 214 million dollars in the added value of industry on an investment of 688 million dollars, which would give a capital output ratio over three. Pakistan estimated an increase of 1,670 million rupees in the manufacturing component of GNP during the second plan period on an investment of 5,800 million rupees, and an increase of 3,330 million rupees on an investment of 13,050 million rupees for the third plan period—an investment which is nearly four times the increase in GNP.

In 1963, China (Taiwan) had 22 per cent of its capital formation in manufacturing industry, and this constituted nearly 4 per cent of the Gross National Product. India's planned outlay on industry for the third five-year period was 26,050 million rupees, and the annual average investment amounts to approximately 3.3 per cent of the national income in 1962. Pakistan's average annual investment during the second plan amounted to approximately 4 per cent of its national income in 1962, and, in the third plan, will exceed 4 per cent of the average national income during the plan period. In the Republic of Korea, to achieve an increase of nearly 100 per cent in the net industrial product, a total outlay equal to 50 per cent of the national income of 1960 or an average annual investment of approximately 5 per cent to 8 per cent of the growing national income is required.[1] In Ceylon, the ten-year plan provides for a total industrial investment of 2,700 million rupees in the 10-year period—an average investment amounting to nearly 4 per cent of the current national income.

With the investments that have been made in the region and the relatively high rate of growth achieved, the advance made in absolute terms has not produced such as significant impact on the economic structure in the countries as was desired. In Pakistan, for industry to increase its share in the GDP by 3 per cent, or from 13.5 per cent to 16.5 per cent, over a period of five years from 1965-1970, an investment amounting to 13,050 million rupees has been planned. In China (Taiwan), the industrial product increased by about 80 per cent between 1958 and 1963, and its share in NDP increased from 18.5 per cent in 1958 to 22 per cent in 1963. In comparison, the process of industrialization in most of the other developing countries needs to be sharply accelerated. The investment directed to industry will have to grow at a progressively increasing rate if those countries desire to develop their industrial sector as the leading sector in the modernization of their economies. Hence, corresponding investments in other sectors will also have to be stepped up and the total volume of investment increased. The formulation of the problem in this manner resolves itself into the obvious statement that capital formation in industry in the aggregate, in developing countries, must be very much higher than it is at present if the structural changes necessary for self-sustained economic growth are to be effected within a reasonable time span. Suppose that an industrial sector in a developing country contributes 10 per cent of GNP. If it grows in accordance with the norms of the Development Decade at an annual rate of 13 per cent in an economy with a total growth rate of 5 per cent, it will have augmented its share to 20.8 per cent of GNP in ten years. This would mean a high rate of investment ranging from approximately 4

[1] The first five-year plan contemplates an investment of 91 million US dollars in 1962 with a national income of 1,621 million US$ and 177 million US$ on a projected national income of 2,093 million US$.

per cent of the national income in the first year, on a capital output ratio of 3 per cent, to 7.5 per cent in the final year of the plan.

The obvious statement that capital formation in industry will have to grow at a much higher rate than at present assumes new significance only in relation to the imperative need for implementing programmes of industrialization and effecting the structural changes in the economy within the shortest possible time.

This need arises from the deterioration its terms of trade between industrial and non-industrial economies which reduces the import capacity of the non-industrial countries and makes the capital cost of industrialization an increasingly heavy burden. This is borne out by the fact that the cost of capital equipment has shown a consistent upward trend. It is possible to draw numerous examples from the developing countries where original estimates of investment have had to be revised on account of increases of cost. Contracts for supply of plant and equipment frequently include escalation clauses linked to the price and wage indices in the country of origin, and the resultant increases have an impact on planned investment which is not inconsiderable. India has calculated that the estimates of investment for selected projects in public sector industry have risen by 23 per cent while the third five-year plan has been in operation. The increase has, of course, been due to a variety of factors, but the increases in cost of capital equipment have been a contributing factor.

The nature of the problem is seen in clearer perspective when one examines the manner in which two principal sources, that is, domestic savings, provisions for consumption of fixed capital and external assistance, have contributed to the fixed capital formation in developing countries. Table 25 gives gross domestic savings and the gross capital formation for a number of selected countries. A nation's capacity for saving bears some relation to the per capita income, although the rate of domestic savings may be substantially influenced by non-economic factors such as the economic and social system. Mainland China, with one of the lowest per capita incomes, has been able to achieve a high rate of domestic saving. Japan has achieved a much higher rate of domestic saving than New Zealand or Australia, whose per capita incomes are substantially higher. But, in most of the developing countries, domestic savings are comparatively low because, in the initial stages, they have to originate from low income sectors such as the agricultural sector, where standards of living are at subsistence level or close to it, and where increases in income are largely spent on consumption. On the other hand, to build the more rapidly capital forming industrial sector, one has to increase domestic savings. This presents the familiar dilemma of developing countries in regard to the capital resources for development. A significantly quick rate of growth may enable a country to effect a substantial increase in its rate of saving, as it is normally easy to keep the levels of consumption from rising at the same rate. Of course, this merely means that, out of a 10 per cent increase of national income in one year, the portion spent on consumption is likely to be less than that spent from a 10 per cent increase spread over a longer period. In Japan, where the rate of growth was as high as 11 per cent between 1958-1962, the savings increased from 23 per cent of NDP to 34 per cent[1] the annual rate of increase of savings was nearly 30 per cent, while the rate of increase in private consumption was approximately 12 per cent.

TABLE 25. GROSS DOMESTIC SAVINGS AND GROSS CAPITAL FORMATION FOR SELECTED ECAFE COUNTRIES

	Private saving	*Government saving*	*Total saving*	*Capital formation*
China (Taiwan)—1962[1] (in million N.T. dollars)	—	5,965	—	5,965	10,644[a]
India 1957/1958[1] (in million Rs.)	7,037.5	1,144.2	1,818.7	12,727.7
Korea, Republic of (billion won)	27.7	–4.6	23.1	75.4
Japan 1962 (billion yen)	5,448	1,830	7,278	7,295
Burma 1960 (million kyats)	276	289[2]	565	1,120
Philippines 1961 (million pesos)	566	270[2]	836	1,792

Sources: Economic Survey of Asia and the Far East 1964, United Nations Yearbook of National Accounts Statistics 1963.

[1] Figures for China (Taiwan) and India are in respect of net savings and net capital formation.

[2] Includes public corporations.

[a] Figures taken from Country Study.

From the existing economic base, developing countries, however, are unable to generate the desired high rates of growth by relying entirely on their capacity to save. Most of the ECAFE countries rely partly on foreign sources of finance to meet the capital costs of development, and this is particularly true of the industrial component of the plans. Out of a total outlay of 104,000 million rupees during the third plan period, India estimated that 33,000 million would have to be met by external assistance. In its third five-year plan, Pakistan anticipates an inflow of external assistance which comprises approximately one-third of the plan outlay. In China (Taiwan), during the period 1951-1963, more than one-third of the fixed capital formation was provided by the United States aid and foreign loans. In the Republic of Korea, foreign aid and borrowings constituted 39 per cent of the outlay in the first year of the plan and 30 per cent in the final year of the plan.

Connected with the limited availability of domestic capital resources is the problem related to the import content of expenditure on development. This again has special relevance for the industrialization

[1] Country Study.

programme, where the import content in the form of plan and equipment can form the major portion of the expenditure. It is necessary here to re-examine the composition of imports of developing countries in table 16 where the increasing proportion of capital goods reflects the high import content of development expenditure. In China (Taiwan)'s third four-year plan, the cost of imported capital goods required for industrialization amounted to 45 per cent of the total outlay. In India's third five-year plan, the import content of the Industrialization Programme was again approximately 45 per cent. For its ten-year plan, Ceylon estimated that, on the outlay of 2,700 million rupees in industry, approximately 1,205 million rupees will be required in the form of foreign exchange.

Most of the developing countries have experienced adverse trade balances over long periods, largely on account of increased imports required for development programmes. The increasing demand on export earnings for imports of capital goods required for development, and the resultant problems of foreign exchange shortages, are common to all developing countries which are embarking on programmes of rapid industrialization.

China (Taiwan) offers a useful example of the process of capital formation for development. The net saving and provision for consumption of fixed capital together provided only 63 per cent of the gross domestic capital formation during the ten years 1953-1962. The balance 37 per cent came as external assistance in the form of grants and loans. As a result, China (Taiwan) was able to achieve a rate of gross domestic capital formation which ranged from 12 per cent of GDP in 1951 to 17 per cent in 1963, a higher rate than those shown by the other developing countries in the region. A period of sustained growth has enable China (Taiwan) to convert a continuing trade deficit to a trade surplus which amounted to 52 million US dollars in 1964. Consequently its dependence on external aid has been diminishing since 1961 and dropped from 5,082 million new Taiwan dollars to 929 million new Taiwan dollars in 1963. The country's economic growth demonstrates the vital role that can be played by a substantial inflow of external resources, provided that the absorptive capacity of the economy is favourable. The figures given for India and Pakistan also confirm the importance of the supporting investment from external sources in the development efforts of the region, and the extent to which the entry into conditions of self-generating growth can be speeded by external assistance.

The place of external assistance in industrial development is a subject for a separate paper. What is intended here is a synoptic comment on the problems of financing industrialization in the ECAFE region and the vital role that foreign resources will have to play in the raising of the region's level of industrialization.

Foreign resources have also been made available through the inflow of private foreign capital for investment in industry. Most of the developing countries in the ECAFE region have attempted to create the conditions for inflow of private foreign capital into industry. Foreign capital is generally required to participate with local capital, but the conditions relating to such participation vary. India generally requires a majority holding of local capital; Pakistan does not impose uniform conditions regarding local participation, but expects the local component to be met by equity capital raised locally. In China (Taiwan), there is no ceiling imposed on the amount of investment by foreign nationals in an enterprise. No discrimination is made between foreign and local capital. Once the industrial investment is approved, the promotional incentives such as tax concessions are equally available. Most countries freely allow repatriation of profits and capital, while some countries such as Afghanistan fix a ceiling in relation to the original investment. However, apparently favourable conditions notwithstanding, the inflow of foreign capital forms only a small proportion of the total capital outlay in industry in the developing regions. In India, the foreign liabilities of manufacturing enterprises at the end of 1961 stood at Rs 3,332 million, while external assistance authorized up to end of March 1964 was Rs 22,000 million, and the planned outlay in industry for the second plan period was Rs 16,200 million. In China (Taiwan), the total of foreign investments in industry approved from 1960 to 1964, excluding investments by overseas Chinese, amounted to approximately 1,600 million new Taiwan dollars, of which approximately 75 per cent was concentrated in the chemical industry. The inflow of private capital over the fourteen years 1951-1964 averaged only 520 million new Taiwan dollars per year. The annual approvals since 1960 have risen to between 800 to 1,200 million new Taiwan dollars, but the actual inflow amounted to an average of 161 million new Taiwan dollars during 1960-1963.[1] In Pakistan, the inflow of foreign capital between the period 1960 to 1962 was approximately Rs 220 million for manufacturing and mining as against a total planned investment in the manufacturing industry in the private sector of Rs 3,660 million.

These figures for three countries engaged in a major effort at industrialization which have created a favourable investment climate for foreign capital indicate that the inflow of private capital, while contributing to capital development, cannot be relied upon as a major factor in the development of those countries. The inflow of foreign capital also involves the recipient countries in two types of problem. If an important segment of the economy is foreign-owned, it may become a contentious factor in the internal politics of that country and impede the development effort. Repatriation of profits in the

[1] Country Study.

context of protected markets and high local profits could also negate, to some extent, the benefits of foreign investment. Hence, ceilings have been placed on the repatriation of profits in some of the ECAFE countries; but whether those countries, in competition with capital markets offering more favourable conditions, would be able to attract foreign investors is problematic. In view of the relatively limited entry of foreign capital into them, it is difficult to assess the effects of the outflow of profits from foreign investments; but, if export earnings do not increase proportionately, it could constitute a substantial burden on a country's foreign exchange budget. Pakistan, for instance, allocated 8.15 per cent of the foreign exchange earned in 1962-1963 to service its foreign debts, and these were largely long-term low-interest loans. It is to be expected that the outflow of profits on foreign capital constitutes a liability of greater magnitude. The sources of foreign financing on which developing countries rely are credits and loans for supply of equipment as well as outright aid, rather than direct foreign participation in local industry.

The problems of financing programmes of industrialization once again focus attention on the compelling need to expand the export capacities of the industrial sector in the developing economies. In this process, the access to markets of the developed economies for manufactured goods from the developing countries can play a major role. Both Pakistan and Ceylon report that, in the case of centrally-planned economies, the supply of plant and equipment on long-term credit has been linked with the export of manufactured products by the developing country to the supplier countries. In certain instances, offers have included the repayment of loans with exports of manufactured products. These provide interesting examples of assistance designed to promote trade links which can energize the developing industrial structures. It is not easy to see how such arrangements can be satisfactorily made in the case of market economies where private sector activity may not lend itself to such reciprocity. It should be possible, however, to devise means to enable the developed countries to create the necessary complementarities in relation to developing economies.

It is recalled that, for the Development Decade, an annual rate of 13 per cent was assumed as the the norm for industrial growth in the developing countries. Applying this norm to the developing ECAFE region, some measurement can be made of the distance between the desired objective and the region's present stage of development. Of course, any estimate of this kind will only serve the purpose of giving some approximate quantitative dimensions to the magnitude of the problems in this region.

The present per capita gross national product in the manufacturing sector of the developing region as a whole can be estimated at approximately US$12, inclusive of Indonesia. To increase the regional average for the per capita manufacturing product to US$18 by 1970, the investment in the manufacturing sector for the developing region on a capital output ratio of three-to-one should be approximately 24 billion US$ during the five years 1966-1970. The per capita investment (based on the estimated population for the region in 1965) would be in the region of US$26. Pakistan in its third five-year plan, and the Republic of Korea in its first five-year plan, have envisaged an investment which approximates to these norms. The investment in India's third five-year plan, and Pakistan's second five-year plan for the period 1960-1965 was in the region of US$12 per head. The investment which the developing region appears to be able to make during the first half of the development decade is apparently in the region of 12 billion dollars, but the volume of investment for the second half is being stepped up substantially in the draft plans of some of the developing countries in the region.

Taking the estimates of Pakistan's third five-year plan as a point of reference, it will be seen that, for 34 per cent of the total outlay, the plan relies on external resources in the form of loans grants, commodity aid, and so on. Of course, a larger proportion of these external resources would flow into investment in the manufacturing sector than into other sectors. Therefore it would be difficult to assess the dimensions of the gap in investment in the manufacturing sector alone and the consequent inflow of external resources required. However, the foreign component in industrial investment has been in the region of 40 per cent to 45 per cent for the developing countries although, here again, the figures vary according to the level of industrialization and the development of the capital goods sector. The Republic of Korea in its first five-year plan, which envisages a per capita investment of approximately US$26 in the manufacturing sector, has planned to finance approximately a third of the total investment in industry through foreign loans. These figures give a broad indication of the volume of external resources required to sustain the investment in the manufacturing sector at a level which would make a significant impact on the region.

Another measurement of the magnitude of the problem is the development of manpower resources in the region proportionate to the investment. For an investment of the estimated dimensions relative to its economy South Korea required approximately 11,000 additional engineers, 85,000 additional technicians and 206,000 craftsmen. For the developing region as a whole, the necessary increases in skilled manpower during the next five years will be in the region of 385,000 engineers, 2.9 million technicians and 8.2 million craftsmen. Again it should be emphasized that these tentative estimates provide only broad indications of the size of the regional problems of industrial growth; but they help to underscore the effort that must be made at the national, regional and

international levels if the countries of the developing region are to succeed in constructing the base for the development of a modern industrial economy.

IV. THE REGIONAL PERSPECTIVE

One of the primary objectives of the Asian Industrial Conference is to explore the possibilities of action at a regional and international level to accelerate the industrialization of developing countries.

In the recent past, various measures have been taken to promote regional co-operation in the field of industry. Forms of regional co-operation include the proposed regional institutes for specific industries, where the ECAFE countries, both developed and developing, can co-operate in training programmes and research activities. Joint investigations into resource potentials, such as the proposed joint offshore geophysical survey, is another example. While regional co-operation has not been lacking, there is a virtually unlimited field where concerted action by the developing countries would have a much more effective impact on their problems. There are many skills and techniques pertaining to industry in which the developing region is deficient; it should be possible for individual member countries to select particular activities connected with their resource endowments, skills, and so on, and build up regional institutions with regional co-operation and international assistance so that they become truly effective centres for dissemination of applicable techniques. The regional co-operation on a technical and technological level that would ensue would help to build up speedily the stock of skills required for industrialization.

The feasibility of harmonizing the industrial programmes of countries on a regional basis, and creating dynamic complementarities of industrial growth within the region, or within groups of countries in the region, has been the subject of much discussion and does not need detailed elaboration. Particularly in the developing ECAFE region, where the income and demand levels are low and where the markets in individual countries do not permit the maximum economies of scale, the harmonization of production plans on a regional basis offers prospects of accelerated industrial growth for the entire region.

Trade in industrial goods in the developing region means mainly that industrial goods flow from the advanced economies to the developing regions. With a few exceptions, the industrial structures are largely inward-looking and, through import-substitution, have industrialized largely on the basis of domestic markets. The developing countries need hard currencies for the imports of essential capital goods, so they inevitably seek to expand their exports to the developed countries. The inherent pressures of industrialization within the region, while compelling an over-all increase of regional trade with the advanced economies, do not favour the quick growth of intra-regional trade among the developing countries. The drive toward import substitution has also contributed to a weakening of the trade links between developing countries in regard to light consumer manufactured products. The process of inward-looking industrial growth in the developing region does not promote the trade in industrial goods among the countries of the region. The historical context in which the developing countries are industrializing, therefore, makes it difficult for them to reproduce the conditions of inter-country trade in industrial goods which nourished the growth of industry in developed countries and provided expanding markets for these goods. The trade links in the developing region which are conducive to growth have, therefore, to be partly derived from the industrial links which have to be created among the countries of the region. Such industrial links will largely depend on the extent to which a programme of regional harmonization can be effectively implemented.

The problems of regional harmonization for the ECAFE region are more complex than for most of the other regions which have sought to implement such a programme. The European Economic Community and the Economic Community of Latin American Countries have an advantage in the territorial proximity of their members, their comparative cultural and political homogeneity, and their relative parity of economic growth. The ECAFE region is in a different position, containing as it does wide disparities in economic growth between its advanced countries and developing countries, and also among the developing countries themselves. However, these factors by themselves do not render a programme of regional harmonization impractical, provided that the economic advantages of such a programme have been proved and that they give each of the participant countries an impetus to economic growth which it would not otherwise receive. It is natural that, in the conditions prevailing in the ECAFE region, the whole concept of regional harmonization is sometimes approached with reservations and even a little apprehension. Will a regional framework for industrial growth in any way restrict national plans and the full exploitation of factor endowments by a given country? Will a country be deprived of certain natural advantages it enjoys in the race for industrial development? Will regional action affect existing capacities in the industrial sector?

A regional programme will have to be approached not as an instrument for regulating industrial growth within each country. This would be to ascribe to it a negative character. It will have to be viewed essentially as leading to the growth of a regional and international market which will give each country a potential for growth and expansion with a freedom which it did not enjoy within the limits of national plans. The extent to which member countries are convinced of its practicality will depend largely on the programme itself and the tech-

niques of regional programming employed. With even a moderate increase in income, the region, which contains 56 per cent of the world's population,[1] offers a potential market for industrial goods which is immense. For example, the tentative demand projections made for the region[2] in respect of selected industries indicate that consumption of paper will increase from 4,793 million tons in 1958 to 16,000 million tons in 1975. Consumption of steel will rise from 23 million tons in 1957 to 80 million tons in 1975.[3] A co-ordinated and planned effort to exploit the potential of the regional market should bring each member national much more benefit than the fragmented efforts of individual countries.

The efforts to achieve regional harmonization have also to be seen against the imperative need for a much faster rate of industrial growth in the developing region than has been possible in the recent past. The structural changes in the developing economies which will free them from their dependence on primary commodity exports will have to be effected with the greatest possible speed, as the widening gap between the living standards of developed and developing nations and the deteriorating terms of trade tend to increase the cost of industrialization in the developing countries.

A programme of regional harmonization would contain the elements of a division of industrial activity in the region, whereby individual countries undertake large-scale production of particular commodities for a regional market. Such a specialization of industrial production need neither interfere with existing capacities, nor militate against the development of an industrial structure with an all-sided technological capacity within the countries. The programme could be conceived in sufficiently flexible terms; it could be composed of separate segments for sub-regional groups. It could be restricted to the expansion of the market up to a given limit, after which, individual countries could develop their own plants if necessary for the growing domestic demand. On the other hand, one need not think of regional harmonization in terms of 'specialization' in the strict sense, or of countrywise monopolies of industry. "Regional" plants for a particular industry could be located in more than one country according to expanding market needs. Specialization, however, would be an important aspect of the programme. For example, the capital goods industry in the region could be more speedily developed on the basis of deliberate specialization. It could in certain instances take the form of joint ventures with capital participation by member countries. The programmes themselves to be effectively regional in character would have to provide the conditions for the dispersal of industrialization over the whole region. This would mean that comparative cost must not be the sole criterion in the distribution of industries for development on a regional market. For each member country to receive proportionate benefits, there would have to be a reasonable distribution of regional industries, and the basis of such distribution would have to be worked out in a manner similar to the basis accepted by ECLA.

Regional harmonization of production plans to be practical and acceptable would, therefore, have to deal adequately with all these aspects. Such a programme would commence with the selection of agreed areas of industrial production for regional harmonization; among other things, it would have to include comparative cost studies for the location of industries; it would have to define the basis of distributing such industries; it would have to reach agree ment on the complementary pricing and trading policies for the area of regional harmonization. The first task in such a programme would be the preparation of a preliminary economic model of regional harmonization adequately demonstrating to all the participating countries the benefits of a division of economic activity and complementarities of production. Such a model would have to project the demands and inter-industry relationships for the region within a framework of regional harmonization. It could initially deal with selected areas, and examine the possible regional interrelations. Even to make such an exploratory study, it would be necessary to establish appropriate machinery. After completion the examination of the study and, thereafter, its implementation would require a continuing regional body officially representative of the member nations. For the implementation of a programme of regional harmonization, the required co-ordinating activity would have to be given an institutional form adequate for the tasks.

A programme of regional harmonization, however, would not be confined merely to the promotion of production links and complementarities within the region. It would have to augment the trade in manufactured goods with the advanced economies and the developing countries outside the region. Such a development is crucial to the whole process of industrialization in the ECAFE region. The UNCTAD resolutions on trade in manufactures and semi-manufactures spelt out the various measures that could be taken at the inter-regional and intra-regional levels to expand the trade of developing countries in manufactures and semi-manufactures. Apart from trading arrangements which provide developing countries with freer access to markets in advanced countries, a more dynamic trading pattern based on industrial branch agreements was contemplated. There has been a great deal of discussion on the need to accommodate the growing industrial structure of the developing countries within an international division of industrial activity of some kind. It has been pointed out that advanced economies could make structural readjustments, diverting their capacity to the more advanced indus-

[1] Includes mainland China.
[2] Excludes mainland China.
[3] Economic Bulletin for Asia and the Far East, Vol. XV. No. 3, December 1964.

tries, leaving to the industrial sectors of these developing countries the industries which have a comparatively simple technology and local sources of raw materials: for example, the vegetable oil industry, cotton textiles, fibre products, and so on. However desirable such a programme may be, its theoretical feasibility has to be reduced to detailed practical possibilities. Even the exploratory studies for such a programme would have to be undertaken at a multilateral level. In this context, the regional harmonization of country plans would make a more effective approach to this question possible. It would be necessary to select the industrial activities which lend themselves to the scheme of structural adjustments envisaged and to examine the economic implications for both developed and developing countries. A comprehensive study of this nature may help in formulating a concrete programme to demonstrate the possibilities of carrying out structural changes without economic injury to the advanced countries and with immense benefit to the industrializing nations.

CONCLUSION

The discussion in the major portion of this paper has been devoted to a comparative survey of industry in the countries of the region with particular reference to the developing countries. An attempt has been made to elicit from available data the quality and the intensity of the industrializing effort in the region. Recurrent themes of the discussion have been (a) the strenuously planned endeavours of many of the countries to accelerate the process of industrialization, and in contrast (b) the relatively low level of industrialization and the meagre stock of productive assets in the industrial sectors of the majority of developing countries. Only one developing country has been able to achieve a rate of growth comparable with the norm set for the Development Decade. Very much greater effort at the national, regional and international levels is necessary if a significantly faster rate of growth is to be achieved and if the industrial sectors in the developing countries are to come anywhere close to a commanding position in the economy.

This report has been able to indicate only in very general terms the areas in which advances might be possible at those three levels. Even in regard to problems at the country level, a greater deal of regional study, exchange of experience and regional co-operation is possible. The strategies of industrial planning, the selection of investments which stimulate growth and which foster production links, the implementation of industrial plans and techniques of programming and progress reviewing, the techniques of manpower development in a programme of industrialization, the development of a capital-saving intermediate technologies, are a few of the areas in which countries of the region could co-operate in studying the experience in the region and in strengthening their industrializing efforts.

The discussion in the paper concluded with the regional and inter-regional perspectives in the industrialization of the ECAFE region. The last chapter of the paper is a statement of the need for action at the regional and international levels, if the developing nations are to raise their level of industrialization within a reasonable time span. For such action to be effective, the objectives need more precise definition. They have to be conceived in terms of specific programmes in which all the interrelations in industry and trade are explicit, and the position of individual countries within the framework is clear. For this purpose, exploratory studies of a detailed nature, requiring close regional co-operation, are essential.

PROMOTION PROGRAMMES AND LIMITING FACTORS

Prepared by the ECAFE Secretariat

I. INTRODUCTION

The analysis in the paper, "Over-all evaluation of progress and problems of industrialization in the ECAFE region" to be reinforced by that of "Industrialization and foreign trade", has brought into sharp focus the seriousness of some of the major economic and technical factors, such as the steady deterioration in the terms of trade, the shortage of capital and "know-how", and the smallness of domestic markets, which are inhibiting the industrial growth of most countries in the region. The developing countries of the region at present contain a large part of the world's population; for this population the share of world industrial output is very meagre. On this basis, the per capita industrial output in the region is among the lowest in the world, lower than the average for Latin America or the developing regions of Africa.

Undoubtedly, to overcome some of the factors limiting economic and industrial growth, a country must depend primarily on its own national efforts. Indeed, as revealed in the various country and sectoral studies prepared for the Conference, all developing nations of the region have been making a strenuous effort with all the means at their disposal to achieve a breakthrough that will result in sustained economic and industrial development. However, it is increasingly clear that national efforts alone may not be able to achieve the desired rate of growth. This is especially so in most of the smaller countries, for which the adoption of inward-looking policies would mean promoting import-substitution industries with protection and often without regard to economies of scale and to high cost of production. Such a pattern of development in the form of individual small water-light compartments has already brought about many uneconomic results and may make the task of rationalizing and accelerating development through economic co-operation between two or more countries in the region much more difficult.

All these considerations point to the urgent need to promote co-operation among countries in the region in their development efforts, and the need to discover what practical steps can be taken to move towards this basic objective. In industrial development, it is possible to implement many co-operative measures immediately, especially in the fields of resources inventory, applied research and standardization, as well as investment and export promotion. These measures will be dealt with in detail in separate papers on finance, technology, and institutional arrangements.

This paper will confine itself mainly to over-all economic and industrial policies and development measures. Part II, which is essentially an extract from chapter III of the ECAFE Growth Studies Series No. 1, reviews national policy measures for promoting import-substitution and export industries. Part III discusses some of the basic limitations inherent in an inward-looking approach to national development and the need for concerted efforts, at the regional or sub-regional level, in the continuing search for a breakthrough in industrial advancement in all participating countries.

II. NATIONAL POLICIES AND PROGRAMMES

1. *Selection and organization of industries*

In the ECAFE region, official policy in selecting and developing industrial activities has generally resulted in emphasis being placed upon the export of agricultural and manufactured products and upon the processing, both for domestic consumption and export, of imported materials. Simultaneously, efforts have been made to discover or develop substitutes for imported raw materials. For instance, oil refineries were initially established in China (Taiwan) and India on the basis of imported crude oil; textile mills, in Burma, Indonesia, and Pakistan, on the basis of imported yarn and cotton; and steel mills, in Ceylon[1] and Pakistan, on the basis of imported scraps and iron ore. Subsequently, some of these enterprises have made increasing use of locally available raw materials. The discovery of mineral oil deposits in India, and the development of spinning capacity and of domestic raw cotton in other countries, have reduced their dependence on imported raw and semi-processed materials and brought about a useful saving of foreign exchange. The growth of import substituting industries on the basis of domestic raw materials and imported crude materials has also led to the creation of an industrial complex which can utilize the by-products of existing industries. In several developing ECAFE countries, the availability of nitrogen from the coke ovens of the iron and steel industry, naptha from petroleum refining, and molasses and bagasse from sugar factories had led to the growth of an industrial complex of fertilizers, synthetic

[1] Under planning.

rubber, newsprint, paper and pulp, industrial alcohol, yeast, citric acid, monosodium glutamate, and other industries.

The decision to develop certain industries inevitably raises problems of organization and management. Some governments reserve certain industries for state ownership and operation because of their strategic importance to the economy. This direct participation by the state helps to achieve certain socio-economic goals, such as preventing the concentration of wealth and economic power in a few hands. Some governments enter certain fields side by side with private enterprise. The adoption of a well-defined policy for the demarcation between government and private ownership and operation must be considered essential. In some ECAFE countries, the official policy is not one of direct ownership but of rendering positive assistance for developing these industries under private ownership.

In Afghanistan, China (Taiwan), Indonesia, Iran, the Republic of Korea and the Philippines, the governments have played a leading role in developing some key import-substituting industries such as textiles, sugar, cement, fertilizers, chemicals, rubber tyres and tubes, iron and steel, and machine tools. Several countries in this group, especially China (Taiwan), Iran, South Korea and the Philippines, have handed over some of the industries developed under public ownership to private enterprise. In Ceylon, the Government has, as a matter of policy, assumed responsibility for developing cement, paper, textiles, ceramics, iron and steel, rubber tyres and tubes, fertilizers, petroleum, and hardware including agricultural machinery and machine tools. In India, the Government has developed under its ownership and supervision new industries in the field of iron and steel, heavy castings and forgings of iron and steel, and heavy electrical plant, including large hydraulic and steam turbines. It has also decided to develop, alone or in joint partnership with private enterprise, certain other categories of industry, namely machine tools, antibiotics and other essential drugs, fertilizers, synthetic rubber, and chemical pulp. Nevertheless, even allowing for further industries which the Government wishes to develop and which have not been mentioned here, a large area of the industrial sector has been kept open for private enterprise. In contrast, Australia, Hong Kong, Malaysia, New Zealand, Pakistan, and Thailand have left almost the entire industrial sector to private enterprise. Burma, until recently, had a mixed pattern of ownership; but from early 1963 the official policy has been for Government ownership and development of the entire industrial sector.

Even where private enterprise has been allowed freedom of operation in most import-substituting and export industries, the governments have usually assumed powers under different laws and regulations to exert both direct and indirect influence on the private sector in order to achieve their desired goals. The industrial licensing regulations in Ceylon and China (Taiwan), the Industries (Development and Regulation) Act and Capital Issues Control Order in India, the Pioneer Industries (Relief from Income Tax) Ordinance in Malaysia, the Promotion of Industrial Investment Act in Thailand, the Basic Industries Act in the Philippines, and Industrial Licensing Regulations and Capital Issues Control Order in Pakistan are examples of regulations that provide the governments with powers to achieve the desired objectives. In licensing or registering an industry, the government takes into account its ability to make use of domestic raw materials in producing for home consumption or for export. Wherever the establishment of a new industry or the expansion of an existing one involves large-scale use of imported raw materials, the licence is either refused or granted subject to the industry's undertaking to produce such materials or parts progressively within a reasonable period of time, or else to produce them from domestic producers. India and Pakistan, in view of the critical balance of payments situation, grant licences to establish certain industries and allow imports of certain components on the condition that the industries export the entire output, or a major share thereof. Recently the Government of India has made it obligatory for some industries both in the public and private sectors to export a specified portion of their annual production. There are also instances where an industry have voluntarily imposed on its member firms an obligation to export part of their annual output. In China (Taiwan), the industrial units which rely heavily on imported raw materials for manufacturing finished goods, such as textiles, paper, iron and steel and rubber products, have decided to export a stipulated percentage of their production. Failure to reach an export target exposes the industry to the payment of a fine or to closing down the operation of a certain portion of its production capacity, as in the case of textiles.

In the context of vast reserves of unemployed labour and scarcity of capital resources, including foreign exchange resources, it is necessary to weigh carefully the relative advantages of capital-intensive and labour-intensive methods of production. It is, however, difficult for governments to make a specific choice. Firstly, there are a number of industries such as steel, petroleum refining and synthetic fibres in which the range of alternative techniques employing capital and labour is very narrow, at least within the manufacturing process. Secondly, the choice is limited by the availability of foreign exchange resources and the willingness of foreign firms to co-operate in selling the patent rights and equipment and in providing assistance for building the plants and training the technical personnel. The government's choice is also circumscribed in some lines of production by the need to provide employment for a growing labour force, even though labour-intensive methods

of production may be less efficient than capital-intensive methods. It may be noted here that the choice of techniques may have to be determined in relation to the size of the domestic market, the export possibilities, the optimum scale required for such techniques and availability of managerial and skilled manpower.

By and large, the new import-substituting industries that have been established in the ECAFE region appear to have been equipped with modern and up-to-date machinery. In establishing petroleum refineries, the leading producers in the United States, and in both western and eastern Europe, have co-operated in supplying plant and technical know-how to developing ECAFE countries. Thus, for example, since India began to receive aid from leading steel producing countries (the United Kingdom, the Soviet Union and West Germany) in establishing and expanding a steel industry, almost all modern steel-making techniques have become available to that country. Some ECAFE countries, in fact, when authorizing the establishment of industrial units, whether with domestic capital alone or with domestic capital in collaboration with foreign investors, prescribe, as a matter of policy, the most up-to-date machinery. Thailand and Malaysia come within this category.

Finally, it may be mentioned that, in most ECAFE countries, the multiple-shift system in the the operation of industrial enterprises has not yet been widely practised. In cases where the productive capacity of an industry is inadequate to meet the market demand, it may be advisable to consider the possibility of adopting the multiple-shift system instead of establishing new units or expanding the existing capacity. Apart from the advantages of saving investment and of cutting down production costs, the multiple-shift system accelerates amortization, thus permitting early replacement of plant-equipment and machinery and helping to keep abreast of technological advancement. It is reported that the system is widely used in mainland China, particularly in the coal industry. Under India's third five-year plan, considerable importance has been given to the possibility of introducing the system to a number of industrial enterprises.

2. *Promotion of foreign investment*

Availability of capital goods and of technical knowledge is essential for a successful programme of import substitution and export diversification. Unfortunately, most developing countries in the ECAFE region lack both a capital goods industry and technical experts, and their capacity of import capital goods and technical services is restricted by acute shortages of foreign exchange.

Most developing ECAFE countries have, therefore, adopted positive policies for attracting external asistance both from private sources and from governments and for channelling it, as far as possible, into import-substituting and export industries according to the priorities and patterns of development envisaged in their plans. A study of the official loans and grants negotiated by the developing countries shows that, although the official policy of developing ECAFE countries has been mainly concerned with securing loans and grants for building up infra-structure, quite a significant amount of the credit and grants have been negotiated in order to establish industries which are typically import-substituting or export-oriented. Countries in the region have obtained from foreign governments not only loans in foreign currency to finance the foreign exchange costs of these industrial projects but also local currency loans from counterpart funds to meet local capital requirements. Reparation payments received from Japan by Burma, Indonesia and the Philippines have been partly used for the development of their import-substituting and export industries.

Foreign official assistance has been obtained for establishing plants to produce a large number of commodities.[1] Official policy has been to negotiate loans from foreign governments to augment the resources of development corporations which, in turn, concentrate their loan operations upon the development of industries.

To assist import-saving and export industries, the official policy of most developing ECAFE countries has been to obtain, either by government initiative or by allowing industrial enterprises to secure, with or without government guarantee, loans and credit from the International Bank for Reconstruction and Development (the Bank), the International Development Association (IDA) and the International Finance Corporation (IFC). The iron and steel and coal industries in the private sector in India, and the natural gas, pulp and paper industries in Pakistan have obtained loans directly from the Bank for financing the foreign exchange cost of their capital equipment. These loans have been of considerable help to India in expanding steel production and to Pakistan in exploiting reserves of natural gas so as to reduce dependence on imported fuel. Credits were raised from the IFC for financing capital equipment for the production of refractory bricks, cement pumps and ball bearings in India, steel rolling, cotton textiles and cement in Pakistan and building materials in Thailand. Foreign exchange credits were also obtained from the

[1] For example: in Burma — textiles, paper, sugar, plywood, tyres, rolled steel and automobile assembly; in Cambodia — palm sugar, tyres, tractor assembly, paper and cement; in Ceylon — textiles, sugar, cement, iron and steel; in China (Taiwan) — fertilizers, P.V.C., paper, cement; in India — iron and steel, locomotives, fertilizers, heavy machinery, automobiles, textiles, heavy electrical machinery, cement, jute, oil refinery, foundry forging, heavy machine tools, machine tools, coal mining plants, electrical cables, synthetic rubber, rayon and staple fibres; in Indonesia — textiles, fertilizers, oil refining, asbestos cement, paper, tyres, rolled steel and steel smelting; in Pakistan — fertilizers and coal; in the Republic of Korea — cement, steel, fertilizers and synthetic textiles.

Bank, IDA and IFC for increasing the resources of the development corporations.[1] India's development corporation, the Industrial Credit and Investment Corporation of India (ICICI), has channelled foreign capital into industries producing electrical goods, textiles, fertilizers, paper, glass and building materials. Likewise Pakistan's development corporation, the Pakistan Industrial Credit and Investment Corporation, has channelled foreign capital into industries producing textiles, jute products, food processing, engineering, chemicals, pharmaceuticals, cement, ceramics, glass and paper products. Similar action has been taken in other countries.

The Governments of ECAFE countries, while making efforts to attract direct foreign capital investment, do not in most cases allow it unrestricted scope and entry. In order to allay fears in regard to expropriation, nationalization, tax discrimination and restrictions on their operations, they have issued policy statements or enacted laws defining in positive terms their attitude toward foreign capital, the manner in which it would be treated and the area in which it would be allowed to operate. Such policy statements and laws generally assure potential foreign investors that they would receive no less favourable treatment than that accorded domestic investors, and that liberal allowance would be made for transferring dividends or repatriating capital, and for fair compensation in the event of the property being expropriated or nationalized. Some countries, however, place restrictions on the nationalities of shareholders, the composition of the board of directors, the choice of directors and the selection and employment of administrative, executive and technical staff. These laws and policy statements usually require foreign investors to train local personnel as quickly as possible.

The financial aspects of official policies differ from country to country. Burma and Indonesia do not favour foreign equity participation in any new industrial enterprise, although Burma is not averse to securing loan capital from foreign investors and importing capital goods on a deferred payments basis. Indonesia, in its efforts to increase exports, has evolved a working arrangement on a production-sharing basis in accordance with its broad national policy of keeping the control of all industries in Indonesian hands. Under this arrangement, Indonesia provides local finance, and the foreign investor exchange credits for purchasing capital equipment or other strategic components, and for paying technical services. In general, production-sharing arrangements are entered into mainly for export industries. The output has to be sold on a mutually agreed basis and earnings from exports must be used for amortization of foreign credits. Such arrangements have revived interest among foreign investors in establishing export enterprises in Indonesia, and agreements have already been concluded for the establishment of a vegetable oil industry, nickel extraction, tin refining, a fishing fleet and a floating cannery. Negotiations are now in progress for units that will manufacture glass, tinplate, cement and plywood.

The types of joint venture commonly undertaken in the industrial sector can be broadly classified into four categories: (1) direct equity participation, either on a majority or minority basis; (2) managerial and technological assistance contracts; (3) licensing or royalty agreements, and (4) loans and deferred payment arrangements for the import of machinery and equipment. There are, of course, many cases where collaboration consists of a combination of these forms. Also, these joint venture arrangements need not be limited to the private sector only. In several countries of the region, such arrangements between private foreign firms and government-owned enterprises or those on a government-to-government basis are not very uncommon.[1]

The selection of the various forms of joint venture will depend on the type of industry involved, and also upon its existing financial position and technological level. For instance, if the industry under consideration needs a large amount of investment, direct equity participation of foreign firms would provide the necessary foreign exchange requirements, as well as the technical skill. On the other hand, if no foreign investments were forthcoming, it would be necessary to use royalty agreements or management contracts. In some cases where the technology required for the industry is not complicated and where the manufacturing process does not involve any patent rights, it would be more economical to recruit individual experts than to conclude a management contract with a foreign firm.

In India, in sanctioning such agreements, the Government usually takes into account the terms involved, the capacity and location of the industry, as well as the foreign exchange requirement for the import of machinery and raw materials. The broad principle is that technical collaboration agreements should have a time limit, and that, as a rule, this should not exceed ten years. Another point to which the Government attaches importance is that the agreement should not lay down any restrictions on exports from India. Even if it is not possible to obtain freedom to export to all countries, agreement to export to some countries should be reached.

It is reported that, in India, there have usually been two factors which have made the Government hesitant to approve collaboration agreements. One

[1] For example, in China (Taiwan) ($5 million), India ($90 million), Iran ($5.2 million from the Bank and $5.2 million from the US aid agency), Malaysia ($8.8 million), Pakistan ($49.1 million) and the Philippines ($28.5 million from the Bank and 27.5 million pesos from the United States Agency for International Development).

[1] In this connexion, see a series of country studies of joint international business ventures published recently by Columbia University (New York, United States).

has been the stipulation contained in some agreements that certain products must be imported only from foreign firms collaborating in the project. While Indian participants might prefer to obtain specialized items from their overseas collaborator, the Government has been averse to approving clauses which would restrict the freedom of choice of the Indian firms. The other point has been the provision in some agreements for payment of a minimum royalty. It is considered that the royalty should be related to the sales proceeds, and that there is little justification for guaranteeing a minimum royalty payment regardless of the volume of sales.[1]

In Japan, the Ministry of International Trade and Industry (MITT) recently made a study of the current situation of international joint venture projects.[2] The study shows that, since the enactment of the Foreign Investment Law in 1950, some 980 technological agreements have been concluded, mostly in the machinery industry. Such agreements have helped to speed up the development of the electrical machinery, telecommunication equipment and automobile industries in the country. Under the Foreign Investment Law, the main criterion for selecting joint venture agreements is that they should contribute to foreign exchange earnings. The results of the past seven years show that foreign investments (including loans) made in the country amounted to US$107 million, while the amounts paid for royalty, interest and dividends were only US$86 million. This gave a favourable balance of US$21 million. The total amount paid for royalty, dividends and interest was only 2.4 per cent of the total foreign exchange payment in 1959. Thus, in terms of foreign exchange requirements, the payment for joint venture projects was comparatively insignificant. It is therefore suggested that, as a matter of future policy, in considering any joint venture projects in Japan, increasing emphasis should be placed on the long-term technological requirements of the industries concerned rather than on the balance of payment problem.

Although most of the joint venture projects entered into by countries of the region are with manufacturers in industrially advanced countries of other regions, there has been growing interest in recent years in promoting joint ventures among ECAFE countries. The Government of Japan has set up an overseas economic co-operation fund for promoting joint venture projects in less developed countries. It is significant that as of March 1960, the total private overseas investment of Japan amounted to some US$110 million, out of which no less than US$84 million, or 76 per cent of the total, was invested in countries of the region (table I). Of late, industries in Hong Kong, Australia, and China (Taiwan) have also started joint venture projects with several countries of the region, including Malaysia and Thailand.

The future expansion of joint venture projects in countries of the region will depend, to a large extent, on further improvement in the investment climate in the capital-importing countries. Meanwhile, the developed countries could assist by taking such steps as extending bilaterial agreements on investment guarantees (preferably without the requirement of paying any premium by their national investors operating overseas) and on avoidance of double taxation. It is further considered that the flow of private capital to developing countries could be considerably increased if the developed countries granted liberal tax concessions for their nationals investing in newly developing countries.

[1] *Indian Finance* (2 April 1960), page 607.

[2] *The Result of Technical Cooperation,* MITI, Japan, March 1960.

TABLE 1. JAPAN'S OVERSEAS INVESTMENT IN ASIA AS OF MARCH 1960

(In thousand US dollars)

	Mining industry	*Forestry*	*Marine products*	*Textile industry*	*Machinery industry*	*Others*	*Total*
Ryukyu	—	—	—	40	—	85	125
China (Taiwan)	—	—	—	—	700	100	800
Hong Kong	250	—	—	500	—	700	1,450
Thailand	800	—	—	2,500	—	1,800	5,100
Malaysia and Singapore	6,100	400	—	—	400	5,000	11,900
Indonesia	10,000	7,000	2,200	—	—	—	19,200
Philippines	6,000	800	—	—	—	—	6,800
Burma	1,000	—	—	800	—	—	1,800
India	—	3,700	—	2,000	10,000	2,000	17,700
Ceylon	—	—	—	—	5,200	—	5,200
Pakistan	—	—	100	13,000	—	500	13,000
Viet-Nam, South	—	—	—	—	—	20	20
Total	24,150	11,900	2,300	18,840	16,300 (15,000)	10,205 (30,000)	83,695 (45,000)

Source: *The Present Situation and Problems Involved in International Economic Co-operation,* MITI, Japan, 1960.
Note: Figures in brackets indicate additional projects under investigation.

3. *Commercial policies*

In order to foster the growth of industries, most developing ECAFE countries protect them from foreign competition by tariffs and import and exchange restrictions, but some differences in the use of these various policy instruments among ECAFE countries should be noticed. Countries such as Australia, Malaysia, and Thailand, which have comfortable foreign exchanges reserves, rely mainly on tariffs for protecting their domestic industries. In 1962, the Philippines shifted emphasis from import and exchange restrictions to tariffs for promoting import-substituting industries. Although import control and exchange restrictions operated by the central bank and other incentives have for years been instrumental in giving a strong stimulus to the growth of industries in the Philippines, pegging the exchange rate to an unrealistic level in the past tended to favour the type of industrial activity that made maximum use of imported raw materials. By allowing the exchange rate to find its own level, the Government removed this distortion. The most common feature of the tariffs in these four countries is a severe discrimination against imported goods competing with domestic products and encouragement to import capital goods or essential raw materials required by the burgeoning import-substituting and export industries. Import tariff is also ingeniously used to promote the use of domestic raw materials. In Australia, the manufacturers of cigarettes are entitled to concessional rates of duty on imported tobacco, if they use a prescribed minimum percentage of domestic tabacco in their products.

The Governments of Australia and Malaysia use considerable discretion in imposing protective tariffs. They afford protection to particular industries after public enquiry and report by the tariff boards or commissions appointed under the provisions of the tariffs acts. In Australia, on the recommendation of the Tariff Board, the Government has granted bounties or subsidies to industries producing acetate rayon yarn, cellulose acetate flake, tractors, copper and brass strips, sulphate of ammonia, pyrites and sulphuric acid.

In Thailand the import-substituting industries approved under the Industrial Investment Act of B.E. 2505, promulgated on 9 February 1962[1], are given protection for an appropriate period through the imposition of a ban on imports of, or high duties on, products that compete with domestic industries. For the purpose of exemptions from duty or business taxes on imported capital goods and raw materials, Thailand's industries have been classified into three groups on the basis of their relative importance to the national economy.[1] All "promoted" industries are given some exemption from normal duties and business taxes in respect of imports of capital goods and raw materials over a period of five years, but the extent of exemption varies from group to group. Industries in Group A receive a 100-per cent exemption from duty, industries in Group B a 50-per cent exemption and industries in Group C a 33-1/3 per cent exemption.

When the Philippines returned to freedom from import and exchange restrictions, import-substituting industries were exposed to external competition, and the Government has had to rely on tariffs to protect them. Duties accordingly were twice revised upward in 1962 and again revised in 1963, mainly with a view to restricting the entry of imported goods competing with domestic products. The upward adjustments in the rates of import duties ranged from ten per cent to 100 per cent *ad valorem* over the levels prevailing prior to decontrol. The industries accorded protection consisted mainly of manufactures of certain food items, fertilizers, textile yarns and fabrics, hosiery, glass products, tableware, articles of cast iron and metals, wire and cable made of copper, household sewing machines, refrigerators and air conditioners. In the case of non-competing imports of raw materials and capital goods, tariffs were revised downward to offset partially the effects of the devaluation. All imported articles, moreover, with a few exceptions, are subject also to a special import tax. But all the industries established under the New and Necessary Industries Act (which was replaced in 1962 by the Basic Industries Act, Republic Act No. 3127) are generally exempt from import duty, compensating tax, foreign exchange margin for, and tariffs on, the importation of machinery, spare parts and equipment to the extent of 100 per cent for a period of three years after their inception; thereafter, for a period of one year, to the extent of 75 per cent; and for another year to the extent of 50 per cent. These exemptions are subject to the condition that no suitable domestic substitutes are currently available in reasonable quantities and at competitive prices.

Countries other than Australia, Malaysia, the Philippines, and Thailand use import countrols in combination with tariffs, multiple exchange rates and other forms of assistance to promote the growth of import-substituting industries. Controls are employed to raise protective barriers behind which import-substituting industries can grow. They are also used for

[1] In Thailand, the first Industrial Investment Act was promulgated on 4 October 1954. As this act proved ineffective, it was replaced by the 33rd Announcement of the Revolutionary Government on 5 December 1958. After the Legislative Assembly had been constituted, the announcement was codified into the Industrial Investment Act of B.E. 2503 or 25 October 1960.

[1] In Group A, considered to be the most important, are such industries as iron and steel, tin, lead, zinc, copper, antimony, tungsten and manganese smelting, tractor producing or assembling, motor vehicles, agricultural machinery, machine tools, motor vehicle tire, caustic soda, chemical fertilizer, plastic, synthhetic fibre, household electrical appliances, lac products, vegetable oil, radio and television sets. In Group B are: car and truck assembly, agricultural machinery assembly, machine tools assembly, shipbuilding industry, paper industry, wood pulp industry, electric wire or cable industry and food canning industries. The list of industries included under these two groups is not exhaustive but illustrative. The remaining industries have been included under Group C.

allocating the scarce foreign exchange resources among import-substituting and export industries.

In cases where domestic production is sufficient to satisfy demand, import controls are employed to prevent the entry of goods competing with domestic substitutes. If home production of certain types of goods is considered insufficient to meet the domestic demand, imports are allowed to cover the shortfall in domestic supply. In exceptional cases, as in China (Taiwan), limited quantities of certain goods on the prohibition list have been imported by the Government with a view to preventing a rise in the prices of domestic substitutes and deterioration in their quality. To protect domestic producers in cases where limited imports are allowed, import duties are levied and fixed at levels which tend to favour domestic products and reduce demands for imported products. Import duties on capital goods and essential raw materials required urgently by the domestic industries are fixed at a relatively low level. The technique of giving incentives to domestic industry through concessionary rates of duties on imports of machinery may, however, work against the interests of domestic capital goods industries in countries where these have been developed. After some progress had been made in the production of capital goods in India, the Government, in March 1963, increased duties on certain types of machinery, iron and steel products and motor vehicles so as to encourage the use of domestic substitutes. South Korea also imposes rigid duties on imported equipment for which domestic substitutes are available.

A protective tariff is not usually granted, unless the industry seeking protection satisfies certain specific criteria laid down in the tariff laws. The various criteria upon which protection may be afforded are that (a) the industry is likely to develop sufficiently to be able to carry on successfully without protection or assistance within a reasonable time; (b) the possible cost of protection to the community is not excessive; and (c) the industry is one for which it is desirable in the national interest to grant protection or assistance. In India and Pakistan, Tariff Commissions have been established to advise the governments on the needs of particular industries for tariff protection, on the working of the tariff protection, and on the performance of the industries to which it has been accorded.

For the purpose of allocating foreign exchange resources to export- and import-saving industries and also to other uses, imports, as a rule, are classified into several groups or categories according to their degree of "essentiality". Items such as capital equipment and raw materials required by domestic industries are generally regarded as essential goods. Importers are also generally classified into categories, among which domestic industries may constitute one group as, for example, in India, Indonesia, and Pakistan, and domestic industries may again be subdivided. In Indonesia, for example, there are three groups. The first includes food and clothing industries, foreign-exchange-yielding industries and government-owned industries; the second, industries engaged in manufacturing of domestic raw materials, foreign-exchange-saving industries and industries in which the Government has a majority share; the third comprises all other industries.

After categories of goods and importers have been classified, quotas for each permissible import are fixed and exchange allocations made. In fixing quotas for permissible imports, account is taken of the domestic availability of substitutes, the technical feasibility of substituting for one imported product another product available in the country, and the likely impact of the imported commodity on domestic production. Some Governments have found that it is technologically possible to substitute for commodities which involve large-scale foreign expenditure other commodities which are domestically produced and available in sufficient quantities. India, for example, has found it technologically possible to replace copper with aluminium in the production of electric cables. Processes have been developed for the production of rayon pulp from bamboo, and other cellulosic materials from substitutes available domestically. Cryolite, an essential mineral previously wholly imported for the production of aluminium, is now being made from indigenous raw materials, as also is the optical glass required for various instruments such as microscopes, telescopes, cameras and binoculars.

In the majority of countries, industries with an export potential are given priority in allocations of foreign exchange for imports of capital goods and other essential components. Indonesia attempts to give producers in the first group of industries (food and clothing), as well as in export industries and government-owned industries, adequate foreign exchange allotments to enable them to operate on a 100-per cent-production-capacity basis; while those in the second group, which are mostly foreign-exchange-saving industries, receive exchange allocations which may enable them gradually to reach a 100-per cent-production-capacity level. Those in the third group are granted foreign exchange which is just adequate to keep them in running condition. Although priorities have been laid down for exchange allocation among industries, the rate at which foreign exchange is made available to importers differs from one commodity group to another because Indonesia operates a multiple exchange rate system.

Besides helping the import-substitution industries through tariff protection and quantitative import restrictions, Governments also provide other forms of aid to these industries. In Ceylon, import control is supplemented by the Industrial Products Act under which imports of foreign products competing with domestic substitutes are regulated to facilitate the sale of domestic substitutes. Licences for import of cotton textiles, plywood chests, dry cell batteries, bicycles and ceramics are granted on condition that the licence

holders purchase local products in a specified ratio to the quantities imported. It is the official policy of most ECAFE countries to purchase, for the government's own use, commodities from the local producers even if their prices are higher than those of imported goods. Assistance is also provided by operating the government's licensing policy in such a way as to prevent the establishment of another unit in the same field so long as the existing installed capacity is not fully utilized.

Sometimes, in view of an extremely tight foreign exchange position, it is not possible to allocate foreign exchange out of the official reserves, as in India, or fully, as in Pakistan, to meet the requirements of import-substituting and export industries for capital goods. At present, imports of capital goods and heavy electrical plant by the industries in India are allowed if one or more of the following acceptable means of financing are available: (a) long-term foreign investment in the capital of the project, (b) loans to the Government of India from foreign governments of financial institutions, (c) long-term foreign exchange loans from financing institutions abroad, and (d) trade and payments agreements between the Government of India and foreign countries.

In order that export industries will not suffer from lack of capital equipment, essential spares and raw materials, Pakistan and India have introduced a system of retention quotas whereby the exporters and export industries are allowed to retain a part of their foreign exchange earnings for imports of goods for their own use or for resale at a premium to other importers in the country. To ensure efficient use of the foreign exchange so released, the governments have either laid down specific conditions or have used their other policy measures to put indirect pressure on users of the foreign exchange so released.

An outstanding example here is the export bonus scheme evolved by Pakistan in early 1959. The scheme grants exporters of specified commodities a stated percentage of their export proceeds in foreign exchange. The sum so granted is called the export bonus, and entitlement is given through bonus vouchers, which are transferable and may be used for importing a stated range of goods either by the exporters who first earned the exchange or by any one who subsequently bought these vouchers. The premium thus earned enables the exporters to cover any shortfall in the foreign exchange allotment for the import of capital goods, essential spares and raw materials which results from the exigencies of the foreign exchange reserve position. It thus enables them to reap economies of scale.

This system of retention quotas also helps the exporters in another way. Pushing the rate of development to the limit of available resources usually puts the domestic prices of export products out of line with international prices, thus impairing the ability of exporters to compete in the international market and so inducing them to sell their products at home. Since the system of retention quotas allows them to import consumer goods which can be sold at a very high profit in domestic markets, they are compensated and encouraged to continue export sales. Exporters may also use these bonus vouchers for expanding old industries or establishing new ones. When approving the expansion of an old industry, or the establishment of a new one, the Government of Pakistan sometimes stipulates that the organizers of the industry must purchase the capital equipment by using bonus vouchers and, to this extent, the system contributes to capital formation in the country.

The Government of India has evolved a somewhat similar scheme under which exporters are granted special entitlements, either to replace the imported raw material content of the exported product or to import capital goods for their expansion. The import entitlement under the scheme may be used for the import of raw materials specified in each case. In cases where imports of machinery and parts are permitted, the entitlements may generally be accumulated for a maximum period of two years and up to a maximum value of one million rupees. The Government of Burma, prior to the nationalization of trade and industry, allowed exporters to retain part of the foreign exchange earnings for the import of essential goods.

To promote export, some developing countries grant subsidies to the export industries partly to offset the disparity between domestic and foreign prices. In the Republic of Korea, an export encouragement subsidy fund was established under a law passed in 1961 to grant subsidies to certain selected products. Subsidies range from five to sixty won per dollar's worth of exports, being equivalent to (according to the 1961 exchange rate) four to forty-six per cent of the export value. Subsidies at the highest rate are paid to new exports, to goods exported to a new market, and to manufactured goods which show the largest rate of increase.

So that an export industry using a relatively high-priced domestic intermediate product will not suffer in competition with foreign producers, an arrangement has been made in some countries to grant a subsidy to the export industry to the extent of the price disadvantage it suffers in using the locally-produced intermediate product. For example, in Australia, there is a system of rebating a part of the price of locally-produced sugar used in the manufacture of certain export products such as canned fruits. The cost of the rebate is borne by the Australian Sugar Industry.

Partly on account of there being different economic systems involving different methods of trading, it has become difficult for exporters to survey the market for their products. Although in many countries there are individual export and trading organizations and chambers of commerce which supply information about consumers' preferences and market possibilities and

help in establishing links with foreign importers, the governments of the developing ECAFE countries have themselves taken an active part in exploring market possibilities. They do this when they negotiate trade agreements between themselves and governments of countries outside the region.

A feature of the bilateral trade agreements that have been concluded by ECAFE countries is that they do not necessarily commit each contracting country to export or import specific quantities of the agreed commodities. They do, however, help to publicize the availability of various commodities for export from each country and they assist industrial enterprises on either side to develop closer relations and to make efforts to meet each other's requirements. These agreements also provide for the settlement of payments for imports in local currencies. Accumulated currencies in ECAFE countries may either be used for purchasing exportable goods in those countries or reloaned to industries.

Since centrally planned economies prefer to conduct trade on a government-to-government basis, it has become necessary for some developing ECAFE countries to create state-owned trading organizations to promote exports of the traditional as well as new products. These trading organizations, as in Burma and India, have been promoting exports of new products and helping domestic industries to secure capital equipment and technical knowledge from centrally planned economies.

In most of the developing ECAFE countries, the Governments have taken special steps to promote medium, small-scale and cottage industries which have great potentialities for producing import substitutes and new export products. To assist the growth of this industrial sector, several countries such as Ceylon, India, Malaysia, Pakistan, the Philippines, and the Republic of Korea have established industrial estates. The ancillary feeder units and useful adjuncts to heavy industries in decentralizing production and promoting specialization in the main work. In India, for example, an industrial estate has been developed around Hindustan Machine Tools to supply component sub-assemblies in the manufacture of main products or accessories to main products. Governments have also established extension centres and research institutes for advisory services, technical assistance in better methods and techniques of production, and facilities for training in handling machine tools and equipment, as well as for standardizing and improving the quality or design of products. These industries are assisted by the governments to secure foreign exchange for imports of strategic components and raw materials, or are supplied with machines and equipment on a hire-purchase basis.

Governments have given much assistance to these small industrial units in exporting their products. India has introduced a scheme called 'export aid for small industries', under which a number of industries manufacturing as wide a variety of products of exportable quality as possible are selected and given expert advice on marketing their products. Services charges are met initially from a special fund and recovered from the proceeds of a small percentage deduction from payments made by overseas buyers. This enables manufacturers to price and ship their products efficiently. The scheme also provides assistance of negotiating marine freights, booking shipping space, supervising customs clearance, and preparing shipping documents. To overseas buyers, the scheme offers the advantages of putting them in touch, through a central organization, with responsible suppliers with any of whom, if they wish, they can place a single order knowing that the organization will attend to the order, and where possible, group items for shipment.

Exporting firms sometimes risk loss resulting from overseas political developments and non-payment by their customers. Official support is needed to insure them against such hazards. Australia, India, and Pakistan have already established government export risks insurance organizations for their exporters. The insurance schemes cover both commercial and political risks on transactions involved in exports and the premiums are moderate. An additional advantage for the exporter is that he can readily get financial accommodation from banks on the security of the insurance policies.

Governments of the developing ECAFE countries have taken measures to provide adequate transport facilities for the expeditious dispatch of exports. Several countries give priority to the transport of export goods. In some cases a rebate is granted. For example, the Government of India grants a 50 per cent refund of railway freights for the movement of export consignments between specified stations. Exporting firms often face peculiar difficulties in getting adequate shipping space at reasonable rates. Both the Government of India and the Government of Pakistan are taking suitable steps to assist the exporters in securing shipping space at rates which are not excessive or discriminatory.

With a view to developing overseas outlets for export products, export groups and export promotion councils have been established with government encouragement and assistance in several countries including Australia, India, and Pakistan. While the export groups in Australia make efforts to push exports of woollen textiles, agricultural machinery, sporting goods and furnishings, their counterparts in India and Pakistan are taking an active part in promoting the exports of jute and jute manufactures, cotton and cotton textiles, engineering goods, sports goods, leather goods, mica, shellac, tea, coffee, and handloom products. To provide effective liaison between the government and industry, several advisory councils have been created in these three countries.

For the promotion of export sales by the industrial sector, governments arrange for the dispatch of

trade delegations and for the exhibition of industrial products in trade fairs abroad; sometimes they bear part or all of the cost of publicity campaigns abroad. They also disseminate commercial information to exporters through specialized government and business organizations. The services of the embassies and legations abroad are utilized for surveying the market for exportable products.

While the governments of the developing ECAFE countries are rendering as much assistance as possible to export industries and firms in promoting the sale of their products abroad, they are at the same time endeavouring to ensure that exporters maintain high standards of quality in their products and conform strictly to the ethics of business. Ceylon, China (Taiwan), India, Pakistan, the Philippines, and Thailand prescribe standards for their major exports. Their governments have legislative powers to inspect the exportable products and prohibit the export of such items as do not conform to the prescribed standards.

4. *Tax policy*

The assistance provided through trade and exchange policies may not be sufficient to promote import substitution and export diversification if the tax liability of the industries concerned continues to be relatively high. Most ECAFE countries, therefore, design their tax policies to provide incentives by remission of both indirect and direct taxes. The indirect tax concessions granted to industries in respect of imports of machinery and essential raw materials required for the production of import substitutes and export goods have been noticed earlier. To provide additional incentives to export industries, most governments of the ECAFE countries including Australia and New Zealand have introduced a system for refund of import duties and other excise and sales taxes paid on materials going into the production of export goods. If these materials are subject to any duty (import duty on foreign material or excise duty on indigenous material), the duty element enters into the cost of export goods and thereby raises the prices of export goods relative to the prices of competing foreign products made from materials not subject to similar duties. As a step toward further simplification of the procedures for granting rebates on materials used for export, the Republic of Korea introduced, in 1961, a bonded factory system which obviates the need for paying duty at any stage of processing and production of export goods. China (Taiwan) and India are considering the creation of free trade zones.

In the sphere of direct taxation, most ECAFE countries provide newly established industries with specific incentives, among which the most important are tax holidays for specified periods, development rebates and investment allowances. The duration of the tax holiday varies from three years in Burma and four years in the Republic of Korea to five years in Ceylon, China (Taiwan), India, Malaysia, and Thailand. For foreign investors the tax holiday may be extended to a maximum period of eight years in South Korea. In Pakistan, the duration of the tax holiday depends on the areas in which the particular industries are located; for industries located in less developed areas, it is six years and, in more developed areas, four years. In the Philippines, the New and Necessary Industries Law, under which tax holidays were granted, expired in 1962; but, during the time the law was in force, out of the six years of tax holiday, full exemption from income tax was granted for three years and tax liability was progressively increased by a specified percentage every year thereafter. In the Republic of Korea, a similar method of tax exemption is followed.

To qualify for a tax holiday and exemption from other taxes, the industry must be approved by the government, and should either save imports or earn foreign exchange. In China (Taiwan), reduction of, or exemption from, business tax is granted to industries falling into one or more of the following categories: those which manufacture goods required in daily life so as to ease or reduce imports of such goods or to provide substitutes for imports, those which export 50 per cent of their output, those which use products of other domestic industries, and those which produce essential goods and equipment required by industrial, agricultural, mining, transportation or utility enterprises or in constructional programmes. In Pakistan, one of the conditions is that the industry should be primarily based on domestic raw materials.

In some countries, the tax holiday is subject to certain financial limitations. In Ceylon, for example, tax exemption applies to profits not exceeding five per cent of the capital employed in approved industrial undertakings; in India the figure is six per cent. In most countries, moreover, dividends declared out of exempted profits are also exempt from tax to the shareholders who receive them. Another major concession is that dividends received by a company (whether domestic or foreign) from another company engaged in one of the specified industries (which are mostly import-substituting or export industries) are generally exempt from supertax.

The other important tax incentive provided in most ECAFE countries is the grant of liberal depreciation allowances and development rebates in respect of plant and machinery, industrial buildings and labour housing. In addition to the normal depreciation allowances on plants and machinery installed, development rebates at rates ranging up to 20 per cent of the cost of plant and machinery are allowed as deductions from the taxable income in the year of installation, thus enabling the enterprise ultimately to charge up to 120 per cent of the original cost of the asset to revenue. If the profits of an enterprise in one year are not enough to absorb the depreciation allowances due for that year, the unabsorbed depreciation is available for deduction from profits in succeeding years for an unlimited period. Similarly, unabsorbed deve-

lopment rebates and business losses can be carried forward for six years in Pakistan and for eight years in India. Exemptions are also made for interest on loans obtained from foreign institutions or on debts incurred abroad for imports of machinery, plant or raw materials on terms approved by the government.

With a view to stimulating the self-financing of industrial expansion, some countries provide tax incentives for the reinvestment of profits. Profits reinvested within one year are exempt from income tax in Burma. In Pakistan, the income tax exemption during the tax holiday period is subject to the condition that most of the profits are reinvested within one year of their accrual; and that not more than 40 per cent of them are distributed. In South Korea, if specified key industries plough back profits for the installation of new productive plant, the corporation tax is reduced by 50 per cent. To encourage investment in new import-substituting and export industries, investors in Ceylon taking up shares of new companies are given tax relief to the extent of Rs 25,000.

Tax laws in some countries provide special incentives to export industries. In the Republic of Korea, income tax and corporation tax are reduced by fifty per cent for specified businesses that earn foreign exchange. India amended its income tax law in 1962 to allow a ten per cent rebate of income tax and supertax attributable to export receipts, except to foreign companies which have not made arrangements for the declaring and paying of dividends in India. In 1963, a fresh tax rebate on export income, over and above the ten per cent concession on income tax and supertax on export earnings, was granted. In Thailand, the Industrial Investment Act empowers the Board of Investment to grant export industries partial or full exemption from business taxes over such a period as may be determined in each individual case. An interesting example of the use of taxation for encouraging exports is provided by payroll tax rebates in Australia. Under the Australian system, introduced in 1960, employers whose wage payments exceed £200 a week, and whose export sales have increased more rapidly than the annual average of export sales from a base period of the two years ended June 1960, are entitled to a rebate of payroll tax. Export sales are expressed as a percentage of gross receipts from all sales; both domestic and export, and the rate of rebate is then taken as one eighth of this percentage. In addition, a double deduction from assessable income is allowed on money spent overseas for export promotion. New Zealand has also introduced special tax concessions to exporters. Since 1962, manufacturers have been allowed a tax deduction of £150 for every £100 spent on promoting export markets and, more recently, a scheme has been approved for direct tax concessions according to the extent to which overseas sales have been increased.

Tax policy is also used to facilitate the supply of raw materials to import-saving and export industries. Both in India and Pakistan, the sugar industry faces a peculiar difficulty in obtaining adequate supplies of sugar-cane, owing to the diversion of sugar-cane for the manufacture of indigenous unrefined sugar. This diversion not only affects the production schedule of the sugar factories but also results in a wastage of about 30 to 40 per cent of the sucrose content of the cane. The governments have, therefore, increased the rate of excise duties on unrefined sugar.

Tax incentives for exports have sometimes to be supplemented by tax disincentives to sales of export goods on the domestic market. The Government of India, for example, has imposed rigid excise duties on all varieties of textile cloth and on jute manufactures.

5. *Credit policy*

Credit has also been used as an instrument for stimulating import-saving and export industries; governments and financial institutions in most ECAFE countries have designed policies specially to meet both short-term and long-term credit requirements. Although central banks are mostly concerned with general control of the monetary system, they have forged policies, within the framework of overall monetary and credit policy, to cater to the requirements of special industries.

In most ECAFE countries, the commercial banks are directed to give priority to the credit requirements of the industrial sector. In China (Taiwan), banks were specially asked to meet the credit requirements of export industries. Even when the central banks have adopted a tight credit policy to contain growing inflationary pressures in the economy, they have ensured that the growth of import-substituting and export industries is not constricted. In prescribing margin requirements on advances against imported manufactured goods, the State Bank of Pakistan exempted from minimum margin requirements bank advances against the industrial machinery, iron and steel, specialized raw materials and semi-manufactures required by the growing industrial sector. In Indonesia, to facilitate imports of the essential raw materials required by the domestic textile industry, advances made by banks for the import of raw cotton and yarn were not taken into account in calculating the ceilings on bank advances imposed by the Bank of Indonesia.

The Reserve Bank of India, in pursuance of a policy of regulated expansion, has introduced a slab rate system of lending, similar to that in Japan. This system has the merit of flexibility in that both availability of credit and the panel rates attached to certain loans can be regulated to suit the requirements of the general credit situation as well as the requirements of particular industries. It has been specially devised to grant preferential treatment to export and small-scale industries. Thus, while the Reserve Bank imposes a ceiling on the amounts each scheduled bank may borrow from it, the banks can borrow at the bank rate (the lowest of the three tier rates) additional

amounts based on their loans to small-scale industries and the coal industry in the private sector.

To provide easier and cheaper credit to exporters, early in 1963, the Bank introduced an export bills credit scheme giving additional accommodation facilities to scheduled banks against their own notes and their declaration that they hold usance export bills. Such borrowings are charged for at the bank rate, and are treated as additional to the normal bank quota of borrowing. The Reserve Bank also makes flexible use of selective credit controls for exempting, partly or wholly, advances to exporters of the commodity affected by these controls. When import-saving and export industries, such as cotton textiles and jute manufactures, have difficulty in finding adequate finance owing to a large inflow of imported raw materials or to bumper outputs of domestic raw jute and cotton, the Bank adjusts its credit policy so as to meet the special requirements of those industries.

Although most ECAFE countries have established development banks and corporations, their resources are not sufficient to meet all the medium- and long-term credit requirements of the growing industrial sector. Ordinary banks have accordingly been encouraged to extend term loans to import-substituting and export industries. In order to provide banks with re-finance facilities, many governments are considering setting up re-financing institutions. In India, the Re-finance Corporaton for Industry established in 1958 has re-financed a large proportion of the term loans granted by banks and state industrial finance corporations to industries which are mainly import-saving and foreign exchange earning. In Australia, a term loan fund was created in 1961, mostly out of the statutory reserve deposit account of the trading banks. From this fund, the trading banks provide term loans for three to eight years for financing capital expenditure for production in rural and secondary industries, as well as for financng exports.

Some ECAFE countries, viz Australia, China (Taiwan), India, South Korea and the Philippines, export machinery and engineering goods. Exports of these goods depend not only on the relative prices and qualities of the products but also on the extent to which the exporters can offer foreign buyers competitive credit terms. With a view to enabling Indian exporters to compete effectively in this respect, the Re-finance Corporation for Industry has introduced a scheme extending the refinance facility to industries which export capital and engineering goods for pre-shipment credits and also for post-shipment credits if their duration does not exceed five years. The minimum amount for which refinance may be sought has been fixed for the time being at Rs 100,000 and the total amount of export credit refinancing to a single exporter is not to exceed five million Rs. In Australia, the term loan fund also facilitates the export of manufactured capital equipment by providing credit on normal commercial terms.

The official policy in most ECAFE countries is to establish, or sponsor the establishment of, both government development corporations and private development banks so as to provide finance for industries by means of long- or medium-term loans and of direct equity participation. To augment the resources of these institutions, governments have provided both share and loan capital, and have assisted industries to raise loans and credits in foreign curencies, with or without a government guarantee. The policy of these institutions is generally to provide financial assistance to import-saving and export industries. For example, both in India and Pakistan, these industrial financing institutions have actively financed capital requirements of new industries and of old industries for producing cotton textiles, jute manufactures, woollen and worsted textiles, synthetic textiles, sugar, cement, paper, chemicals, fertilizers and pharmaceuticals, food preservatives, vegetable oils, leather, glass and ceramics, automobiles, plywood, aluminium and mechanical engineering products. The Korean Reconstruction Bank had about 47 per cent of its loans portfolio, as of 31 December 1962, in loans to manufacturing enterprises, the bulk of which went to the fertilizer, textile, food processing, coal and steel industries. A similar pattern of loan distribution is found in China (Taiwan), Indonesia, Iran, and the Philippines.

While public sector projects receive direct accommodation facilities from governments, there are instances of government providing loan assistance directly to import substituting industries in the private sector, for example, the assistance given to the steel industry by the Government of India.

6. *Price policy*

To maximize the rate of growth, it is necessary to mobilize all available resources, which, in many ECAFE countries, involves deficit financing. Monetary, price and wage stability therefore becomes a major concern. This section does not include a discussion of general monetary stabilization policies; but it should be noted that, at the early stage of industrial development when the productivity is usually very low, price and wage stability is essential, especially for promoting export-orientated industries.

For some of the industrial products such as iron and steel, cement, and fertilizers which enjoy a protected domestic market and in some cases, a virtual monopoly in certain countries, the governments may find it necessary to regulate prices. In India, the Government exercises control over the prices of these products. In order to arrive at a proper estimate of the net benefit to the whole economy of investment in such industries, it is necessary to consider, not only the prices and costs involved but also whether prices have been set at appropriate levels; if they are arbitrarily set too low, then investment may be diverted from more to less important uses. Governments should periodically review the effect of controlled

prices on the profitability of each industry and make any adjustments required.

III. REGIONAL PROSPECTIVES

1. *Basic issues*

The analysis of the economic policies in respect of industrial development in Part II highlights the fact that, in the absence of any regional harmonization of national development plans, each country has been pursuing an independent national development policy. A series of factors, ranging from a lack of technical "know-how" and insufficient specialization to a shortage of financial resources, have prevented the dynamic growth of the industrial sector in some of the smaller countries of the region. All these factors, however, are really manifestations of the main obstacle to industrial development which, as has been repeatedly asserted, is the limited size of domestic markets. These markets are too small to attract heavy industrial investment or even to encourage a suitable division of labour and the application of modern manufacturing techniques.

True, during recent years, promotion at the national level has produced some encouraging results in several countries. The new industries that have been comparatively successful are mainly in the field of consumer goods, where the economies of scale are somewhat flexible. However, in other fields, the limitation and fragmentation of markets have already had some noticeably undesirable results. There are cases where the plant sizes based on the national market are uneconomic and will have to be protected indefinitely, either through a high tariff or import quota restrictions, or through subsidies. In other cases, the plant sizes are too big for the home market, with a consequent low utilization of capacity and high production cost.

Furthermore, the adoption of independent national development policies and the resultant creation of a number of watertight compartments constituted by small individual markets has led to unhealthy competition among the countries and thus hampered the development programmes of all concerned. The types of industry that are to be promoted or that have already been specified in industrial promotion acts or pioneer industries legislation are practically identical in many countries. Yet, the general practice in most countries is to design a new industrial plant with a capacity 30 to 50 per cent in excess of the domestic market, in the hope that the surplus production can be exported to the neighbouring countries. Were this practice to continue indefinitely, the end result would be that no country could run its plants with a reasonable degree of capacity utilization, and that the total idle capacity of some industries in three or four countries would be equivalent to one whole plant. In other words, the investments in one of every three or four plants may often be considered as wasted.

The long-term consequences of such a pattern of development on the economic growth of countries of the region, as revealed in various studies of the ECAFE secretariat[1], may be summarized as follows:

(a) The limitation and fragmentation of markets would make it virtually impossible to speed up the development of various capital goods industries, such as iron and steel, non-ferrous metal, industrial machinery, electrical equipment, transport equipment, farm machinery and heavy chemical industries, which are characterized by their high degree of capital intensity and by their reliance on an expanding market to obtain the desired economies of scale.

(b) Without facilities for manufacturing some of the basic capital goods, most countries of the region would have to continue relying on advanced countries for their supplies. However, because of the unfavourable terms of trade in the exchange of primary products for capital goods and of the limited foreign exchange saving achieved by import-substitution consumer goods industries, the balance of payments difficulties of many countries would be likely to persist.

(c) The prospects for intra-regional expansion would also be far from bright, as the developing countries in the region would be exporting more or less the same commodities. At the same time, the export of any manufactured goods to countries outside the region would be handicapped by the high cost of production because of the small size of the industrial plants.

There is thus a cycle in such a pattern of development. Most of the smaller countries of the region would find it extremely difficult, if not impossible, to achieve a breakthrough in sustained economic growth. These basic difficulties are, of course, found not only in Asia. They are well recognized in other regions and have led to various regional and sub-regional arrangements in the form of common markets, customs unions and free trade areas in Europe and Latin America, to harmonize national development programmes by providing wider markets and thus ensuring more efficient utilization of development resources.

2. *Search for a breakthrough*

In view of the urgent need for economic co-operation among countries in the region, both the Commission and the Ministerial Conference on Asian Economic Co-operation have recommended that practical measures be taken to promote co-operation in various fields including industry, mining, trade, agriculture, transport and communications. In the industrial field, special attention has been given to the possibility of setting up agreed industrial projects on a regional or sub-regional basis under market-sharing and joint-venture arrangements. It is generally recognized that, although trade constitutes the main channel of economic relations between countries, the existing pattern of production and trade in the region is such that the

[1] For details see "Approaches to Regional Harmonization of National Development Plans in Asia and the Far East", E/CN.11/CAEP.2/L.5 September 1964.

mere relaxation of trade barriers between the countries would not ensure the maximum potential increase in the intra-regional flow of commodities. In order to achieve the principal goal of accelerated growth, co-operation among the countries of the region would have to be extended to the sphere of production and investment, especially in industry.

Clearly, the most important consideration for a successful scheme of agreed specialization in industrial investment and production would be the principle of mutual benefit and equity. However, the intra-regional division of labour might not always be in conformity with some of the national objectives of individual countries. One may therefore argue that, while theoretically it is easy to think of plan harmonization along the lines of so-called "regional" industries, in actual practice the location of these industries raises considerable difficulties. Though technology and economies of scale might neutralize to a considerable degree the advantages of natural endowment, they could not be ignored altogether. On the other hand, if industries were located on the basis of natural advantages alone, some countries might be bypassed altogether. Again, since economies of scale are possible only with a well-developed infrastructure and organization, the strict application of economic calculus might lead to an undue concentration of industries in a small number of countries. Therefore, a deliberate attempt would have to be made to disperse industries to other countries, and it might be necessary to design projects in such a way that they would grow with the growth of infrastructure facilities and ultimately be able to achieve economies of scale that would justify their location in a particular country.

These arguments about the practical difficulties of achieving any harmonization of national industrial development plans were also advanced in the early stages of discussions on regional co-operation schemes in Latin America and even in Europe. Obviously, a general debate on these complicated issues is not likely to lead to concrete results. In Latin America, in order to demonstrate to all countries by facts and figures the benefits that would accrue to all participants in various regional economic co-operation schemes, the ECLA secretariat, in collaboration with the governments of its member countries, mobilized a large number of technical teams consisting of economists and engineers who undertook several years of intensified research and field investigations. The studies covered, among other things, the cost and benefit of possible regional industries as well as the necessary safeguards and preferential treatment for the less developed countries. The facts and figures in the studies allowed countries to see clearly the respective economic advantages in the proposed regional or sub-regional arrangements. This eventually led to the Agreement on the Regime for Central American Integration Industries and to the formation of the Latin American Free Trade Association.

It is recognized that the political and economic environment in Latin America is not entirely comparable to that in the ECAFE region. However, the experience in Latin America as well as in Europe shows that, in launching any regional or sub-regional schemes, it is essential to work out all possible alternatives and combinations in detail for consideration by the countries concerned. Often, the cold economic facts or incentives illustrated in these studies help to alleviate certain political or other differences among countries, thus promoting a wider objective of international co-operation.

In the ECAFE region, various studies undertaken by the ECAFE secretariat during the past several years have already resulted in many concrete regional co-operation schemes, such as the Mekong basin development scheme, the construction of the Asian Highway, industrial training schemes in various fields, joint mineral resources surveys, and the Asian Development Bank. For reasons indicated earlier, increasing attention will have to be given immediately to projects concerned directly with productive activities especially in the industrial field. This calls for intensified study and field investigations in two areas which are discussed below.

(a) *Specific industrial studies*

ECAFE's preliminary studies of (a) iron and steel, (b) fertilizers, (c) aluminium, (d) pulp and paper and (e) machinery and transport equipment have already identified these industrial sectors as perhaps the most fruitful areas for regional or sub-regional co-operation in the establishment of future production units, and this conclusion was supported by the second session of the Conference on Asian Economic Planning (19-26 October 1964). The next phase would be to undertake a detailed feasibility study with special reference to raw material supplies, number and size of plants, locations, production costs, channels of distribution and all the related trade aspects of these industrial products including tariff regimes and the possible need for long-term agreements among the co-operating countries.

(b) *Steps toward multilateral economic co-operation in Asia and the Far East*

Along with the investigation of specific industrial projects, an intensified and detailed study of the feasibility and comparative advantages of all possible alternative arrangements for broader regional or sub-regional economic co-operation should be made, since the initiation of any co-operation scheme in industrial production and investment will inevitably involve all sectors of the economies of the participating countries. This study of alternative arrangements needs to embrace trade, tariff regimes, payment and credit arrangements, transport, resources and manpower development, as well as special measures for speeding up development in the less developed countries. Using the facts and figures emerging from this study, it would

be possible to outline the specific steps which should be taken toward broadening the base of multilateral economic co-operation.

To undertake the studies and investigations in depth as outlined above would require the active participation of the senior officials and experts concerned with economic and industrial development in all countries of the region. Their direct participation in these studies would facilitate close consultation with their counterparts in various countries. In addition, this would provide an opportunity for those senior officials, who may be accustomed to thinking only in terms of their own national development policy, to examine closely some of the new avenues open for development under regional or sub-regional arrangements. As most countries of the region may not be able to spare their officials or experts for a long period for this purpose, a rotation system might be introduced, whereby each country would assign its officials to this joint study and investigation programme for a fixed period of, say, three to twelve months. Such a system would not only bring in a wealth of diversified experience for the studies, but would also help to set in motion a process of "cross-fertilization" through close consultation among senior officials and experts in countries of the region, thus paving the way for better understanding and closer co-operation in the actual implementation of any joint schemes in the future.

The major portion of the detailed economic and technical studies will of course have to be undertaken by the ECAFE secretariat. Experience in other regions shows that a detailed study of the two areas outlined above would require a considerable number of specialists in various fields of industry, trade and economic policies. Thus adequate financial provision would have to be made for the engagement of these specialist consultants from both inside and outside the region in order to complete this important study in a reasonable period of time.

In this connexion, it may be mentioned that the formulation of any scheme of economic co-operation among countries is necessarily time-consuming, as has been shown by experience in both Europe and Latin America. In most cases, the planning of large-scale mineral projects and heavy industries may take as long as five or eight years. If the preparatory work is not undertaken well in advance, it may seriously delay the actual implementation of any co-operation scheme when it comes into operation.

The need for a comprehensive investigation of various forms of economic co-operation has become especially urgent in view of the recent establishment of the Asian Development Bank, because the proposed study programme on regional co-operation schemes is expected to reinforce and facilitate the Bank's operation.

In conclusion, it may be said that, for each country of the region, it is increasingly important to imbue its national development policy with a regional outlook. During the past decade, the underlying principle of the industrial development policies of countries in the region has been that, by utilizing the technical "know-how" and experience provided by the industrially advanced countries and by intensifying national efforts to build up import substitution industries, it should be possible to achieve an accelerated rate of economic and industrial growth. It is increasingly more clear, however, that for many countries, particularly the smaller ones, a third element — the need to work for co-ordination with neighbouring countries in development — has to be added, if the desired rate of growth is to be achieved. In this respect, much can be learned from experience of countries in Europe and Latin America. In the years ahead, the rate of industrial growth in countries of the region may well hinge on the extent to which they can adopt the necessary measures to quicken the pace of co-ordinating the development programmes and efforts among themselves.

THE APPLICATION OF SCIENCE AND TECHNOLOGY TO MORE EFFECTIVE USE OF RAW MATERIALS

Prepared by the ECAFE Secretariat

I. RAW MATERIALS IN TRADE

The developing countries of the ECAFE region are characterized by their unfavourable balance of trade, attributed to various causes, among which are the import of capital goods needed for development, low rates of productivity, and lack of skilled labour. Perhaps one of the most important reasons is their inability to make effective use of their raw material resources. The developing countries' exports consist largely of raw materials, such as agricultural crops, crude forest products and mineral ores, while their imports consist of finished and semi-finished products, machinery, equipment, and so on. Their raw material exports command much lower unit prices, while imported manufactured goods have to be paid for at higher unit prices as they include not only the cost of the material, but also the costs of labour, power, and the production technology used in the countries of origin.

It is estimated that the value of the raw material exports of the developing countries of the region in 1962 amounted to about US$4,900 million. If some of the raw materials exported had been manufactured into finished or semi-finished products before they were exported, their value would have been considerably increased. Moreover, there is a probability that some of the products so produced could be used as substitiutes for some of the imported finished products. Of course, it would not be possible to manufacture all the raw materials for export into finished goods, but at least vigourous efforts should be exerted by the developing countries of the region to manufacture as many finished products as possible. Industrialization or the establishment of manufacturing industries based on indigenous raw materials is, therefore, one of the most effective means of using the raw materials and improving the trade balance of the developing countries.

II. MAXIMUM USE OF RAW MATERIALS

A raw material is said to have been used effectively when most, if not all, its components are utilized, thereby deriving the maximum value from it. Not only the main part but also the waste materials should be made use of. For instance, in the mining of alluvial tin, if the most suitable equipment and machinery for the type of deposit are used and operated at their optimum adjustment so as to ensure the highest possible recovery of tin and of the associated tungsten, titanium and gold, and so on, then effective use of the mineral raw material, tin ore, is achieved. In the case of rice, an example of a plant raw material, when not only the rice grains, but also the rice straw, the rice hulls, the rice bran and its oil are utilized, then the raw material has been effectively used.

In certain conditions, profit to the operator may be greater when only the main constituent is recovered, especially when the prices of the minor components are low. However, taking the long-term view and considering the greater number of people benefited, it is still preferable to recover all the components.

III. TRAINING A REQUISITE FOR THE EFFECTIVE USE OF RAW MATERIALS

Science and technology are necessities for the proper utilization of raw materials, but they cannot be made to function without suitable manpower and energy supply. Lack of skilled labour and technical manpower is one of the drawbacks of the developing countries of the region. Raw material and power resources are usually plentiful. Capital, which is also insufficient in these countries, can usually be attracted from foreign sources, or even from domestic sources, if a favourable investment climate is created and economically sound projects are conceived; but the lack of manpower requirements at all levels can be eliminated only by training. It is true that skilled manpower could be imported, but that is costly and is usually done only at the initial stages, while local manpower is being trained. The training of the necessary personnel for projected industries must therefore be given due consideration and awarded high priority in the planning stages. Skill and technical "know-how" are ingredients of industrialization which are not dissipated with use, but are rather, enriched with experience. It would therefore pay to invest in training programmes.

IV. RESEARCH WORK IN THE UTILIZATION OF RAW MATERIALS

Basic scientific research is the foundation of all industrial processes, while industrial research aims at the practical application of scientific and technological knowledge and data. There are many aspects of research concerning or related to raw materials utilization. One aspect is the determination of the physical and chemical properties of raw materials, the results of which may guide their design or proper use. Others are research on the applicability of certain processes to particular raw materials, the determination of the optimum conditions for a plant's efficient operation, and the utilization of waste materials after acquiring the main component. There are also researches concerned with the protection of plant and animal resources from pests and diseases, which constitute another aspect of better utilization of raw materials.

The value of research is recognized in many of the developing countries of the region and for this reason there are several research institutes and organizations in these countries, some of which are achieving notable successes. The Union of Burma Applied Research Institute deals with all types of materials, whether agricultural or mineral. In Ceylon, besides the Ceylon Institute of Scientific and Industrial Research, there are several other specialized research organizations such as the Coconut Research Institute, the Rubber Research Institute, and so on. In China (Taiwan) the Union Industrial Research Institute under the Ministry of Economic Affairs has ten laboratories doing research work in branches of chemistry and electronics. In Malaysia, research laboratories are found under the government departments and institutes and also in private organizations.

India has several research facilities operated by the Council of Scientific and Industrial Research, the Department of Atomic Energy, government departments, universities, scientific societies and trade associations; they undertake pure and applied research, and research in specialized fields. The Pakistan Council of Scientific and Industrial Research, the Pakistan Standard Institute, the Fazi-Omar Research Institute and the Pakistan Central Jute Research Institute are the organizations conducting research in Pakistan. The Philippines has the National Institute of Science and Technology, the National Development Company, the Philippine Coconut Administration, the Philippine Sugar Institute and others contained in the Government bureaus and departments. In Thailand, scientific and industrial researches are conducted in laboratories attached to the Government ministries.

Some of the research work being undertaken is of common interest in the region, examples of which are as follows. The extraction of oil from rice bran and of essential oil from plants; researches on rubber, coconut, tea, pinapple and fibrous raw materials; and the isolation and identification of useful substances from coconut husk are among the researches concerning plant raw materials. Beneficiation of low grade ores of tin, manganese, iron, copper, lead and zinc; recovery of copper from copper-bearing slags, of nickel from blistered slag; substitution of aluminium for copper in electric cable industry; and the recovery of antimony and lead from discarded batteries are some of the researches in the mineral and metallurgical fields. Researches concerning animal raw materials include the development of methods of cultivation and selection of fish; swine and cattle improvement such as management, feeding practices and breeding; development and production of a fowl pox vaccine and sera for diseases of poultry; and many more.

Research work must continue in the developing countries of the region, and the work programmes of research organizations must be geared to the needs of the developing industries. Researchers should be aware of work that has been done with success in other institutions in order to avoid needless duplication of effort which could be usefully directed to other problems. This points to the need for the exchange of information concerning the progress of work of the various research organizations of the region. The training of researchers in sufficient numbers to ensure the continuity of research work and to meet the increasing needs of the growing industry is a point that should not be neglected by authorities concerned.

V. SOURCES AND TYPES OF RAW MATERIALS

There are an infinite number of raw materials to be derived from the land, under the ground, the forests and the seas. Plant raw materials are produced in the farms, taken from the forests, the swamps, and — to a certain extent — from the sea. The animal raw materials are largely raised on farms and ranches, or obtained from the sea and the forests, while the mineral raw materials are won from below the surface of the ground in the lowlands or in the mountains, and more recently from the bottom of the sea where the search for minerals is being extended. The atmosphere itself is the source of nitrogen and oxygen, which are important raw materials for some industries.

As the population of the earth increases, more and more raw materials will be required. The productive areas of the land must be extended into the unused portions, and science and technology must be harnessed for more intensive production from the land. Mineral resources must be sought at greater depths of the earth and in the deeper portions of the seas. In the production of and the search for more raw materials, science and technology will play more and more vital roles. Hence, their capabilities must be extended through more research, both basic and applied.

VI. SCOPE OF SCIENCE AND TECHNOLOGY ON RAW MATERIALS

Science and technology are of service from the winning or production of the raw materials to their

transformation into finished products, and even extend to the time when the products reach the consumer. In the mineral fields, science and technology must be increasingly utilized in the search for the mineral deposits through developments in geophysical and geochemical prospecting. In producing plant and animal raw materials, reliance has to be placed on science and technology in choosing the land and selecting the variety of plant or species of animal to be raised on that land. Fish culture depends on science and technology whether it is carried on in fresh and brackish waters or in the seas, and they assist in the development of methods and techniques to increase the output of food and industrial raw materials from this source.

Science and technology exercise their influence on the concentration of the mineral ores, their smelting into metals and the fabrication of metals into finished products; on the rearing and the protection of plants and animals from pests and diseases, on their final exploitation for the manufacture into food and finished products, and on the distribution of these products to the consumers.

Through all these stages, the objectives of science and technology are to obtain the maximum yield at the most reasonable costs, produce high quality products and minimize the waste of raw materials. The succeeding pages illustrate the vast areas in which science and technology can serve in utilizing raw materials for the benefit of the people of the developing countries.

VII. MINERAL RAW MATERIALS

The ECAFE region contributes a substantial portion of the world's production of mineral resources. The richest tin-belt of the world stretches from south China through Burma, Thailand, Malaya, and Indonesia over a distance of more than 3,000 kilometres. Malaysia is the world's largest producer of tin; Thailand is the third largest and Indonesia is the fourth largest. Of their combined production of 92,400 tons in 1962, about 13,000 tons were exported as tin in concentrate, and 80,000 tons as primary tin metal. One of the world's largest and richest lead-zinc mines is in Burma, but at present production is limited. The Philippines is the world's largest producer of refractory chromite, but production is entirely exported as ore. That country also produces substantial amounts of copper concentrate, averaging 60,000 tons of contained copper yearly, but all are exported as ore concentrate, with none smelted locally. Malaysia and Indonesia produce bauxite which is entirely exported. Iron ore is mined in Malaysia, Indonesia and the Philippines, but all are exported as ore. The developing countries of the ECAFE region, with the exception of India, are mainly producers and exporters of mineral raw materials. On the other hand, those countries import iron and steel, tin-plate, copper wire, machinery, cars, trucks and many other finished metal products. Clearly, there is a very wide scope for the application of science and technology to the development of the mineral industries of the countries of the region. If they continue to export their mineral production in the raw, the balance of trade will continue to be to their disadvantage.

Most of the countries have plans to process their minerals into metals. Thailand has now established a tin smelter and Indonesia is working toward the same goal. Malaysia, the Philippines, Indonesia, and Ceylon each hope to establish an iron and steel industry. The Philippines intends to establish a copper smelter and refinery. Indonesia is reported to be putting up an integrated alumina-aluminium industry with German and Russian assistance. There are countries with potential for the establishment of aluminium smelters, such as Brunei and Iran, where large reserves of natural gas for the production of cheap power exist, and the countries of the lower Mekong basin and the Philippines, where favourable sites for the generation of cheap hydro-electric power are available. However, the lack of bauxite deposits and other raw materials in these areas is a disadvantage that must first be overcome.

In the non-metallics field, many of the developing countries in the region have made some progress. Most of the countries have their own cement plants, although in many of them the production of cement is insufficient to meet the domestic demand. A few countries have developing ceramics industries though some have to import part of their raw materials. India is the largest producer of mica in the world, while Ceylon and South Korea are noted for their production of graphite. Most of the graphite and biotite are exported outside the region. Precious stones produced in Ceylon and Burma are also exported. Although the local utilization of non-metallic minerals has been more extensive than utilization of metallic minerals, there are still large opportunities for its continued expansion.

In both the metallic and non-metallic minerals, the developing countries of the region should strive to process their minerals to reach as high a stage of manufacture as conditions permit in order to get the maximum benefits from their mineral wealth. In doing so, they will create more jobs for their people and receive more foreign exchange for their exports. Feasibility studies must, however, be conducted before undertaking projects of this nature, which must include determination of the existence of sufficient reserves of ore and other raw materials to justify the capital investment. The application of science and technology should be made possible through technical assistance if local technical men are not available. Training of local personnel should be undertaken during the initial stages of the operations so that they can take over after they have acquired the skills and techniques required.

As with other raw materials, mineral raw materials are said to be effectively used when the

maximum benefit is derived from them. In general, when all the valuable metals of an ore are extracted economically, the ore has been effectively used. For instance, in a complex ore of copper-lead-zinc-gold, if all the metals are extracted at the optimum percentage recovery, within economic limits, then the ore has been effictively used. It is, however, possible that the operator could derive more profits by exporting the ore in the forms of concentrate, rather than smelting it and exporting the metal. However, the greater number of people employed and benefited, together with the availability of part of the metal production for local industries, make processing and smelting the ore locally more beneficial to the national economy; it will produce higher foreign exchange earnings and better employment opportunities.

The recovery and utilization of by-products of mineral ores, to the extent consistent with economy, must be the objective of mine operators. To achieve this, they must choose appropriate methods and techniques developed through science and technology. Although the processes of extraction and separation of the metal contents have more or less been standardized, pilot testing is usually required to determine the most effective flowsheet, the degree of fineness of grinding for optimum recovery and separation, the type and concentration of reagents to use, and other details.

In most of the developing countries of the region there are numerous known mineral deposit occurrences which are not being exploited for various reasons. Many mining operators think in terms of exporting the ore produced, but frequently neglect the possibility of utilizing it locally in an already existing industry, or in new enterprises that are needed in the country. There are many such possibilities, and it may be appropriate to review some of them during the Asian Conference on Industrialization which pays special attention to the developing countries.

Of the tin producing countries in the region, smelting facilities are found only in Malaysia which, however, exports practically all its tin, mostly outside the region. On the other hand, countries of the region import the tin-plate that they need for their canning industries. This increases the cost not only of the tin can but also of the canned products that those countries hope to export. It is obvious that, in planning iron and steel industries in the region, provision for establishing tin-plate manufacturing facilities as an important secondary industry should be made.

Along with the establishment of the iron and steel industries, there should be a plan to manufacture refractory bricks from the chromite production of the Philippines, Pakistan, India, and other countries with chromite resources. Manufacture of ferro-alloy metals from local resources may be included. The possibility of using chromite in the chemical industries should also be considered, as well as the production of chromates of lead, zinc, and so forth, for pigments in the paint and textile industries, and other chemicals for use in the tanning of leather, manufacture of ink and so on.

Antimony occurs in Burma, Thailand and the Philippines. Its use in producing a white pigment, antimony trioxide, for paints, lacquers, porcelain enamels, glass and adhesive cements and also for flame-proofing canvas should certainly ensure that it will find a ready local market, if not an export market. Cobalt, manganese, lead, zinc and calcium are found in many countries of the region; if these are chemically processed into their organic salts, they can be readily used as dryers in paints.

With the development of shipping industry in the region, an increase in the number of vessels is foreseen; the requirements for marine paints and antifouling agents to protect them from corrosion and prevent the adhesion of barnacles and other seas animals and plants to their hulls will rise proportionately. Copper exydul and mercury oxides, which are good anti-fouling agents may be produced from copper and mercury.

Rock salt is found in many countries of the region and solar salt is produced in considerable quantities. Of the industrial uses of salt, the manufacture of caustic soda and soda ash are the most important, as many industries depend on these chemicals for their operation. Caustic soda is used for soap manufacture, mercerization of cotton, in the paper industry, aluminium industry, vegetable oil refining, rubber industry, petroleum refining and others. When caustic soda is produced by the electrolysis of salt, an important by-product, chlorine, is produced which also finds many applications in various industries. Chlorine is used in water purification, paper and textile bleaching, production of titanium dioxide by the chlorination process, production of organic chlorine compounds for agriculture, fire extinguishers, metal degreasing, plasticizers, production of anti-knock additive to gasoline, agricultural insecticides, wood preservatives, "arochlors" for paints and lacquers, die casting operations, fire-proofing, chlorine-based plastics and chlorinated rubber for special paints and varnishes.

Soda ash, which may be produced by the reactions of chlorine, limestone and caustic soda, is used in glass-making and the textile industry, as well as in the manufacture of washing powders and of sodium silicate. Sodium silicate finds use in the manufacture of household detergents and as an addition to soap, glue, fire proof paints, silica gels (dryers) and so forth.

Large quantities of mica are found in India, and Pakistan and some in other countries. The utilization of large sheets is no problem as they find ready outlets in world markets. Utilization of mica splittings and fines is advantageous in the manufacture of mecanite, a very useful substance for providing electrical and heat resistance. The very fine mica is a useful paint filler, especially in the case of fire-proof paints.

Graphite is produced in Ceylon, the Republic of Korea and Hong Kong. It is a useful lubricant, refractory material and electrical conductor, and is used in the manufacture of dry cells, motor and generator brushes, protective paints resistant to sulphur gases, acids, and the like.

Minerals known to exist in Afghanistan include coal, salt, chrome, silver, gold, sulphur, iron ore and petroleum; at present, only coal, salt and chrome are being exploited. The recent discovery of petroleum and natural gas in the country should help in exploiting its other mineral resources.

Burma produces a wide variety of minerals including petroleum and natural gas. There could be numerous ways of utilizing some of the production locally. Burma has the richest lead-zinc-silver mine in the world. The Union of Burma Applied Research Institute (UBARI) includes in its activities research on the processing and utilization of minerals in glazes and designs for a wide variety of ceramic products. It is also engaged in the installation of a modern ore treatment plant. Other minerals should be included in its programme of research.

Bauxite is reported to have been found in Cambodia. If this is of commercial quantity and grade, it is a significant discovery, as the prospect of producing cheap hydro-electric power in the lower Mekong basin points to the feasibility of establishing an alumina-aluminium industry in that country. Its phosphate deposits should have good prospects for development in view of the shortage of this mineral resource in the region.

The mineral production of Ceylon includes graphite, ilmenite, monazite, clay, kaolin and silica sand. Of these, graphite ilmenite and monazite are exported. The Ceylon Institute of Scientific and Industrial Research includes in its programme of activities research on improvement of production methods for manufacturing ceramic wares. It might possibly include research on the utilization of graphite, ilmenite and monazite.

China (Taiwan) has the Union Industrial Research Institute, under the Ministry of Economic Affairs, which serves public and private industries in Taiwan. The Institute includes in its research programme the utilization of the country's natural gas and other minerals.

India produces a wide variety of minerals both in the metallic and the non-metallic groups. Some of the production is exported, but a large proportion is used locally in its expanding industries. Utilization of indigenous minerals is being given proper attention by the Government through the Council of Scientific and Industrial Research, the Department of Atomic Energy, and other government agencies, and also in universities, scientific societies and trade associations. Some of the interesting projects are: (1) steel manufacture utilizing indigenous alloying elements, (2) beneficiation and upgrading of ores and ferro-alloy industry, (3) iron production without coking coal, (4) recovery of copper from copper-bearing slags, of nickel from blisterred slags, silver and other metals from silver refinery liquors, and so on, (5) boraxless enamels for ceramics and glass, (6) replacement of soda ash by salt cake in glass manufacture, (7) talcs for insulators, (8) uses of scrap mica, and so forth.

Although petroleum is the most important product of Iran, the Government is giving attention to the development of its other mineral resources of iron ore, lead and zinc ore, and the ores of manganese and chromium. The very large amount of natural gas being flared for lack of ready utilization might be used in processing other mineral resources. The possibility of putting up an aluminium smelter, based on imported bauxite, has been suggested.

Laos possesses a wide variety of mineral resources such as coal, lignite, ores of iron, manganese, tin, tungsten, copper, lead, zinc, silver, antimony, molybdenum, cobalt and gold, as well as sulphur, pyrite, gypsum and salt, and so on. Only tin ore and salt are being exploited. The power development projects in the lower Mekong basin should be able to supply the necessary power for the exploitation of these mineral resources. Their exploration should, therefore, be undertaken as soon as possible.

The Republic of Korea possesses a wide variety of ores and minerals, including coal, iron ore, gold, graphite, limestone, tungsten concentrate, silver, silica and many others. Iron ore is mostly exported, although domestic production of pig iron was started in 1963. Tungsten concentrate is exported, while copper ore is smelted into metal and refined electrolytically. The recovery of gold, silver, lead and zinc will be undertaken upon completion of facilities now under construction. Dressing plants for graphite, fluorite and kaolin were also under construction in 1963. The Republic of Korea is making good progress in the processing of its ores and minerals and also in the local utilization of some of them.

Malaysia, besides being the world's largest producer of tin, also produces iron ore, bauxite, ilmenite, gold and manganese, and so on. Practically all the production is exported. Tin is the only metal smelted locally. Malaysia plans to establish an iron and steel industry which may possibly include tinplate manufacturing. The bauxite output is entirely exported. Tin mining has some by-products, namely, gold, ilmenite, monazite and tungsten. The local utilization of domestic ores could be a rewarding subject for the country's research organizations. The successful research conducted by the Department of Mines Laboratory concerning the processing of low grade tin ores has immensely increased the usable reserves of tin in Malaysia.

Although Nepal has no mineral production of consequence, the Government of Nepal attaches importance to the utilization of its resources. Oil seeps have been reported in the country, and lead ore

deposits have been found in many places. Iron ore is being studied for possible smelting. Peat, stone, limestone and marble could be very useful in the building industry — especially peat, which is being used in brick kilns.

Pakistan produces natural gas, petroleum, coal, chromite, limestone, celestite, bauxite and silica. Other known mineral resources are iron ore, gypsum, copper ore, and salt. The utilization of the natural gas has made progress; it is now used for fertilizer and cement manufacture and other industrial uses, as well as for household consumption. Chromite is exported, while the other minerals produced are locally utilized.

The important mineral products of the Philippines are copper concentrate, gold, iron ore, chromite, zinc in concentrate, molybdenum in concentrate, and manganese, all of which are exported. Cement, coal, salt and gypsum are also produced and used locally. The Philipines has no copper smelter despite its substantial production of copper concentrate. Besides its reserves of hard iron ore, it has vast reserves of lateritic iron ore. There are plans to establish a copper smelter and refinery and also an iron and steel industry. Research on the local utilization of mineral resources is carried out by the Bureau of Mines, which has an ore dressing laboratory, a ceramics laboratory and an analytical laboratory. Among the researches completed and in progress are: (1) beneficiation of low grade manganese ores; (2) direct reduction of iron ore; (3) coal utilization; (4) utilization of iron-nickel laterites, and so on. The Philippines has succeeded in utilizing most of its non-metallic minerals, but still has to undertake the smelting of its iron and copper ores. Some of the small deposits which are not now mined could be the bases for some chemical industries.

Tin concentrate, lignite, manganese, wolframite, fluorite, gypsum, iron ore, lead ore, and antimony are the principal mineral products of Thailand. Copper minerals are known to exist in some places. With the exception of gypsum, lignite and manganese, the mineral production is largely exported. The establishment of a tin smelter is a step toward more effective use of local mineral resources. Limestone, gypsum, anhydrite, lignite and manganese are possible raw materials for the chemical industries.

Anthracite coal is the only important mineral product of the Republic Viet-Nam; it is entirely used locally for power generation and in the manufacture of fertilizer. Silica sand is also produced and exported, while solar salt production is partly used locally and partly exported.

This brief review of the mineral occurrences in the developing countries of the region furnishes a general idea of the means of using these resources in the metallurgical and chemical industries now existing or in those which might be established on the basis of these occurrences. The role of the national scientific and technological research institutions is very important in investigating the various possibilities.

VIII. PLANT RAW MATERIALS

Most developing countries of the region are within the tropical and subtropical zones, hence they are amply provided with abundant rainfall and thick soil cover, conditions which are favourable for the growth of plants. It is to be expected that plant raw materials will become the most important basis for the industrialization of these countries. Agriculture will be an important source of raw materials for several industries, and will itself need to be industrialized to ensure the maximum utilization of land. Forestry should also be placed on a scientific basis so as to produce better raw materials for other industries.

The composition of the exports of the developing countries shows that plant raw materials share at least 50 per cent of the total exports. The main exports of this kind are sugar, logs, copra, fibres, spices, forest products, and so on. Most of these exports could be processed into finished and semi-finished products in the countries of origin and thus command better prices. Science and technology must be applied to their transformation into manufactured goods.

Another aspect of the better utilization of plant raw materials is in the utilization of the waste materials after recovering the valuable part of the plant. For instance, after harvesting rice and milling it, the rice hulls, rice bran and rice polish can be utilized. The rice hulls can be used for fuel, or the carbon and soot produced by burning them may be used for clarifying sugar liquors, or the hulls may be used in the manufacture of furfural. Rice bran may be made to produce rice oil by extraction, or used as feed mix for poultry, cattle and swine. Rice polish is used as poultry feed or swine feed.

In 1963-64, the production of rice in the ECAFE region was 130 million tons, accounting for 52.5 per cent of the total output in the world. Taking a six per cen yield of rice bran from paddy rice as the minimum percentage, the potential yield of rice bran is 7.8 million tons, from which 1.09 million tons of good edible oil can be extracted, valued at US$325 million. This will increase oil resources of this region by 16 per cent without any pressure on the existing cultivated land. In comparison, the present production of rice bran oil in the ECAFE region is about 50,000 tons, or only five per cent of the potential yield.

The main problem involved in developing this industry is the stabilization of the rice bran. Immediately after milling, the free fatty acids in the oil contained in the bran are below three per cent. Without stabilization, the free fatty acid content in the oil may increase at a rate as high as one per cent per hour under high room temperature and humid atmosphere due to the enzyme reaction in the bran, which renders the oil difficult to refine and non-edible.

The principle of stabilization is to destroy the enzyme in the bran by heating at the proper temperature and time. Some research work has been done in China (Taiwan) and India on this subject, but no standard method has been developed yet. A pilot plant study is most necessary to discover a suitable method of stabilization and to decide upon the design of the equipment to be installed in rice mills.

Corn is another agricultural product whose waste materials could be utilized. The corn stalk can be used as fuel, or may be a potential source of pulp for paper, or as feed mix for animals. The corn cob, after being broken to pieces and soaked with molasses, can be used as feed for hogs and cattle; or, if ground and screened, it can be processed into furfural which is used for the production of certain nylons. If corn is used for the production of corn starch, other products produced are the germs, gluten and bran. From the germs, refined corn oil which has good dietetic value can be extracted; soapstock which is used in soap manufacture is a by-product derived from the refining of corn oil. Corn gluten may be used as a source of protein and beta carotene (provitamin A) in broiler feed, or as feed mixture for hogs, dairy cattle and beef cattle. The water used for soaking the corn in the steep tank, when concentrated through the use of waste steam, may be used as a substrate in growing molds for antibiotic preparations or as a basis for food yeast; or it may be added to corn hulls and to gluten, dried and used as feed mix with excellent growth value for poultry feed.

Sugar cane is one of the important agricultural products of developing countries from which not only sugar is usable, but also the bagasse and molasses. Bagasse is used in the manufacture of wall and ceiling boards, and of light weight, heat-insulating hollow blocks; it is also used as pulp for paper manufacture, or, when mixed with molasses, as animal feed. Molasses is used as feed mix for cows and poultry; and also as preservative to green feed, grasses, legumes, alfalfa, green soyabean and cereal grains. As an industrial raw material, molasses is used for the production of alcohol, monosodium glutamate, citric acid, antibiotics and yeast.

Coconut fruit and the tree itself find numerous uses aside from the copra meat that is usually exported from the developing countries. From the fruit, the husk fibers form raw materials for the making of mats, ropes, handbags, brushes and the padding material now becoming popular in combination with rubber latex. The hard shell is usually utilized as fuel for the drying of copra or is burnt to produce active carbon or charcoal, or ground to a fine powder and used as filler for plastic materials.

To extract the oil, the copra is pressed in expeller presses or hydraulic presses. The oil cake still contains much oil which may be extracted by solvent oil extraction. The meal cake or residue contains protein and nitrogen and is suitable as feed mix for dairy cattle, swine, growing chicks, and laying hens.

Somewhat similar procedures are followed with other sources of vegetable oils, and the by-product meal cake or residue is similarly utilized as feed mixture, although the composition varies from fruit to fruit. Some of the other sources of oil are: palm kernel, soyabean, sesame seed, cotton seed, flax (linseed oil), castor seed, rape seed, mustard seed, kapok seed and hemp seed. After refining and processing the oil from coconut, palm kernel, soyabean, sesame seed, cotton seed, the oil is used for shortening, soap manufacture and other uses. Linseed oil, castor oil and hemp seed oil are used for paints and varnishes. Castor oil is also used as a purgative, a lubricant and a component of brake fluid.

Some plants are good sources of fibres for the textile, paper, rope and fibreboard manufacturing industries. Some of the sources of textile fibres are cotton, jute, flax, ramie, sisal. The sources of pulp for paper manufacture are the coniferous woods (soft woods) and some hard woods, as well as bamboo, shrubs and grasses, and the like.

Research is still needed to determine the possibility of using other sources for pulp and paper manufacturing, such as old rubber trees. The area under rubber plantation in the ECAFE region have been estimated to be about 11 million acres, representing 90 per cent of the world total. Rubber trees that have been tapped for 30 years should be felled and cleared to make way for replantation. Old rubber tree wood is unfit for use as a building material and is consumed only as fuel-wood. Huge quantities of rubber wood are available in the region. It has been estimated that old rubber trees covering at least 300,000 acres should be felled every year in the region; and that this clearing would yield about 15 million tons of rubber wood. If this wood can be utilized as an industrial raw material, the value of so large a quantity will be great. The cost of production of natural rubber could also be reduced, for it has also been estimated that, if this amount of rubber wood were converted into paper and board, six million tons of these products would be obtained, with a value of about US$800 million. Other fibre materials such as jute sticks, bagasse, banana and cassava stems, and so on, are also available in large quantities in this region. Cotton stalks may be processed into pulp for use in paper making. A pilot plant should be set up to study the possibilities of using these materials in the manufacture of pulp and paper, fibre board and particle board.

The utilization of parts of trees and plants which cannot be used for pulp should also be considered as a means of deriving additional benefit from raw materials. The bark of trees is usually used for fuel, but some might be good sources of tanning material. In the chemical pulping process, the cooking liquors usually contain ligning, cellulose, hemi-cellulose, and pentosanes and may be used for microbiological production of yeasts and glues and so forth.

Some plants are medical herbs containing alkaloids which give them their medicinal value. Although these plants suffer competition from synthetic chemicals, they could still stand on their own if they were properly selected, cultivated, harvested and, as far as possible, processed locally to save the cost of transport.

Many tropical and sub-tropical plants are sources of essential oils, flavouring substances and spices. They could be used as bases for industrial activities. The methods of production of essential oils in the developing countries of the region need to be improved and modernized through the application of science and technology. The essential oils and extracts should be standardized in order to facilitate their marketing and inspire the confidence of buyers. The trade in spices is estimated to amount to $105 million annually. Here also standardization is desirable. New methods for the preparation of spices should be adopted so that the products are hygienic, clean and free from foreign materials. Among the common spices are pepper, cloves, ginger, cardamon, turmeric, cassia bark, cinnamon leaves and bark, nutmeg, mace and tamarind, extracts of which may be attempted for production so as to save on transport costs when exported, and so they can be used in shakers like salt and pepper.

Despite competition from synthetic dyestuffs, those from natural sources could hold their own if scientifically produced. Haematain logwood is suitable for dyeing leather and black silk, while cutch from India, Burma, and Thailand is still used for silk dyeing. Fustic from India gives yellow, orange and brown shades for wool, cotton and leather.

Cocoa, coffee, and tea are beverages and food mixtures appreciated throughout the world which should be cultivated on a scientific basis to improve their quality and expand their production for local use as well as for export. Their preparation into finished and semi-finished products will be industries in themselves which could create more employment and increase their export value.

In the forests of most countries of the region are found wood rosins and resins which are important raw materials for paints, varnishes, lacquers, polish, medicines, gums, mucilages and tanning ingredients. A number of industries could be established on the basis of these raw materials in the developing countries. A few of the sources of paint rosins are the pine in India, Burma, Thailand, Iran, Pakistan, and other countries, manilacopal from Indonesia, the Philippines, and elsewhere, and also the dammas, mostic and elemi resins. Among the medicinal resins are the aloe, ammoniacum (ditphoretic, anti-asthmatic, good for chronic bronchities, and used in dentistry), asafoetida (carmenative, expectorant, and the like), balsam of Peru (from Ceylon, India, Indonesia), benzoin, galbanum, camboge, and others.

From the fermentation of the residues and other parts of these tropical and sub-tropical plants may be produced alcohols, acetic acid, yeast, citric acid, acetone, butanol, lactic and propionic acid, enzymes, pepsin, pancreatin, papain, antibiotics, all of them very important products for modern living.

At this point, it might be appropriate to review some of the fields in which science and technology have contributed to the production of plant raw materials of better quality and to their more effective use. Since plants are dependent on soil for their growth, the choice of the right plants for particular land areas, or the choice of the right soil for the cultivation of a particular plant, is an important consideration in seeking the maximum yield from the land and high quality products from the plant. Soil surveys, which classify land areas into various types each with certain characteristics and a particular use, have become a basic requirement for the agricultural development of a country. This work may be accelerated by the use of aerial photographs.

More detailed work in the form of soil profiles (which include investigation in depth) is also useful in the consideration of irrigation and soil erosion problems, fertilizer requirements, salinization, and so forth. Other scientific studies on soils include foliar diagnosis (the chemical analysis of plant leaves to provide indications of the natural soil nutrient deficiencies), soil chemistry, soil physics, soil microbiology, and the like. The soil scientists have a very important contribution to make in the more effective investigation of land, through science and technology.

In the utilization of land, science and technology have developed methods of increasing the yield per hectare. The benefits of using fertilizers are clear from the experience of many countries. In China (Taiwan) the number of stands of pineapple was increased from 20,000 to 35-40,000, thanks to heavy fertilization. In Australia, fertilizer used for grass in pastureland increased the carrying capacity from almost nothing to one beef animal per acre in 10 years. The use of potassium fertilizer for coconut palm in the Ivory Coast resulted in earlier production, increased number of nuts per tree and increased weight of copra per nut. The yields doubled after two years of application, trebled after four years, and multiplied 7.5 times in eight years. Fertilizers were also used in the growing of forest trees, resulting in quicker and more complete establishment of plantations.

Irrigation has been transformed into a science through more understanding of the basic scientific principles of water use. It should be pointed out, however, that incorrect practice of irrigation may have some bad effects as well, including: the rapid silting of reservoirs due to lack of protection of the exposed parts of the catchment area as a consequence of destruction of forest cover; the waste entailed in irrigation of land unsuitable for intensive cultivation; the rise of water tables over wide areas; and excessive drainage leading to degeneration of soils through loss of structure and cohesion.

Soil conservation practice is a field which prevents the deterioration of land through scientific and technological means.

Plant breeding is a means of improving the variety of plants through the application of the science of genetics. The main objectives are: to evolve varieties with higher yield potentials, greater cultural reliability, greater resistance to diseases and pests, accommodation to the special requirements of different types of cultural practice; and improvement of quality, both nutritional and industrial. Plant breeding work is already in progress in most developing countries in the region and beneficial results are expected. In New Zealand, an increase of 23 per cent in the yield of wheat was achieved when a new variety, "Aotea", was used in about 86 per cent of the area planted to wheat. In Japan, the annual production of rice has increased from 7,500,000 tons to 12,500,000 tons over a period of fifty years because of plant breeding. The use of high-yielding plant varieties must be combined with an appropriate farming system in order to prevent the exhaustion of the fertility and productivity of the soil.

Plant pests and diseases cause considerable loss in plant food materials. An estimate presented at the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas, based on information from various sources regarding the destruction caused by insect pests, diseases and weeds (but excluding destruction caused by birds, rodents and other organisms) indicates that the magnitude of the damage is equivalent to food for approximately 700 million people. The prevention of this destruction is obviously of paramount importance in providing sufficient food for the rapidly increasing population of the world.

There is a wide range of scientific and technoligical disciplines which may be applied to plant protection. These may be grouped into a series of recognized principles, which are: (1) exclusion, that is, preventing their spread from areas or countries in which they exist to hitherto unaffected areas or countries; (2) eradication, that is, complete elimination or destruction of pests or diseases; (3) protection, by seed dressing, spraying, dusting, or seed treatment; and (4) immunization, by breeding into the crop plant certain characteristics which prevent or forestall the attacks of a pest or disease, or by the use of new or altered cultural practices.

Biological control, that is, the control of animal or plant pests by means of living organisms, is a new technique which is gaining some acceptance. It consists in the deliberate introduction into an infested area of large numbers of natural enemies of the insect or other pests, with a view to their redressing the balance of nature by establishing an equilibrium whereby the pest ceases to be of economic importance.

Most of the developing countries of the region are endowed with forest resources from which plant raw materials are derived. A survey and inventory of the whole forest area of each of the countries is needed in order to form an effective forest policy. The survey should give information on the extent and nature of the country's forests, the physical possibilities of their economic exploitation, the size of the potential home market and the possibilities for export of forest products. Recently the science of genetics and plant breeding has been applied to forestry, producing good commercial timber from disease-free trees. Research and trials on the application of the technique are still continuing. The use of manures and fertilizers in forestry is a new practice, and the latest techniques of cultivation and irrigation are also being introduced. The planting of exotic species in reforestation work is gaining acceptance in many countries. Sylviculture — the control of growing of trees for timber — is being practiced in Burma, India, Rumania, the Ivory Coast, and Nigeria.

Control of pests and diseases and, in addition, fire control, are important aspects of forestry work. They are especially applicable to plantations where large areas are planted to one or two species only.

Wood is still the world's most widely used raw material. The per capita timber consumption of most countries of the world has increased during the past decade despite the use of some substitutes for timber. Many developing countries depend on their export of timber for earning part of their foreign exchange. To make the fullest use of forest resources, a developing country should study the utilization of waste and of smaller-sized timber, and also, where possible, the harvesting and utilization of subsidiary forest products.

Mechanization in the forest requires large capital investment; hence, in many developing countries, it has to be undertaken gradually. Although it displaces some labour, it at the same time requires more skilled labour. Mechanization has been claimed to be effective and economic for the establishment of plantations. The use of mechanical planting equipment has accelerated the rate of planting in one particular case from 100 hectares a year to 400 to 1,000 hectares a year. The serious problems attendant on mechanization are: lack of equipment suited to local conditions and of trained personnel for handling it, as well as the need for maintenance of the equipment.

To promote the utilization of the wide range of species found in tropical forests requires the institution of forest products research. Commonly research is directed toward developing the timber industry of the country concerned. The building up of data concerning the mechanical and physical properties of the principal timbers, such as strength and shrinkage, which are needed in timber design and construction is essential for their successful utilization and marketing. Other fields which may be covered by research work in the early stages are harvesting, manufacture, seasoning and preservation against decay and insects. The determination of the pulping and other chemical uses of wood requires a well-equipped laboratory, and it may be advantageous

to secure the co-operation of an already established laboratory in another country.

The domestic use of timber for such purposes as railway ties, telegraph poles, bridges and buildings in place of imported materials such as concrete or steel could save large amounts of foreign exchange for a developing country. The economic use of timber must, however, be justified not only by its lower cost but also by its sufficient strength and durability. Good preservation techniques must be found through research to lengthen the life of timber structures. Chemical preservation by deep impregnation has gained wide application in many countries.

Timber seasoning is an essential treatment for improving the quality and working properties of timber. Under humid tropical conditions, the processes commonly used are air drying, pre-drying or kiln seasoning, or a combination of these processes.

The use of charcoal is still common in many developing countries and, in certain industrial processes, charcoal in large quantities may be substituted where coal is not available. The production of charcoal from timber waste materials will certainly promote the more effective use of timber raw materials. In Japan, a new technique for charcoal burning is said to have been developed. In the same country, a system for making charcoal out of sawdust is also being used. In Brazil, Argentina, and Australia, charcoal is being used in the commercial smelting of iron ore into pig iron; and it produces a high quality product.

IX. ANIMAL RAW MATERIALS

Animals are dependent on plants for their growth and life. Since the developing countries of the ECAFE region are in the tropical and subtropical zones where plants grow well, the raising of animals locally should also be favourable.

In some of the less developed countries, animals are neither properly fed nor adequately cared for. Some ranches are over-populated, and the animals are undernourished and diseased with consequent heavy mortality. Unfortunately, tradition and lack of knowledge of modern methods often exercise a restrictive effect on the development of animal industry.

The fields in which science and technology could be applied for the more effective utilization of animal raw materials are: 1) the effective use of waste or by-products, 2) livestock breeding, 3) pasture management, 4) disease control, 5) conservation of forage and water for animals, 6) dairy technology, 7) meat processing and preservation.

An important development in animal industry is the propagation of feed-mix plants. These plants serve two purposes: to make use of waste materials and to prepare more nutritive food for animals. The plants can prepare food from various formulas suited to special uses. A feed for dairy cattle is different from a feed appropriate for beef cattle. There are special feeds for growing chicks, egg layers and fryers. Needless to say, these feeds result in faster growth, healthier animals, greater yield and better quality products. Use is made of discards from the milling of cereals and grains; corn cobs; the remains of sago or tapioca starch products; orange peel and other waste materials.

Science and technology are important in the processing of meat, such as in canning, pickling, drying, smoking, freezing and other methods of preservation. A new technique for extending the freshness of meat is by anti-biotic treatment immediately before or after butchering the animal.

The utilization of other parts of the animal contributes to the value derived from it. The dried blood of cattle, sheep, chickens or other animals is a high quality protein material used for feed meals; blood albumin is used for the preparation of special glue and also as a high colloidizing agent; the hemoglobin of the blood has a nutritive and medicinal value.

Hides are the raw materials for leather manufacture. For better results, they should be properly stretched for washing and cleaning. In the developing countries there are plants containing tannic acid, such as mangrove, mycobalanes, sumach, camachili and others, which may justify the putting up of local tanneries.

Tallow is produced by cooking the less valuable fat parts of animals, which are best separated at the abattoir. It is used in the manufacture of soap usually combined with soap stock from the oil seed refineries. It is also split into stearin, olein and glycerin for use in the chemical industries. Bones of animals are used for the manufacture of bone glue, and the fats derived from the bone are used for making cheap soap. Bone meal is used in feed mixtures as a source of calcium phosphate. The horns and claws are steamed and used as special fertilizer for flowers, roses and expensive vegetables. Intestines are made into cords for musical instruments, casing for sausages, netting or tennis rackets and special sieves. The pancreas of cattle and pig when dried and powdered gives pancreatin, used as finishing agent in the textile industry. Pancreas, liver, kidney, spinal cord, gall, brain, and so on, are sources of extracts used in medical preparations. These glands are also cooked, dried as meat meal and sold to feed-mix plants. Chicken, goose, and duck feathers are used in making bedding materials, or cooked as feather meal for the feed-mix plants. The wool of animals is used for textile, wool grease and raw wool fat production.

Milk is the main product as well as raw material of the dairy industry. Its utilization, pasteurizing, sterilizing and bottling are the bases of many industries. Milk that is not consumed fresh is preserved by evaporation and made into condensed milk or powder milk, the latter by spray drying. Milk is also manufactured into butter, ghee, cheese, pure milk protein (casein), cream, whey, and lactose (milk sugar).

Casein is used for the manufacture of glue, and artificial wool (Fibrolane, Aralac, Merinova).

Eggs are used fresh in developing countries, but the growth of their poultry industries requires the preservation of some of the production for sale in other areas. The modern methods of preservation are by deep cooling, treatment with sodium silicate solution, egg oiling, coating with poly-vinyl acetate, paraffin and plastics; or dehydration into egg powder. The egg-white (albumin) when dried may be made into glue for bookbinding, while the yolk is sold to bakeries and noodle factories or made into yolk powder. The egg shells are washed, dried, ground and sold to feed-mix plants. Some of these methods may be adopted in the developing countries of the region.

Fish is an important source of protein food for most countries in South-east Asia. Fish and fish products are believed to be the least exploited food sources. It is interesting to note that, even in the advanced countries of the world, fish culture has not been developed appreciably, and that the most advanced techniques in the culture and production of fresh-water fish have been evolved in the less developed countries, such as China and Indonesia. Science and technology could make important contributions to the advancement of fisheries in such fields as physical oceanography, biological oceanography, improvement of equipment or gear for fishing, preservation and transport of fish, conservation of marine resources, development of inland fisheries, and the processing and preservation of fish and fish products.

The utilization of fish waste materials, is an industry in itself and makes fuller use of fish resources. The entrails, heads, tails and bones of fish are manufactured into fish oil and fish meal. The fish oil is used as drying oil for paints and varnishes, and also in the manufacture of detergents and surface active agents for flotation. The fish meal, which contains about 64 per cent protein, is an important ingredient for feed mixes for animals. The stick-water produced with the fish oil after pressing the meat fish is rich in vitamins and, after concentration, is added to feed mixtures. A modern alternative method without cooking the fish waste materials is by mincing it and treating it with small amounts of sulphuric acid and enzyme which partly digest the proteins and prevent decomposition. The resulting material is spray dried or soaked up by spongy material such as bran or disintegrated straw, and then used as feed mixture. Fish livers (shark, cod, tuna) are rich in vitamin A and provitamin D. The skins of some fish are tanned as leather. The heads, bones and skins of fish are made into a liquid glue which can be used directly without heating.

Livestock breeding has been enriched by the application of genetics; fifty or more years ago this used to be carried out by trial and error. The experience accumulated in the more developed countries is useful in the developing countries and, by combining it with scientific genetical knowledge, the improvement of the livestock may be attained in a shorter time than before. Breeds of cattle with high yields of milk or beef have been developed for particular conditions of climate and systems of management; poultry with fast growing capabilities or high egg-laying productivity have been developed.

Improving the indigenous animal has some advantages over the import of selected stock. The former is acclimatized to local conditions, has higher resistance to disease or insect pests, is adapted to natural grazings of inferior quality, and has the ability to exist during short periods of draught. The direct use of imported stock has the advantage of quicker results, provided that a breed can be found which is likely to suit the conditions of the new country.

Livestock feeding and management are important in obtaining higher yields, as well as in maintaining or conserving the pastureland. Over-population on limited grazing areas could lead to progressive deterioration of grasslands, through soil erosion and disappearance of the better forage plants. The grassland could be improved by improvement of indigenous grasses with or without the addition of new species, replacement of existing pasture species by exotic species of proven merit, raising the soil fertility level by suitable manuring practices, and by the use of irrigation wherever economically possible. The correction of nutrient deficiencies could result in healthier and more resistant animals.

Animal disease control is very vital in the development of the animal industry of a country. Even in the developed countries, losses through animal diseases and parasitic infestations are considerable, despite the availability of efficient health services. In the developing countries, high animal-disease rates are common. It is in the control of animal disease that organized application of science is badly needed. There must be facilities for the production of vaccines and sera, and an agency responsible for enforcing control measures which possesses the necessary authority.

X. SUMMARY AND CONCLUSION

The application of science and technology to the more effective use of raw materials covers a wide scope, starting from the production or winning of the raw material and continuing through its manufacture into finished products. In the developing countries of the region, their application could be further extended and intensified. Experience accumulated in the more advanced countries could be taken advantage of in accelerating the utilization of the region's raw materials through industrialization.

Technical assistance from the advanced countries is of importance in the initial stages of industrialization, but intensive manpower training at all levels is necessary in the developing countries to ensure full utilization of the raw materials.

The importance of continued research in adapting the methods and techniques developed in the advanced countries to suit local conditions must be stressed. The other fields of research which could lead to the more effective use of the region's raw materials are: the determination of the physical and chemical properties of the raw materials; finding means of using the traditional waste materials; protection of raw materials against pests and diseases; plant or animal breeding to improve yield and quality; and developing industries on the basis of indigenous raw materials.

The developing countries can receive more value from their raw materials if they are processed so as to reach as high a stage of manufacture as possible before they are exported. This could be done by importing the required technology through technical assistance and training programmes.

To accelerate the industrialization of the developing countries, some regional action might be necessary in making the needed raw materials available to the developing industries. Consideration might be given to the establishment of pilot plants to conduct research on the utilization of potential raw materials existing in the region. Pilot plants for the beneficiation of low-grade ores could be very useful for many countries. Similarly, the establishment of a pilot plant for research on the utilization of old rubber trees and other plants for pulp and paper manufacture would be very timely. The bauxite-poor countries might consider joint action for utilizing their high-alumina clays for the extraction of alumina and aluminium. Regional action might also be directed to the utilization of marine resources, of which this region undoubtedly has a great potential.

INDUSTRIALIZATION AND FOREIGN TRADE

Prepared by the ECAFE Secretariat

SUMMARY

Part I. Introduction

In this paper industry is taken to include only manufacturing industry. Coverage of this paper is thus narrower than that of the paper on 'Overall Evaluation of the Progress and Problems of Industrialization in the ECAFE Region.' Agro-based industries, as well as mining, are excluded from the definition in order to emphasize the relative importance of manufacturing industry. Factors responsible for its importance are:

1. the declining terms of trade in respect of primary commodities;
2. increase in demand for manufactured products despite increasing prices;
3. the increasingly important relationship between agricultural productivity and industry;
4. the need for greater economic independence as well as a faster rate of growth;
5. the need to relieve chronic unemployment and under-employment and to increase the standards of living;
6. the need to increase the national share in world trade on the basis of an equitable division of labour.

Part II. The relative position of the ECAFE region

The greater part of the world's population is contained within the ECAFE region. The per capita income of the region is the lowest in the world. The discrepancy in per capita income between the industrially developed countries and the developing ECAFE countries has increased over the years. This increase has been basically due to the growing disequilibrium in the pattern of trade between primary commodities and manufactures. Differences in the degree of industrialization are evident from the insignificance of the proportion of the industrial component in the national product of the developing countries of the region in contrast to the industrially advanced countries. Consumption of energy as well as of steel has remained extremely low.

Declining trends of primary commodity trade

The percentage of imports of the Asian developing countries declined from eight per cent of the world total in 1938 to 6.2 per cent in 1963 and that of exports from nine per cent to 5.2 per cent. This lower percentage of export reflects the decline in the world demand for primary commodities as against manufactured products. The export value of raw materials has also continued to decline relatively to that of manufactured products. The reasons for the decline are:

1. slackening demand for primary commodities;
2. increasing production of primary commodities in the developed countries;
3. increased substitution by synthetic products;
4. decreasing inputs of raw materials in the manufacturing sector.

Part III. The process of transformation through industrialization

The following subjects are discussed: the importance of manufacture, as demonstrated by the relative percentage contribution to gross national product, even in countries which have specialized in agricultural production; the basic problems associated with increased agricultural output, such as the creation of surpluses and the inability of the developing countries to supply the domestic requirements of manufactured products consequent to the declining terms of trade; the process and progress of industrialization and its centrifugal tendency; import substitution and its limits determined by factor endowments, necessitating provision for wider scope in import substitution on a regional basis and as a means to correct imbalances in the export trade of the region as a whole.

There follows a discussion of the growth of manufacture and its impact upon trade. Increasing production of primary commodities further aggravates the adverse terms of trade and, when associated with improvements in productivity, causes a reduction of labour requirements in that sector. Industry, in these circumstances, has to provide avenues for increasing absorption of labour force.

Changes in consumer patterns associated with industrialization also require additional consumer goods which can be provided by local manufacture and supplemented by imports. The beneficial effects of industrialization on trade are demonstrated by the examples of Japan, China (Taiwan) and the Republic of Korea, which support the conclusion that increased indus-

trialization of the less developed countries promotes trade.

Estimated commodity-wise demand projections for the ECAFE region based on a growth rate of the GNP of 5 per cent are given. The qualitative alteration of the pattern of demand and its affect upon imports from the developed countries is set forth, followed by some discussion of the effects of industrialization on supply of raw materials, and of the reduction of costs of raw materials which has resulted from improvements in productivity and from bringing in of new sources of raw material supplies.

Part IV. Prospects for manufactured exports

An examination is made of a 5-per-cent growth rate of the GNP and its effects on the balance of payments. The deficit in balance of payments by 1980 is estimated at US$9,000 million. Attention is drawn to the relevance of increased industrial exports in the context of the balance of payments gap.

Then follows a discussion of the demand for manufactures affecting world trade and the need to diversify the base of industrial production; the present problems of the region in exports of manufactures arising out of concentration on a few commodities, such as textiles, in a few countries; and a comparison of trade in manufactures as between the developing countries and the countries of the region. An analysis of the pattern and direction of trade is provided.

Increasing exports of manufactures of the ECAFE region are shown by trade developments between 1960/62. The percentage growth rate of trade in manufactures has increased from about four per cent per annum to over twenty per cent per annum. A detailed analysis is given of trade in manufactures and the structure of trade; and the prospects of increasing trade in exports of manufactures at an annual rate of ten per cent, so as to achieve a ten cent share in world trade manufactures by 1980, are set forth.

Part V. Interdependence of national development plans and foreign trade

This section analyses the relevance of the growth of industries within individual countries and its importance for co-ordinating regional development on an integrated basis. The fundamental assessments involved pertain to prospects of diversification on the basis of integrated substitution. Individual country analysis focusses attention upon the pattern of trade and the balance of trade; the advantages of foreign exchange budgeting in order to demonstrate the importance of exports to developing countries; and the relevance of imports in the context of industrialization and its impact upon world trade as a whole. Consideration is given to the extension of import substitution on a regional basis; examples of fertilizers, iron and steel, pulp and paper products are provided to demonstrate the efficient management of foreign exchange. Stress is laid upon the importance of the manufacturing industry to exports as demonstrated by the increasing share of machinery manufacture and other equipment in the increasing share of exports in manufactures as well as the importance of plan co-ordination on the basis of the principles indicated in earlier sections. Then follow the basic assumptions regarding regional co-ordination and a suggested starting point through project studies. Suggestions are made regarding an institutional structure for co-ordination which could take into consideration the techno-economic aspects in relation to the world demand, technical changes and the preparation of long-term projects. A scheme is recommended for the study of selected commodities through effectively harmonizing the country plans on the basis of the over-all objectives of regional co-operation.

Part VI. Measures toward expansion of trade

This part opens with a discussion of the basic assessments involved in expansion of trade with:

(a) developed market economies;
(b) developing economies;
(c) centrally planned economies.

Then follow: quantitative assessments of trade expansion prospects in terms of 10 per cent projected growth rate per annum; an analysis of exports on the basis of patterns of demand in the major consuming centres, and an analysis of prospects and possibilities of increasing exports. Consideration is given to the changing pattern of world demand for manufactured goods and the following problems associated with increasing trade are discussed:

1. bilateral balancing of trade;
2. direct and indirect obstacles to trade in manufactures and semi-manufactures from developing countries, and the steps to be taken by the ECAFE countries in order to overcome these problems.

Institutional facilities

In this section, consideration is given to such aspects as shipping and financial arrangements. Recommendations are contained in regard to the establishment of regional shipping lines as well as sub-regional shipping arrangements.

Another aspect of institutional arrangements will pertain to measures for the establishment of proper standardization and the introduction of efficient methods of marketing.

Insofar as financial arrangements are concerned, the establishment of the Asian Bank could provide opportunities for arrangements in regard to the extension of credit and guarantees, insurance, and so on. Problems pertaining to improvements in the financial aspects are also dealt with briefly.

I. INTRODUCTION

This study is principally concerned with the problems of industrial development in the ECAFE region with particular reference to foreign trade. For this purpose, the term 'industry' is construed in a narrow sense to refer to manufacturing industry, exclusive of such economic activity as generation of power, mining, construction, transport, development of infrastructure and service facilities. In economic literature, however, it is customary to include mining, generation of power, and construction as components of industry strictly so-called. In fact, even certain facets of agro-based industries, such as the processing of tea, rubber and coconut, are included.

There is no doubt that such activities will continue to occupy a significant position in the economies of the developing countries for some time to come. It will be seen, however, that a heavy reliance upon trade in a few minerals or plantation agricultural crops or both has been one of the principal factors contributing to the inhibition of economic growth of the developing countries. Hence, their inclusion within the scope of industry in the context of this discussion, would tend to reduce the weight of emphasis upon manufacturing industry, which unquestionably acts as the centrifugal generator of the dynamic force of economic development.[1]

On the other hand, in any discussion related to the process of industrialization in general, all these aspects, as well as other socio-economic issues such as education and health, would come within the scope of examination. There is a close interrelationship between them, which makes it impossible to examine them individually in water-tight compartments.

In excluding mining from this definition it is necessary to remember that, if the mining of mineral and mineral oil is undertaken for domestic processing, then such activity will be reflected in its manufacturing account; whereas, if mineral ores and oils are exported as raw material for manufacture in foreign countries, they will obviously fall into the category of primary commodities — as raw materials entering into the manufacturing account of the importing country.

Moreover, there are several other factors which play this part in causing the developing countries to place primary importance on the development of manufacturing industries. The issues can be summarized as follows:

(a) the relative decline in the price of primary commodities associated with the declining demand for these products in the industrial countries;
(b) the increasing demand in the developing countries, despite an increase in prices, for manufactured products;
(c) the increasingly important relationship between agricultural productivity and industry;
(d) the need for greater economic independence as well as a faster rate of growth;
(e) the need to relieve chronic unemployment and under-employment and to increase the standards of living; and
(f) the desire to increase the national share in world trade, on the basis of an equitable international division of labour.

While it may be convenient to examine the urgency to industrialize on the basis of the factors enumerated above, a far more important consideration is the historically determined condition, and the urgent need for a change in the pattern of world trade. The pattern wherein a few countries specialize in manufacturing industries while others are producers of raw materials and primary products, was due to historically determined economic conditions. Subsequent development, particularly with more new countries progressing rapidly in the sphere of manufacturing industry, has brought about certain quantitative and qualitative changes in the pattern of this relationship. These changes have reacted not only upon the problems of growth and trade in and between the industrialized countries, but also upon the entire pattern of development and trade on a universal scale. These are the circumstances in which co-operative attempts at an international level, first at Havana in 1946 and then in Geneva in 1964, were made in order to formulate new principles for trade between the nations, principles which would eventually eliminate certain factors which were retarding economic development.

The paper consists of this introduction (Part 1) and five other parts dealing with: (2) the relative position of the ECAFE region, (3) the process of transformation through industrialization, (4) prospects for manufactured exports, (5) interdependence of national development plans and foreign trade, and (6) measures towards expansion of trade. The analysis pertaining to the relevant position of the ECAFE region deals with the present pattern of trade and the declining trends of primary commodity trade. Special attention is given to the present structure of economies in relation to foreign trade with special emphasis on problems of balance of payments. The latter parts stress the need for a great degree of diversification in the structure of industry, taking into consideration changing patterns of world demand for manufactured products.

An attempt is made in part V to assess the national development plans of selected countries in order to highlight certain special features of foreign trade

[1] This definition is in accord with the definition provided by the Committee for Industrial Development which states: "Industrialization is a process of economic development in which a growing part of the national resources is mobilized to develop a technically up-to-date, diversified, domestic economic structure characterized by a dynamic manufacturing sector having and producing means of production and consumer goods and capable of assuring a high rate of growth for the economy as a whole and of achieving social and economic progress".

TABLE 1. POPULATION, *per capita* CONSUMPTION OF ENERGY AND STEEL — OF THE ECAFE REGION (1963)

	Population (mid year 1963) millions	*Consumption of energy kg. per head* [a]	*Consumption of steel kg. per capita*
Total World	3,160	1,463	..
United States	..	8,507	540
Western Europe	..	2,893	368 (UK) 473 (Germany, Fed. Rep.)
South America	..	546	..
Africa	..	286	..
ECAFE Region			
Afghanistan	14.9	20	..
Burma	23.7	55	..
Cambodia	5.9	48	..
Ceylon	10.6	114	8.9
China (Mainland)	(700.0)[b]	—	16.0
China (Taiwan)	11.7	573	34.0
India	460.5	170	16.0
Indonesia	100.0	111	2.3
Iran	22.2	352	21.0
Japan	95.9	1,532	258.0
Korea (North)	10.7	..	..
Korea (South)	26.9	391	..
Laos	1.9	38	..
Malaysia (including Singapore)	10.4	499	33.0
Mongolia	1.0	..	..
Nepal	9.7	5	..
Pakistan	98.6	83	7.5
Philippines	30.2	191	20.0
Thailand	28.8	84	13.0
Viet-Nam (North)	(17.8)	..	2.0
Viet-Nam (South)	15.3	62	4.7
Hong Kong	3.6	567	150.0
Australia	10.9	4,213	389.0
New Zealand	2.5	2,069	201.0

Source: United Nations, *Statistical Yearbook*, 1964.
[a] Coal equivalents.
[b] Estimated.

development within the region. It examines the interdependance of national plans and, also, the possible areas of regional or sub-regional co-operation. Finally, an outline is given of possible measures for expansion of trade with the developed market economies and the centrally planned economies as well as within the developing countries themselves. There is also a discussion of the necessary institutional arrangements for achieving these objectives.

II. THE RELATIVE POSITION OF THE ECAFE REGION

1. *The widening gap*

For the countries within the ECAFE region the issues of industrialization and trade have a particular significance. From a geopolitical point of view, the region encompasses national entities of a wider range than any other region. Extending from Iran in the Middle East to Korea and Japan in the Far East and from Mongolia in the North to New Zealand in the South-East, it contains the largest population concentration in the world (excluding mainland China) with 1,013.7 million of the world's 3,160 million people, according to mid-year 1963 estimates and, together with mainland China, it contains over 50 per cent of the world's total population. The region's absolute increase in population (including that of mainland China) between 1958 and 1963, represented over 60 per cent of the total world increase of population during the same period.

The per capita income in the region is the lowest in the world, with $120 (1959) for the Far East (which includes Japan), and $67 for south-east Asia. Infant mortality rates are the highest in the world, with 108.7 (1959) per 1,000 for the Far East (including Japan) and 116.3 (1959) per 1,000 for south-east Asia. Whereas the annual average percentage increase in the per capita income of the world was for the hundred years 1860-1959, 1.52 the rate of increase for the Far East and south-east Asia was as follows:

	Far East	South-east Asia
1861-1913	1.12	0.52
1913-1959	0.63	0.07
1860-1959	0.89	0.34

TABLE 2. SOME INDICATORS OF THE LEVEL OF LIVING

	Per Capita Income ($)	*Infant Mortalities (Rate per 1000)*	*Per Capita income and percentage change 1860-1959*					
			1860	*1913*	*1959*	*1860-1913*	*1913-1959*	*1860-1959*
						(Annual percentage change)		
North America	1,810	28.5	420	1,000	1,900	1.65	1.41	1.54
Oceania	..	..	440	580	980	0.52	1.04	0.81
North-western Europe	680	36.6	230	460	810	1.31	1.24	1.28
Soviet Union	535	48.0	95	160	780	1.00	3.50	2.15
South-east Europe	285	70.9	110	200	390	1.14	1.41	1.29
Latin America	260	92.5	100	160	320	0.89	1.52	1.18
Japan	..	..	40	90	270	1.54	2.42	1.78
Far East	110	108.7	50	90	120	1.12	0.63	0.89
South-east Asia	64	116.3	48	65	67	0.52	0.07	0.34
China	..		44	47	70	0.13	0.87	0.47
Total	..		90	200	400	1.52	1.52	1.52

Source: Essays on Unbalanced Growth — A Century of Disparity and Convergence, edited by E. de Vries, Monton & Co. 1962.

In absolute terms, these figures indicate a very low level of development and low rates of growth. An examination of them in relation to the comparative figures for the industrially advanced countries reveals the progressively increasing disparity between the income levels of the two groups of countries. For example, the per capita income of North America increased from $420 in 1860 to $1,000 in 1913 and $1,900 in 1959; that of North-western Europe increased from $230 to $460 and $810 respectively for the same years. The disparity in income between the former and the Asian countries increased from nine times in 1860 to over fourteen times in 1913, and twentyeight times in 1959; between the latter and the Asian countries five, seven and twelve times, respectively.

These increasing discrepancies occurred not only because the industrially advanced countries had an early start, but also, and more significantly, because of the Asian countries' inflexible adherence to an economic structure which could not harmonize with the rapid progress of industrialization. The discrepancy between the industrialized countries and the non-industrialized under-developed regions increased at an alarming rate, until finally the latter countries began to question the very basis of their economic structures.

2. *Degree of industrialization*

An examination of the industrial status of the region in the context of international industrial progress reveals the following features: Estimates prepared by the United Nations (Statistical Year Book 1964) in respect of the degree of industrialization on the basis of the percentage distribution of value added in industry for 1958 are as follows:

> Industrialized countries — 92.2 and the less industrialized — 7.8. North America (35.8), the Soviet Union and eastern Europe (27.2) and Europe (26.5) occupied the predominent position; while, on the other side, in descending order were: Latin America (3.0), Africa (2.0), Asia (excluding Japan) 1.7,[1] and Oceania (1.2).

Yet another basis of comparison is the consumption of energy and steel. Consumption of energy for the countries of the region, excluding Japan, Australia and New Zealand, averaged 194 kg (in coal equivalent) per capita (1963), and ranged from 5 kg per capita, the lowest consumption rate in the world, to 573 kg per capita; in relation to the world consumption of 1463 kg, United States 8507 kg, western Europe 2893 kg, South America 546 kg and Africa 286 kg, it stood lowest. The wide variations of consumption within the region itself are of alarming proportions and reflect an unevenness in the rate of industrialization. Similarly, in regard to the consumption of steel, on the basis of the per capita consumption figures of 1963 available for 15 countries of the region, the average per capita

[1] Asia including Japan — 4.3.

TABLE 3 (1). ECAFE COUNTRIES[1]: INDEX OF INDUSTRIAL PRODUCTION

Percentage weight 1958 = 100

Year	Total	Mining total	Manufacturing	Light manufacturing	Heavy manufacturing	Food beverages tobacco	Textiles	Paper	Chemicals	Basic metal	Metal production	Electricity gas
1938	48(44)	62(51)	46(44)	56(47)	36(36)	56(51)	74(58)	29(13)	54(56)	54(66)	24(18)	33(22)
1953	58(59)	66(54)	57(61)	67(66)	49(50)	74(74)	69(68)	58(41)	51(52)	67(75)	39(41)	62(54)
1957	98(96)	100(98)	98(96)	99(97)	97(95)	95(95)	105(98)	100(86)	96(95)	103(94)	94(99)	93(89)
1960	143(122)	119(125)	146(121)	123(116)	205(131)	112(112)	125(112)	145(132)	134(122)	169(167)	193(130)	133(128)
1963	197(156)	142(154)	205(156)	153(142)	254(184)	131(127)	149(130)	196(180)	199(166)	235(232)	304(193)	186(185)
1964	225(170)	152(169)	236(168)	165(150)	301(204)	138(135)	164(140)	221(195)	228(183)	278(236)	369(224)	210(211)

Source: United Nations, Monthly Bulletin of Statistics, May 1966.

[1] Figures in brackets exclude Japan from the 17 countries covered.

TABLE 3 (2). MANUFACTURING INDEX (1958 = 100) AND PERCENTAGE INDUSTRIAL COMPONENT IN NET DOMESTIC PRODUCT

(Selected ECAFE Countries)

Year	Ceylon	China (Taiwan)	India	Korea, South	Pakistan	Philippines	Viet-Nam, South	Australia	Japan	New Zealand	Thailand
Manufacturing Index											
1959	109	115	108	111	—	108	—	100	121	100	—
1960	117	131	121	117	100	112	—	110	152	104	—
1961	122	144	128	122	107	119	—	111	183	113	—
1962	132	165	138	142	119	126	100	110	198	119	—
1963	137	181	150	161	133	134	116	123	218	125	—
Percentage Industrial Component in Net Domestic Product											
1958	4	12	—	9	—	—	—	28	—	—	12
1960	4	18	17*	11	9	—	10	28	—	—	10
1962	5	19	15*	10	9	19	10	28	30	—	11
1963	6	22	—	10	—	19	—	—	30	—	11

Source: United Nations, *Statistical Yearbook*, 1964.
* Includes manufacturing and construction.

consumption of steel stood at 27.2 kg, excluding Japan, Australia and New Zealand, as against 540 kg for the United States, 368 kg for the United Kingdom and 473 kg for West Germany, and ranged from 2.3 kg to 150 kg.[1]

Table 3 shows the index of industrial production for 17 countries of the region presented in two different ways: figures within brackets are exclusive of Japan and show to some extent the disparities in the rates of growth of the manufacturing industries between one country in the region and the rest. Where indices have been provided for commodity groups, they show also the disparities in the rate of growth in some vital industries such as heavy industry, chemicals and metal products, where development has been much lower than in certain other sectors.[1]

3. *Declining trends of primary commodity trade*

Despite short-run periodical setbacks, world trade has, on the whole, been quite buoyant during the recent past. Total imports have increased from $25,400 million in 1938 to $161,100 million in 1963 (table 4) and exports have recorded an increase from $23,500 million to $153,500 million during the same period. Whereas the developed countries' share in imports remained at 68 per cent, and their share in exports rose 65 per cent — 67 per cent, the Asian countries excluding Japan, Australia and New Zealand, accounted for only 8 per cent of the total imports of 1938 which fell to 6.2 per cent in 1963. In exports, the percentage fall was much more pronounced. In 1938 it represented 9 per cent and in 1963 only 5.2 per cent. On the other hand, the percentage annual growth rates of value of imports are more revealing. Insofar as the developed market economies are concerned, the annual growth rate between 1950 and 1955 was 9.3 per cent, between 1955 and 1960 6.4 per cent, between 1960 and 1962 6.2 per cent, whereas the developing market economies experienced decreasing growth rates in imports from 6.9 per cent between 1950 and 1955, to 4.2 per cent between 1955 and 1960, and 2.1 per cent between 1960 and 1962.[1]

An examination of the Trade Volume Index in table 5(1) reveals two significant features. Between 1938 and 1948, prior to the base year 1958, the vloume of trade (as well as production) in food and raw materials remained higher than that in manufactured products, whereas for 1960, 1962 and 1963 the contrary trend is noticeable. The second feature is the stagnation that has overtaken both the production of primary commodities and the volume of them entering into trade. The same trend is reflected in the

[1] For more detailed and more varied comparisons ride Part I, chapter I, of the paper on 'Overall Evaluation of the Progress and Problems of Industrialization in the ECAFE Region.'

[1] The comparative position in the exports of primary commodities in relation to manufactured goods has been extremely discouraging since 1928. For example, United Nations, Report on Trade and Development (1964), Vol. II, "Towards a New Trade Policy for Development" states that, although between 1876 and 1929 the cumulative annual rate of growth of both primary products and manufactures was approximately 2.5 per cent, a striking disparity began to appear for the first time after the great depression. Thus, whereas exports of manufactured products registered an annual growth rate of 3.1 per cent, that of primary commodities grew only at one per cent (these figures are exclusive of centrally planned countries). The following table shows the relative position since 1928:

WORLD PRODUCTION AND EXPORTS OF PRIMARY COMMODITIES AND MANUFACTURING — 1960

	Volume Index (1928 — 100)	Average Annual Percentage Increase (1928 — 1960)
Production — Total	236	2.7
Manufacturing	293	3.4
Primary	170	1.7
Primary excl. Petroleum	159	1.4
Exports — Total	190	2.0
Manufacturing	260	3.1
Primary Commodities	158	1.4
Primary Commodities excl. Petroleum	137	1.0

Source: Bureau of General Economic Research and Policies of the United Nations Secretariat.

TABLE 4. WORLD TRADE
($ Millions)

	Imports		Exports	
	1938	1963	1938	1963
World	25,400	161,100	23,500	153,500
Developed Areas ... (United States, western Europe, Japan, Australia, New Zealand, South Africa)	17,900	110,200	15,200	103,400
Under-developed Areas ..... (Other than developed areas, eastern Europe, mainland China, Mongolia, North Korea, and North Viet-Nam)	5,800	32,000	5,900	31,500
Africa	1,550	8,340	1,020	7,550
Asia (Sterling)	1,410	7,260	1,580	5,810
Asia (other)	960	3,430	1,070	2,640

Source: United Nations, *Statistical Yearbook*, 1964.

TABLE 5 (1). TRADE VOLUME INDEX
1958 = 100

	1938	1948	1958	1960	1962	1963
Exports						
All commodities	57	55	100	118	131	141
Food and raw materials	83	66	100	119	125	132
Manufactured goods	42	50	100	122	137	147
Production						
Primary commodities	69	76	100	105	110	115
Manufactured goods	42	61	100	118	130	137

TABLE 5 (2). VALUE OF EXPORTS
(Million $ — 1959 prices)

	1938	1948	1958	1960	1962	1963
All commodities	53,250	51,900	94,500	111,500	123,300	133,200
Food and raw materials	27,200	21,200	32,950	39,050	41,150	43,300
Manufactured goods	20,900	24,500	49,250	59,900	67,250	72,500

Source: United Nations, *Statistical Yearbook*, 1964.

export value of raw materials and manufactured goods worked out on the basis of 1959 prices wherein, except for 1938, the total value of manufactured goods exports has sometimes exceeded the value of exports of raw materials and food by almost as much as 70 per cent. These adverse conditions were brought about by two related forces exerting their influence on both supply and demand. One was the general slackening of demand for primary commodities and the other was the efforts made by the industrial countries themselves to increase their production of and trade in primary commodities. In fact, the share of industrial countries' exports of primary commodities increased from 47 per cent in 1960 to 55 per cent in 1961, whereas the share of the developing countries dropped from 41 per cent to 29 per cent.[1] Short-term favourable trends in exports, as in 1963 when a 10 per-cent increase was recorded[2] in south-east Asia's exports, do not alter the unfavourable impact of the long-term trends on the balance of payments position of the countries in the region. "Prices of South-east Asia's exports, unlike those of other developing areas, did not show any marked overall improvement in 1963; higher prices of sugar and oil seeds were virtually offset by a decline in prices of jute, rubber and cotton, while there was no substantial change in rice, tea and tin. The area's advance in exports was thus essentially due to a volume increase, the main groups of products involved being textile fibres, oil seeds, timber and manufactures".[3] The solution to this problem does not lie in increasing the volume of exports of the existing commodities of trade. In circumstances of a falling demand, quantitative increases would tend to worsen the terms of trade. Increasing export earnings could only be brought about by a much higher volume of trade.[4] There are, of course, several other steps which can be taken to ameliorate these trends, such as commodity agreements, lowering of tariff barriers in the developed countries (including internal duties), introduction of measures to restrict the grant of subsidies and sale of surpluses. These measures will, to a large extent, reduce rather than eliminate the declining trend.

There are other internal factors operating within the developing countries which tend to negate the temporary advantages so gained. The pressure to reduce costs and increase output invites technical changes into the sphere of primary commodity production. This process influences not only the primary export sector, but also other agricultural sectors, thereby reducing considerably the capacity of labour absorption in these spheres of production. In countries where the largest proportion of gainfully employed population is engaged in agriculture, it sets in motion serious problems of unemployment and affects not only the employed, but also the annually increasing numbers of employable persons. The long-term solution to this problem lies in the co-ordinated development of the manufacturing industry and agriculture.

[1] Vide GATT, International Trade 1963, Geneva 1964, page 120.
[2] GATT, *op. cit.* page 120.
[3] Vide the Problems of International Trade and Development — Policy Statements, Volume II, United Nations, New York 1964, page 13.
[4] Vide *Economic Bulletin for Asia and the Far East*, Vol. XIV, No. 3, Dec. 1963, which states "During the 1950's the volume of ECAFE exports increase at the rate of 3.4 per cent per annum, but the value remained virtually stagnant because of an equivalent fall in export prices", page 31, and "The regions' large export surplus of about 1 billion dollars in 1928 was halved in 1938 and was replaced in 1958 by an import surplus of about $400 million. The import surplus trebled in the subsequent decade", page 61.

III. THE PROCESS OF TRANSFORMATION THROUGH INDUSTRIALIZATION

It becomes apparent from the data presented in the preceding section that, if the developing countries are to reduce the increasing disparities in economic development, they must do so by a radical alteration of their pattern of economic structure. Such an alteration must take into consideration the relative significance of the impact of the different sectors upon growth,[1] not merely in relation to internal economic problems, but also in relation to foreign trade. This could only be achieved by the adoption of a vigourous programme of industrialization and by appropriate adjustments in the existing pattern of the international division of labour.

1. *The process of industrialization*

The process of industrialization eventually affects all facets of the economy of a country. It alters the pattern of employment and distribution and introduces an internal coherence between the various sectors of economic activity. By the establishment of links with the other sectors of the economy, it rationalizes economic behaviour on an ever-expanding productive basis. It dissolves all forms of medieval agrarian social structure by extending the scope of monetary relationships. These changes significantly alter the composition of consumption patterns. Subsistence agriculture gives way to the requirements of the exchange economy. Transport and means of communication acquire a greater economic significance not merely by greater movements of goods, but also by the necessary of increasing people's mobility. The sum of all these changes causes very rapid improvements in the standards of living, of social behaviour and social values.

The progress of industrialization, however, depends upon multifarious factors such as national endowments, adequate infrastructure, availability of skilled labour, size of internal markets, know-how, capital (both internal and foreign), and such other factors as the existence of a suitable climate for investment. The availability of these factors differs from one country to another.

In terms of the pre-industrial division of labour, there was what may be called a very elementary "dependent" form of foreign trade in which the "determining" metropolitan states maintained "the dependants" as reservoirs of raw materials and safe markets for manufactured goods. The dependencies were characterized by a very low level of economic activity, a large part of which was devoted to subsistence agriculture. Consumption was generally at a very low level mainly related to the elementary requirements. The validity of this classical division of labour remained only up to a point when exports were adequate in volume and value to meet the increasing requirements which could not be supplied domestically. However, even at such a time, the contradictions inherent in such a division of labour were evident. Whereas the industrialized countries were able to imporve progressively the living standards of their people, the dependent countries were characterized by stagnation. There developed what may be called a scissors movement; while exports declined in volume and value, the rise in prices of imports necessitated a reduction in volume of imports. This marked the breakdown of the classical concept of the international division of labour, which was further aggravated by increasing supplies of food and primary products within the industrial countries themselves, a greater degree of synthetic substitution and simultaneous reduction in the quantities of raw material content in manufactured goods.

2. *The limits of import substitution*

In such circumstances, solutions are conceived of in terms of self-sufficiency. The first phase of industrial development of most countries within the region — and in fact of all developing countries — has been characterized by the development of import substituting industries with basic consideration being given to foreign exchange saving and, in some instances, to the supply of essentials which during periods of interrupted trade (such as war) could not be imported. Such thinking, however, ignores that fact that the process of industrialization produces complex repercussions which ultimately have their effect not only upon internal problems of economic growth, but also upon the external economic relations between countries. Insofar as individual countries are concerned, the progress of industry depends upon factor endowments and, without exception, the process of industrialization must reach internally a limit beyond which it cannot proceed; unless consideration is given to applying the principles of comparative costs on the basis of a new and equitable division of labour, there can be no progress. In these circumstances, it is necessary that practical steps be taken to work out a scheme of development that will ensure the maximum mutual advantage to the regional countries. Such a concept should also envisage a further extension of such a division of labour, which needs to be progressively worked out on the basis of foreign trade.

The only way to improve the adverse balance of trade in the developing countries of the region is through a vigorous build-up of industries. The pro-

[1] Even in countries which are traditionally the major exporters of agricultural products, the agricultural share in national output is now considerably smaller than the industrial component, as can be seen from the following:

Country	Year	Share in percentage	
		Agricultural	Industry
Canada	1960	7	37
Denmark	1960	15	37
Netherlands	1960	11	42
New Zealand	1954	22	30

Source: Statistical Year Book of United Nations.

ducts of those industries could be exported not only to supplement the falling income from traditional exports, but also to create adequate surpluses to meet the increasing propensity to import caused by the process of development itself. However, various factors have compelled the countries of the region to concentrate initially on import substituting industries rather than on export industries. This was due not only to the protective policies followed by the industrialized countries, but also to the technological inadequacies and the difficulties encountered as a result of a late start. The controllability and certainty of the domestic market attracted industrial planners to such an extent that the majority of planners based their calculations on internal markets rather than on export possibilities. The rapidity of technological progress in manufacture, obsolescence, and the efficiency of substitution were also factors to contend with. This attitude naturally obtained public approval, largely because industrial development itself involved the use of scarce resources in circumstances which called for public sacrifice. "Thus in the developing countries", states the United Nations Report on Trade and Development, "which undertook to industrialize at that time, industrialization proceeded piecemeal in a large number of watertight compartments with little inter-communication, to the serious detriment of productivity".[1]

3. *Trade expansion through a wider base of industrialization*

In international trade, the initial impact of a process of industrialization in undeveloped regions tends to create certain beneficial results. The increase in income and employment gives rise to qualitative as well as quantitative changes and improvements in consumer patterns. No only does this effect an increase in demand for domestically produced manufactured goods, but also there is a general tendency for greater consumption of imported manufactured commodities. Apart from consumer goods which are required to supplement inadequate domestic supplies, there will be an increasing demand, characteristic of the demand pattern of developing countries, for capital goods and machinery, construction equipment and materials, transport equipment and other durable goods. Conclusions reached by research elsewhere in regard to the effects of such development have been generally proved by experience since the 1930's. A League of Nations' study of the subject concludes as follows: "On the whole, the older industrial countries have profited greatly from industrial development elsewhere and it is natural to conclude that they could profit from further industrialization of undeveloped countries".[2] This study further states that, under normal conditions, such a process which results in an extension of the manufacturing base also improves the demand for primary products and, owing to the diversification of demand for manufactured products resulting from a rise in average incomes and changes in the pattern of consumption, also increases the international exchange of manufactured goods.

With improvements in the economic levels of the developing countries, there are also caused by mechanization and improvements in the infrastructure and increasing productivity of labour; these in turn have their beneficial effects upon trade in these products. In such circumstances, stated the spread of industrialization, rather than placing restriction on the scope for international trade, tends generally to create the conditions favourable for its expansion.

The favourable impact upon international trade is demonstrated by the trends in import trade of Japan, China (Taiwan) and the Republic of Korea (table 6), which have recorded the fastest growth rates in manufacturing industries for the countries of the ECAFE region.

The most striking feature in all three cases is the phenominal increase in imports of food, crude materials, chemicals, machinery, transport equipment and other manufactured goods. Food imports more than doubled between 1958 and 1963, imports of crude materials trebled in the case of China (Taiwan) and almost doubled in the cases of Japan and the Republic of Korea. Imports of machinery almost trebled in the case of all three countries. Transport equipment imports quadrupled in Japan, nearly doubled in China (Taiwan), and trebled in the Republic of Korea. Imports of other manufactured goods trebled in Japan, increased five times in China (Taiwan) and showed a 20 per cent increase in the Republic of Korea.

According to estimates made by ECAFE,[1] Japan's imports are expected to increase from all sources by about four times between 1958 and 1980. Food, beverages and tobacco from $530 million in 1958 to $1,070 million in 1980, raw materials from $1,370 million to $4,140 million, and manufactured goods from $620 million to $3,730 million.[2] The pattern of imports of the countries is in the contrast to those of several other developing countries of the region where the recorded increases in imports are lower as well as irregular. This demonstrates the strong correlation between industrialization and foreign trade. It may reasonably be concluded that, had all the countries of the region been able to achieve a reasonable degree of industrialization, there would have been a tremendous increase in the volume of trade, both of exports and imports of the whole region.

Projections made by ECAFE[3] in regard to the region's imports up to 1980 also support the above

[1] Vide United Nations Report on Trade and Development Volume II.

[2] Vide League of Nations, Industrialization and Foreign Trade 1945, reprinted by United Nations 1948, page 76.

[1] Vide *Economic Bulletin for Asia and the Far East* Vol. XIV, No. 3, Dec. 1963.

[2] It has been estimated that the expected rate of growth of Japan's imports will be higher than that of either Western Europe or North America.

[3] *Op cit.*

TABLE 6. VALUE OF IMPORTS BY PRINCIPAL COMMODITY GROUPS (MONTHLY AVERAGES)[1]
(J = Japan, C(T) = China (Taiwan), and K(S) = South Korea)

	1958			1959			1960			1961			1962			1963		
	J	C(T)	K(S)	J	C(T)	K(S)	J	C(T)	K(S)	J	C(T)	K(S)	J	C(T)	K(S)	J	C(T)	K(S)
Index-manufacturing	100	100	100	121	115	111	152	131	117	183	144	122	198	165	142	218	181	161
Imports-monthly averages (oo)																		
Food	15.66	46.7	5.46	14.05	49.6	2.28	15.87	83.7	2.63	19.19	114.8	3.34	21.05	98.7	4.05	31.43		10.05
Cereals and cereal preparations	9.43	—	4.25	8.69	—	1.46	8.73	—	1.71	9.88	—	2.52	11.20	—	3.34	14.16		8.94
Sugar and sugar preparations	3.85	—	—	3.40	—	—	3.64	—	—	4.06	—	—	4.06	—	—	7.84		—
Crude materials inedible except fuels	38.98	93.0	5.76	52.04	138.5	5.19	65.08	195.8	5.71	82.46	264.3	5.27	70.86	251.1	7.47	82.44		8.92
Oil seeds, oil nuts and kernels	4.04	20.4	—	4.93	28.8	—	5.62	43.1	—	5.92	53.0	—	6.17	23.8	—	8.14		—
Crude rubber	2.59	—	—	4.25	—	—	5.31	—	—	4.30	—	—	4.23	—	—	4.02		—
Textile, fibres raw	18.23	41.8	—	19.56	55.6	—	22.84	82.4	—	28.54	98.2	—	22.24	134.1	—	26.51		—
Metal ores and scrap	7.73	—	—	14.89	—	—	20.20	—	—	25.68	—	—	21.38	—	—	23.01		—
Chemicals	4.99	103.2	5.72	6.69	146.1	5.73	7.96	137.7	6.34	10.08	137.8	5.14	9.01	158.5	7.78	11.07		6.66
Machinery	9.11	76.2	2.40	8.96	134.0	2.70	9.48	187.1	3.24	14.93	204.6	3.62	19.51	181.9	5.26	20.34		7.02
Transport equipment	1.15	23.3	0.66	1.64	39.1	0.58	2.61	56.0	0.10	3.04	66.8	0.11	3.51	40.7	0.55	3.65		2.61
Other manufactured goods	4.42	28.9	4.64	5.93	42.2	2.37	9.53	59.8	2.91	14.21	68.8	2.21	11.53	141.8	4.54	13.97		5.57

[1] International Statistical Yearbook — United Nations 1964 and Asian Economic Statistics — Vol. XV, No. 1 — June 1964.
oo Japan '000 Million Yen, China (Taiwan) Million New Taiwan $ and, South Korea $ Million (US).

analysis. This study, using the aggregative method, has made an estimate of import requirements on the basis of two alternative rates of growth of GNP. A high annual growth rate of 5 per cent (the goal of the United Nations Development Decade) and a low of 3.5 per cent derived from the past rates of growth, have been used for this purpose. The aggregate data have been suitably deflated to obtain dollar values at constant 1960 prices. The results of this study indicate that requirements for imports of food will increase from $1,700 million to $7,600 million on the lower growth rate and to $5,800 million on the higher one; imports of raw materials from $2,900 million to $9,200 million at the higher growth rate and $8,600 million at the lower growth rate; capital goods from $3,100 million to $9,600 million and $4,800 million; consumption goods from $3,200 million to $7,200 million and $9,000 million; and merchandise from $9,200 million to $26,000 million and $20,400 million respectively.

One could envisage, however, a qualitative alteration in the pattern of imports. Whereas, under normal conditions, increases in income increase the demand for consumer goods, the increases of income resulting from industrialization will create an altogether different type of impact. On the one hand, the growth of industries in the developing countries will create an income-consumption effect largely among sectors of the population which have hitherto not depended upon imports; while, on the other, the expansion of the market and creation of a domestic demand for raw materials will permit the economic exploitation of resources hitherto uneconomic for exploration and exploitation. The impact of development will naturally differ from country to country and will depend also upon the policies of industrialization followed by the developing countries. Generally, larger countries could follow policies of import substitution more effectively, without violating technological considerations of manufacture, while smaller countries will find considerable difficulties in the pursuit of such policies.

Another aspect of the problem relates to the supply of raw materials. The extension of industry will naturally increase the demand for them. While a proportion of this supply will, as stated earlier, be met by exploration of new resources, the smaller countries, and even larger countries which do not have adequate resources, will become net importers. Increasing demands are, therefore, likely to be met by increased supplies rather than by reduction of exports.

Therefore, both from the point of view of imports of manufactured goods from the developed countries, and from the point of view of the impact of the growth of industry upon the supply of raw materials, the progress of industry in developing countries will not adversely affect the interests of the industrial countries. On the other hand, net advantages will accrue from the effect of industrialization upon increasing the

import potential for manufactured goods, including consumer goods, in the developing countries and also from the cost reductions consequent upon mechanization and improvements in productivity in the raw material producing sectors.

There are, however, qualitative aspects to be taken into consideration. The process of industrialization will alter the pattern of demand relative to the industrialized supplier countries. Therefore, while in terms of quantity there is an observable trend toward an increase of imports, in terms of quality the changes may affect certain countries adversely. The changing nature of these imports has been analysed in a study of the import structure for the ECAFE region,[1] which shows that, between 1951-1953 and 1958-1960, while imports of capital goods rose by 63 per cent and materials for capital goods by 48 per cent, imports of food fell by one per cent and consumer goods by 22 per cent. This trend occurred despite an increase in the output of metal and engineering industries in certain countries of the region.

The present trend, according to available data, therefore confirms the results of the research conducted into the relationship between the movement in manufacture with that of trade in manufacture since the early 1870's. The research established that the growth of manufacturing industries "far from rendering the countries concerned independent of foreign produced manufactured articles, stimulated the importation of such articles, and that imports tended to follow a course parallel to that of manufacturing activity".[2]

4. *Balance of payments position*

On the basis of a 5-per-cent growth rate in the GNP, the target set for the Development Decade, the ECAFE secretariat has made the following projections on the balance of payments gap.

	At 1960 Prices ($ billions)	
	1960	*1980*
Exports F.O.B.	7.6	18.0
Imports C.I.F.	9.2	26.0
Deficit on trade account	— 1.6	— 8.0
Deficit on invisible account	— 0.4[a]	— 1.0[b]
Total deficit on current account:	— 2.0	— 9.0

[a]Estimated [b]Estimated on past trends.

The total deficit by 1980 is, therefore, expected to be in the region of $9,000 million. These projections have been based on an estimated increase in primary commodities export earnings from $5,800 million in 1960 to $12,600 million in 1980 (an annual compound rate of 4 per cent increase) on the assumption that prices will remain unchanged; but that assumption is unlikely to hold good against the background of past experience. The ECAFE survey itself points out that, if the adverse trend of prices were to continue, there would be a drop in earnings by about $6,000 million, thereby increasing the gap to $15,000 million. Faced with these possibilities, one can surmise the extent to which a deficit of this nature would impede the development efforts of the region, if the present structure of the developing economies persisted in 1980.[1]

On the other hand, this also shifts the emphasis of the developing countries' exports from a high dependence upon primary commodities to a similar dependence on manufactured goods. While, under normal conditions, the demand itself for primary commodities has been affected and the situation is likely to be further aggravated, the demand for manufactured goods is of a different nature. The flexibility of the manufacturing industries sector, which lends itself to adaptation, is itself an advantage which would permit the introduction of structural changes based upon proper co-ordination of planning with a view to maximizing advantages. Several developing countries, including newcomers, are themselves competing or forced into competition with one another, thereby mutually worsening their own bargaining powers, but complementary development in manufacturing industries would obviate this difficulty.

Industrial investment, if supported by proper administration of import policies, could result not merely in a direct saving of foreign exchange, but also in release of foreign exchange with a multiple effect. Estimates made elsewhere[2] provide valuable evidence of this. For example, it has been estimated that, if food grains were to be imported to feed all the additional population in India for a period of five years, it would cost in foreign exchange $945 million. The cost of importing fertilizer to produce the food would cost $280 million. However, five factories costing $21 million each, totalling $105 million for the first five years, would be able to produce every year 350,000 tons of fertilizer which would be adequate to produce the required food. Furthermore, a heavy machine plant at a cost of $21 million could produce the plant and equipment for all the fertilizer factories. "Wise utilization of $21 million of foreign exchange once and for all can lead to a saving of $945 million in imports of food grains over a period of five years. Similar considerations hold good in other crucial sectors. An investment of $315 million, including $168 million of imported machinery, would be required to install a million-ton steel plant with a product value of $84 million. A heavy-machine building factory with an investment of $168 million,

[1] Vide *Economic Bulletin for Asia and the Far East* — op. cit. Page 83.
[2] Vide Industrialization and Foreign Trade — op. cit. Page 118.

[1] Vide also chapter VI to the paper on 'External Assistance for Industrialization' for a discussion of the same problem.
[2] Vide United Nations, *Economic Survey of Europe 1959*, Chapter VIII.

TABLE 7

(1)

IMPORTS OF RAW MATERIALS FOR CONSUMPTION GOODS, FOR CAPITAL GOODS AND CAPITAL GOODS IMPORTS AS PERCENTAGE OF GNP

		Total imports as percentage of GNP	Imports related to industry (as shown above)
Burma	51/53	21.5	10.4
	58/60	23.0	14.3
Ceylon	51/53	37.1	12.8
	58/60	35.1	13.8
China	51/53	16.2	10.9
(Taiwan)	58/60	20.8	17.7
India	51/53	7.3	4.5
	58/60	6.9	5.3
Indonesia	51/53	10.0	4.8
	58/60	6.2	3.5
Pakistan	51/53	6.8	4.1
	58/60	8.2	5.7
Philippines	51/53	13.6	6.5
	58/60	11.1	7.7
Thailand	51/53	18.8	8.9
	58/60	21.4	12.8

(2)

ECAFE COUNTRIES: SOURCE OF FINANCING FOR IMPORTS (Total Import — 100)

Year	Exports of goods and services	Private	Official	Total	Reduction of foreign assets	Net errors
1951	128.0	–7.9	1.0	–6.9	–21.8	0.7
1962	107.9	–0.3	11.1	10.9	–20.6	1.8
1951	109.4	–6.7	0.2	–6.5	–5.6	2.6
1962	93.7	–1.7	3.0	1.3	4.4	0.7
1951	65.1	4.4	35.3	39.8	6.1	1.2
1962	72.7	1.3	21.5	22.8	5.6	–1.1
1951	90.6	1.1	3.1	4.2	8.4	–3.1
1962	65.2	7.3	22.5	29.8	5.7	–6.7
1951	110.9	–0.7	3.3	2.7	–12.4	–1.2
1962	68.1	0.1	23.6	23.7	14.6	–6.3
1951	123.4	0.2	–0.1	0.1	–23.0	–0.5
1962	68.1	0.3	33.0	32.7	–1.8	–1.4
1951	92.7	2.1	1.9	4.0	8.2	–4.9
1962	98.6	–0.4	1.8	1.4	–4.3	4.2
1951	116.1	1.0	1.1	2.1	–25.8	7.6
1962	89.5	12.9	6.6	19.5	–10.4	1.4

Source: *Economic Bulletin for Asia and the Far East*, Bulletin Vol. XIV No. 3, Dec. 1963-Table 21. Balance of Payments Yearbook.

with foreign imports worth about $105 million, could produce every year machinery worth roughly $168 million, or the equivalent of the imported machinery needed to set up a million ton steel plant. Once such a heavy machinery factory entered production, it would be possible to start a new million-ton steel plant every year out of its own resources. An investment of $63 million in a plant to manufacture mining machinery would produce goods worth about $63 million a year. An investment of $210 million in heavy electrical equipment (generators, switch gear, heavy motors, rectifiers, transformers, etc.) would give products of the value of about $147 million per year, and so on".[1] These indicate merely the extended foreign exchange savings of such investment. There are other factors which cannot be financially measured in such terms, such as the changes in the domestic economy itself which would contribute to further growth.

The statistical data given in table 7 for eight developing countries of the region indicate: (1) the extent to which exports are capable of financing imports; and (2) the high percentage of imports related to industry as a component of the total imports. One notices also the increasing role of foreign capital (particularly official) inflow. In many instances, several countries have had to draw upon their accumulations of foreign assets.

It has been pointed out[2] that, whereas the net inflow of all types of finance (loans, investments and grants in aid) to the developing countries from 1950 to 1961 amounted to $47,400 million, including private reinvestment, the amount of remittances and interest for the same period amounted to $20,900 million. The fall in the purchasing power of total exports consequent upon the deterioration in terms of trade has been estimated at $13,000 million, which means that net capital inflow available for use amounted only to $13,500 million. In the case of Latin America the situation was particularly severe. Whereas the losses due to deterioration in terms of trade amounted to $10,100 million and remittances to $13,400 million, the net inflow of foreign capital of all types amounted to only $9,600 million, thus leaving a deficit of $13,900 million.

It is abundantly clear in the light of these considerations that the developing countries of the region need increasing imports to implement their programmes of industrialization. Trade in traditional commodities continues to decline and the income which could be derived from exports is inadequate to meet import commitments. There is a limit to the extent to which individual countries can draw upon their reserves of foreign assets. Foreign economic assistance could, however, make a tremendous contribution in these circumstances.[1]

An important aspects of consideration with respect to foreign aid is in relation to the impact of such aid on economic development and in particular upon foreign trade. Changes which are now taking place in this field, which will be discussed in greater detail later in this paper, indicate that there are possibilities of obtaining such aid not merely on advantageous financial terms, but on terms which also take into consideration the possibilities of exporting manufactured products as repayment. Agreements

[1] ECE Chapter VIII, page 13.

[2] Problem of International Trade and Development — Vol. II.

[1] A detailed assessment of the implications of foreign economic assistance comes within the purview of a separate study.

TABLE 8. MAIN TRENDS IN INTERNATIONAL TRADE[a] 1938 TO 1959

Years	Value in million US$ FOB			Volume Index 1953 = 100			Unit Value Index 1953 = 100		Value Index 1953 = 100		
	All commodities	Manufactured goods		All commodities	Manufactured goods		All commodities	Manufactured goods[b]	All commodities	Manufactured goods	
		Total[b]	Machinery[c]		Total[b]	Machinery[c d]				Total[b]	Machinery[c]
1938	20,700	9,800	1,582	71	54	42	39	50	28	27	21
1948	53,000	23,600	4,957	70	64	64	102	103	72	66	66
1950	54,400	24,200	5,006	85	78	78	89	86	76	67	67
1951	74,900	34,400	7,075	95	94	92	108	102	102	96	94
1952	72,300	34,800	8,461	94	93	109	105	104	99	97	113
1953	73,100	35,900	7,489	100	100	100	100	100	100	100	100
1954	76,000	37,000	7,603	105	105	104	99	98	104	103	102
1955	82,700	40,900	8,530	114	115	115	99	99	113	114	114
1956	91,800	46,600	10,044	124	126	130	101	103	126	130	134
1957	98,700	50,800	11,398	131	133	143	103	106	135	142	152
1958	94,000	49,600	11,474	129	130	144	100	106	129	138	153
1959	99,800	53,500	12,159	139	140	153	98	106	137	149	162

Sources: *United Nations Statistical Yearbooks 1959 and 1960*, New York (Table compiled by ECE — United Nations 1963).

[a] Data exclude Albania, Bulgaria, mainland China, Czechoslovakia, East Germany, Hungary, North Korea, The Mongolian People's Republic, Poland, Romania, the Soviet Union, and North Viet-Nam. All calculations are based on export data and are therefore on F.O.B. basis.

[b] SITC sections 5 to 8; mainly including chemicals, textiles, metals, machinery, but excluding processed food and refined petroleum.

[c] SITC Division 71 and 72; machinery, non-electrical. These data summarize exports of twelve countries, covering 96 per cent of all machinery exports in 1959 (excluding those of the countries listed under footnote[a]: the countries are Belgium-Luxembourg, Canada, France, India, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom, the United States, and Western Germany.

[d] Estimated by applying the same unit-value index as was computed for manufactured goods.

to that effect could provide the basis for planning a limited degree of bilateral integration through industrial specialization as a first step toward integrating several countries in a much wider network of interdependence.

IV. PROSPECTS FOR MANUFACTURED EXPORTS

1. *Characteristics of ECAFE trade in manufacture*

The rate of increase in world trade in manufactured commodities has been higher than that of the total trade increases relating to food and raw materials (table 8). Whereas, between 1938 and 1963, world trade in food and raw materials increased from $27,200 million to $43,300 million (at 1959 prices), trade in manufactured goods increased from $20,900 million to $72,500 million [table 5 (2)]. In this context, the share of the ECAFE region, which was less than 3 per cent in 1960, is extremely disappointing. Estimates of growth possibilities made by ECAFE are as follows:

TABLE 9. DEVELOPING ECAFE COUNTRIES (EXCLUDING JAPAN AND MAINLAND CHINA) PROSPECTS FOR MANUFACTURED EXPORTS IN 1980

(1960 prices — million $)

1960	Total world exports	ECAFE exports	ECAFE exports as per cent of world exports
Machinery and Transport equipment	27,740	126	0.5
Other manufactured goods	34,520	1,689	4.9
Total manufactures ...	62,260	1,815	2.9
1980 (Total Manufactures)			
(1) Regional share remains the same ..	131,100	3,802	2.9
(2) Doubling of regional share	131,100	7,866	6.0

It will be noticed that a doubling of the regional share to $7,900 (exceeding $5,400 million assumed on the basis of a four per cent share in the total of world trade in manufactures) would reduce the projected balance of payments deficit from $9,000 million to $6,500 million. This assumes an annual growth rate of manufactured exports of approximately 4.7 per cent.

Table 10.I shows that, for the developing market economies as a whole, total exports of manufactures constituted four per cent of the world trade in manufactures and that, although there had been an absolute increase from $1,800 million to $2,600 million, the percentage share dropped from five in 1955 to four in 1961.

An increase was shown both in absolute terms and in percentage share by the centrally planned economies. Table 10.II shows the distribution of this share in which the Asian region accounts for approximately three times the combined value of the African and Latin America regions. The percentage distribution shows that the Asian trade is more or less evenly distributed between the developed economies and the developing economies, whereas the other developing countries have a greater concentration of their exports in the European developed market economies. Although the share of the centrally planned economies has shown the highest rate of in-

TABLE 10. I. WORLD EXPORTS OF MANUFACTURE — BY ORIGIN — 1955 AND 1961

Exporting group	Amount (Billion $)		Index 1961 (1955:100)	Percentage Distribution	
	1955	1961		1951	1961
World	37.8	62.3	165	100	100
Developed market economies	32.0	52.0	162	85	83
Developing market economies	1.8	2.6	146	5	4
Centrally planned economies	3.9	7.7	196	10	12

II. DEVELOPING MARKET ECONOMIES. GEOGRAPHICAL DISTRIBUTION OF EXPORTS AND MANUFACTURES — 1961
Importing Group Developed Market Economies

Exporting group	World	Western Europe				North America	Other	Developing market economies	Centrally planned economies
		Total	Total	EEC	EFTA				
Amount in million $	2,640	1,350	710	270	415	500	135	1,150	82
Asia	1,945	905	412	122	283	369	113	928	59
Africa	325	200	180	63	110	7	15	105	18
Latin America	325	220	96	83	12	110	3	75	4
Percentage distribution	100	51	27	10	16	19	5	44	3
Asia	100	47	21	6	15	19	6	48	3
Africa	100	62	55	19	34	2	5	32	6
Latin America	100	68	30	26	4	34	1	23	1

Source: United Nations, *World Economic Survey 1963* — pp. 178/179.

TABLE 11. DEVELOPING MARKET ECONOMIES — COUNTRY DISTRIBUTION ACCORDING TO VALUE OF MANUFACTURES SUPPLIED TO DEVELOPED MARKET ECONOMIES

Amount supplied ($ million)	No. of developing market economies	Group Total ($ million)	Developing market economies	Distribution Group Total
350 and more	2	774	2	47
100 — 350	2	203	2	12
50 — 100	2	114	2	7
25 — 50	4	132	3	8
5 — 25	29	330	25	20
Less than 5	79	91	67	6
Total	118	1,643	100	100

crease, simultaneously increasing their volume and percentage in the world trade, the developing countries' share in this increase appears to be rather limited.

Apart from the insignificant nature of the manufacturing trade of the developing countries, much more alarming features are the high concentration of this trade on a few commodities and its being limited to a very few countries. This situation has been well expressed in the following summarized data.[1]

Hong Kong[2] and India alone accounted for 47 per cent of the trade, totalling approximately $770 million. Next in order of importance among the Asian countries were Iran and the Philippines, Pakistan and China (Taiwan). "Even more telling is the fact that 79 of the other developing countries together provided only six per cent of the supplies, the contribution in no single case equalling even $5 million", states the United Nations World Economic Survey (1963). This concentration also brings to bear the disadvantages associated with a high degree of export dependence upon a few traditional commodities such as textiles. In addition, they also happen to be largely exported to a few developed market economies such as North America, EFTA and EEC countries. In terms of the 1960 total exports, only 0.5 per cent of world trade in manufacturing machinery and equipment was shared by the region, with the bulk of the exports (4.9 per cent) of the world's share coming within the group of 'other manufactures'.

TABLE 12. DEVELOPED MARKET ECONOMIES — IMPORT OF MANUFACTURES FROM DEVELOPING MARKET ECONOMIES 1962

SITC Code	Item	Value of imports from developing countries	Per cent of distribution imports from developing countries	Imports from developing countries per cent total of imports
841	Clothing except fur cloth	233	14.2	18
653	Textile fabric not cotton[a]	190	11.6	14
652	Cotton fabrics	123	7.5	17
667	Pearl, precious and semi-precious stones	107	6.5	20

[1] Vide United Nations, *World Economic Survey, 1963*, Page 179.

[2] In regard to Hong Kong, re-exports constitute a fair proportion of the value of exports. In that particular year, 1962, nearly 21 per cent were re-exports.

657	Floor covering, tapestry etc.	93	5.7	29
631	Veneers, plywood, boards etc.	68	4.1	18
656	Misc. textile products	66	4.0	27
611	Leather	63	3.8	21
513	Inorganic chemicals	58	3.5	15
899	Misc. manufactured goods	51	3.1	15
651	Textile yarn and thread	48	2.9	5
551	Essential oils, perfume and floor materials	46	2.8	31
735	Ships and boats	37	2.3	5
681	Silver, platinum etc.	36	2.2	14
711	Power machinery — non-electric	33	2.0	3
521	Mineral tar, crude chemicals from coal, petroleum and natural gas	29	1.8	29
512	Organic chemicals	28	1.7	3
599	Miscellaneous chemicals	28	1.7	4
655	Special textile products	227	1.7	10
894	Prams, toys, sporting goods, etc.	25	1.5	8
851	Footwear	24	1.4	6
	Other manufactures	231	14.1	4
	Total	643	100.0	4

[a] $173 million consisted of jute fabrics.

Table 12 shows the heavy concentration of the exports of the developing countries on a few products, among which textiles play the major role. As far as the region is concerned, therefore, the pattern of exports appears to be concentrated in a manner which is more harmful than beneficial. This disadvantage becomes more and more obvious in view of the fact that international trade in textiles has since 1961 been declining, which tendency continued during 1963.

TABLE 13. ECAFE REGION EXPORTS — DIRECTION AND COMMODITY GROUP ($ million 1962)

Exports from	*China (mainland)*	*Indonesia*	*Oceanic Asia*	*Continental south-east Asia*	*India*	*Pakistan*	*Japan*	*Australia and New Zealand*	*Total*
To ECAFE region	414	603	1,756	478	266	482	1,557	906	6,462
North America	8	99	827	47	295	68	1,656	485	3,485
Western Europe	170	175	920	138	464	183	648	1,438	4,136
Eastern Europe	850	46	173	30	185	45	214	77	1,620
Others	42	19	265	58	183	657	840	214	2,278
Total	1,484	942	3,941	751	1,393	1,435	4,915	3,120	17,981
of which:									
Food, beverages and tobacco	304	109	825	465	510	56	339	1,327	4,010
Crude materials, oils & fats, mineral fuels etc.	393	823	1,886	261	267	243	203	1,427	6,413
Chemicals, machinery & transport equipment	46	4	226	2	25	42	1,515	111	1,939
Other manufactures	741	4	1,035	22	590	93	2,860	253	5,616

Source: ECAFE Trade Statistics 1962.

TABLE 14. ECAFE COUNTRIES: EXPORTS OF COMMODITY GOODS BY COUNTRIES 1962 ($ millions) AND PERCENTAGE OF INTRA-REGIONAL TRADE

Country	*Chemicals*		*Transport equipment machinery*		*Manufactured goods*		*Miscellaneous manufactures*	
	Value	*Percentage intra-regional*	*Value*	*Percentage intra-regional*	*Value*	*Percentage intra-regional*	*Value*	*Percentage intra-regional*
Indonesia	1.4	50	0.1	50	0.2	90	0.3	30
China (mainland)	14.3[a]	—	5.4[a]	—	141.4[a]	—	29.3[a]	—
Ceylon	1.3	25	—	—	1.6	40	0.5	10
Malaysia	39.1	90	126.3	99	342.1	57	44.5	90
Hong Kong	10.5	90	26.5	55	140.9	50	353.7	24
Philippines	2.1	60	0.3	10	22.0	10	1.1	—
China (Taiwan)	15.6	60	3.8	90	66.9	66	14.6	10
Total Oceanic Asia	68.7	80	157.0	90	574.3	25	414.5	20
Cambodia	—	—	0.5	80	—	—	—	—
Burma	0.3	—	—	—	6.6	66	—	—
Thailand	0.4	—	—	—	6.9	66	1.9	60
Laos	—	—	—	—	—	—	—	—
Viet-Nam (South)	—	—	—	—	—	—	—	—
Total continental south-east Asia	0.7	90	0.6	85	13.7	77	2.1	70

India	15.7	25	9.2	50	555.4	20	24.8	20
Pakistan	0.7	50	3.5	27	86.8	22	6.2	16
Afghanistan	—	—	—	—	9.1	—	—	—
Iran	4.8	4	0.2	—	1.0	50	—	—
Korea (South)	0.9	10	1.4	40	6.1	66	1.9	10
Total north-continental Asia	5.8	7	1.7	—	16.3	16	2.0	10
Japan	262.0	65	1,252.8	33	2,072.8	35	786.3	18
Australia	29.5	75	68.6	17	196.7	20	26.2	65
New Zealand	12.1	25	1.2	90	9.4	75	0.6	70
Total	395.2		1,894.5		3,525.4		1,262.7	

Source: ECAFE Trade Statistics 1962.

[a] Mainland China's trade with other regions is not tabulated.

2. *Growth potential*

In the light of the above data, caution must be exercised in making projections of growth possibilities. If a doubling of the region's exports is expected by 1980, thus permitting the region's percentage share to be six per cent of the total world trade in manufactures (table 9), clearly it could not be brought about by adhering to the present structure of commodities. A doubling in the volume of trade in manufactures to achieve the six per cent share also means an annual growth rate of over seven per cent (on the basis of 1960 exports). On the other hand, in order to achieve by 1980 a 10 per cent share in the world trade manufactures, the region must attain a rate of growth in manufactured exports of over 10 per cent per annum. If this objective could be achieved, the balance of payments gap could be brought within manageable proportions.

A rate of 10 per cent expansion per annum in the region's exports is by no means too ambitious an objective. An analysis of trade data in tables 13 and 14 in respect of the region's trading situation for manufactures for the year 1962 indicates an annual rate of growth of over 20 per cent since 1960. Whereas the total trade in manufactures in 1960 amounted to $1,815 million (excluding Japan and mainland China), the total for 1962 stood at $7,555 million for the entire region and, excluding Japan and mainland China, Australia and New Zealand, at $2,466 million. Exports of machinery and transport equipment for the region amounted to $1,894.5 million, and excluding Japan, mainland China, Australia and New Zealand, it amounted to $566.5 million as against $126 million in 1960. Exports of other manufactures including chemicals, manufactured goods and miscellaneous manufactures, amounted to $6,011.2 million; excluding Japan, mainland China, Australia and New Zealand, it was $2,234.3 million in 1962, as against $1,689 million in 1960. If this rate of growth is maintained, the region's dependence upon exports of primary commodities will be considerably reduced and so will the 'economic distance' between the industrially advanced countries and the developing countries of the ECAFE region.

In order to achieve this objective, the countries of the ECAFE region must take joint steps to (a) consolidate and expand the export of those commodities which have achieved a fair degree of progress particularly in the developed countries, and (b) diversify their exports to include manufactures which have shown a growing importance in world trade, for example, such types of manufactured goods as machinery and machine parts, diesel engines, locomotive and electric generators and light machine tools, and so on. Present developments in exports, particularly the concentration of export commodities on particular lines, should not be considered an unusually discouraging feature, for it follows the pattern of export trade development of the industrially advanced countries during their initial stages. Present difficulties appear to result from the restrictions placed by the developed countries upon imports of textiles, in particular, rather than from a real contraction of demand. In order to achieve any substantial expansion of exports, therefore, such obstacles to exports must be removed.

A real dynamic export programme could, therefore, be carried out only on the basis of a diversified industrial base while taking into account changes in the demand pattern of the developed and developing countries. It is in this sphere that the crux of the entire 'outward-looking' programme of industrialization lies. Insofar as the developing countries are concerned, the resources for investment are limited. In these circumstances, while funds are readily invested in market-based industries, no government is likely to give ready approval to projects based on uncertain export markets. This uncertainty acts as a deterrent not only because of the fear of competition from the more industrially advanced countries, but also because of the rapid changes in technology which are taking place throughout the world. Two other factors of considerable importance which will be taken up for subsequent discussion need to be mentioned. They are (1) the obstacles set up by the industrial countries against imports of manufactured goods from outside sources, such as high tariffs and quota restrictions, and (2) problems of shipping.

The diversification of export industries is of

TABLE 15. FOREIGN TRADE OF SOUTH-EAST ASIA*
(million $; exports f.o.b.; imports c.i.f.)

	1958-1961			1962			1963		
	Export	Import	Balance	Export	Import	Balance	Export	Import	Balance
Burma	217	226	— 9	265	219	+ 46	271	234	+ 37
Cambodia	62	85	— 23	54	102	— 48	89	107	— 18
Ceylon	369	388	— 19	380	349	+ 31	363	315	+ 48
Hong Kong	619[a]	935	— 316	786[a]	1,165	— 397	874[a]	1,297	— 423
India	1,312	2,105	— 793	1,409	2,359	— 950	1,636	2,365	— 729
Indonesia	837	599	+ 238	682	647	+ 35	696	514	+ 182
Korea, Rep. of	27	336	— 309	55	422	— 367	87	560	— 473
Malaysia									
Fed. of Malaya[b]	810	636	+ 174	858	800	+ 58	884	828	+ 56
Singapore[b]	1,092	1,281	— 189	1,116	1,318	— 202	1,136	1,398	— 262
Sarawak[b]	154	139	+ 15	133	130	+ 3	121	130	— 9
Sabah[b]	61	57	+ 4	77	78	— 1	90	100	— 10
Pakistan	354	511	— 157	397	738	— 341	417	889	— 472
Philippines	521	636	— 115	556	655	— 99	727	687	+ 40
China (Taiwan)	168	269	— 101	218	304	— 86	332	362	— 30
Thailand	388	439	— 51	458	546	— 88	469	595	— 126
Viet-Nam, Rep. of	72	238	— 166	57	265	— 208	77	286	— 209
Others	244	325	— 81	226	420	— 194	251	413	— 162
Total South-east Asia: ..	7,310	9,210	—1,900	7,710	10,520	—2,810	8,520	11,080	—2,560

Source: IMF, International Financial Statistics, October 1964.
[a] Of which re-exports amounting to million dollars 209,187 and 203 respectively.
[b] Data include trade between the Federation of Malaya, Singapore, Sarawak and Sabah.
* Vide GATT — International Trade 1963, page 120.

immediate importance and the countries of the region must consider this as a matter deserving the highest priority. This diversification needs to be undertaken not only in relation to the demand arising in the European and the North American countries, but also in relation to the projected demands in (a) the centrally planned economies (the Soviet Union, the east European socialist countries, and mainland China), (b) regional countries, and (c) other developing areas of the world.

The growth rates that the ECAFE region as a whole hopes to achieve in trading its manufactures must necessarily take into account the region's capacity for rapid expansion of demand and the supply prospects to other developing regions. It has been observed that the ECAFE share of the total export of manufactures in almost three times the combined value of the African and Latin American regions. An examination of the commodity composition of exports of manufactures in 1960 suggests that the prospects for diversification within the region are better than those in the other developing regions,[1] taking into consideration the fact that the region already has an advantage in the total volume of exports. The percentage distribution was less in chemicals — 0.9 as against 1.0 and 1.3, and metals — 1.8 as against 11.9 and 5.3 for Africa and Latin America respectively; but, for exports of machinery and equipment, textiles and other manufactures, it was as follows: 1.2, 6.9 and 6.4 as against 0.4, 1.0, 3.8 and 0.3, 0.1 and 1.3 respectively for Africa and Latin America. This suggests that the prospects for diversification, particularly into such lines as machinery and equipment, are relatively encouraging. In addition, as table 10 shows, the region's position is stronger than those of the other developing regions in the markets of the EFTA group of countries, the North American continent, the developing market economies and the centrally planned economies. Provided that no other factors influence economic decisions, this indicates that the ECAFE countries have an advantage in the markets of the very countries in which increases in imports are likely to take place.[1]

Despite these encouraging aspects, the uneven rate of development within the region and the concentration of export industries in a few countries are likely to cause considerable problems unless concerted action is taken in time. The future development, based upon a 10-per-cent annual increase of exports, in the face of the diversification that is called for, is by no means a small task. The main issues, particularly during the next ten years of development, will therefore relate to the co-ordination of industrial planning with a view to regional or sub-regional integration.

V. INTERDEPENDANCE OF NATIONAL DEVELOPMENT PLANS AND FOREIGN TRADE

With the exception of a few countries of the region which are industrially more advanced, the region's countries have economies which are complementary to the industrially advanced countries, but competitive among themselves. It was only after the

[1] Vide *World Economic Survey, 1962* — Part 1.

[1] Vide United Nations *Economic Survey of Europe, 1960* — Chapter V.

tendency to increase the economic distance between the industrially advanced countries and the primary producers had continued unabated, due to the continuation of the adverse terms of trade, that the very basis of the traditional division of labour was brought into question. This offered an opportunity to design and construct appropriate regional or sub-regional arrangements whereby making the most of the region's efficiency and advantage would depend upon the degree of development and specialization achieved by each country within the region.

In such a context, the existence of economically backward countries inhibits the degree of specialization and thus limits the extension of the division of labour which alone could make available an abundance of material wealth. Just as a country's development cannot proceed smoothly if there are stagnant sectors within it, the economic progress of the region will largely depend upon the pace and extent of industrial progress within the individual countries of the region. The connexion between this dependence and the economic progress of the individual countries is self-evident. The following is a brief examination of growth prospects of several individual countries in relation to foreign trade.

1. *National development plans*

Afghanistan

Afghanistan has just completed the implementation of its second five-year plan (1961/65). Both of its five-year plans have concentrated on building up a healthy infrastructure. In its first plan, an allocation of 5,100 million Afghanis amounting to 49.5 per cent of the total outlay was made toward transport and communications. The allocation toward industry, including electric power generation, amounted to 2,700 million Afghanis constituting 27.5 per cent of the total outlay. In its second five-year plan, the highest allocation has been made toward industry, mining and power, constituting a total of 10,508 million Afghanis, amounting to 33.5 per cent of the total plan outlay.

The projects in the industrial sector include the exploitation of natural gas and petroleum, the target for natural gas being 500 million cubic metres and for petroleum 120,000 tons. Proposals include the construction of a petroleum refinery, a thermal electricity plant based on gas, a chemical fertilizer plant (initial capacity 56,000 tons nitrate per annum). Investment in mining is expected to result in an increase of the output of coal by 300 per cent, and in a tenfold increase in installed power capacity.

It is evident from these data that Afghanistan's industrial production is limited to a few light consumer goods industries such as sugar, cotton yarn and fabrics, wool, cement, and soap. The greater part of these industries, with the exception of cotton, wool and carpets, principally supply domestic requirements. It is also significant that the export earnings from the three major items of manufacture are limited to about $22 million. The total value of exports has remained more or less static since 1958/59. In 1958/59, the total was $22.40 million as against $22.82 million in 1963/64.

Furthermore, most of the factories are working below capacity. In the case of textile fabrics, whereas the capacity is 77 million metres per annum, the maximum level of production, which was reached in 1962/63, amounted to 36.8 million metres, production in 1963/64 recorded a decrease to 35.8 million metres.

Besides the chemical fertilizer plant and the petroleum refinery, the second five-year plan also aims at the establishment of a shoe factory, a unit for carpet washing, a unit for silk spinning, a paper mill and a caustic soda plant.

The country's total exports in 1963/64 amounted to $66.05 million which was less than the 60/61 export figure of $67.92 million. The total value of exports reached in 1963/64 was only 14 per cent over that reached in 1958/59. This is in contrast to imports which increased to $63.28 million in 1963/64 from $50.01 million in 1958/59.

Afghanistan also relies to a large extent upon bilateral trade, the significance of which has gained increasing importance. This trade currently accounts for over 50 per cent of the country's total export earnings.

Afghanistan's per capita imports in 1963/64 amounted to $4.5, compared with $4.2 for exports. There are several reasons for this low level of economic and trading activity. That Afghanistan is a land-locked country is one of the main obstacles to the expansion and development of its foreign trade.

Australia

Australia is one of the regional countries which does not rely upon planning for its economic and industrial development. There are, however, several

AFGHANISTAN: INDUSTRIAL OUTPUT (MANUFACTURING INDUSTRIES)

	1957/58	*1958/59*	*1959/60*	*1960/61*	*1961/62*	*1962/63*	*1963/64*
Sugar ('000 tons)	4.7	4.7	4.4	4.5	4.7	8.0	7.1
Cotton ginned ('000 tons)	—	—	—	14.6	15.6	21.1	22.2
Cotton yarn (million metres)	0.6	0.3	0.1	0.1	0.5	0.7	1.0
Cotton fabrics (million metres)	19.8	21.9	16.4	23.5	27.2	36.8	35.8
Silk ('000 metres)	—	—	—	—	267.0	338.0	338.0
Wool fabrics ('000 metres)	219.0	240.0	233.0	306.0	157.0	191.0	189.5
Cement ('000 tons)	—	21.0	34.1	36.6	40.6	59.5	103.2
Soap ('000 cases)	—	—	—	—	1,971.0	1,886.0	—

AUSTRALIA: VALUE OF INDUSTRIAL OUTPUT ($ million)

	1957/58	1958/59	1959/60	1960/61	1961/62
Treatment of non-metaliferous					
Mine and quarry products	228.7	224.0	285.7	333.1	337.1
Bricks, pottery and glass	135.3	149.6	173.4	179.5	178.2
Chemicals, dyes, explosives, paints — oils and grease	986.2	1,039.2	1,115.2	1,124.6	1,157.9
Industrial metals, machines, conveyances	3,513.2	3,735.4	4,311.1	4,527.7	4,430.9
Precious metals, jewellery, plate	30.1	27.3	28.7	29.2	28.8
Textile & textile goods (not dresses)	520.5	498.3	582.6	565.1	569.2
Skins and leather (not clothing or footwear)	115.5	113.3	132.1	119.8	123.5
Clothing (except knitted)	484.4	494.3	532.5	553.6	559.4
Food, beverages and tobacco	1,821.7	1,907.9	2,042.4	2,128.1	2,238.8
Saw mills, joinery, boxes, etc.					
Woodturning and carving	430.3	447.3	496.5	499.1	481.3
Furniture of wood, bedding, etc.	140.5	148.4	167.2	167.5	170.0
Paper, stationery, printing, book-binding	594.0	599.6	647.0	720.4	722.1
Rubber	165.7	173.2	188.6	192.9	178.9
Musical instruments	7.8	7.5	7.0	5.9	7.5
Miscellaneous products	156.0	170.9	193.8	199.0	205.8
Total	9,284.9	9,756.2	10,930.8	11,346.5	11,395.4
Total manufactures exported	211.4	209.9	241.5	264.8	299.9
Total exports	—	1,799.6	2,055.9	2,058.4	2,381.6
Manufactures as percentage of total export	—	12.0	12.0	13.0	13.0
Exports less imports	93.6	57.9	46.8	-245.3	468.3

Source: These figures are based on the Country Study and on J. B. Condliffe, *op. cit.*, pages 126, 128 (table 13 and footnote 3).

governmental agencies whose activities are mainly concerned with the designing and implementation of measures for the promotion and regulation of industries and for the provision of such fiscal and other incentives as are necessary for the promotion of industries on the basis of broad governmental policies.

Although Australia's general economic setting is different from those of the other regional countries, there is a great degree of similarity in its structure of economic development in that its exports are concentrated mainly upon a few basic commodities. Exports of wool, sugar, and wheat account for almost 60 per cent of total export receipts. Its traditional exports are pastoral, agricultural and mineral products, wool being predominant. It has been estimated that, in the export year 1960/61, primary produce accounted for 87 per cent of the total value of exports,[1] three-fourths of it unprocessed. Exports of manufactures constituted only 13 per cent of the total. The impact of such heavy dependence upon a few primary commodities is shown up by the fact that, as a result of a fall this year (1965) in the world market price of sugar, wheat and wool, the export earnings are likely to drop by almost $134 million. Although manufactured exports rose in 1964 to a record of $345 million, they comprised only 11 per cent of the total export receipts.

Among the industrial goods exported, the most important items are iron and steel, petroleum and shale oils, machinery, other metal manufactures, chemical and medicinal products and vehicles, including parts (in descending order of the value of exports). Since 1948/49, both imports and exports have been growing at about 7 per cent per year. The 1965 imports are expected to exceed $3,024 million, an increase of 20 per cent over 1964. In terms of 1961/62 imports/exports, the per capita imports have been $191 and exports $238. Foreign trade is extremely important for the development of Australia's industries since 80 per cent of its imports consist of capital equipment, raw materials, components, fuel and fertilizers. The demand for these products is expected to rise.

Although Australia has a surplus of commodity exports over imports, there is a large deficit on current account transactions which has resulted in government borrowing, in addition to private portfolio and direct investments, and which has increased external liabilities. The pace and extent of Australia's future development will largely hinge upon favourable export markets and its ability to diversify in order to strengthen its overall export position. Recent developments indicate, that both for exports and imports, Australia may have to rely to a greater extent upon the regional markets.[1] This is all the more important in view of the fact that a 5 per cent growth rate (which is necessary to absorb the increasing labour force) will increase its imports by as much as 56 per cent in 1970/71 over 1960/61. This calls for an increase in exports by $892 million by that year.

Brunei

Brunei has incorporated a manufacturing programme in its first national development plan (1962/

[1] Vide The Development of Australia — J. B. Condliffe, Free Fress, Collier-Macmillan Ltd. London 1964.

[1] Vide Condliffe *op. cit.* page 121.

1966) with the objective of diversifying its economy in order to be less dependent upon exports of oil (mainly), gas and rubber.

The plan does not give any quantitative projections of exports or imports. In the field of agriculture, Brunei expects to substitute imports to a large extent, particularly in rice of which the country expects to reduce its exports by 83 per cent of the 1960 figure.

Brunei has had a continuing favourable balance of trade which approximated $50 million in 1964. In the field of manufactured exports, there has been very limited activity restricted substantially to the export of sawn timber and timber products.[1]

The development plan includes provision for feasibility surveys for establishing several industrial projects which include manufacture of glue, glucose and industrial alcohol, glass, fish meat and fertilizer as by-products of the fishing industry; processing of fish foods, plastics and petro-chemical products, cement, chemical fertilizers from natural gas, pulp and paper and veneers, bricks and tiles and other clay products. Of these projects, investigations have been limited to the natural gas resource survey conducted by an ECAFE study group in August 1964. Proposals have now been formulated for joint ventures with foreign capital in respect of the following plants: aluminium ingots, caustic soda, petroleum cake, fertilizer, cement, and glass. Implementation of these schemes will considerably increase the volume of imports of capital goods, machinery and related products.

Burma

National development in terms of planning commenced in Burma in 1948 when the first two-year plan was formulated. During the early years of planning, emphasis was laid upon the promotion of light consumer goods industries and cottage industries. Following the two-year plan, steps were taken to formulate an eight-year plan (1952/53 to 1959/60) which aimed at doubling the gross domestic product. Manufacturing industry did not receive priority consideration, because greater attention was paid to improvements in infrastructure, power, railways and highways. Planned investment for these exceeded 50 per cent of the total plan allocation.

The successful implementation of the plan rested largely upon the success in the projected targets of export earnings. However, from 1953/54 up to 1959/60, the actual receipts from rice exports, which constituted more than 70 per cent of export earnings, fell to below half the planned targets.[2] This resulted in a modification of the plan, as a result of which it was decided to have two four-year plans, the first covering 1956/57 to 1959/60 and the second 1961/62 to 1964/65. In fact, the second four-year plan envisages a series of four-year plans constituting a long-term sixteen-year plan. The two plans since 1956/57 have placed considerable emphasis upon agriculture and irrigation, power transport and communications. Industry received 9.7 per cent (first plan) and 10.6 per cent (second plan) of the total allocation in the public sector.

In the industries sector, the second plan aims at a total industrial output of K238.4 million, approximately $50 million, with chemicals accounting for 20 per cent, basic industries such as metal manufacture and transport equipment 4 per cent, and light consumer goods over 75 per cent. New industries planned are a 60-ton-per-day pulp and paper mill and a fertilizer plant. The existing major industries, apart from petroleum refining are: textiles, jute, cement, sugar, steel rolling, pharmaceuticals, assembly of motor vehicles, aluminium, oils and fats, plywood, flour milling and basic chemicals (sulphuric acid plant). One major difficulty appears to be that of under-utilization of capacities. Significantly, this is not due to a lack of markets; for, in most instances, the installed capacities are inadequate to supply domestic demands.

Burma depends heavily upon exports to finance its development projects. In view of the instability of primary export prices there appears to be an urgent need to diversify exports, particularly to manufactured goods. This can be achieved to a certain degree, as laid down in the plan, by increasing exports of minerals and mineral products, such as tungsten and other mixed concentrates, and of manufactures such as aluminium products, rubber products, cottage industry textile products and canned products. The plan envisages a curtailment of consumer goods imports in order to provide for increasing imports of capital and investment goods.

Cambodia

One of the basic objectives of economic development in Cambodia has been summarized as follows: "Processing the products obtained from the soil and the sub-soil locally as far as possible, freeing the country from foreign imports to the maximum extent possible, and gradually re-allocating the foreign exchange made available by reducing imports of consumer goods to imports of capital goods for use in new industries". Considerable attention has, therefore, been paid to the production of intermediate goods. Cambodia has at the same time commenced upon a programme of establishing plants for assembly of equipment and simple machinery to save foreign exchange.

Plants have been established for the manufacture of cotton yarn, textile fabric, plywood, paper, and cement in the public sector and there are several units in the private sector concerned with the manufacture of numerous items of light consumer goods. Except in cotton fabrics and cement, there is at present a substantial extent of under-utilization. Proposals have been formulated for expansion of capacities in respect of

[1] Exports of these items have been extremely insignificant in relation to the total exports and they have shown a continuous fall since 1960.

[2] The average price of rice per ton was almost halved between 1952/53 and 59/60.

cotton fabrics, paper and cement. New projects to be completed by 1969 are tyres, assembly of tractors, refined sugar, glass, caustic soda and nitrogenous fertilizers. Apart from these, construction of mixed capital projects for the manufacture of phosphorite, jute sacks and refined oil will commence in 1965. The Government has conducted surveys of the possibility of setting-up plants for caustic soda, chlorine and manufacture of insecticides, multi-purpose oil works, a plant for agricultural implements and a sugar refinery. These projects are expected to be commenced in the late nineteen-sixties.

CAMBODIA — BALANCE OF TRADE (Million Rials)

	Imports C.I.F.	*Exports F.O.B.*	*Balance*
1955	1,665	1,402	– 263
1960	3,320	2,441	– 879
1961	3,396	2,220	–1,175
1962	3,583	1,903	–1,680
1963	3,751	3,116	– 635
1964	2,863	3,063	+ 200

A continuing balance of payments deficit has been arrested by a curtailment of imports. In the absence of statistical data on local production, it is difficult to verify the assertion that this reduction is the result of heavy import substitution. One fact which emerges from the above data is that the development of new industries, including projected expansion schemes, will largely depend upon a considerable increase of exports. In 1960, nearly 41 per cent in value of the exports consisted of liquid latex, smoked rubber sheets and crepe rubber. In 1964, whereas the export earnings increased to 3,063 million Ri, an increase of almost 600 million Ri, the percentage share of the latter group of semi-manufactured products was reduced to 14. Exports of rubber products recorded an almost 50 per cent drop in value as well as quantity. This favourable position may have arisen as a result of the increases in exports of both maize and rice.

Ceylon

Foreign trade is of extreme importance to Ceylon, where imports constitute about 35.1 per cent[1] of the gross national product. This was one of the reasons which necessitated giving early consideration to the building up of several light consumer goods industries, with a view to supplying essential commodities during times when there were long periods of interruption to the normal flow of international trade. Although the Government's concern for industry goes back to 1922, it was not until 1959 that a "rough plan" was drawn up for establishing a number of import substitution oriented medium scale plants. Planning in earnest, however, commenced only after the creation of a planning secretariat. The first six-year plan ran from 1954 to 1960. This plan laid special emphasis upon the development of agriculture, for which the allocation amounted to 45 per cent of the total plan outlay, with the allocation for industry amounting to only 5 per cent or about $25 million. With the establishment of the National Planning Council, a new ten-year perspective plan was drawn up in 1959. This plan gives greater emphasis to industry and allocates a sum of $220 million (30 per cent of the total outlay) for the plan period.

The plan envisages considerable changes in the structural pattern of imports. By 1968, it is expected that imports of consumer goods will be reduced from 58 per cent in 1958 to 40 per cent of total imports. Capital and intermediate goods are expected to rise from 42 per cent in 1957 to 60 per cent in 1968. Although the major portion of export earnings will still accrue from traditional commodities such as tea, rubber and coconut, manufactured exports are expected to increase by almost $18 million — an increase of 120 per cent from $15 million in 1957. By 1968, the percentage export contribution of manufactured goods is expected to constitute 13.7 per cent of total exports and they will, after tea, constitute the second important item of economic activity from the point of view of exports.

CEYLON: BALANCE OF TRADE 1957-1963 (Million Rupees)

Year	*Exports F.O.B.*	*Imports C.I.F.*	*Balance of Trade*
1957	1,682	1,804	–122
1958	1,711	1,717	– 6
1959	1,754	2,005	–251
1960	1,832	1,960	–128
1961	1,733	1,703	+ 30
1962	1,808	1,660	+148
1963	1,731	1,500	+231

The continuing deficits in the balance of trade during the initial years of the plan constituted a major difficulty. The financing of the plan was based to a great extent upon the increases in exports of traditional commodities; but, as will be noticed from the previous table, there has been an unhealthy stagnation in this sector which, besides affecting the efficiency of plan implementation, has also caused a drastic curtailment of imports.

Ceylon's projected plans for expansion in the public sector include provision for several export-based industries. Leaving out mineral sands (ilmenite, rutile and zircon) and oils and fats, these include synthetic textiles, ceramicware, rubber tyres and tubes, leather footwear and other leather products, chemicals and hardware.

Although insignificant at present, the potential for exports of other manufactured goods has already been established; these include accumulators, textile garments, confectionary, manufactured rubber goods, manufactures of fibre, tanned leather, machinery for

[1] Vide *Economic Bulletin for Asia and the Far East* Vol. XIV No. 3 December 1963 — Table 21 page 23.

tea, rubber and coconut and electrical apparatus and equipment.

In view of the limited extent of the domestic market, the country's future expansion prospects for industries must be based upon exports. The declining importance of primary commodities in world trade makes Ceylon's position quite vulnerable. The country will, therefore, need to rely not merely upon import substituting industries, but also upon export based industries which must progressively increase their contribution to export earnings. However, the traditional export sector will for several years to come play a vital role and can, in fact, if future trading prospects are stabilized, play the role of a heavy industries sector by supporting the development of other sectors of the industry.

China (Taiwan)

In 1964, China (Taiwan) completed the last year of its third four-year economic plan. The plan envisaged an increase of the *per capita* income at an average rate of 4.8 per cent per annum, and an 8 per cent annual rate of growth in its national income, which was expected to have increased by 36 per cent over the plan period by 1964. At present, the fourth four-year plan and a projection up to 1974 are being examined by the Government. This plan was drawn up with the expectation of maintaining an annual growth rate of 7 per cent throughout the coming decade.

In the third four-year plan, the requirements of foreign exchange were estimated at approximately 37 per cent of the overall investment. In the fourth year of the plan, exports were expected to increase from $164 million to $260 million, an almost $100 million increase, whereas imports were expected to rise at a much lower rate from $287 million to $320 million, an increase of only $37 million. The plan's emphasis upon exports and curtailment of imports was largely designed to correct the adverse balance of payments situation. Great stress was, therefore, laid upon import substitution by which it was expected to reduce the trade gap from $123 million in 1960 to $60 million in 1964. Much of the increase in exports was to have come from the agricultural sector — rice, bananas, pineapples, hogs and processed foods; for the manufacturing industries, support was to be given to exportable textiles, including cotton yarn, glass, petrochemicals and wire and cables. Estimates indicate that 70 per cent of imports were financed by exports. The balance was to be financed by foreign aid.

The total exports reached a level much above the planned targets. For 1964, they reached a level of $463 million and they were expected to reach $480 million by 1965. Total imports (including government exchange, United States aid and so forth) increased to $410 million. The trade balance recorded export surpluses for 1963 and 1964 of $20 million and $52 million respectively.

CHINA (TAIWAN): EXPORTS OF MANUFACTURED AND SEMI-MANUFACTURED GOODS ($ million)

	1960	1961	1962	1963	1964
Semi-Manufactures					
Sugar	74.4	61.1	49.6	106.0	135.4
Tea	6.3	8.9	7.9	8.1	8.4
Citronella oil	3.4	3.8	5.2	6.9	4.8
Canned pineapple	8.4	12.1	10.9	11.6	13.9
Feathers	1.3	1.5	1.8	2.1	2.4
Canned mushrooms	.1	1.8	8.5	16.2	15.8
Total	94.7	81.4	85.9	154.2	186.8
Manufactured Goods					
Salt	2.5	2.4	1.9	2.3	3.6
Coal and asphalt	4.1	3.9	3.4	2.9	2.4
Cement and building materials	2.3	6.8	11.3	17.1	17.7
Camphor	.3	.3	.5	.8	1.1
Paper and pulp	2.5	3.7	3.9	3.4	5.0
Chemicals	6.8	15.8	20.5	19.3	23.0
Ores, metals and machinery	6.2	12.0	13.2	22.0	27.6
Wood products and lumber	5.5	11.1	17.7	27.7	41.8
Cigarettes and wires	.4	1.1	1.9	1.2	1.1
Textile fibre and manufacture	21.2	27.8	38.0	44.4	61.0
Total	51.8	84.9	112.3	141.1	184.3

China (Taiwan)'s foreign trade income was subject to wide fluctuations due to the predominance of sugar and rice, which constituted 60 per cent of the total value of exports. 90 per cent of the total value was derived from agricultural products up to about 1957, after which their predominance declined to 68 per cent in 1960. Export of industrial goods expanded rapidly from 1956 and, from being below 10 per cent in the early years, reached 30 per cent in 1960. Among the exports of manufactured goods, textiles occupied a predominant position and rose from $21 million in 1960 to $61 million in 1964; wood and wood products, ores, metals and machinery, chemicals and cement accounted for the major share of the balance. Exports, which constituted 8.1 per cent of the GNP in 1953/55 (average), rose to 12.0 per cent in 1958/60 (average). The relative percentages for industrial exports were 0.5 per cent and 2.6 per cent for the respective periods, a more than five-fold increase.[1]

China (Taiwan)'s import trade is also important, particularly from the point of view of its increased industrialization. This aspect has received consideration earlier and from the past trends, one can envisage that the country's future development programme will depend, as before, to a large extent upon its position in international trade.

[1] Vide *Economic Bulletin for Asia and the Far East* Volume XIV No. 1 June 1963 page 47.

Hong Kong

As already noted, Hong Kong accounts for a very substantial share of the region's exports of manufactured products. The country's industrial development is related to external trade in view of its small population and its limited market and resources. Apart from textiles, plastic ware and light metal products accounted for over 82 per cent of total domestic exports in 1964.

EXPORTS OF HONG KONG (HK$ million)

Item	*1960*	*1961*	*1962*	*1963*	*1964*
Textiles and textile products including made-up garments	273.8	268.0	304.1	355.5	407.1
Plastic ware	45.9	52.5	61.9	69.7	93.4
Light metal products, enamelware, flashlights & aluminium products	28.5	29.5	30.9	32.8	33.8
Electrical Products	0.05	2.2	6.4	12.0	16.6

In 1951, the total exports from Hong Kong (domestic as well as imported) accounted for $776 million; by 1954, however, due to the embargo on trade with mainland China, this figure dropped to $423 million. Subsequently, exports began to gather momentum until, in 1963, they reached $873 million. The value of re-exports remained fairly steady from 1959 to 1963 at approximately $175 million. In 1964, it rose to $237 million. Although the traditional pattern of the region's trade, which was based upon exchanges of products with the developed countries, is now gradually changing to one in which products of one regional country are exchanged for those of another, Hong Kong still finds its main export markets in the United States and the United Kingdom. Its exports of domestic products are increasing and, by the first eight months of 1964, reached a figure of $82 million, $9 million more than the exports of 1963.

India

India, in its third five-year plan (1961-1966) expects to increase its national income by 5 per cent per annum. Its exports and imports, expressed as a percentage of its overall output, amount to 5 and 7 per cent respectively. Its per capita exports and imports are $3 and 4.5 respectively. Although the country has vast resources and a large domestic market, its foreign trade will, for a considerable time, exercise important influences upon its economic development. The total foreign exchange component of investment in the third plan was of the order of Rs 19,150 million, of which the requirements of the industrial sector accounted for Rs 11,900 million. These magnitudes emphasize the importance of imports and exports in the fulfilment of the plan targets. The country's total requirements, as is shown in the table below, amount to Rs 62,930 million for the plan period.

INDIA — IMPORTS REQUIREMENTS OF INVESTMENT[1]

	Rs (million)
Industry and minerals	11,900
Power	2,700
Transport and communications	3,000
Agriculture, community development and irrigation .	750
Social Security including construction	800
Total development imports	19,150
Social maintenance imports	2,000
Maintenance imports	35,700
Import of foodstuffs under P.L.480	6,080
Total Imports	62,930

In the planning of these import requirements, the projected increases in the supply of several commodities, including certain items of machinery, were taken into consideration. There is an increasing demand by the industrial sector for large quantities of capital goods and for increasing quantities of raw materials. During the first nine months of 1964, total imports increased by 17 per cent mainly due to a 17 per cent increase in raw cotton, a 9 per cent increase in base metals and an 8 per cent increase in machinery and transport equipment. Imports of petroleum, chemicals and other manufactured goods fell by 15, 13 and 7 per cent respectively during this period. Exports continued to increase and, significantly, the largest gains were recorded in trade with ECAFE countries, which increased from $287 million in 1962 to $383 million in 1963. There was also a slight increase of exports to the United States, but exports to western Europe fell to 30 per cent of the total exports. Bilateral agreements were also responsible for substantial gains, particularly those with the centrally planned economy countries. Exports to the Soviet Union increased by almost 50 per cent in the course of the year.

INDIA'S BALANCE OF TRADE — (Million Rupees)

		Imports	*Exports*	*Balance of Trade*
1951/56	Total of first plan	36,170.0	30,293.0	– 5,877.0
	Average of first plan	7,234.0	6,058.6	– 1,175.4
1956/61	Total of second plan	48,822.6	30,462.5	–18,360.1
	Average of second plan	9,764.5	6,092.5	– 3,672.0
1961/64	First three years of third plan (total)	33,916.9	21,874.2	–12,043.7
Average of three years:		11,305.6	7,291.4	– 4,014.2
1964/65		5,330.8	4,136.8	– 1,394.0

The increasing deficits in the balance of trade, together with the very low level of the external reserves ($526 million — September 1964), emphasizes the importance which India's foreign trade plays in its planning.

[1] GATT Secretariat paper on Trade and Payments Aspects of the Third Five-Year Plan of India — Committee III Expansion of Trade, GATT COM/111/47 June 1961.

INDIA — EXPORT FORECASTS OF SELECTED PRODUCTS[a] EXCLUDING RE-EXPORTS
(Million Rupees)

Product	Forecast 1960/61	Forecast 1965/66	Third plan Total
Major Traditional Exports			
Tea	1,310	1,390	6,750
Jute manufactures	1,060	1,150	5,500
Cotton textiles	620	670	3,250
Total	2,990	3,210	15,500
Other Traditional Exports			
Cashew nuts	160	200	910
Sugar	10	60	220
Spices	100	110	530
Vegetable oils	170	240	1,050
Oil cakes	180	220	1,000
Raw cotton and waste	160	350	1,040
Yarns	110	130	610
Coir manufactures	40	60	250
Manganese ore	140	120	650
Coal and coke	70	80	370
Petroleum products	40	50	210
Others	1,180	1,270	6,030
Total	2,360	2,790	12,870
Iron Ores and New Export Commodities			
Iron ore	220	450	1,760
Iron and steel	100	—	40
Ferro, manganese	80	80	380
Metal manufactures	30	70	230
Machinery and transport equipment	40	60	360
Total	470	660	2,770
Other exports	570	580	2,870
TOTAL EXPORTS	6,390	7,240	34,010

[a] GATT, *op. cit.*

INDIA — EXPORTS OF MANUFACTURED GOODS
(Million Rupees)

	1960/61	1963/64
Jute manufactures	1,339.1	1,561.7
Cotton fabrics	575.4	474.6
Coir manufactures excluding yarn	32.1	40.3
Synthetic fibre fabrics	46.0	105.8
Woollen manufactures	55.9	84.8
Linen (bed, table, kitchen and toilet)	22.5	37.7
Silk fabrics	6.0	17.1
Cashew kernel	189.1	214.1
Sugar	32.9	273.0
Metal	18.7	38.0
Machinery and transport equipment	36.8	59.2
Footwear	30.8	36.1
Clothing	6.9	39.4
Silver, platinum, gems and jewellery	10.1	165.7
Miscellaneous manufactures	69.9	153.4
Total including minor items not mentioned above	2,579.4	3,429.5

INDIA — SEMI-MANUFACTURED EXPORTS
(Million Rupees)

Vegetable oils	85.4	199.2
Cotton yarn and thread	44.4	66.6
Coir yarn	53.2	75.9
Iron and steel scrap	55.0	49.1
Hides and skins (tanned or dressed)	248.5	262.0
Base metals	99.4	57.4
Petroleum products	40.7	74.3
Oil cakes	143.0	353.7
Total including items not given above	854.3	1,211.2

It is evident that India has been able to keep up to its export targets. There is, however, heavy reliance upon traditional exports such as jute, cotton textiles, vegetable oils, and hides and skins which account for more than 50 per cent of export earnings. This structural pattern will, according to estimates, continue until after 1970/71. However, present indications are that the fourth five-year plan will lay considerable emphasis upon substantial building up of export earnings from the engineering goods sector, in which exports are expected to increased from Rs 160 million to Rs 500 million; metal ore is expected to increase from Rs 400 million to Rs 950 million. Increases are also expected in exports of chemicals, plastics and rubber manufactures.

It is of interest to note the envisaged change in the structural pattern of exports. While India does not expect substantial increases in some of the traditional items of export, new items proposed for export include metal manufactures and machinery and transport equipment such as electric motors, electric fans, sewing machines and bicycles. India's foreign trade policy as defined in the third five-year plan, in expectation of greater resistance on the part of the developed countries towards exports of manufactures, anticipates a shift in the direction of trade toward the countries of the ECAFE region.

Indonesia

The national over-all development plan (1961-1969) of Indonesia does not give any import/export projections. The trends of imports and exports up to 1963 were as follows:

INDONESIA — COMPOSITION OF IMPORTS (CIF) — (Million Rupiah)

	Consumption goods Food	Consumption goods Other	Materials chiefly for consumption goods	Materials chiefly for capital goods	Capital goods	Total
1958	1,328	1,177	1,155	547	1,578	5,785
1959	1,130	792	1,130	600	1,563	5,224
1960	5,977	5,630	6,165	1,072	6,991	25,835
1961	4,555	9,450	9,024	1,530	10,953	35,521
1962	3,729	7,750	7,400	1,253	9,003	29,135
1963	—	—	—	—	—	—

INDONESIA — VALUE OF EXPORTS (FOB) MONTHLY AVERAGE
(Million Rupiah)

	1958	1959	1960	1961	1962	1963
Tea	23.6	19.2	104.0	96.4	77.3	66.7
Copra	19.9	30.2	217.2	143.4	68.0	66.3
Natural rubber	248.2	396.6	1,414.6	1,145.6	1,119.4	918.5
Tin ore	35.9	34.0	204.0	140.3	130.0	70.9
Petroleum & products	268.2	219.8	827.9	975.7	809.2	1,007.8
Total (annual)	7,149.6	8,397.6	32,132.4	30,009.6	26,454.6	25,562.4

The above table of imports and exports indicates that there has been a sharp fall in Indonesia's export earnings despite devaluation in 1959/60. Its imports, which rose in 1961 to a high of Rupiah 35,521 millions, fell in the subsequent year. This fall in export earnings from that in the initial year of the plan resulted in a curtailment of imports which affected the import requirements in terms of the plan. While both imports and exports were below the 1962 level, for the first eight months of 1964 there was a fall in exports of 5 per cent and an increase in imports for the first five months of the year by 43 per cent. Among the exports, petroleum and petroleum products and natural rubber accounted for the greater part of the earnings.

Important industrial projects included in the plan were: (a) the establishment of an iron and steel industry with a capacity of 100,000 tons per year; (b) an increase of the oil refining capacity by 50,000 barrels per day; (c) the establishment of basic chemical industry; (d) an increase of cement output to 1,925,000 tons per year; (e) an increase in coal production to 700,000 tons a year; and (f) expansion of asphalt production to 50,000 tons a year. The implementation of the plan will largely depend upon the degree of achievement with exports, which at present consist entirely of traditional commodities.

Iran

Iran is now in the middle of its seven-year programme (1962-1968), the over-all objective of which is to increase national income by 6 per cent per annum. The plan contains no information pertaining to imports or exports. It is also noteworthy that no provision is included for laying down targets for the oil industry, although it is Iran's major source of income, as well as its main foreign exchange earner.

On the export side, Iran expects increases in dried fruits, carpets and minerals, particularly chromite and iron ores. On the other hand, domestic production is expected to be substituted to some extent for imports of such items as sugar, textiles, vegetable oil, cement, paper, iron and steel, chemicals and pharmaceuticals. Investigations carried out by the Consortium have proved the existence of larger petroleum reserves amounting to 10 per cent of the total world's resources. Exports of crudes were at an even level during the first half of 1964, but output has increased considerably during the past few years.

IRAN — PRODUCTION OF SELECTED COMMODITIES ('000 tons) MONTHLY AVERAGES

	1958	1959	1960	1961	1962	1963
Coal	16	20	19	17	13	—
Natural gas (Million M3)	62.0	75.6	79.2	82.1	87.6	94.9
Petroleum (crude)	3,409.0	3,850.0	4,370.0	4,907.0	5,447.0	6,086.0
Sugar	9.2	9.2	7.4	7.9	12.0	12.8
Petroleum Products	1,259.0	1,307.0	1,439.0	1,278.0	1,466.0	1,487.0
Cement	34.2	48.2	65.2	54.2	62.1	—

BALANCE OF TRADE (Billion Rial) MONTHLY AVERAGE

IMPORTS CIF (Million Rial) MONTHLY AVERAGE

	FOB export	CIF import	Balance	Food beverages and tobacco	Sugar	Tea	Chemicals	Textiles	Base metals and manufacture	Machinery	Transport equipment
1958	4.58	3.77	+0.81	366.0	180.1	124.2	128.5	346.2	390.2	565.2	279.8
1959	4.76	4.09	+0.67	372.5	192.2	105.0	176.4	379.6	505.8	825.2	475.4
1960	5.15	4.10	+1.05	536.7	206.3	102.7	261.7	316.4	700.8	1,126.0	477.3
1961	5.50	3.93	+1.57	496.9	266.2	62.8	277.9	321.5	572.5	1,056.8	329.2
1962	6.26	3.25	+3.01	336.9	95.0	62.3	340.7	—	591.3	879.2	240.5
1963	5.89	3.30	+2.59	390.5	190.8	63.5	320.0	—	537.1	704.2	276.6

IRAN — EXPORTS FOB (Million Rial) MONTHLY AVERAGES

	1958	1959	1960	1961	1962	1963
Fruit, fresh, dried & preserved	135.3	110.3	102.5	139.4	148.1	118.7
Raw cotton	124.5	151.1	180.5	203.0	167.9	237.4
Petroleum & products	1,904.9	4,102.1	4,435.8	4,693.8	5,070.4	5,573.8
Carpets (hand-made)	110.4	126.7	180.3	182.7	138.5	165.0

In domestic production, the years 1962 and 1963 witnessed improvements in respect of natural gas, crude petroleum, petroleum products and sugar. Imports of machinery, which can be taken as a rough indication of the advances made in industrial development, have not shown any improvement, in contrast to the two years prior to the initial year of the plan, during which imports may have been largely related to increased imports of machinery and equipment for the petroleum industry. Both transport equipment and machinery imports declined in the two plan years 1962 and 1963. There was also a drop in tea and sugar imports, tea imports dropping almost by 40 per cent. Export performance, except for petroleum, has been somewhat inconsistent.

Japan

Exports from the developing countries during the seven-year period, 1953/54 to 1960/61, increased by 48 per cent in value, of which the amount imported by Japan increased from 8.8 per cent to 9.7 per cent. The region's imports from Japan increased for the same period by 77 per cent and Japan's exports to the region increased from 10.6 per cent to 12.4 per cent.

Because of Japan's industrially advanced state, however, its foreign trade is growing at a very much faster rate than that of the rest of the region as a whole. For instance, between 1953/54 to 1960/61, the value of Japan's exports rose by 185.5 per cent as against 35.4 per cent for the developing countries of the region. Similarly, Japan's imports increased by 114.2 per cent as against 50.8 per cent for the ECAFE region. Its exports and imports between 1959 and 1970 are expected to grow by 257 per cent and 249 per cent respectively. Although Japan's export projections are highest in respect of two items for which there is likely to be an increasing demand within the region, namely light and heavy machinery and transport equipment (increases in which are projected for 1970 at 4.7 and 4 times respectively), it envisages a decrease of its exports to all developing regions from 61.4 per cent of its total exports in 1956/58 to 49 per cent in 1970, owing to anticipated payments difficulties in the developing countries.

Japan's import requirements are expected to rise in 1970 as follows: machinery and other finished products — 5 times; semi-finished products — 3.5 times; raw materials including mineral fuels — 1.9 times; foodstuffs — 1.6 times. A substantial increase is also expected in the demand for maize due to growth prospects of the dairy and animal husbandry industry in Japan. These projections appear to be somewhat discouraging to the region as the highest demands are for those very items which the region may not be in a position to supply[1]; nevertheless, this fact strengthens the case for diversifying the base of the region's export potential. The demand for non-ferrous metals, for the production of which the region is in an advantageous position, is anticipated to increase 3.7 times. The region's exports of tin, bauxite, copper and copper concentrates are likely to be favourably placed.

In terms of its ten-year long-range economic plan (1961-1970), Japan's import requirements are expected to rise by 1970 to $9,890 million at an annual average rate of increase of about 9.3 per cent. The largest in value of imports will pertain to raw materials, although the highest rates of increase are in respect of manufactured goods. This calculation is on the basis of the country's industrial expansion, which is expected to reach three times the level attained in 1959. A disconcerting feature is the expected decline in the proportion of imports from south-east Asia.

The export targets for each of the major commodities have been set. Exports of light and heavy machinery, which are the most important, are projected at $3,900 million, an increase of 5.8 times the 1956/58 level. Total exports are expected to reach $9,320 million, an increase of 3.5 times the 1956/58 level. Exports will grow at the rate at 10 per cent per year and Japan's share in world trade is expected to increase to 5.6 per cent in 1970, as against 3.4 per cent in 1959.

JAPAN — COMMODITY IMPORTS BY MAJOR CATEGORY[a]

Category	FY 1959 Million $	FY 1959 Percentage of total	FY 1970 Million $	FY 1970 Percentage of total	FY 1970 Rate of income
Foodstuffs	499	12.6	804	8.1	161
Raw materials ..	1,995	50.2	3,789	38.3	190
Textiles	778	19.6	1,131	11.4	145
Medicals and chemicals	81	2.0	94	1.0	116
Iron and steel ..	390	9.8	901	9.1	231
Non-ferrous metals	155	3.9	573	5.8	370
Agriculture and forestry	350	8.8	599	6.1	171

[1] This is, of course, in keeping with the general trend of the rapid growth in world demand for manufactured goods. It has been estimated by ECE that, in western Europe alone, the increase in demand for manufactures will be in the region of $370,000 million by 1980. On the other hand, exports of manufactures by the developing countries are expected to increase from $2,000 million to $15,000 million by 1980, of which it is expected that $5,000 million will be absorbed by the developing countries themselves. If the western European countries were to absorb 1/3rd of the total increase, this would amount to between 1.5 to 2 per cent of their additional *domestic* demand for manufactures.

Miscellaneous ...	241	6.1	491	5.0	204
Mineral fuel	693	17.4	1,863	18.8	269
Semi-finished products	312	7.8	1,093	11.1	350
Finished products	471	11.8	2,330	23.6	495
Machinery	366	9.2	1,735	17.5	474
Miscellaneous ...	105	2.6	595	6.0	567
Other items	6	0.2	12	0.1	200
Total	3,976[b]	100.0	9,891	100.0	249
Food, beverages and tobacco ..	252	6.9	547	217	5.9
Light machinery .	86	2.4	400	468	4.3
Miscellaneous ..	459	12.7	1,206	263	12.9
Total Industrial Products ...	3,337	92.1	8,859	265	95.1
Miscellaneous .	288	7.9	461	160	4.9
Total	3,625	100.0	9,320	257	100.0

[a] Vide *Economic Bulletin for Asia and the Far East*, Vol. XIV no. 1 June 1963.
[b] Values after customs clearance.

The plan puts considerable emphasis upon the development of closer economic relations with the developing countries of the ECAFE region.

JAPAN — COMMODITY EXPORTS BY MAJOR CATEGORY

Category	*FY 1959* Million $	*Percentage of total*	*FY 1970* Million $	*Percentage of total*	*Percentage rate of increase 1957/70*
Heavy Industrial and Chemical Goods					
Machinery, transporation equipment	855	23.6	3,450	404	37.0
Metals and metal products	448	12.3	1,040	232	11.2
Medical, chemical goods	169	4.7	493	292	5.3
Light Industrial foods					
Textiles, apparel .	1,068	29.5	1,723	161	18.5

Malaysia

In terms of the second five-year development plan (1961-1965), Malaysia expected to increase its national output by more than 4 per cent per annum. The successful implementation of the plan, like that of several other development plans in the region, was dependent largely upon the stability of Malaysia's main exports — rubber, tin, iron ore, palm oil, coconut products, canned pineapples, and so forth. Although rubber production was expected to increase by about 10 per cent during the plan period, expected earnings, owing to falling prices, might not exceed earnings during the course of the first plan (M$7,430 million).

Rubber accounts for 60 per cent of the former Federation's foreign exchange earnings and tin for 20 per cent; increases in earnings may not be proportionate to increased output. On the other hand, exports of iron ore in large quantities (50 per cent over the first plan period) are expected to bring an income estimated at M$661.2 million. Total earnings from all commodities are expected to rise by only about 10 per cent to about M$13,000 million.

TRADE OF THE FORMER FEDERATION OF MALAYSIA
(Exports FOB)
(Million M$)

Commodity	*1959*	*1960*	*1961*	*1962*	*1963*	*(Jan.-Oct.) 1964*
Food	88.6	102.6	108.1	117.9	112.3	101.7
Beverages and tobacco	0.8	0.4	0.7	0.7	1.3	0.5
Crude materials inedible	1,908.2	2,100.7	1,704.2	1,626.8	1,669.3	1,342.2
Mineral fuels	11.2	8.2	9.2	10.9	13.2	36.2
Oils, animal and vegetable	81.6	85.2	89.5	87.5	91.2	74.9
Chemicals	13.3	17.2	19.1	21.4	31.9	32.2
Manufactured goods	319.1	543.7	609.8	664.5	680.8	614.5
Machinery and Transport	18.0	30.8	42.3	51.0	51.9	49.8
Miscellaneous	13.3	16.3	18.2	19.9	22.1	20.6
Miscellaneous transaction NES	19.0	22.3	25.0	25.3	30.6	22.1
Total	2,473.1	2,027.4	2,626.1	2,625.9	2,704.6	2,291.7
Pineapple canned	21.6	26.1	25.6	27.8	29.0	28.4
Rubber	1,721.8	1,829.5	1,442.4	1,367.6	1,374.0	1,078.9
Timber	20.5	39.0	41.5	49.0	65.8	72.2
Palm oils	51.7	60.6	61.2	65.1	69.0	63.6
Oil palm fruit and kernels	9.2	11.1	7.2	6.6	7.3	5.6
Copra	13.4	34.5	18.8	9.1	13.0	2.8
Coconut oil	29.8	23.9	27.7	22.2	22.0	11.1
Iron ore	99.9	140.2	163.8	166.1	176.3	152.7
Tin	294.5	505.9	550.1	616.4	638.3	575.3
Total	2,262.4	2,670.8	2,338.3	2,329.9	2,394.7	1,990.6

The trade deficit of the former Federation of Malaya in 1961 amounted to M$237.8 million; it increased to M$410.7 in 1962, and to M$659.1 in 1963. Increases have been recorded in all import items. Whereas imports of food, minerals and textiles increased at a slower rate over the period 1958-1963, imports of machinery, transport goods and other manufactured goods almost doubled. Similar changes are noticeable in the other states of Malaysia. Among the exports, rubber underwent a quantitative fall of 16 per cent and a value fall of 20 per cent since 1963.

Total exports of manufactures and semi-manufactures are becoming increasingly important. In 1963, the total value of exports under this category amounted to M$738.8 million. Nevertheless, the increasing deficit in trade will become an obstacle to plan implementation. Malaysia estimates a total of $1,950 million as the total liability for the plan period in respect of net payments on services, interest and dividends and private remittances, and so on.

Nepal

The objectives of Nepal's second three-year plan are to increase agricultural and industrial production and to create additional employment opportunities. At present, Nepal imports practically all its requirements of food and textiles which, together with cigarettes, constitute about 50 per cent of its total imports. 65 per cent of Nepal's exports are accounted for by food grains and other raw materials. The plan accords high priority to import substitution, mainly of such items as sugar, cigarettes, cement, and textiles. The existing industries are limited and so was production up to 1964. In agriculture, planned targets have been laid down for food grains, milk and milk products, and other export earning commodities. Nepal's external trade is limited by the fact that, like Afghanistan, it is a landlocked country. 95 per cent of its present foreign trade is conducted with India. Since 1960, however, after the signing of the Treaty of Trade and Transit with India, Nepal has been able to sign agreements with several other countries for the establishment of bilateral trade relations.

In October 1962, Nepal signed a trade agreement with Pakistan for trade between the two countries providing for increases in Nepalese exports of raw materials such as timber, pulses, oil seeds, butter and cheese, medicinal herbs, hides and skins, rice, wool, and so forth, and imports of cotton textiles, rock salt, paper and newsprint, leather goods, cigarettes, toilet requisites, and so on.

This continuing unfavourable balance of trade has been attributed to stagnation in the agricultural sector and to the absence of any industries able to meet at least a fair proportion of the growing demand for consumer goods. However, there are proposals for the inclusion of several industries in the five-year plan 1965/70. They include manufacture of cement, nitrogenous fertilizer and agricultural tools mainly to meet the domestic demand, as well as jute (15,000 tons), plywood and hardboard (15 million square feet), fruit canning and preservation, brewery and distillery, paint and varnish, pulp and paper (15,000 tons) and resin and turpentine (48,000 and 21,000 tons respectively), which are being planned both for domestic and export purposes. The implementation of these schemes will considerably increase the country's demand for machinery and equipment.

NEPAL — EXPORT AND IMPORT — BALANCE OF TRADE
(crores of Rupees)

	Exports FOB	*Imports CIF*	*Balance*
1956/57	9.54	16.98	— 7.44
1957/58	7.33	15.83	— 8.50
1958/59	11.79	22.33	— 10.54
1959/60	13.17	28.75	— 15.57
1960/61	20.97	39.79	— 18.82
1961/62	28.12	45.41	— 17.29
1962/63	37.97	57.70	— 19.73
1963/64	50.00	70.00	— 20.00

New Zealand

Development of industries in New Zealand has not taken place within the context of an over-all plan. However, the Tariff and Development Board suggested, in 1963, guidelines for the development of new industries in the form of criteria which formed the main directives for industrial development.

NEW ZEALAND — BALANCE OF TRADE '000$

	Exports FOB	*Imports FOB*	*Balance of trade*
1958/59	732,500	650,250	82,480
1959/60	862,650	605,600	257,000
1960/61	797,850	760,600	37,250
1961/62	809.400	755,350	54,050
1962/63	843,300	705,450	137,900
1963/64	1,007,200	839,850	167,350

The importance of external trade to New Zealand is noticeable from the fact that its per capita exports ($403) and imports ($336) rank among the highest in the world, despite the restraints on its capacity to import caused by the import controls and quotas imposed on account of a continuous current account deficit since 1950, with the exception of 1953/54 and 1959/60. Two characteristic features of New Zealand's export trade are: (a) 80 per cent of its export products, by value, comprise wool, meat and dairy products; and (b) nearly 50 per cent of its exports go to the United Kingdom. In 1963, that country accounted for nearly 47 per cent of New Zealand's exports. In 1930 the figure was as high as 80 per cent.

Exports of manufactures, though liable to less restrictions than New Zealand's present export commodities, have not made much headway, chiefly

NEW ZEALAND — EXPORTS OF MANUFACTURED GOODS ($'000)

Item	1958	1959	1960	1961	1962	1963	1964
Newsprints	7,317	7,550	8,562	7,514	6,388	16,230	16,611
Wood pulp	7,576	8,120	7,809	6,994	7,856	7,108	7,851
Other paper and paper manufactures	759	1,079	1,351	398	473	467	542
Wood manufactures including case timber in shooks	842	809	600	603	684	689	592
Machinery including agricultural wood-working and electrical	662	951	940	1,148	1,145	1,582	2,121
Manufactures of metals	106	97	120	167	209	261	445
Textiles, yarns and fabrics	44	33	133	189	678	840	967
Manufactured tobacco and cigarettes	209	300	403	364	336	436	448
Rubber manufactures	230	311	373	442	370	389	442
Canned vegetables	876	600	439	242	161	400	598
Cereal preparations	178	125	231	186	239	356	434
Leather and leather manufactures	128	264	189	180	222	322	386
Beverages	261	200	203	322	272	322	411
Medical, pharmaceutical & toilet preparations	164	167	189	297	431	578	895
Clothing and footwear	8	70	108	41	106	303	612
Printed material	33	150	145	156	189	236	456
Other manufactured goods	600	703	1,095	790	926	1,496	4,095
Total	19,994	21,531	22,890	20,033	20,685	32,015	37,906

because the country's natural endowments, in relation to the size of its population, favour agricultural productivity. Other reasons are the limited domestic market and the country's geographical location at considerable distances from the main markets of the world. In 1964, exports of manufactures accounted for only 3.7 per cent of total exports; yet, in terms of per capita export, they amounted to $15.

It will be observed that newsprint and wood pulp account for more than 50 per cent of the value of exports. In regard to newsprint, the years 1961 and 1962 were bad but, in 1963 and 1964, exports increased to more than three times the low level of 1962. In 1964, exports of machinery increased by over 30 per cent above the level in 1963. The fastest rate of increase was recorded for commodities coming within the category of 'other manufactured goods; which included, in 1964, articles of man-made fibre and other plastic materials, photographic equipment and measuring, controlling and scientific instruments, toys, games and sports goods, pottery, and food preparations.

As in Australia, pastoral products dominate the value of New Zealand's export earnings, which are, therefore, highly susceptible to variations in prices. For example, the total wool exports amounted in value to $317 million in 1963 showing an increment of 18 per cent over 1962. This increment, however, was mainly due to a 20 per cent increase in prices. With the decline of the United Kingdom as its main market, the United States and particularly the Japanese markets have begun to assume greater importance. The latter countries have also substantially increased their share of exports to New Zealand.[1]

From the point of view of employment, the most important industries in order of precedence are: (1) food (2) footwear, clothing and made-up textile goods (3) transport equipment (4) wood and cork products except furniture; and in terms of value output: (1) food (2) transport equipment (3) footwear, clothing and made-up textiles (4) wood and cork products.

New industries being planned include the following:

(a) Iron and steel, 189,000 tons of billets, wire rod and galvanized sheets.
(b) Oil refining, output of 1.9 million tons per year — operations have already begun.
(c) Nylon spinning — two units, already in production with a capacity of 3.5 million pounds.
(d) Fertilizer.
(e) Timber and wood chips.

The heavy industries under construction, including the chemical group, will call for larger imports of machinery and other capital goods. They will strengthen the base of the heavy industries sector considerably.

The Republic of Korea

The first five-year economic development plan took effect from January 1962. The plan envisages an increase of the national income at an average rate of 7.1 per annum and, by 1966, it is hoped that it will have increased by 33 per cent.

The very substantial deficits in the balance of trade have resulted in continuous unfavourable balance of payments, whereas exports per capita in 1963 amounted to $3.2 imports reached $20.8. In these circumstances the highest priority has been accorded to the expansion of exports. The successful implementation of the plan hinges largely upon achieving the projected export targets.

[1] *Vide* GATT, International Trade 1963 page 133.

REPUBLIC OF KOREA — EXPORTS — IMPORTS AND BALANCE OF TRADE ('000$)

Year	Exports (FOB) Commercial	Other	Total	Imports (CIF) Commercial	Official Aid	Development & Other	Total	Balance of Trade
1958	16,451	—	16,451	48,675	310,975	18,515	378,165	– 361,714
1959	19,162	650	19,812	80,966	210,743	12,098	303,807	– 283,995
1960	31,832	995	32,827	97,168	231,947	14,412	343,527	– 310,700
1961	38,646	2,232	40,878	103,138	196,818	16,186	316,412	– 275,264
1962	53,804	1,009	54,813	178,989	218,539	24,253	421,782	– 366,969
1963	81,537	5,265	86,802	232,709	232,635	94,928	560,273	– 473,471
1964	115,113	5,738	120,851	189,500	168,100	92,500	450,100	– 329,249

REPUBLIC OF KOREA — EXPORT TARGETS IN THE FIRST FIVE-YEAR ECONOMIC PLAN

(in million $US)

Commodity Group	Base Year 1960	Target Year 1966	Total Five Year Plan
Food	10.3	35.8	138.2
Inedible crude materials	16.5	50.9	185.2
Mineral fuels	1.1	3.6	13.5
Animal and vegetable oils and Fats	0.2	1.6	6.0
Chemicals	0.2	3.7	14.2
Manufactured goods (by material)	4.1	10.0	39.7
Miscellaneous	0.6	12.0	42.8
Bonded trade	—	20.0	61.0
Total	33.0	137.6	500.6

Exports are expected to rise by the end of the plan period to as much as four times the 1960 level. At present, the principal exports are tungsten ore, rice iron and steel mineral products, fish, oysters and related products, textile fabrics consisting largely of silk (raw and waste) and assorted manufactured products. The principal items among manufactured goods have been plywood sheets and veneers ($6.3 million in 1963); miscellaneous manufactured goods (which, from the point of view of value, is gaining greater importance); machinery and transport equipment (1963 — $4.06 million), having dropped to $1.8 million for the first eleven months of 1964; raw silk (1963 — $4.6 million); cotton fabrics (1963 — $4.3 million); and steel plates and sheets ($8.3 million in 1963).

The total commodity import requirements for the plan amount to $2,405 million, or an average of $450 million annually. Capital goods imports have been estimated at $684 million (28 per cent approximately of total import requirements). Large imports of machinery, industrial raw materials and semi-industrial products constitute the bulk. Due to the large deficit in trade, the plan restricts the imports of consumer goods, and simultaneously provides for increasing domestic production of food and other manufactured consumer goods for purposes of import substitution.

New industries expected to go into production in 1965, 1966 and 1967 are as follows: telecommunication facilities manufacturing plant, 1965; spinning and processing machines manufacturing plant, 1967; gear and bearing manufacturing plants, 1966; iron and steel plant (ingots) (532,600 M/T per year) 1967; soda ash plant, 1967; cement plant (400,000 M/T per year) 1967.

Pakistan

While formulaing its third five-year plan, Pakistan also worked out the framework of its twenty-year perspective plan (1965-1985) with which the third, fourth, fifth and sixth five-year plans have been integrated. The perspective plan hopes to increase the GNP from about Rs 44,000 million in 1965 to Rs 145,000 million by 1985 at constant 1965 prices. This will mean an increase in the rate of growth from the average of 4.8 per cent per annum during the second plan period to 7 per cent during the sixth, or an average annual growth of 6.2 per cent.

An interesting feature of the plan is the tremendous importance of industry, from which are expected the highest annual growth rates. Whereas, the manufacturing sector contribution to the GNP was Rs 5,620 million in 1965, it is expected to increase to Rs 8,950 million in 1970 and to Rs 31,860 million by 1985 at an annual growth rate between 1965 and 1985 of 9.1 per cent. Although the consumer goods sector, which is substantially concerned with import substitution, will still contribute over 50 per cent of the total value, the intermediate products sector is to increase at 10.6 per cent per annum, augmenting its contribution to GNP from Rs 1,400 million in 1964 to Rs 10,540 in 1985; and, the investment goods sector is to increase at 15.1 per cent per annum, its contribution increasing from Rs 300 million in 1965 to Rs 5,000 million in 1985. The percentage share of the agricultural contribution to GNP is to be reduced from 47.5 per cent in 1965 to 42.4 per cent in 1970 and 31.0 per cent in 1985, and the mining, manufacturing and public utilities sector will increase its percentage contribution from 13.4 per cent in 1965 to 16.5 per cent in 1970, and to 23.2 per cent in 1985.

Total imports of goods and services for the third plan are estimated at Rs 34,000 million (a 7 per cent increase per annum), rising from Rs 5,700 million in 1964/65 to Rs 7,670 million in 1969/70, which is less than the rate of increase in imports of the second plan. Exports of goods and services are expected to increase at 7.5 per annum from Rs 2,950 million

(1964/65) and to Rs 4,250 million (1969/70). Total development expenditure imports will amount to Rs 21,000 million, of which capital goods will amount to Rs 2,350 million (1964/65) and increase to Rs 2,900 million (1969/70). Whereas capital goods imports will decrease percentagewise from the second plan imports, raw materials for capital goods and other development projects will be 70 per cent higher than in the second plan.

PAKISTAN — BALANCE OF PAYMENTS PROJECTIONS — 1965--1985

(million rupees 1964-65 prices)

	1965	1985	Annual Compound Rate of Growth 1965-1985
1. Development imports	3,630	7,300	3.6
Capital goods	(2,630)	(4,000)	2.2
Raw materials for capital goods	(1,000)	(3,300)	6.1
2. Non-development imports (incl. debt servicing)	2,070	5,600	5.1
3. Total imports	5,700	12,900	4.2
4. Total export earnings	2,950	11,900	6.0
5. Total external resources	2,750	1,600	– 2.7

Export earnings form an important constituent of the financing of the plan. Export of manufactures in the second plan were limited, but the third plan estimates a significant structural change in favour of manufactured goods. Manufactured exports, which are expected to account for nearly 30 per cent of the total exports in 1964/65, are expected to increase to increase to about 45 per cent of the total in 1960/70.

Export earnings during 1960/70 have been estimated as follows:

PAKISTAN — EXPORT EARNINGS DURING 1960/70

(million rupees current prices)

Item	1959/60 (actual)	11962/63 (actual)	1964/65 (estimates)	1969/70 (estimates)
Raw jute	729	840	800	800
Jute Manufactures	227	320	360	840
Raw cotton	189	390	400	500
Cotton manufactures ..	231	90	150	300
Hides and skins	83	80	70	80
Wool	75	90	90	90
Rice	45	120	150	250
Fish	50	100	90	200
Newsprint and paper .	—	10	10	50
Other exports	198	210	280	500
Invisibles	300	500	550	640
Total	2,127	2,750	2,950	4,250

The plan has laid down physical targets for several principal industries. These include increases in sugar from 500,000 tons to 640,000 tons, edible vegetable oils from 250,000 to 300,000 tons; textiles, yarn 520 to 620 million lbs, jute manufactures from 380 to 720 thousand tons; paper and boards, writing and printing from 30 to 100 thousand tons; chemical industries, nitrogenous fertilizer (amonium sulphate) 550,000 to 2,500,000 tons; phosphate fertilizers (triple phosphate) 7 to 550 thousand tons; soda ash 74 to 150 thousand tons; caustic soda from 35 to 75 thousand tons; petro-chemicals (new) 300 thousand tons; cement 3 to 5 million tons; and steel .55 to 1.2 million tons. Production of machinery and machine tools is to the value of Rs 500 million during the third plan, of which a heavy machinery complex will account for Rs 400 million.

The Philippines

The five year socio-economic programme of the Philippines (1963-1967) expects to increase the per capita income at a rate of 3 per cent per annum, and the national income at an average rate of 6 per cent per annum over the programme period.

PHILIPPINES: FOREIGN EXCHANGE REQUIREMENTS IN TOTAL INVESTMENT

Sector	Total Investment 1963-67 (million Peso)	Total Foreign Exchange Requirements (1963-1967)	
		Million Pesos	Million $
Agriculture	1,208.0	280.4	80.1
Mining	467.0	278.3	79.5
Manufacturing	4,394.7	2,190.7	625.9
Transport & comm.	3,070.0	2,380.7	680.2
Construction	3,560.0	991.9	283.4
Others	1,334.3	370.7	105.9
Total	14,034.0	6,492.7	1,855.0

Rate of Exchange: Peso 3.50 = $1.

The total import requirements of the five-year period have been estimated at $4,271 million. The bulk of imports will be related to capital goods required for new plants as well as existing industrial units. Capital goods and raw materials will amount to about 75 per cent of total imports. Producer and consumer goods imports are expected to increase by 45 per cent during the plan period, increasing at an average rate of about 5 per cent per annum. The foreign exchange requirements of the agricultural sector comprise only about 2 per cent of the total investment and are largely related to imports of agricultural and farm machinery and equipment, insecticides, pesticides, fertilizers, handling equipment, and so on.

The total export earnings have been estimated at $2,944 million, or 70 per cent of the total import requirements, the bulk of which is expected from the export of traditional commodities. Exports of manufactures, which are limited in volume, will be in the category of light manufactures such as textiles, shoes, pharmaceuticals, cement and wall boards. Out of a total commodity export of $450 million in 1961, manufactured exports which comprise fruits and vegetables, beverages and tobacco, oil seeds and nuts, wood and lumber, metal scrap, animal and vegetable oils and fats, wood and cork manufactures, textile

PHILIPPINES: PROPOSED FOREIGN EXCHANGE BUDGET
(1963-1967 Financial Year) MILLION $

	1963	1964	1965	1966	1967
Export receipts	552.0	571.0	589.0	607.0	625.0
Invisible receipts	158.0	158.0	158.0	158.0	158.0
Sub-Total	710.0	729.0	747.0	765.0	783.0
Less: Disbursements (Investment, remittance)	183.0	192.3	222.9	237.9	261.8
(Servicing of loans etc.)	527.0	536.7	524.1	527.1	521.2
Plus: Reparation and other aid	30.0	30.0	30.0	30.0	30.0
Total available foreign exchange	557.0	566.7	554.1	557.1	551.2
Total foreign exchange requirements for essential consumer goods, raw materials and producer goods for existing productive capacity and for new capital goods required by the programme	771.0	809.0	848.0	890.0	953.0
Excess of import requirements over available foreign exchange (gap)	(214.0)	(263.4)	(314.3)	(362.2)	(434.5)
Financing the gap					
Loans (external)	217.7	224.9	283.7	316.4	373.7
Effect of import substitution	6.3	48.5	40.6	55.8	70.8

yarns, fabrics, made-up articles, furniture and fixtures, and so on, amounted in all to $32 million, or less than 10 per cent of total exports. Under the plan, it is expected to increase the number of items of manufactured exports by including those mentioned earlier. The total manufactured exports are expected to reach $320 million for the plan period, which means more than doubling the present value. This would still remain less than 10 per cent of the total exports.

The difference between financing the gap and the excess of import requirements (amounting to $10 million per annum) will be the amount credited to the international reserve.

An examination of the foreign exchange budget reveals certain interesting features. Exports are expected to rise by 39 per cent over the actual exports of 1961. In view of the increasing import requirements in respect of servicing loans and remittances constitute almost 50 per cent of the export receipts and exceed 50 per cent of the gap. The expected external loans amount to almost 75 per cent of export receipts. Although import substitution is expected to increase from $6.3 million in 1963 to $70.8 million in 1957, it constitutes only about 16 per cent of the gap.

The plan takes into consideration the establishment of the following new industrial plants: an integrated steel mill, aluminium plants, fertilizer, pulp and paper, insecticides, cement, newsprint, and plywood and veneer plants. Much of the success of the plan will depend upon the achievement of the export targets and, in order to achieve them, considerable emphasis is placed upon the promotion of international trade through international negotiations.

Thailand

Under Thailand's national economic development plan (1961-1966) it is expected to raise the gross national product at the rate of 5 per cent per annum, and the per capita income at 3 per cent annum during the plan period. The plan does not contain adequate information rgearding planned targets of exports or imports, both of which are expected to rise at an annual average of about 4 per cent. External loans and foreign aid, which were expected to be substantial during the initial years, are to be reduced towards the end of the plan period. External loans projected for 1961 amounted to 904 million baht as compared to 128 million baht in 1966. Foreign aid is to remain more or less uniform, at a level of approximately 500 million baht per annum.

Thailand's principal exports are rice, natural rubber, teak, tin ore and concentrates. On the import side, there have been substantial increase in imports of machinery, other manufactured goods and chemicals, whereas imports of textiles, transport equipment, have not shown as big an increase.

The country's major manufacturing industries are cement, sugar, gunny bags, textiles, and tobacco. Of these, sugar production is partly for export. In 1964, there was an export of 33,186 tons of raw sugar and 8,800 tons of white sugar. Production in 1963 is expected to reach a high of 250,000 tons creating an export surplus of about 120,000 tons equivalent in amount to the total local production of 1961. Among products of the mining industry, tin remains the most important and despite the poor production years of 1958 and 1959, production has consistently increased and is expected to reach 20,000 tons during the course of the next few years. The value of tin exported amounts to 8.5 per cent of total exports. Other minerals exported are tungsten, lead, zinc, antimony, manganese and iron ore. Local production of these minerals reacts sharply to changing world prices. There has been a spectacular increase in the production of iron ore. Although in 1961 55,700 tons were produced, production declined to 15,700 in 1963, but rose to 190,900 in 1964. Local smelting is undertaken to a limited extent, but production is directly related to export prospects and the sharp increase in 1964 was a result of this.

Thailand is, at present, engaged in the preparation of its second economic development plan which is expected to commence in 1967.

THAILAND'S BALANCE OF TRADE
(million Baht)

	1958	1959	1960	1961	1962	1963	1964
Exports	6,446.0	7,560.4	8,614.3	9,997.0	9,529.2	9,676.3	12,339.2
Imports	8,237.0	8,988.3	9,622.0	10,287.3	11,503.7	12,802.8	13,971.0
Balance	- 1,790.4	- 1,427.9	- 1,007.7	- 290.3	- 1,974.5	- 3,126.5	- 1,631.8

Although the country's imports have increased consistently, exports have remained more or less stagnant increasing the deficit in the balance of trade particularly in the plan years.

2. *Possible areas of regional co-operation — illustrative examples*

The above analysis reveals the increasing role of planning within the regional countries. One factor of considerable significance which emerges from the analysis is the importance of foreign trade to the implementation of the plans. Another noticeable feature is that all countries have given considerably greater weightage to the building up and strengthening of their industrial sectors. An analysis of developments during the last decade (1953-1963) indicates a significant expansion in industrial output. However, as already noted in Part II (table 3), the rates of growth as between various countries of the region have been disparate, and, furthermore, such development as has taken place has been more or less for the region as a whole, biassed towards import substitution. An examination of the new projects planned within the countries gives an indication that this tendency is still of considerable importance. The point to note, however, is that, although import substitution undoubtedly could serve as the basis for a start, after a certain stage the progress of industrialization itself will be limited unless concerted efforts are taken towards expansion outward. For this expansion regional co-operation is essential.

Import substitution, rather than becoming an end in itself, should be the means to an end and, if conceived in its proper relationship to individual economies, could become a powerful lever of development. Import substitution should be extended beyond national economies. It could, for instance, take into consideration demands within a sub-regional group or the entire region. For illustrative purpose, the following is a brief analysis of the possibilities in this direction.

(a) *Fertilizer industry*

The region's total consumption of nitrogenous fertilizer (excluding the developed countries of the region) was 242,990 tons in 1951/52. Production amounted to 15.2 per cent. The only producers were China (Taiwan) and India. While India produced 45.4 per cent of its requirements, Taiwan accounted for only 18.1 per cent. In 1961/62, total consumption increased to 838,440 tons, of which only 33.6 per cent was produced within the region. Apart from China (Taiwan) (53.4%) and India (48.8%), the Republic of Korea, Pakistan and the Philippines produced 15.9 per cent, 39 per cent and 13.5 per cent of their requirements respectively. The region's deficit for 1961/62 amounted to 556,725 tons in nitrogenous fertilizer alone. Total consumption of phosphatic fertilizers increased from 71,030 tons in 1951/52 to 227,370 in 1961/62, production in the latter year accounting for 44.4 per cent of requirements and leaving a deficit of over 126,000 tons. Similarly, in regard to pottassic fertilizers, the consumption of which increased from 44,730 tons in 1951/52 to 169,970 tons in 1961/62 production in the region accounted for only one per cent. Phosphatic fertilizers were produced in China (Taiwan) and India (amounting to over 90 per cent of their requirements), Pakistan and the Philippines (less than 25 per cent of their domestic requirements) India produced only 6.1 per cent of its requirements of pottassic fertilizer. The regions total deficit in 1961/62 amounted to 853,336 tons. In 1966/67, total consumption is expected to increase up to 5.2 million metric tons, while present production is around 381,000 tons. Although there has been an increase in domestic production, the extent of the deficit is clear from the above figures. These figures do not take into consideration requirements of one of the world's largest importers of fertilizer, mainland China. Mainland China's annual consumption exceeds one million tons and its buying exercises its influence upon prices in the world market. These figures indicate the import substitution potential for one of the basic commodities in the region.

Fertilizer production presents several vital economic and technical problems. The size of the domestic market and high capital costs are important factors to be taken into consideration, but these difficulties can be overcome if the problem is looked at from the regional and sub-regional point of view. In fact the slow development of production in the past years may have been due to these difficulties; but, if production were not considered merely in terms of domestic consumption, export prospects and the increasing demand throughout the world could have assured economic production. This demonstrates the limitations of national planning which does not take regional and international aspects into our view.

(b) *Iron and steel and engineering industries*

The development of the iron and steel industry and the engineering industries are of extreme importance in relation both to domestic industrial development and to foreign trade. Consumption of steel in

the ECAFE region increased from 16.4 million tons to 52.4 million tons in 1961. In 1962 there was a drop to 51.0 million tons. However, estimates of future consumption trends made by the United Nations[1] indicate that consumption will increase to 73.3 million tons by 1972/75. At present the major producers of iron and steel, apart from mainland China, are Japan, India, and Australia. These three countries accounted for 99.7 per cent of the region's total output. Several countries of the region have the resources as well as adequate markets to support an iron and steel complex and considerable progress has also been made in the direction of planning for the setting up plants. In view of recent developments in research, both in regard to economics and to the technical aspects of manufacture, which indicate the feasibility of smaller but specialized units, the region's output could increase considerably in the near future.

The region's output in the engineering industries has increased to 7.7 times in 1963 that of 1953; and, in 1962, it constituted 37.2 per cent of the total manufacturing output. As in the case of iron and steel, production is largely limited to a few advanced countries, namely Australia, mainland China, Japan, India and New Zealand. However, Burma, China (Taiwan), Hong Kong, Indonesia, South Korea, Pakistan, Malaysia, Thailand, and Iran have already made some progress and the plans of other countries indicate that most of the countries in the region will enter into this field of production. The following table gives an idea of the structure of the engineering industries in 1961.

SELECTED ECAFE COUNTRIES — 1961

	A	*B*	*C*	*D*	*E*
Australia	18	30.3	26.1	42.2	41.2
India	320	18.0	18.8	40.5	37.9
Japan	27	30.2	36.0	57.3	25.5
New Zealand ..	15	—	25.2	33.1	43.0
Burma	126	8.4	– 5	negligible	18.9
China (Taiwan)	6	27.3	11.9	39.6	30.6
Hong Kong	38	21.4	—	—	—
Indonesia	44	10.9	—	—	—
Korea, South ..	18	12.8	11.0	39.2	28.2
Malaysia	2	10.3	8.0	23.9	20.1
Pakistan	61	12.4	11.0	36.4	26.6
Philippines ...	57	21.8	20.8	37.2	23.3

Source: National Surveys, Reports and other publications.

A — Average number of persons employed per establishment.

B — Number of persons employed as percentage of total manufacturing employment.

C — Value added as percentage of total. Value added by manufacturing.

D — Value added by the machinery and apparatus section as percentage of total value added by engineering industries.

E — Value added by the transport and equipment section as percentage of total value added by engineering industries.

Column C shows the value added as percentage of total value added by manufacturing, which is higher in the case of the more industrialized countries, and lower in the less industrialized countries. Thus, as countries advance in their levels of industrialization, the engineering industries assume greater importance. This importance can be gauged from the fact that, in 1961, about 20 per cent of the total industrial labour in the advanced countries was engaged in them[1] and that, as industrialization advanced, the share of the percentage employed in these industries also increased.

Obviously, any scheme toward diversification of export trade must also take into consideration the world demand. World trade in all commodities increased from $20,700 million in 1938 to $99,800 million in 1959. Manufactured goods (chemicals, textiles, metals and machinery excluding processed food, and refined petroleum), which in 1938 constituted $9,800 million (less than 50 per cent), increased their share to $53,500 (over 50 per cent). Of the trade in manufactured goods, the share of machinery increased from $1,582 to $12,159 (nearly 25 per cent of manufactured goods) and constituted 12 per cent of exports of all commodities. (These figures are exclusive of development in the centrally planned economies). The increase in exports not only reflects an increase in terms of current values, but also in terms of volume.

The region's position in relation to the iron and steel industry and the engineering goods industries in particular has improved considerably during the last decade. The latter group of industries in particular lends itself to diversification and specialization. Furthermore, techniques of manufacture range from those requiring a larger degree of technical knowledge as well as considerable capital, to simple machine parts with higher labour capital ratios. Regional and sub-regional arrangements could be made for their co-operative manufacture, with a view to both import substitution and export. Arrangements could be made whereby many countries are brought together in joint enterprises manufacturing a variety of parts and components. This, however, requires comprehensive study and agreement and study group concerned with the technical, as well as economic aspects, should prepared the groundwork at a regional or sub-regional level.

(c) *The pulp and paper industry*

The demand for the products of the pulp and paper industry is directly correlated to standards of living and literacy. It is little wonder, therefore, that the paper and paper products industries constituted the smallest sector of manufacturing in the region. In 1958, this sector contributed only 2.9 per cent to the region's total manufacturing output, declining in 1962 to 2.5 per cent. Consumption, however, had increased between 1948-55 and 1957/58 by 220 per cent from 1.5 million tons to 4.7 million tons, of which 4 million

[1] Industrialization of the ECAFE region op. cit. table 30 page 89.

[1] Vide *Economic Commission for Europe*, Production and Export of Mechanical and Electrical Engineering Goods, Geneva 1963.

tons was produced by Japan alone, accounting for 75 per cent of the region's output. Estimates made by ECAFE indicate that consumption will rise to 11.6 million tons in 1970 and 16 million tons by 1975. Excluding mainland China and the developed countries of the ECAFE region, the total output in the region increased from 404,000 tons in 1958 to 792,000 tons in 1963,[1] with India accounting for over 60 per cent of the total.

These industries are representative samples of fields in which the region could take immediate steps for accelerated growth. Preliminarily, it would be interesting to work out the prospects for import substitution, particularly of such items as fertilizers; and the extent to which substitution could lead to an crease of industrial production itself. Second, financing industrial and development plans through the active participation of industry could be undertaken by means of (1) increasing exports of manufactures, and (2) increasing the degree of import substitution. Whereas exports may in many instances be slow moving, import substitution, with of course, the ultimate objective of export diversification, could become a very powerful weapon. It could result, as observed earlier, in the release of large sums of scarce foreign exchange toward development expenditure.

3. *Importance of plan co-ordination*

In considering the basic issues of regional co-ordination, it would appear that with the exception of a few large countries which possess adequate resources, no single country would be in a position to meet all the requirements for manufactured goods. The necessity to import, therefore, makes it inevitable that countries should increase their exports; for there has to be a tendency toward equality in imports and exports, the extent of import dependence laying down the export requirements. At this point, the principles of import substitution lose their validity. If, under these conditions, all countries were to limit their production to import substitution either they would be confronted with problems of unutilized capacities (excess capacities) with high costs, or they would be restricted to primitive levels of technology. Economic development in such circumstances would be virtually impossible.

Regional co-operation has to take into consideration two activities: (1) regional import substitution, and (2) foreign trade. In regard to the former, as an initial step, sub-regional arrangements could be made based upon natural endowments. For instance, if four countries within a geographical sub-regional all required soda ash, which is a basic chemical, one or or two may undertake to supply the sub-regional demand and set up units to meet it. Production and output must be co-ordinated so that countries which do not produce can rely upon uninterrupted supplies and take steps towards utilizing available capital in other directions. The release of productive potentials on such a basis in relation to scarcity of factors will mean tremendous economies. In the plans, there is evidence that several countries of the region are either contemplating construction of new units or expansion of existing units. Even where expansion is involved, it may be more economic to divert resources toward more urgent needs than to use them for needs arising from foreign exchange difficuties. This is, of course, only by way of example. The actual grouping of industries needs to be studied carefully.

It has been observed earlier that the iron and steel and heavy engineering industries will constitute an increasingly important sector within industry, not only in the sphere of domestic production, but also as regards export. A few advanced countries of the region may be able to make some progress in the direction of exports. They may even compete with one another for international markets. On the other hand, since this sphere of production lends itself perfectly to diversification and specialization, great advantage could be derived from such a division of labour. Both in respect of the iron and steel and the engineering industries, there are certain products which require relatively high inputs of labour and some which require complex technical processes involving automation and heavy capital expenditure. Products range from machine parts to simple agricultural implements. It would be advantageous for the countries of the region to pool their resources on a planned basis, particularly in the sphere of exports. Components of various commodities, including machine parts, could be turned out in factories located in different countries where they could be mass produced economically. There are no limits to such specialization. It would be possible then to think not only in terms of exports of simple manufactures, but also in terms of more complex and complicated machinery. In drawing up the programmes of exports, the smaller countries which depend on foreign trade to a larger extent should be given the opportunities for building-up their export potential. Regional or sub-regional groupings should, within the proposed schemes, place special emphasis upon this aspect; for, unless guarantees of this nature are made, the possibilities of regional or sub-regional grouping, or both, are limited.

It would be difficult to attempt in the present study a detailed analysis of the possibilities of regional co-operation on the basis of commodities. The extent of those possibilities could only be discovered after considerable study. The point to be borne in mind is the urgency of taking the first steps in this direction. During the first stage, work may be related to the study of a few commodities such as (1) iron and steel and engineering industries, (2) pulp and paper industries, and (3) chemical industries (selected groups such as soda ash and fertilizers). The techno-economic studies should be as comprehensive as possible and

[1] The actual production for 1963 stood at 885,000 tons, of which India accounted for 540,000 tons. Vide FAO *Yearbook of Forest Products, 1964*. The ECAFE document only takes newsprint into consideration.

deal with long-term projections of demand, technical aspects of manufacture and possible locations.

VI. MEASURES TOWARDS EXPANSION OF TRADE

The central problems pertaining to industrialization and foreign trade have been discussed in the preceding parts of this paper. These are the adverse terms of trade vis-a-vis primary commodities associated with a declining importance of primary commodities in world trade, and the increasing importance of trade in manufactured products; the relevance of foreign trade to the development planning of the countries of the region and the prospects of increasing trade in manufactures; the structural adjustments in manufacture in terms of the changing pattern of future world trade and the steps to be taken at a regional level on the basis of mutually advantageous co-operative arrangements; the magnitude of the trade problem in the terms of the 5 per cent growth rate of the GNP and possible long-term targets of exports of manufactured goods.

Finally, it is necessary to examine certain factors relating to the major markets of the world. The basic issues for consideration will be the factors which determine trade opportunities in (1) the developed market economies, (2) the developing market economies and (3) the centrally planned economies.

1. *Trade with developed market economies*

It has been noted that the implementation of the programmes of industrialization as well as increased trade in manufactures depend to a large extent upon the stabilization of the existing trade with the developed market economies. Where primary commodities are concerned, the problems of stabilization have been subject to examination at an international level; but many of the schemes tried out have been of limited effectiveness. More recently, the United Nations Conference on Trade and Development put forward several proposals which cover practically all the issues involved. The Third Committee of the Conference devoted considerable attention to aspects of compensatory financing. The discussions centred round different approaches to the problems of:

(1) long-term versus short-term compensation schemes;
(2) automatic versus non-automatic schemes;
(3) creation of new machinery versus the expansion of the existing IMF scheme.

These proposals took into consideration the problems associated both with declining terms of trade and with declining export trade which may affect the supply of foreign exchange in terms of the development targets envisaged for the Development Decade. In this connexion, such steps as are necessary to examine the adequacy of national and regional financial policies pertaining to currency systems and reserves may be taken jointly. Institutions for stabilizing exchange and payments unions have in other regions served useful functions in overcoming problems of trade and development during the early stages of growth or during periods of economic instability. Financing of exports and guarantees, especially for manufactured exports, is perhaps the most important aspect of promoting trade in manufactures. In this regard, the Asian Development Bank could play an important role.

Schemes must be formulated which will guarantee sufficient export earnings to finance the implementation of economic development envisaged in the development plans of the regional countries.[1] From the point of view of long-term prospects, however, the most promising solution lies in increasing domestic processing and manufacture. In this connexion early efforts must be made to set up the necessary institutions for research and study which alone can provide the basis for sound investment. This is particularly important since any further processing involves the question of markets, both regional and inter-regional.

The question of diversification of exports has been examined on the basis of achieving a possible target of 10 per cent annual growth rate in exports of manufactures. In the discussions relating to alternative markets, an assessment of the implications of such an increase has been attempted to indicate what is required for its achievement in quantitative terms. It is evident that any substantial expansion of markets for manufactured products will depend upon the extent to which the existing direct and indirect barriers to trade are removed.

This involves (1) reduction and elimination of tariff barriers; (2) reduction and elimination of quotas and other restrictions which are discriminatory towards manufactures and semi-manufactures from developing countries; and (3) provision of direct measures to expand market opportunities for such products.[2]

In this connexion, very comprehensive recommendations have been made by the United Nations Conference on Trade and Development pertaining specifically to the elimination of preferential tariffs, no-tariff barriers and preferences, provision of additional measures for trade promotion in all industrialized countries, and measures for the promotion of trade in manufactures and semi-manufactures among the developing countries.

Regarding trade in primary commodities, the United Nations Conference on Trade and Development recommended that international commodity arrangements be made in order to achieve stability of prices, increase imports of primary and semi-processed commodities into the developed countries, ensure satisfactory access to their markets, and co-ordinate commodity production and marketing policies with a view to long-term stabilization of trade in primary commodities.

[1] For more details in regard to the proposals made by the United Nations Conference on Trade and Development see the Reports of the First and Third Committees, Volume I.

[2] A detailed study of tariffs and other quantitative restrictions is contained in the United Nations *Economic Survey of Asia and the Far East, 1962.*

Appropriate recommendations have been made to ensure the achievement of these purposes.

The Conference also recognized the importance of taking measures to reduce competition from synthetics and substitutes and has recommended that steps be taken at the national and international levels toward:

(i) raising the technical efficiency of the production of natural products so as to reduce costs;
(ii) improving quality and grading practices;
(iii) intensifying technical and market research on the uses of natural products;
(iv) prohibiting, by appropriate means, the representation of a synthetic product as if it were a natural product;
(v) granting appropriate consideration to the phenomenon of interchangeability of certain products in determining agricultural and industrial policies, particularly in the developed countries;
(vi) improving the statistical information regarding both natural and synthetic sectors of the industries, particularly with regard to current and planned productive capacity and end-uses, by the fullest possible exchange of information about the appropriate international bodies;
(vii) increasing access to developed countries' markets for natural and semi-processed products facing competition from synthetics, and progressively reducing tariff and non-tariff barriers against these natural and semi-processed products with a view to their final elimination;
(viii) giving special attention in study groups, or in the negotiation and operation of international commodity agreements, to the need for measures to mitigate short-term fluctuations in the prices of the natural products facing competition from synthetics;
(ix) bringing about as much co-ordination as possible in investment planning and policies in the field of the natural and synthetic sectors;
(x) introducing, where appropriate, financial measures to help reduce the impact of the development of synthetics on the long-term prospects for the export earnings of developing countries and to assist them in undertaking the necessary structural adjustments; and
(xi) where feasible and necessary, and taking into account the studies recommended in 4(c), adopting mixing regulations or comparable actions in order to ensure that the proportion of utilization of natural products is not reduced.

The Conference has recommended further "that developed countries should avoid giving special encouragement to the production of new synthetics which may displace other natural products and to additional investment in the production of synthetic materials competing with the natural products exported by the developing countries, especially when such investment can be employed more effectively in other fields; and, in exceptional cases requiring a departure from this principle, consultations be held with the developing countries likely to be adversely affected, or with the appropriate international bodies, in order to consider forms of co-operation, including financial measures, to mitigate such adverse effects."

In addition, it was recommended that "consideration be given, by appropriate bodies within the United Nations family, especially those bodies which might be created following the United Nations Conference on Trade and Development, to the establishment of a permanent sub-group to deal with the problems of commodities affected by competition from synthetic substitutes and other substitute products. The sub-group should give consideration to studies being carried out in this field, and in the meantime these studies should be vigorously pursued, and that studies be made relating to:

(a) Feasibility of agreements covering both the natural product and its synthetic substitutes;
(b) Possible role of long-term contracts (up to ten years) in stabilizing the market for particular natural products; consideration of new techniques for extending the scope and applicability of such contracts;
(c) Feasibility of mixing regulations."

Of particular importance are the recommendations pertaining to trade in manufactures. The Conference adopted a resolution calling for the establishment of industrial branch agreements, the principal features of which were described as follows:

"Long-term bilateral or multilateral agreements. The agreements, because of their very nature, will have to be concluded on a long-term basis. They may be either of bilateral or multilateral character. The latter form would apply to cases where the machinery and equipment for the establishment and development of a particular export industry would be supplied by two or more countries with centrally planned economies, and/or the export industry in question would be jointly established by two or more developing countries, and/or where the products of the particular industry could be sold to two or more countries with centrally planned economies.

"Partners to agreements. The agreement would be concluded between the Governments or trading organizations and production enterprises in countries with centrally planned economies, and the Governments or public and private corporations in the developing countries.

"Selection of export industries. Resource-based industries and/or industries producing manufactures of higher levels of processing may be established for

which: (a) the developing country has a suitable raw material base or other suitable conditions for the development of the industry and a limited domestic demand for its product; and (b) the country with the centrally planned economy has the capacity of exporting the required machinery and equipment and associated technical assistance for their installation and operation and is prepared to adapt its development plans so as to import a stated proportion of the output of these industries.

"Credit. The country with the centrally planned economy will provide machinery and equipment to the developing countries on credit at reasonable terms and rates of interest.

"Repayment of credit. The repayment of the credit instalments will be agreed upon between the contracting parties. It might be made by the developing countries fully or in part by: (a) exports of raw materials and other commodities until the export industry has production available for export; and (b) an agreed proportion of the output of the export industry and other specified commodities in the subsequent period until the credit is fully repaid.

"Co-operation in design and research. The agreement will include provisions for close co-operation between the respective partners in designing the product, and research for improving the processes of production and the quality of products.

"Clearance of payments. As a rule, the branch agreements will be linked to trade agreements and payments arrangements between the countries concerned. The latter should provide, to the maximum extent possible, for multilateral clearance.

"Prices. Prices of machinery and equipment and technical services provided by the countries with centrally planned economies and those of goods exported by the developing countries will be agreed upon in the light of world prices and world standards.

"If required by the developing countries, countries with centrally planned economies may assist in promoting the exports of products of the new industries to third countries. The agreement may also contain provisions dealing with re-exports of the products of the new industries and other commodities.

"The establishment of the export industries in the developing countries under the branch agreements is designed to create complementarity of economies based on specialization and partial division of labour. The exports of these industries to countries with centrally planned economies would be expected, therefore, to continue after the credit for the machinery and equipment has been fully repaid.

"The negotiations concerning the conclusion of branch agreements may best be initiated through bilateral consultations. Such consultations would take place as a rule between Governments; appropriate governmental institutions such as development banks; trade associations and similar bodies having sufficient general knowledge of the economies of the countries concerned. When trade co-operation between the countries has already sufficiently developed, the establishment of specific branch committees with representatives of both sides may be envisaged which would deal with the implementation of the agreements and other relevant matters as they arise."

In regard to tariff and non-tariff barriers, the Conference recommended the following:

"Developed countries should not, ordinarily, raise existing tariff or non-tariff barriers to exports from developing countries, nor establish new tariff or non-tariff barriers or any discriminatory measures, where such action would have the effect of rendering less favourable the conditions of access into their markets of manufactured and semi-manufactured products of export interest to developing countries. If, in exceptional and compelling circumstances, a developed country imposes or intensifies quantitative restrictions or increases tariffs on imports of manufactured or semi-manufactured products of export interest to developing countries, it should consult, upon their request, the developing countries affected, bilaterally or in appropriate international institutions.

"Developed countries should accord high priority in international trade negotiations to according maximum reductions in and, wherever possible, elimination of duties on manufactured and semi-manufactured products of export interest to developing countries. In these negotiations, every effort should be made to secure maximum reductions in and, wherever possible, the elimination of tariff differentials which differentiate unreasonably between such products in their primary and their processed forms. The benefits of the negotiations should not be limited to countries which are members of the international organization under whose aegis the negotiations take place.

"Developed countries should, as a matter of urgency, remove quantitative restrictions on manufactured and semi-manufactured products of export interest to developing countries as soon as possible.

"Developed countries, in co-operation with a competent international body, should proceed forthwith to identify existing non-tariff barriers to expanded trade in manufactured and semi-manufactured products of current or evident potential export interest to developing countries and should, as a matter of urgency, seek practical approaches to the maximum feasible reduction or the elimination of such barriers at an early date.

"Appropriate provision should be made by developing and developed countries to encourage co-operation between Governments and private groups in their countries, so as to build up export production in developing countries of manufactures and semi-manufactures in demand by consumers and industrial users in advanced countries. Co-operative measures should be taken to raise the level of technology and of industrial skills in the developing countries.

"Developed countries should participate, through the appropriate international trade body, in analysing

the development plans and policies of individual developing countries. at their request, and in examining trade and aid relationships with a view to devising concrete measures to promote the development of export potential and to facilitate access to export markets for the products of the industries thus developed. In this connexion, they should seek appropriate collaboration with Governments and international organizations having competence in relation to financial assistance for economic development, in systematic studies of trade and aid relationships in individual developing countries aimed at obtaining a clear analysis of export potential, market prospects and any further action that may be required.

"Developed and developing countries should collaborate in seeking methods to expand export trade of developing countries through international harmonization and adjustment of national policies and regulations, through technical and commercial standards affecting production, transportation and marketing, and through export promotion by the establishment of facilities, within individual countries or competent international organs, for the increased flow of trade information and the development of market research.

"When the measures recommended above are insufficient to give rise to steady and effective flow, to the developed countries, of processed, semi-manufactured and manufactured products from developing countries in the intial phase of industrialization, developed and developing countries should examine, through and with the appropriate international institutions, what additional and, if necessary, new ways and means can be provided to support the national development and export programmes of the least industrialized countries. In this respect, consideration should be given, *inter alia,* to channelling financial and technical assistance through appropriate international organizations, including regional economic organizations, in cases where the developing countries needing such assistance are participating in regional economic programmes.

"In relation to the foregoing, periodic discussions and consultations should be held by developed and developing countries in appropriate international institutions for the purpose of:

(a) Reviewing the progress made;
(b) Assessing the results achieved; and
(c) Considering what further measures are required to meet the needs of developing countries."

The steps taken recently by Australia to obtain the approval of the GATT Council to extend preferential duties, initially on sixty items, to 118 developing countries can be regarded as an encouraging sign. Imports of these particular items from the developing countries amounted to approximately $3 million (1963/64) and are expected to increase to about $18 million after the preferential duties become effective. This indicates the possibilities of expansion of trade in the developing countries' exports of manufactured products, if collective action is taken by the developed countries to implement the resolutions of the United Nations Conference on Trade and Development.

The degree of success to be achieved by means of export diversification with a view to correcting the imbalance in export structures and, consequently, of all measures taken toward this end at the national and regional levels, will be proportionate to the successes achieved in the direction of removing all obstacles to trade. Since satisfactory action cannot be taken at national levels, realistics and practical steps must be taken at the regional level.

2. *Increasing trade with the developing countries*

Unlike the case of the other developing regions, intra-regional trade is of considerable importance to the ECAFE region. Although most of the trade is with the developed countries of the world, a fair proportion of it is intra-regional; about 35 per cent in 1950-52 and 28 per cent in 1962 was within the region itself (see table 15). This is in contrast to approximately 10 per cent for the African, Latin American and the Middle Eastern areas. In the preceding sections, consideration has been given to the more important aspects of intra-regional trade and to the ways and means of increasing and diversifying it through the application of rational measures towards regional harmony and integration.

From the statistical data supplied earlier, it is evident that the ECAFE region as a whole does enjoy certain advantages over the other developing regions, both from the point of view of an earlier start as well as markets. The African and Latin American continents as well as countries of the Middle East have now taken concrete steps not only to increase industrialization but also to integrate economic development. Economic integration, however, does not and cannot result in blocking out demarcated areas of self-contained economic blocs. Regional self-sufficiency would become as retrogressive as national self-sufficiency. Hence, it is necessary that steps be taken toward the establishment of multi-regional complementarities where such complementarities are economically of mutual advantage.

The demand for capital and investment goods as well as for manufactured light consumer goods will increase considerably in the other developing areas of the world. Although, geographically, distance is a factor to be taken note of, yet economic problems such as shortages of capital will provide for certain advantages inter-regional supply arrangements. These factors justify the giving of increased attention to the markets of the developing countries of the other regions by the countries of the ECAFE region.

TABLE 15. ECAFE COUNTRIES: EXPORTS OF COMMODITY GOODS BY COUNTRIES 1962 ($ MILLIONS) AND PERCENTAGE OF INTRA-REGIONAL TRADE

Country	Chemicals		Transport equipment machinery		Manufactured goods		Miscellaneous manufactures	
	Value	Per cent intra-regional	Value	Per cent intra-regional	Value	Per cent intra-regional	Value	Per cent intra-regional
Ceylon	1.3	25	—	—	1.6	40	0.5	10
China (mainland)	14.3[a]	—	5.4[a]	—	141.4[a]	—	29.3[a]	—
China (Taiwan)	15.6	60	3.8	90	66.9	66	14.6	10
Hong Kong	10.5	90	26.5	55	140.9	50	353.7	24
Indonesia	1.4	50	0.1	50	0.2	90	0.3	30
Malaysia	39.1	90	126.3	99	342.1	57	44.5	90
Philippines	2.1	60	0.3	10	22.0	10	1.1	—
Total Oceanic Asia	68.7		157.0		574.3		414.5	
Burma	0.3	—	—	—	6.6	66	—	—
Cambodia	—	—	0.5	80	—	—	—	—
Laos	—	—	—	—	—	—	—	—
Thailand	0.4	—	—	—	6.9	66	1.9	60
Viet-Nam, South	—	—	—	—	—	—	—	—
Total Contiental south-east Asia	0.7	90	0.6	85	13.7	77	2.1	70
India	15.7	25	9.2	50	555.4	20	24.8	20
Pakistan	0.7	50	3.5	27	86.8	22	6.2	16
Afghanistan	—	—	—	—	9.1	—	—	—
Iran	4.8	4	0.2	—	1.0	50	—	—
Korea, South	0.9	10	1.4	40	6.1	66	1.9	10
Total north-continental Asia	5.8	7	1.7	—	16.3	16	2.0	10
Australia	29.5	75	68.6	17	196.7	20	26.2	65
Japan	262.0	65	1,252.8	33	2,072.8	35	786.3	18
New Zealand	12.1	25	1.2	90	9.4	75	0.6	70
Total	395.2	32.5	1,894.5	78.5	3,525.4	28.0	1,262.7	24.1

Source: ECAFE Trade Statistics, 1962.
[a] Mainland China's trade with other regions is not tabulated.

TABLE 16. DIRECTION OF INTERNATIONAL TRADE OF CENTRALLY PLANNED ECONOMIES 1955-1962

	1955		1962		
	$ million	Percentage distribution	$ million	Percentage distribution	Percentage increase or decrease (—)
Imports					
Eastern Europe					
From all countries	7,360	100.0	15,190	100.0	106
From other centrally planned economies	5,760	78.3	11,000	72.4	91
From developed countries	1,180	16.0	2,920	19.2	147
From developing countries	410	5.6	1,260	8.3	207
Africa	130	1.8	260	1.7	100
Asia	90	1.2	429	2.8	377
Latin America	175	2.4	475	3.1	171
Asia[a]					
From all countries	1,500	100.0	1,330	100.0	(—11)
From other centrally planned economies	1,190	79.1	650	48.9	(—45)
From developed countries	150	10.0	440	33.1	193
From developing countries	165	11.0	240	18.0	45
Africa	27	1.8	41	3.1	52
Asia	132	8.8	89	6.7	(—33)
Latin America	6	0.4	100	7.5	1,567
Exports					
Eastern Europe					
To all countries	8,010	100.0	15,770	188.0	96.9
To other centrally planned economies	5,990	74.8	10,800	68.5	80.3
To developed countries	1,500	18.7	2,890	18.3	92.7
To developing countries	380	4.7	1,560	9.9	310.5
Africa	115	1.4	330	2.1	186.9
Asia	73	0.9	460	2.9	530.1
Latin America	140	1.7	580	3.7	314.3

Asia					
To all countries	1,420	100.0	1,510	100.0	6.3
To other centrally planned economies	960	67.6	850	56.3	(—11.5)
To developed countries	210	14.8	250	16.6	19.0
To developing countries	239	16.6	415	27.5	73.6
Africa	22	1.5	40	2.6	81.8
Asia	215	15.1	350	23.2	62.8
Latin America	2	0.1	4	0.3	100.00

Source: Economic Production for Asia and the Far East, Vol. XV No. 1, June 1964.
[a] Including mainland China, Mongolia, North Korea and North Viet-Nam.

3. *Centrally planned economies*

Trade between the centrally planned economies and the developing countries was only two per cent of total world trade in 1960. The total value of exports of the centrally planned economies expanded from $27,020 million in 1952 to $17,280 million in 1962, the share in world trade increasing from 8.8 per cent to 12.3 per cent. Asia's total trade in exports, though increasing from $6,800 million in 1952 to $7,630 million in 1962, showed a reduction as a percentage share of world trade from 8.5 to 5.4.

Asia's exports to the centrally planned economies of eastern Europe increased from $90 million in 1955 to $439 million in 1962, an increase of 377 per cent. Its exports to the Asian centrally planned economies, however, declined by 33 per cent from $132 million in 1955 to $89 million in 1962. Imports from both sources increased by 530.1 per cent and 62.8 per cent respectively from $73 million in 1955 to $460 million in 1962 with the former, and $215 million to $350 million with the latter.

The largest gain in the increased imports from developing countries went to Asia, which more than quadrupled while exports to the Asian countries increased by more than six times. In relation to the other developing countries, exports from the ECAFE region remained low, but an encouraging feature is the increase from 22 per cent in 1955 to 34 per cent in 1962. Another feature which needs mention here is the fact that although, as previously mentioned, the region's exports of manufactured goods are more than those of other developing countries, in 1952 there were no exports of machinery or chemicals to the centrally planned economies and exports of other manufactured goods to them amounted to a mere $1 million. In 1962, the latter increased significantly to $60 million (chemicals $1 million), but there were still no exports of machinery. While imports from Asian centrally planned economies increased from $215 million to $350 million between 1952 and 1962, the region's exports to these countries declined from $132 million to $89 million during the same period. In the case of Japan the process was reversed. Whereas Japan's imports declined from $78 million to $57 million between 1955 and 1962, its exports increased from $28 million to $57 million. Exports to the east European centrally planned economies increased in importance, accounting for a major share of the total exports. While mainland China as a market for the developing ECAFE countries declined in importance, its share of imports from other developing countries increased. On the other hand, 23 per cent of mainland China's exports were to the ECAFE developing countries in 1962.

Trade between the ECAFE developing countries and the centrally planned economies was marked by a high degree of concentration of both imports in a few countries. The reasons for the smallness of trade as well as its high concentration among a few countries have been both economic and political.

If the developments in the past are to be taken as an indication of future trends, then the fact that the annual rates of growth of both imports (24.0 per cent) and exports (18.0 per cent)[1] of the developing countries have been the highest relating to the growth rates recorded in respect of trade with industrialized regions indicates the possibility of greater trade relations between the developing countries and the centrally planned economies. Of the developing countries, the ECAFE countries' performance is outstanding as is evident from table 16. Several reasons have contributed to this phenomenal increase. First of all, the volume of trade in 1955 was almost negligible. Asian countries' exports to eastern European planned economies amounted to only $90 million or 1.2 per cents of the total exports from all sources, and imports amounted to $73 million or 0.9 per cent of the total imports.

Asia's expansion prospects must be assessed not only in terms of the future growth prospects of the centrally planned economies but, more particularly, in terms of the structural changes that are likely to take place in the pattern of imports and exports of these countries. Table 17 indicates that the bulk of the exports consisted of food and crude materials. Exports of manufactured products to all centrally planned economies amounted to only $71 million in 1962. In terms of available data,[2] all eastern European and Soviet countries have planned for a faster growth rate in external trade between 1958 to 1965 than in previous years. Czechoslovakia planned for an expected increase in trade from 11 per cent to 12½ per cent, Poland from 7 per cent to 8½ and 9½ per

[1] Vide — United Nations Trade and Development, Page 49-50, Vol. I.
[2] Vide United Nations *Economic Survey of Europe 1960*, Chapter V.

TABLE 17. ECAFE COUNTRIES: IMPORTS AND EXPORTS BY COMMODITY GROUP 1955 AND 1962
(Million U.S. Dollars)

Year	Total		Crude materials	Fuels	Chemicals	Machinery	Other manufactured goods
IMPORTS							
ECAFE developing countries							
from all countries							
1955	6,790	1,230	975	565	515	1,260	2,130
1962	9,860	1,750	1,085	755	800	2,570	2,780
from eastern Europe							
1955	73	5	5	1	4	22	34
1962	460	28	12	17	19	235	161
from Asian centrally planned economies							
1955	215	115	34	—	4	1	62
1962	350	124	30	3	9	5	183
Japan from all countries							
1955	2,120	560	1,070	205	100	110	75
1962	4,460	680	1,850	750	235	600	315
from eastern Europe							
1955	5	—	4	1	—	—	—
1962	125	9	36	44	9	5	22
from Asian centrally planned economies							
1955	78	24	48	5	—	—	—
1962	57	9	29	13	1	—	5
EXPORTS							
ECAFE developing countries							
to all countries							
1955	6,850	1,700	3,210	550	110	75	1,141
1962	7,650	2,070	2,860	480	120	183	1,800
to eastern Europe							
1955	90	33	58	—	—	—	1
1962	429	101	265	—	1	—	60
to Asian centrally planned economies							
1955	132	24	76	—	22	1	10
1962	89	20	59	1	5	1	4
Japan to all countries							
1955	2,000	135	115	7	94	245	1,400
1962	4,920	340	185	20	260	1,250	2,860
to eastern Europe							
1962	11	—	—	—	—	—	10
1962	165	1	9	—	5	87	65
to Asian centrally planned economies							
1955	28	1	—	—	18	2	8
1962	47	—	9	—	10	2	25

Source: Economic Bulletin for Asia and the Far East, Vol. XV, No. 1 June 1964.

cent, and Hungary has stated that "in our trade with non-socialist countries we shall increase turnover especially with those countries that have been liberated from colonial rule and continue to struggle for a consolidation of their national independence". The United Nations Economic Survey for 1960 has estimated that those countries alone accounted for about 70 per cent of the total eastern European trade turnover with the less industrialized countries, and that, up to 1965, the total turnover for the area on the basis of these estimates would reach $1,800 million. The Soviet Union's trade turnover is expected to double, thus reaching $1,600 million. Agreements between India and the Soviet Union and between Indonesia and the Soviet Union were expected to double and treble their trade turnover respectively, between 1960 and 1963.

Assessment

Estimates postulated earlier in regard to expansion of manufactures must take into consideration the possibilities of increasing trade among the regional countries. The present regional trade in manufactures amounts to approximately 30 per cent. Regional trade must, therefore, be expected to take the larger share in the total export rade of manufactures of not less than about $6,000 million by 1980. As far as the industrialized European countries are concerned, estimates indicate that, by 1980, they will be able to absorb about $5,000 million. The region's share in this trade must be over $3,000 million.[1] The balance of $4,100 million needs to be exported to centrally planned economies, the North American continent and

[1] This assumption is reasonable on the basis of the present distribution of trade.

the developing countries. Exports of manufactured goods to the centrally planned economies would, therefore, have to increase to over $2,000 million by 1980 from the 1962 level of $71 million. These estimates are mere arithmetical assessments and must not be taken as exact projected data.

Development prospects of the centrally planned economies also indicate, similar to the pattern in the industrialized countries, that an increasing share of the trade in manufactures would be met by trade within the region itself. In terms of the 1960-65 development prospects, it has been worked out that the largest extent of self-sufficiency in the centrally planned economies will be achieved in such items as cotton and woollen fabrics, footwear, jute, natural rubber and tea, in contrast to increasing imports of tropical foodstuffs, such as coffee, cocoa, citrus fruits, bananas and dates. This will adversely affect exports of primary products from the ECAFE region.[1] Export of other products, therefore, will have to be increased at a much faster rate.

Estimates made by the Economic Commission for Europe, on a rather conservative basis of foreign trade increases at 0.8 per cent for each one per cent increase in domestic product from 1956 to 1980, for the Soviet Union, and a one-to-one ratio for the European countries, show that the total trade turnover will increase to $80,000 million. Estimates of increased trade with developing countries supplied by Soviet Union economists to the World Trade Conference[2] were as follows:

	1963	*1970*	*1980*
Total turnover (in million roubles)[3]	1,480	3,000	10,000
Imports of some tropical commodities from developing countries in '000 tons:			
Cocoa beans	54.0	120	350
Coffee	29.1	60	120
Citrous	60.2	180	750
Coconut oil, palm oil, and other oils for confectionary perfumery industries (in quantities of oil seeds)	212.0	300	1,000

Similar increases can be expected in the trade of the Asian centrally planned economies too, which are important for the ECAFE region as a potential market.

If the figures for the Soviet Union alone are expected (as indicated above) to be in the region of about $6,000 million, it is possible to assume that the total imports by the centrally planned economies will increase by 1980 up to about $7,000 million or more. ECE estimates that, since import of tropical foods alone is expected to increase from $130 million in 1962 to more than $2,500 million by 1980, implying at the same time a greater degree of trade liberalization, imports are likely to reach a figure of between $5,000 million and $6,000 million. On the basis of present increases, which have been quite phenomenal, the ECAFE region's exports to the centrally planned economies can be estimated to reach a minimum of $3,000 million, of which at least $2,000 million, as indicated earlier, must be in the form of manufactured commodities.

One of the basic difficulties likely to arise in the trade relations with the centrally planned economies pertains to the conditions of bilateral balancing of trade. Bilateral agreements are generally associated with a restriction of trade in view of their use during the depression of the nineteen-thirties to restrict rather than expand trade. However, if such agreements could contribute to expansion of trade rather than causing restrictions of trade, they should not be considered as obstacles.

The experience of some ECAFE countries has been that bilateral agreements with both developed market economies and centrally planned economies have, in most cases, rather than creating difficulties, contributed to establishing a degree of certainty, which has on the whole been beneficial from the long-range planning point of view. Many of the difficulties which could arise, if there were conditions for bilateral balancing of trade, have already been overcome through flexible arrangements which have left room for modifications to be introduced depending upon the circumstances of each case. For example, Indonesia began its trade on the basis of a high degree of bilateralism through clearing accounts; but, after 1957 arrangements were made for the introduction of a multilateral payments system. Similarly, Burma, Ceylon and India have been able to arrange for suitable payment systems which do not hinder the expansion of trade.[1]

Institutional facilities

(a) *Shipping*

Sea transport facilities constitute an important element in foreign trade as well as in balance of payments of developing countries. Apart from the advanced countries within the region, national shipping facilities are limited to a very few countries. In consequence, reliance upon established lines has resulted in unfair practices and discriminatory rates, so much so that this can be regarded as an obstacle to industrialization likely to cause effects similar to those of tariffs. For example, in certain countries freight rates have hindered the setting up of smelters and refineries. "The freight rates on tin from Indonesia, for instance, have been based, until recently, on metal content so that no additional costs were incurred when concentrates were shipped instead of refined tin".[2]

[1] Imports of metal ores from the region are very small even at present.

[2] Vide, Trade and Development, Final Act and Report, Vol. 1, United Nations, page 94.

[3] US$ 1 = .90 rouble.

[1] For a brief account of the working systems devised by these countries, see ECAFE Bulletin Vol. XV, No. 1, June 1964.

[2] Vide United Nations *Economic Survey of Europe 1960*, page 22 Chapter V.

The United Nations Conference on Trade and Development (Report of the Third Committee) has recommended the establishment of well-organized consultation machinery to consider the following matters:

(a) publication by the Conferences of their tariffs and regulations;
(b) increase in Conference freight rates, levy of surcharges, and so on; reasonable advance notice to be given in this regard;
(c) the terms of dual rates and deferred rebates agreements;
(d) effective representation of Conferences in major ports of developing countries where appropriate;
(e) the adequacy of shipping services in the trades concerned;
(f) action to be taken in order to improve and promote exports of developing countries and, in particular, intra-regional trade;
(g) rationalization of routes and freights, established in accordance with the national characteristics of production, marketing and development requirements.

The countries of the ECAFE region must give important consideration to questions of shipping facilities with a view to strengthening both intra-regional trade and trade with countries outside the region. One of the recommendations made by the Council of Ministers at Manila in December 1963 was in regard to taking early steps in connexion with the establishment of joint shipping lines. This could perhaps be done in two phases, that is:

(1) the establishment of sub-regional groupings where pooling of resources will result in greater economies; and
(2) similar action at a regional level.

It may, in fact, be advantageous to set up a shipping committee to study the technical and economic problems involved and to recommend a scheme or schemes for the establishment of regional shipping lines. Whereas the larger countries have the resources and the facilities to establish their own shipping lines, the majority of smaller countries are unable to do so. The establishments of individual national shipping lines will not be adequate to cope with the larger aspects of regional problems.

(b) *Standardization and marketing*

Standardization, relating not merely to commodities, but also to weights and measures, is of extreme importance in foreign trade. Marketing, particularly in foreign markets, involves the study and application of special techniques. However, since these aspects are contained in a separate paper in which a recommended course of action will be presented, the matter is merely mentioned here.

EXTERNAL ASSISTANCE FOR INDUSTRIALIZATION

Prepared by the ECAFE Secretariat

I. INTRODUCTION

An accurate assessment of the part played by external assistance in the industrialization of developing countries is fraught with a number of difficulties. The first problem on faces is that of definition—what is external assistance? The practice of the donor countries is to include as assistance all transfers made for whatever motive and on whatever terms as regards quid pro quo. Thus, reparation and indemnity payments which are obligatory, private capital investment which is made for profit, and commercial export credits are all included in the computation of total assistance. The United Nations previously included as economic assistance only outright grants and net official long-term lending for non-military purposes by government and international organizations. The United Nations also considered as long-term only such loans as had a maturity of five years or more. This definition has since been greatly widened. Private capital investment is now included as well as all loans which reach maturity after one year or more. In this paper, it has been considered desirable to adopt a very wide definition of external assistance, for the purpose is to see what has been the volume of total transfer of capital to developing countries and what has been its effect on industrialization. The question of motive has been largely ignored and only benefits and costs have been taken into account.

The second difficulty is caused by a lack of adequate and reliable data regarding the flow of assistance. The data used in this paper are mainly those furnished by the contributing countries; but even those countries' statistics do not adequately measure all elements in the flow, and the deficiency is particularly felt in the case of private investment and credits. A peculiar difficulty in distinguishing between 'public' and 'private' assistance is caused by the fact that the countries from which the assistance originates classify it as public or private according to the source of funds, but the recipient countries consider assistance as public or private according to the recipient of the funds. Since the calculation of the volume of assistance received has to be made from the balance of payments statistics of the recipient countries, confusion is inevitable.

Another difficulty which arises in connexion with avaluation is due to the diverse elements which make up the total flow of assistance. Not all elements have the same import as regards cost to the contributing countries or benefits to the recipient countries, but all have to be taken at their face-value in assessing the total volume. A qualitative assessment is therefore necessary, in addition to quantitative computation, to arrive at the real value of assistance. This assessment is obviously difficult to make, and is likely to give rise to controversy.

Finally, assistance has been devoted to a variety of purposes ranging from general budgetary support to the financing of carefully defined development projects, and ranging from projects to install power plants and industries to schemes for general improvement of health and education. An exact assessment of the return on investment is obviously impossible in every case. The subject matter of this paper is limited to external assistance for 'industrialization', but only a minor portion of the total assistance has been directed to industrialization as such, while quite a considerable portion has been devoted to the development of infrastructure such as transport and power. Since improvement of infrastructure plays a vital role not only in the over-all development of an economy but in industrial development as well, it would be inadequate to take into account only such assistance as has been specifically rendered for industrial development. An attempt has therefore been made, first to assess total assistance and then to see what effects it has had on the total industrialization of the developing ECAFE countries.

II. THE FLOW OF LONG-TERM EXTERNAL ASSISTANCE TO DEVELOPING COUNTRIES

The net flow of long-term capital and official donations from developed market economy countries, centrally planned economies, and multilateral agencies to developing countries has increased considerably since the beginning of the 1950's.

The total value of assistance from developed market economy countries[1] and multiliateral agencies averaged $2,600 million during 1951-55 and increased to $6,000 million in 1960-62 (see table 1).

[1] For want of authentic net disbursement figures for credits from centrally planned countries, their contribution is not included here. The net flow from these countries during 1962-63 was probably of the order of $350 million (see footnote 3, page 138).

TABLE 1. NET FLOW OF LONG-TERM CAPITAL[a] AND OFFICIAL DONATIONS FROM DEVELOPED MARKET ECONOMY COUNTRIES AND MULTILATERAL AGENCIES TO DEVELOPING COUNTRIES: ANNUAL AVERAGES

(In thousand million dollars)

Item	*1951-55*	*1956-59*	*1960-62*
Total	2.7	4.7	6.0
Bilateral flow			
Total	2.6	4.5	5.7
Official donations ..	1.1	2.1	2.6
Official capital[b]	0.8	1.0	1.9
private capital[c]	0.7	1.4	1.2
Flow from multilateral lending agencies	0.1	0.2	0.3

Source: United Nations, *World Economic Survey 1963*, chapter 8 — table 8-1.

[a] Loans and investment without maturity or maturing after one year.

[b] Including loans and credits extended by private banks and utilized portions of local currency balances derived from sales of United States agricultural surpluses.

[c] Including reinvestment of earnings.

There were increases in all the components of the flow, but their relative share changed. In 1951-55, official donations accounted for 46 per cent of the total, but during 1960-62 they accounted for 43 per cent. There was a fall in the contribution of private capital, from 30 to 20 per cent. As the role of private capital diminished, that of official capital and contributions from multilateral agencies increased. The two elements provided respectively 32 and 5 per cent of the total funds in 1960-62, as against 33 and 4 per cent during 1951-55.

The contribution of other countries in the flow has increased, particularly that of West Germany and Japan, but the United States still remains by far the largest supplier of funds, followed by France and the United Kingdom. The share of the latter two countries, however, diminished from a combined total of 33 per cent in 1951-55 to 23 per cent in 1960-62, while that of the United States increased from 54 per cent to 57 per cent.

Official bilateral assistance

In the first four years of the Development Decade, official bilateral assistance from developed market economy countries to less developed countries increased by some 30 per cent from $3,782 million to $4,885 million. In 1963, slightly less than half of this assistance was directed to Far Eastern countries, about one-third to Africa, one-sixth to Latin America, and one-twentieth to the Middle East. The share of Latin America at the beginning of the decade had been less than one-tenth, so its share was increased considerably (see table 2).

Almost the entire increase of $1,100 million from 1960 to 1963 was accounted for by an increase of loans in donor's currencies. The amount of straight grants and grant-like transfers of commodities increased slightly, but their total share in the over-all flow of assistance fell from over four-fifths in 1960 to about three-fifths in 1963, while the share of loans in donor's currencies from one-eighth to one-third. The change reflects a corresponding change in the philosophy of aid, not only on the part of the aid-giving countries, but also on the part of some aid-receiving countries.

The shares of individual ECAFE developing countries in the total flow of bilateral assistance to Asia in 1960 and 1963 are shown in table 3.

Over this period, the combined share of these countries increased from $1,880 million to $2,248 million or by some 19 per cent. Again, the entire increase was due to an increase of the loan element. Grants and grant-like contributions, which accounted for about four-fifths of the total assistance in 1960, contributed about three-fifths in 1963.

TABLE 2. FLOW OF OFFICIAL BILATERAL NET ASSISTANCE FROM DEVELOPED MARKET ECONOMY COUNTRIES TO LESS-DEVELOPED COUNTRIES: 1960-1963

(Value in million dollars)

By type	*1960*		*1961*	*1962*	*1963*	
	Value	*Percentage*			*Value*	*Percentage*
Grants[a]	2,000	60	2,431	2,234	2,262	46
Transfer of resources[b]	808	22	681	756	859	16
Loans repayable in recipients currencies[c]	191	5	193	263	225	5
Other loans	583	13	1,219	1,248	1,539	33
Total	3,782	100	4,524	4,504	4,885	100
of which:						
Africa	1,317	35	1,537	1,573	1,545	32
Latin America	324	9	924	876	854	16
Middle East	255	6	348	257	228	5
Far East	1,886	50	1,715	1,798	2,238	47
	2,782	100	4,524	4,504	4,885	100

Source: Prepared from Flow of Financial Resources to Less-Developed Countries, 1956-63, OECD, 1964, Table V-2 and Balance of Payment Yearbook, Vol. 16.

[a] Includes reparations.

[b] Net transfer of resources through sale in recipient currencies.

[c] Loans provided from resources generated by sale of commodities in local currencies.

TABLE 3. FLOW OF OFFICIAL BILATERAL NET ASSISTANCE TO DEVELOPING ECAFE COUNTRIES, 1960 AND 1963

(In million dollars)

Country	1960			1963		
	Grants and grant like contributions	Loans	Total	Grants and grant like contributions	Loans	Total
Afghanistan	12.0	3.0	16.0	34.0	1	35.0
Burma	34.0	—	34.0	34.0	7	41.0
Cambodia	27.0	—	27.0	21	—	21.0[b]
Ceylon	10.0	1	11.0	6	4	11.0
China (Taiwan)	98.0	14.0	112.0	49.0	27.0	76.0
India[a]	434.0	304.0	737.0	354.0	548.0	903.0
Indonesia	57.0	2.0	59.0	92.0	21.0	113.0
Iran	12.0	16.0	29.0	31.0	–7.0	24.0
Nepal	8.0	—	8.0	15.0	1.0	16.0
Pakistan[a]	210.0	35.0	245.0	183.0	235.0	419
Korea, South	247.0	3.0	250.0	226.0	24.0	250.0
Laos	33.0	—	33.0	34.0	1.0	35.0[b]
Malaysia	14.0	–1	13.0	13	2.0	15.0
Philippines	43.0	28.0	71.0	27.0	–8.0	19.0
Thailand	26.0	16.0	43.0	25.0	14.0	39.0
Viet-Nam, South	191.0	—	192.0	206.0	15.0	221.0[b]
Total	1,458	422	1,880	1,354	884	2,248
(percentage)	(78)	(22)	(100)	(61)	(39)	(100)

Source: Ibid, table V-3.

[a] Excluding contribution to the Indus Water Scheme.

[b] Excludes French grants and loans totalling $9.8 million to these countries for which a country-wise break-down is not available.

Of 16 countries in the region, six (India, Pakistan, Republic of Korea, the Republic of Viet-Nam, Indonesia, and China (Taiwan)) received a total of $1,982 million, or 89 per cent of the assistance given. India received 41 per cent, Pakistan 19 per cent, Korea 11 per cent, the Republic of Viet-Nam 10 per cent, Indonesia 5 per cent, and China (Taiwan) 3 per cent. On a per capita basis, the three smaller countries received much more assistance than the larger ones.

The flow of bilateral assistance to the developing ECAFE countries came mainly from the United States. Out of $2,200 million in 1963, that country alone provided about $1,800 million, or over four-fifths. The next largest contributors were West Germany and Japan, which provided $110 million and $140 million respectively. The United Kingdom provided $90 million, Canada $50 million, France $10 million, Sweden $4 million, and Australia and New Zealand together about $8 million.

Of the assistance provided by the United States to developing ECAFE countries in 1963, the bulk was received by four countries: India ($740 million), Pakistan ($382 million), the Republic of Korea (239 million) and the Republic of Viet-Nam ($211 million). Contributions to the latter countries were mostly in the form of grants; but, in the cases of India and Pakistan, the proportion of grants or grant-like contributions was about half or less.

Over half the total bilateral assistance of the United States is provided under the Foreign Assistance Act of 1961 administered by the Agency for International Development (AID). Slightly more than half of this is in the form of development loans, one-seventh in the form of development grants, and one-fourth in the form of "supporting assistance." Over one-third of the total assistance is provided under the Food for Peace Programme (PL 480) in the form of surplus agricultural commodities. Under Title I of PL 480, agricultural commodities are sold against recipient countries' currencies and the proceeds are utilized for giving grants and loans, excluding about 10 per cent which is used for meeting the United States expenses in the recipient countries. Titles II and III, which accounted for about one-third of the total PL 480 programme in 1963, are for grants of agricultural commodities for economic development, relief, and donations. Title IV provides for a long-term supply of agricultural commodities against loans payable in dollars over 20 to 25 years at ¾ per cent interest. In 1963, such loans amounted to $55 million.

The next most important the United States assistance programme is conducted by the Export-Import Bank, which provides loans repayable in dollars (of which the total amount provided in 1963 was $283 million). One category of loans is for foreign governments or private parties: project loans, emergency foreign trade loans and agricultural commodities export loans. All are for import of goods from the United States. The rate charged for project loans in 1964 was 5.5 per cent.

The United Kingdom's over-all assistance is mainly in the form of grants, but they are given

mostly to colonies and dependent territories and for technical assistance to Commonwealth countries. The bulk of the assistance to ECAFE countries in 1963 was given to India ($58 million) and Pakistan ($26 million), mostly in the form of loans under sec. 3 of the Export Guarantees Act of 1949. The maturities of such loans are fairly long; some of them are for a period of seven years, but the rate of interest is about six per cent. Canada's assistance amounted to about $100 million in 1963 compared to $62 million in 1961, when the programme was initiated. Grants, partly in the form of commodities, form the bulk of the assistance, the balance consisting of official export credits and soft loans. The bulk of the grants is made to the Colombo Plan area, India and Pakistan being the main recipients. They and Ceylon also received major commitments of export credits which are otherwise directed mostly to Latin America.

The assistance of West Germany (excluding reparations) consists of grants for technical assistance, development loans and official export credits. West Germany is a member of the Indian and the Pakistani consortia. Those two countries are the largest recipients of its assistance after Israel. This assistance is in the form of loans. The terms vary according to the project—being 3-3.5 per cent interest and 20 years maturity, with a period of grace, in the case of infrastructure, and commercial rate of interest with a maturity of not more than 15 years in the case of industries.

The flow of financial assistance from Japan is directed mainly toward Asia, which accounted for 90 per cent of this assistance in 1963. About 30 per cent of the Japanese contribution consists of grants, including reparation payments, and the balance mainly of long-term official export credits and some government loans. Principal recipients of grants were Burma, Indonesia, the Philippines, and the Republic of Viet-Nam, while India accounted for the bulk of the lending.

The assistance of the other developed ECAFE countries, Australia and New Zealand, is in the form of grants for technical assistance to the Colombo Plan which benefit the developing ECAFE countries.

The flow of long-term private capital

Long-term private capital is the next category of bilateral assistance from developed market economy countries. This flow is of strategic importance to the economic, particularly industrial, development of less developed countries; but there is an unfortunate lack of reliable information on its size, components, and destination in the developing regions, which makes an assessment very difficult. According to "The Flow of Financial Resources to the Less-developed Countries," published by OECD, the total net flow of private long-term capital to developing countries, including some European countries, declined from an average $2,500 million in 1956-59 to $1,870 million in 1963. According to table 1 above, the flow declined from $1,400 million in 1956-59 to $1,200 million in 1960-62. According to another United Nations publication, entitled "International Flow of Long-term Capital and Official Donations, 1961-62" (E/3917/Rev.1), the flow of long-term private capital to developing countries (excluding European less-developed countries, as in table 1) declined from $1,240 million in 1960 to $550 million in 1961 and then increased to $930 million in 1962, giving an average for the three years of some $900 million.

Another difficulty with private capital flow statistics, which has already been mentioned, is that what is classified as 'private' by the capital-exporting countries may be shown as 'public' in the balance of payments statistics of the recipient countries, so that correlation becomes virtualy impossible. Again, the contributing countries' statistics include re-invested earnings; but, in many cases, these earnings are excluded in the statistics of developing countries, while capital received from international lending agencies is included. For these reasons, the size of private capital flow as computed from figures of import in developing countries differs considerably from the size indicated by export figures. According to import statistics, the volume of private long-term capital received by developing countries in the three years 1960, 1961 and 1962 amounted respectively to $1,200, 1,000 and 1,200 million. The difference between export and import figures in 1961 amounted to $450 million and in 1962 to $293 million, import exceeding export in both cases.

Of the developed market economies, only a few are regular exporters of private capital: the United States, the United Kingdom, Switzerland, Belgium, West Germany, and Sweden. Others are regular importers of capital — particularly Canada, Ireland, Australia, New Zealand, Spain, Portugal, Denmark, and South Africa.[1] During the ninteen-fifties, the five capital-exporting countries provided an average of $2.9 billion per annum, of which about $2,000 million came from the United States, $500 million from the United Kingdom, and $200 million from Switzerland. During the first three years of the nineteen-sixties, private capital flow from the United States increased by over 50 per cent to an annual average of $3,100 million, but West Germany turned from a capital-exporting to a capital-importing country, because of large-scale United States investments in its territory. The United Kingdom also in total received capital on a net basis, while Japan emerged as a new source of supply.

Of a total capital of about $3,000 million supplied by the capital exporting countries as a group, an average of $2,200 million was utilized by the other developed countries — and the share of developing countries was $800 million, or about one-fourth. According to "The International Flow of Long-term

[1] There has been large scale repatriation of capital from South Africa recently and during 1960-61 that country suffered a considerable net outflow.

TABLE 4. FLOW OF PRIVATE LONG-TERM CAPITAL FROM DEVELOPED MARKET ECONOMIES TO DEVELOPMENT COUNTRIES, BY REGION, 1959-1962

(Amount in million dollars)

Regions	1959		1960		1961		1962	
	Amount	Percentage	Amount	Percentage	Amount	Percentage	Amount	Percentage
Africa	–17	–2	196	16	160	15	96	8
Latin America	920	88	648	54	676	66	811	68
Middle East	60	5	102	9	82	8	114	10
Far East	101	9	252	21	115	11	173	14
Total[a]	1,064	100	1,198	100	1,033	100	1,194	100

Source: International Flow of Long-term Capital and Official Donations 1959-61 and 1960-62 (A/5195/Rev. I and E/3917/Rev. 1).

[a] Excluding Congo, Cuba, Liberia and Saudi Arabia.

Capital and Official Donations, 1960-62", the developing countries' share fell to $553 milion in 1961 and recovered to $929 million in 1962. But according to the Secretary General's "Report on the Promotion of International Flow of Private Capital (E/3905)" submitted to the Economic and Social Council, there was a steady decline in the flow of private capital to developing countries from $1,127 million in 1960 to $984 million in 1961, and to $877 million in 1962. There were indications of a further decline in 1963.

The flow of private capital has been very unevenly distributed among the developing regions, Latin America receiving by far the major share. In 1959, its share was as high as 88 per cent. This figure dropped to 54 per cent in 1960, but it went up to 68 per cent in 1962. The share of the Middle East went up from five per cent in 1959 to ten per cent in 1962, while the shares of Africa and the Far East declined. In the Far East, which comprises developing ECAFE countries, the share went up in 1960 to 21 per cent, but declined to 14 per cent in 1962 (see table 4).

TABLE 5. DEVELOPING ECAFE COUNTRIES: IN-FLOW OF LONG-TERM PRIVATE CAPITAL, 1960-63

million dollars

Countries	1960	1961	1962	1963
Burma	–10	– 2	...	–14
Ceylon	– –	– 2	– –	1
China (Taiwan)	17	15	5	13
India[a]	59	–10	– 2	20
Indonesia	– –	– –	– –	10
Iran	21	6	9	–51
Korea, South	3	– –	3	42
Malaysia	44	54	66	36
Pakistan	25	28	23	74
Philippines	74	10	–20	–30
Thailand	18	32	78	78
Viet-Nam, South	3	1	12	2
Total twelve	273	121	184	181

Source: International flow of long-term capital and official Donations 1960-62 and Balance of Payments Year Book.

(–) Sign indicates a net out flow.

[a] Excluding re-invested earnings.

Among individual ECAFE countries Malaysia, Thailand, Pakistan, India, China (Taiwan), and Iran received sizable amounts of foreign private capital, particularly Thailand and Malaysia. (See table 5)

The uneven distribution of private capital highlights the basic pattern of private capital investment, which tends to be concentrated on petroleum and mining and other export-oriented sectors. For instance, of the total gross outflow of private capital for direct investment from the United States during 1959-62 in the developing countries of Africa, Asia and the Middle East, 75 per cent was for petroleum, 14 per cent was for mining and smelting and only 10 per cent was for industry.[1] Figures for petroleum investment in the case of the United Kingdom (which must be considerable) is not available. The distribution of that country's other investment in the developing region during 1959-61 for agriculture and other sectors was 56 per cent and for manufacturing was 44 per cent.

The United States is the largest supplier of private capital, but 73 per cent of the gross outflow from that country in 1960 was directed to developed countries, 15 per cent of Latin America and only one per cent to the underdeveloped countries in Asia. In the case of West Germany the percentage for developed countries in western Europe and America was 85, while the share of all other countries was 15 per cent. Among the developing ECAFE countries, India in 1959 obtained 30 per cent of its private capital from the United States, 57 per cent from the United Kingdom and 13 per cent from other sources. Pakistan in 1960 received 4 per cent from the United States, 65 per cent from the United Kingdom, 2 per cent from western Europe and 30 per cent from other countries.

Private capital investment by developed countries in developing countries mainly takes the form of direct investment (including re-investment of pro-

[1] The United States investment in petroleum industry in Latin America has been tapering off in recent years and therefore manufacturing industries and other sectors, including utilities, play a larger part in the United States investment in that region.

fits) which involves control of the enterprises. In 1961-62, direct investment accounted for about four-fifths of the total private capital flow. About one-half of all direct investment consists of re-invested earnings, therefore, only about one-half of the reported figure actually represents a net new capital flow. In 1962, for example, about 60 per cent of net direct investment by the United States in less developed areas consisted of re-invested earnings, the corresponding figures for the United Kingdom and West Germany being 45 per cent.

The other form of private capital flow is bilateral portfolio investment and other new lending, that is, private financial loans and export credits not covered by official guarantees.

Guaranteed private export credits form a separate categories of private capital flow which is not included in the United Nations statistics of private capital. This element is included in the OECD statistics, and is important because. in size, it is about double the flow of portfolio investment and other forms of lending. It is no doubt a commercial credit; but, when it is for more than one year, it meets the United Nations and IMF definition of 'long-term' capital. Roughly one-half of this credit is for more than five years and is thus more significant to developing countries than short-term official credits. The flow of guaranteed private export credit has therefore been included in the total flow of financial assistance to the developing ECAFE countries. The shares of the individual countries are indicated in table 6.

TABLE 6. DEVELOPING ECAFE COUNTRIES: FLOW OF GUARANTEED PRIVATE EXPORT CREDITS 1960-1963

(In million dollars)

Countries	*1960*	*1961*	*1962*	*1963*
Afghanistan	3	— 4	— 1	—
Burma	1	—	2	— 2
Ceylon	1	3	— 3	— 2
China (Taiwan)	2	7	—	— 3
India	—68	—89	—38	—11
Iran	20	—12	— 8	—58
Indonesia	25	42	10	5
Korea, South	— 1	12	7	20
Malaysia	2	3	5	— 2
Pakistan	— 8	14	24	—14
Philippines	12	20	— 4	1
Thailand	10	25	2	10
Viet-Nam, South	— 2	1	— 1	—
Total	— 3	25	— 6	62

Source: Flow of Financial Resources to less-developed countries 1956-63. OECD, 1964 — Table V-3.

(–) Sign indicates a net outflow.

The flow of private capital to developing countries has been reduced in recent years, and only a few of the developing ECAFE countries have attracted sizable amounts of such capital. Increased private capital investment is, however, essential for rapid industrialization. Most of the developing countries realize this importance and have generally removed restrictions regarding repatriation, association of local capital, and so on, and in many cases given tax and other incentives to attract more capital. The level of private investment, however, depends on the expected return, availability of worthwhile investment opportunities matured to a point where investment decision and implementation can be effectively made, and a reassuring climate which makes investors feel secure about the future of their investments. Unfortunately, these prerequisites are still lacking in many countries. The developing ECAFE countries should stabilize their economies, keep inflation in check and avoid frequent changes in their fiscal and monetary policies. Development can best take place on the basis of a well-thought-out plan. Such countries as do not already have them should work out such plans, including projects suitable for foreign investment.

The establishment of national development finance institutions is another effective way of attracting foreign private capital. Such institutions have been set up in several ECAFE countries, but not all. They should be established in all countries if more investment from foreign private investors and multilateral institutions is to be secured. Developing countries should also set up investment promotion centres to facilitate foreign investment. Developed countries can help by establishing agencies to inform their private investors about investment opportunities in developing countries as is being done by the United States' AID. Tax incentives in the form of exemption from income tax for a period or concessional income tax rates, reduction of or exemption from tariffs on the import requirements of the enterprise are widely prescribed measures to promote foreign investment; but, perhaps, a well-balanced tax-system at a reasonable level and tariff protection for the product are more effective inducements to would-be investors. Developed capital-exporting countries now generally give tax-exemption for foreign investment profits earned in developing countries to avoid double taxation, but they should encourage investment by their nationals in developing countries by giving more favourable tax treatment (as through special investment allowances) to the profits derived from such investments than to profits from domestic investment. They should also guarantee investors against non-business risks such as government interference or expropriation, non-convertibility, disorders, and the like, by giving investment insurance as is being done by the United States, West Germany and Japan. Finally, both developed and developing countries can facilitate foreign investment by agreeing to a scheme for independent international arbitration and conciliation of investment disputes; as has been under

consideration by the International Bank for Reconstruction and Development.[1]

Assistance from centrally planned economies[2]

Significant economic assistance from centrally planned economies to less developed countries started in 1954, when the Soviet Union established its first assistance programme. By the end of 1962, total commitments of credits and grants from these countries to developing market economy countries[3] had reached the cumulative total of $4.6 billion. The Soviet Union accounted for about 70 per cent of this total, other European centrally planned economies for 24 per cent, and mainland China for 6 per cent. Credit commitments reached a peak of $1.1 billion in 1961 but, according to available information, fell considerably to $429 million in 1962 and many have fallen further in 1963. The reason for this fall is not very clear, but it seems to have been the heavy backlog of unused credits, for actual disbursements had not amounted to more than a third of the total commitments. According to "The Flow of Financial Resources to Less-developed Countries,[4] 1956-63". gross disbursements totalled $1,435 million by the end of 1962 as against commitments amounting to $5,074 million. Yearly disbursements were:

	($ million)
1954	1
1955	3
1956	107
1957	87
1958	205
1959	161
1960	186
1961	294
1962	391

The above figures, however, include Cuba, other centrally planned economies, and certain European countries in the category of less developed countries.

Commitments of bilateral assistance by centrally planned economies and their distribution by recipient areas and countries are shown in table 7. The assistance has been concentrated in a few countries in Asia and Africa. Far East Asia received more than 50 per cent of the assistance and Africa 30 per cent. Among Far Eastern countries, India, Indonesia, and Afghanistan received the bulk, while in Africa the largest recipients were the United Arab Republic and Ghana.

Economic assistance from centrally planned economies was generally directed toward specific projects. More than half of these were industrial projects, particularly in the field of ferrous and non-ferrous metals, engineering and metal-working industries. An example of this type of project is the Bhilai metallurgical works in India. Other projects involve power development and irrigation, such as the hydro-electric plant in Afghanistan and the Aswan High Dam in Egypt, and transport and communications. Non-project assistance probably does not account for more than five per cent of the total commitments, while technical assistance programmes may account for about fifteen per cent.

The economic assistance of centrally planned countries represents a relatively small proportion of the assistance received by developing countries from all sources. However, its impact on the economies of the recipient countries has been significant because of its concentration in a few countries. For instance, it is reported that the share of centrally planned economies in total credits and grants received by India from all sources amounted to 11.4 per cent up to 1962, and that the share of centrally planned economies in total loans extended to 21.4 per cent of all loan commitments. According to Soviet Union sources, credit commitments to Ceylon represented 35 per cent of all credits received by that country until 1961 and commitments to Afghanistan were scheduled to cover half of the total investment during its second five-year plan.

The majority of loans by the Soviet Union carry an interest of 2.5 per cent and are repayable over 12 years from the time of first disbursement, or from the time of completion of the project. There are also repayment schedules up to 50 years. The eastern European countries, however, have often charged interest up to 5 per cent and some of their credits have been for periods ranging from four to eight years. In respect of these credits, repayment is usually made in the form of local products, though most credit agreements also provide for settlement in convertible currencies, if no satisfactory terms of payment in kind can be found. As repayment is in kind, so also is the original disbursement of credit, which is offered in the form of goods and services by the donor country. In this respect, the credits are similar to tied credits given by developed market economies, but it is claimed by centrally planned economies that the valuation of goods and services supplied is at international market prices and that therefore no hardship is involved. One disadvantage, however, remains—the donor country may not be in a position to supply all the equipment of the right quality. This difficulty could be partly overcome if centrally planned economies would agree to utilization of the credits in other centrally planned economies by making them convertible within the CMEA area.

The credit agreements generaly cover whole projects and include not not only machinery and equipment, but also preliminary surveys and training and education of nationals of the recipient countries in the construction and operation of the project. In

[1] See the appendix for a summary of UNCTAD recommendations on foreign investment.

[2] Centrally planned economies include Bulgaria, mainland China, Czechoslovakia, East Germany, Hungary, Poland, Rumania and the Soviet Union.

[3] Excluding Cuba.

[4] Source: "The Flow of Financial Resources to Less-developed Countries, 1956-1963". OECD. 1964. Table II-14.

addition, technical assistance is provided through the training of specialists, managers and technicians under a number of independent programmes. There are also programmes for training personnel from developing countries in the countries with centrally planned economies.

TABLE 7. CENTRALLY PLANNED ECONOMIES; COMMITMENTS OF BILATERAL ECONOMIC ASSISTANCE TO DEVELOPING COUNTRIES

(In million dollars)

Country or region	*Total up to 1959*	*1960*	*1961*	*1962*
By donor:				
Bulgaria	—	—	180	—
China (mainland)	145	46	51	51
Czechoslovakia	210	59	208	1
East Germany	29	—	61	6
Hungary	—	17	124	—
Poland	54	71	59	88
Rumania	11	—	50	50
Soviet Union	1,880	484	555	233
Total	2,327	677	1,126	429
By recipient:				
Africa	493	117	655	86
of which:				
Ghana	—	40	131	—
United Arab Republic	357	15	302	26
Latin America	109	—	200	—
Argentina	109	—	—	—
Brazil	—	—	200	—
Middle East	379	91	—	30
of which:				
Iran	6	—	—	—
Far East	1,344	467	271	313
Afghanistan	185	—	—	200
Burma	10	—	86	4
Cambodia	29	—	11	2
Ceylon	57	12	—	11
India	764	155	48	34
Indonesia	273	280	96	50
Laos	—	—	—	12
Nepal	23	20	—	—
Pakistan	3	—	30	—
Total all recipient countries	2,327	677	1,126	429

Source: United Nations, *World Economic Survey 1963*, Chapter 8 — Financing for an Expansion of International Trade — Table 8-26.

III. MULTILATERAL ASSISTANCE

A second type of official external assistance received by developing countries is that provided by international lending institutions and United Nations agencies. The institutions are: The International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the International Finance Corporation (IFC), the European Development Fund (FEDOM) and the Inter-American Development Bank (IDB). The United Nations agencies and programmes which provide technical assistance are: the Regular Programmes of Technical Assistance of the United Nations and its specialized agencies,[1] the United Nations Special Fund,[2] and the Expanded Programme for Technical Assistance (UNEPTA).[3]

The United Nations agencies provide grants while the international institutions provide loans, except for the European Development Fund which until 1962 provided assistance entirely in the form of grants. IDB and FEDOM are international only in a limited sense, as their assistance is confined respectively to the developing countries of Latin America and the associated overseas territories of the European Economic Community. The Asian Development Bank falls into this category; but, obviously, assistance by these regional institutions should be taken into account in assessing the total flow of external economic assistance to developing countries.

The international lending agencies are of the nature of joint corporations whose capital is contributed by developed and developing countries together, the share of developed countries being naturally much greater. IBRD and IFC, in addition, obtain funds through bond issues, sale of loans and investments. IBRD has been extending long-term loans to less-developed countries since 1947; and its disbursements, although small in relation to the funds supplied under the bilateral programmes, have been substantial. The amount of development capital supplied by multilateral agencies has increased considerably since the establishment of IFC in 1956 and IDA in 1960. The flow of funds from these institutions during 1960-63 is indicated in tables 8 and 9.

From 1960 to 1963, gross disbursements of the three institutions to less developed countries (including some countries in Europe) increased by 63 per cent from $354.0 million to $578.3 million and commitments by about 70 per cent from $583.2 million to $871.5 million. The increase was most marked in the case of IDA which, in 1963, accounted for 18 per cent of the total disbursements and 24 per cent of the commitments.

Table 9 shows the net flow of capital from the three institutions and the share of developing countries in the different regions. The net flow has also been increasing; but, in 1963, it was only slightly more than one-half of gross disbursements and less than one-third

[1] ILO, FAO, UNESCO, WHO, ICAO, ITU, IMO and IAEA.

[2] The Economic and Social Council has recently approved the merger of these two agencies under the title "Council of Administration for the United Nations Development Programmes".

[3] The United Nations publications on international economic assistance to developing countries and the Flow of Financial Resources to Less-Developed countries 1956-63, published by OECD (Paris, 1964) include other United Nations agencies and programmes such as the Children's Fund (UNICEF), the Relief and Works Agency for Palestine Refugees (UNRWA) and the Korean Relief Agency (UNKRA) in computing both the contributions of developed countries and the receipts of developing countries. They have been excluded as not being very relevant in the present context.

TABLE 8. GROSS LOAN DISBURSEMENTS AND COMMITMENTS BY MULTILATERAL AGENCIES TO LESS DEVELOPED COUNTRIES, 1960-63[a]

(In million dollars)

	Disbursements				Commitments			
	1960	1961	1962	1963	1960	1961	1962	1963
IBRD Loans	341.0	320.7	409.2	462.1	568.6	568.3	506.7	648.1
IFC Loans & participations	13.0	7.9	18.1	11.6	14.6	12.6	18.1	13.5
IDA Loans	—	0.5	24.7	104.6	—	180.8	186.7	209.9
Total	354.0	329.1	452.0	578.3	583.2	761.7	711.5	871.5

Source: Flow of Financial Resources to Less-Developed Countries, 1956-63 — OECD, Paris, 1964 — Table IV-13.
[a] Including Cyprus, Greece, Spain, Turkey and Yugoslavia.

of total commitments. It amounted in that year to $309 million, of which the developing countries of Latin America received 58 per cent and those of Asia, 37 per cent, while the developing countries in Africa[1] suffered a small net outflow (because of subscription payments to IDA).

The International Bank of Reconstruction and Development

IBRD was originally established to finance reconstruction of production facilities destroyed by the war and increase of productivity and living standards in the underdeveloped areas of the world. The initial emphasis of the Bank's activities was on reconstruction in Europe; but, after the European Recovery Programme came into operation, the Bank turned its attention to its other responsibility, financing the development of less developed countries. This has since become the principal area of its activities.

TABLE 9. NET DISBURSEMENTS[a] BY MULTILATERAL AGENCIES TO LESS DEVELOPED COUNTRIES[b], 1960-63, AND THE SHARES OF DIFFERENT RIGIONS

(In million dollars)

	1960	1961	1962	1963
IBRD[c]	254.10	194.80	267.20	262.80
IFC	12.15	8.50	15.22	8.20
IDA	-27.30	-40.70	-32.10	37.80
Total	238.95	162.60	250.32	308.80
Europe	-11.51	- 5.70	7.18	10.70
Africa	127.69	52.80	49.45	- 1.20
Latin America	66.64	48.70	99.80	180.60
Asia	55.03	66.80	108.25	118.70
of which: Middle East	- 1.00	9.50	13.85	3.80
South	53.93	52.30	72.70	86.40
Far East ..	2.10	5.0	21.70	28.50

Source: Flow of Financial Resources to Less-Developed Countries, 1956-63, OECD, Paris 1964, Table V-5.
[a] Net loans less subscriptions and contributions.
[b] Including Cyprus, Greece, Spain, Turkey and Yugoslavia.
[c] Including net change in IBRD outstanding debt and net sales of IBRD loans and participations by developing countries. The total for 1960 includes an unallocated amount of $1.10 million.

[1] The share of the developing countries of Africa in the disbursements of IBRD, IFC and IDA has been progressively reduced since 1960, as their receipts from the FEDOM and United Nations technical co-operation agencies have increased. Their net receipts from EEC amounted to $51 million in 1962 and $63 million in 1963.

As of June 30, 1964 the Bank held effective loans in 55 countries totalling $4,994 million, of which $3,461 million had been actually disbursed.[1] About $1,600 million or one-third of the total effective loan, was in developed European countries, Japan, South Africa, Australia and New Zealand and two-thirds in developing countries. Among developing countries, seventeen Latin American countries accounted for $1,526 million or about 30 per cent; nine Asian countries accounted for $1,357 million, or 21 per cent; and nine African and Middle Eastern countries for $313 million, or 6 per cent. The position of ECAFE countries is shown in table 10.

The Bank gives loans primarily for the establishment of basic facilities which are prerequisites for general economic development, but it also finances industries. Of about $7,900 million worth of loans given by the middle of 1964, about $2,400 million was for electric power generation and distribution, about $2,500 million for transportation, about $550 million for agriculture, poultry and fishing, $1,240 million for industry, $500 million for postwar reconstruction and the balance for general development and other purposes. It appears that transportation and power have attracted the major part of the Bank's financing and that the share of industries has been rather small.

TABLE 10. IBRD LOANS TO ECAFE COUNTRIES AS OF JUNE 30, 1964

(In million dollars)

Country	Total commitments	Total[a] disbursements	Effective loans currently held by Bank
Burma	33.5	30.8	26.0
Ceylon	41.5	32.9	34.0
China (Taiwan)	8.0	—	7.0
India	876.0	742.7	648.0
Iran	213.0	189.8	104.0
Malaysia	95.5	33.6	84.0
Pakistan	361.0	188.7	245.0
Philippines	82.0	44.3	74.0
Thailand	182.0	121.3	135.0

[1] The original principal amount of loans signed on June 30, 1964 was $7,931 million, of which $177 million had been cancelled or refunded, $773 million repaid, $1,759 million sold or agreed to be sold and $252 million not yet effective — leaving a net effective balance $4,949 million after exchange adjustments.

Total nine developing ECAFE countries .	1,892.5	1,392.2	1,357.0
Australia	417.7	388.4	195.0
Japan	613.0	488.6	526.0
New Zealand	40.5	3.9	35.0
Total developed ECAFE countries .	1,071.2	880.9	756.0
Grand total	2,693.7	2,273.1	2,113.0

Source: Prepared from IBRD annual reports and International Financial Statistics.

[a] Up to end of December 1964.

In the developing ECAFE countries, the Bank has financed power generation and distribution in Ceylon, India, Malaysia, Pakistan, the Philippines and Thailand and, when all the projects are complete, they will add about 2 million kilowatts to the total generating capacity of those countries. In addition, it has financed the construction of gas pipelines in Pakistan to the extent of about $29 million, which has increased the availability of power in that country. (The Bank has also financed a considerable amount of power generation in the developed ECAFE countries, Japan, Australia and New Zealand, particularly in Japan and Australia).

In the sector of industry proper, loans made by the Bank to ECAFE countries, up to June 30 1964, amounted to around $580 million out of total loans amounting to $2,964 million, or a little less than one-fifth. Only seven countries received such loans: India, $283.5 million, Japan $163.5 million, Pakistan $93.5 million, the Philippines $15 million, Malaysia $8 million, Iran $5.2 million, and Thailand $2.5 million. The Bank has financed development of the Indian steel industry by making two loans to the Indian Iron and Steel Company and two further loans to the Tata Iron and Steel Company. These loans have helped to increase the steel producing capacity of India by about 800,000 tons a year. The Bank has also made two loans to increase coal production to meet the growing needs of the steel mills and other users. In addition, it has made four loans totalling $60 million to the Industrial Credit and Investment Corporation of India and one loan of $30 million to the Industrial Development Bank to finance the growth of private industry.

In Pakistan, the Bank has made a loan of $4.2 million to one industrial unit — the Kamaphuli Paper Mills Limited — for the production of pulp and paper. It has, however, provided loans to the extent $79 million to the Pakistan Industrial Credit and Investment Corporation and a further loan of $20 million to the Industrial Development Bank to aid the growth of private industry. The industrial credits given by the Bank to Japan have also been channelled through a local financing institution, the Japan Development Bank. Most of the amount of $163 million lent has been used to finance steel companies to help in modernizing and enlarging Japan's steel manufacturing capacity. Compared to the loans given to India, Japan, and even Pakistan, assistance given by the Bank for industrial development in the Philippines, Iran, Malaysia, and Thailand has been quite moderate. The small loans made to these countries have all been to their industrial development finance companies.

In addition to providing long-term development capital, the Bank is helping developing countries with technical assistance. This has consisted in despatching missions to various countries to analyse their economies and recommend a pattern for a long-term development programme, posting of resident missions or advisers, and provision of experts and training. The Bank has made comprehensive economic surveys in Ceylon, Malaysia, and Thailand, and has helped to prepare Malaysia's second five-year plan. Bank missions have kept in particularly close touch with the economic problems of India and Pakistan. There are resident missions in both countries. Studies organized by the Bank preceded the establishment of industrial development banks in both. Most important, the Bank has taken a lead in concerting the efforts to provide assistance to these countries by calling meetings of the "Aid to India" and "Aid to Pakistan" consortia. It has established a resident mission in the Philippines and has had a resident representative in Thailand for a number of years. In both those countries, Bank missions have assisted in the drawing up of long-term development plans. Moreover, the Bank has organized and contributed toward the financing of specific studies in other ECAFE countries, including a study to promote an investment programme for the improvement of transportation in China (Taiwan) and another to assist in the establishment, and initial operation, of an authority for the planning and development of the electric power industry. A large number of officials from the Asian member countries have received training in the Bank's Economic Development Institute, and in the Bank itself.

The actual expenditure of the Bank in providing these services to its members, including the cost of the EDI, amounted to $4.3 million in the fiscal year ending June 30, 1964, and was expected to increase to $5 million in fiscal 1965.

The Bank's assistance for direct industrial projects has been small as compared to that given for the development of infrastructure. After the establishment of IDA to make soft long-term loans for this purpose — which is the most appropriate kind of financing for such projects — the Bank may be able to devote a larger part of its resources to financing more directly productive enterprises.

It will be noticed that, in the ECAFE region, more than one-third of the Bank's financing has been in developed countries. Since the developing countries' need for finance is much more acute than that of the developed countries which have greater access to private capital and other sources, it is desirable that the Bank give more attention to the former.

Finally, the Bank should step up its over-all level of operations. The Bank's average annual commit-

ments to less developed countries during 1960-63 were of the order of $570 million only and the rate of increase was quite slow. The rate of net disbursements was about two-fifths of its commitments. As has been pointed out by Andrew Shonfield, if the Bank continues to lend money at a steady rate of $700 million a year, servicing costs will increase to a point where the net contribution to development is reduced to zero within a few years.[1] The Bank can and should increase the rate of its lending.

International Finance Corporation

IFC is an international investment institution with a capital of about $100 million subscribed by member countries, including a number of developing countries. It is affiliated with the World Bank, but its operations are distinct, dealing as it does exclusively with private business. It is essentially an investing rather than a lending institution, though under its charter it cannot invest in capital stock and shares. It makes loans to private projects on the basis of their merit as investments for private capital. Though the Corporation does not participate in management, its loans carry some right to share in profits and the growth of business. It invests mostly in developing countries, in association with local and foreign private capital and, unlike the World Bank, does not require any guarantee from the government involved. Among the World Bank group of institutions, it has taken a leading part also in financing industrial development finance corporations in various countries.

The disbursements and commitments of IFC to developing countries have already been shown in table 8. As of June 30, 1964, its operational investments and standby and underwriting commitments totalled $111 million in 29 countries (12 in Latin America, 5 in Africa, 6 in Asia, 5 in Europe and 1 in Australia). Out of the original investment, only $59 million is now held by the Corporation: $17.8 million in equity and $41.7 million in loans, the balance having been sold to private investors or repaid.

In Asia, the Corporation holds investments in the following ECAFE countries: India (six undertaking — $1.74 million and an additional $6.04 million not yet effective), Iran (one undertaking — $.2 million), Malaysia (one undertaking — $.82 million), Pakistan (four undertakings — $5.07 million), the Philippines (one undertaking — $.21 million) and Thailand (one undertaking — $.19 million). The undertakings in Iran, Malaysia, Philippines, and Thailand are all industrial development finance companies. The four enterprises in Pakistan include the Industrial Credit and Investment Corporation. The rest of the enterprises in Pakistan and all the enterprises in India are actual industries — mostly producer goods industries.

IFC's current investment in ECAFE developing countries (including that promised in India) is less than a quarter of its total investments and less than half of its investments in Latin America. The Corporation has, however, some special merits which make it an institution of considerable promise for the industrial development of under-developed countries. It is its business to promote industrial ventures. For this it carries out technical investigations and feasibility studies on projects for investment and is prepared to help local and foreign investors with information, advice and technical assistance even if its financing is not sought. It is a recruiter and mobilizer of foreign capital and promoter of joint ventures. It not only enlists foreign capital assistance through sale of loans and participations, but it also associates such capital in many cases from the beginning. This enables large total investments to be made with a limited amount of IFC capital. The Corporation's participation creates confidence which attracts foreign investment which might not otherwise be forthcoming. It can thus be considered as an important instrument for promoting private industrial investment in less developed countries.

The drawback of the Corporation is limited funds. A proposal has been made to amend the articles of Agreement of both IBRD and IFC to enable the Bank to make loans to IFC for relending to private companies. This proposal, if accepted, would facilitate further use of Bank funds and enable the Corporation to expand its operations.

International Development Association

IDA is an affiliate to IBRD, but its financial resources are entirely separate. Like the Bank, it helps to finance development projects, but, unlike the Bank, it finances projects in developing countries (Part II members) only and gives loans on specially favourable terms and for very long periods. As against five per cent interest charged by the Bank, IDA gives its loans free of interest, making only a service charge of ¾ per cent per annum. The loans are payable over a period of 50 years, including a ten-year period of grace. Repayment is at the rate of one per cent per annum for ten years after the grace period and three per cent per annum for the remaining 30 years.

Disbursements and commitments of the Association from 1960 to 1963 have been shown in table 9. During the fiscal year 1963/64, $283 million of new credits were approved and this brought total commitments on June 30, 1964 to $778 million. Cumulative disbursements stood at $193 million. The distribution of the commitments and disbursements by area and country is shown in table 10.

IDA has given credits to 21 developing countries: nine in Latin America, six in Africa, two in the Middle East, and four in Asia and the Far East. Though the financing is concentrated in only four countries in the ECAFE region (of which two account for most of the total commitment in the area), the share of this region in total commitments as well as actual disbursements is as high as about four-fifths. With more ECAFE

[1] The Attack on World Poverty — Andrew Shonfield; Chatto and Windus 1960.

countries receiving loans from IDA in future years, the benefit of its assistance will become more widespread in the region, as it should be.

TABLE 11. DISTRIBUTION OF DEVELOPMENT CREDITS GIVEN BY IDA UP TO JUNE 30, 1964, BY AREA AND COUNTRY

(In million dollars)

Country and region	*Total commitments*	*disbursements*
Latin America	82.0	17.5
Africa	54.4	10.7
Middle East	17.0	1.2
Europe	26.7	5.0
Far East	598.3	157.9
China (Taiwan)	19.0	8.5
India	390.0	133.7
Korea, South	14.0	13.7
Pakistan	179.0	2.0
Total	778.3	192.3

Source: Annual Report of IDA for 1963-64.

IDA's loans to the ECAFE countries concentrate on infra-structure building through financing of highway construction and transportation, water supply and irrigation, rather than on industrialization as such. It has, however, given some direct assistance to industrialization and power production also. It has made a loan of $55 million to the China (Taiwan) Development Corporation, financed an industrial estate project in Pakistan and provided finance to the extent of $56 million for three power projects in India. During 1963-64, it provided a credit of $90 million to finance industrial imports to facilitate fuller use of selected capital goods industries in that country. Taken with the investments in power development, IDA commitments up to June 30, 1964 for industrialization — mostly in Asia — came to $162.5 million or more than one-fifth of total commitments for all purposes.

The Asian Development Bank

Before closing this section on international lending agencies, mention must be made of the Asian Development Bank. A capital of $1,000 million has been agreed on, part of which is to come from the ECAFE countries themselves. The Bank's organization will perhaps be similar to that of IDB and, like IDB, it will raise funds also through issuing bonds and other forms of borrowing. It will be able to provide finance including soft loans for development projects including infrastructure, agriculture and manufacturing, as may appear necessary.

There can be no doubt that this Bank will be of great benefit to the developing countries of the ECAFE region, if it can mobilize additional capital for their development. As will be seen from section V, those countries are still very short of development funds and the ADB will be a new and a more readily accessible source. The technical resources of the Bank will also be available to help the member countries with preparation of projects and studies. More important, the Bank can be an instrument to promote regional cooperation in planning and development.

IV. TECHNICAL ASSISTANCE

Technical assistance given by the United Nations and its specialized agencies under the Regular and the Expanded Programmes consists mainly in the provision of experts and advisers to help governments and of arrangements for direct training through regional training centres, seminars, workshops and the like, and country fellowships. United Nations Special Fund assistance is also limited to the provision of experts, fellowships, equipment and supplies and special services essential for projects, but the orientation of Special Fund activities is different. The Fund "seeks to raise the productive capacity of the under-developed nations by demonstrating where investment is feasible and by creating conditions to make it more fruitful. It produces factual data upon which domestic and outside investors can rely for guidance. It also helps to build institutions and skills essential to self-sustaining economic growth and social advance."[1]

The importance of technical assistance for the less developed countries is well known. Lack of sufficient qualified and trained personnel in various fields is a great handicap to their development. It is generally recognized that, to achieve the Development Decade target of five per cent annual growth, the developing countries will have to increase their gross investment from the current low levels to nearly 20 per cent of their gross domestic product. It has been estimated that five per cent of this investment will have to be devoted to pre-investment surveys, feasibility studies and the training of personnel, if the lag in this sector does not hold up progress. The developing countries are not in a position to meet the necessary expenditure from their own resources and they do not have the required facilities. Therefore, they depend heavily on the United Nations, on individual developed countries, and on international organizations.

The value of technical assistance provided by the United Nations and its specialized agencies to developing countries through the UNEPTA and UNSF programmes has considerably increased in recent years, particularly assistance given by UNSF.

The expenditure on the Regular and Expanded Programmes of assistance and earmarkings of the Special Fund amounted to $64 million in 1960 and increased to $105 million in 1964. The share of Africa in total increased from a third in 1962 to almost half in 1964; that of Asia and the Far East increased from about one quarter to a little less than one-third, while the combined shares of Latin America and the Middle East dropped from two-fifths to a little more than one-fifth. Africa predominated both as regards technical assistance and Special Fund allocations.

[1] United Nations Special Fund Report 1963, p.6.

TABLE 12. VALUE OF TECHNICAL ASSISTANCE GIVEN BY UNITED NATIONS AGENCIES TO DEVELOPING COUNTRIES, 1960-64, AND SHARE OF VARIOUS REGIONS
(In million dollars)

Year	Regular programme [a]	Expanded programme [a]	Special Fund [b]	Total
1960	2.20	5.80	56.0	64.00
1961	3.37	5.70	33.25	42.50
1962	5.80	8.00	73.00	86.80
1963	7.00	7.25	72.25	86.50
1964	6.28	10.52	88.20	105.00

Distribution by regions

Regions	1962		1963		1964	
	Value	Percentage	Value	Percentage	Value	Percentage
Africa	22.66	34	29.0	34	47.50	46
Latin America	20.81	24	23.25	27	18.50	17
Middle East	13.60	16	8.75	10	5.0	5
Asia and Far East	22.23	25.5	24.75	28	32.50	31
Inter regional	.50	.5	.75	1	1.50	1
Total	86.80	100	86.50	100	105.00	100

Source: Prepared from particulars contained in the reports on the programmes made to ECOSOC.
[a] Expenditure.
[b] Governing Council's earmarkings.

Up to the end of 1964, the Special Fund had approved 421 projects involving $375 million of its own resources and a total cost of $918 million, including counterpart contributions of the recipient governments. For resources surveys there were 167 projects, for technical education and training institutes there were 163, for applied research institutes there were 84, and the remaining seven were for economic development planning. Technical training involved half the total cost and surveys and research the balance, except for some 2½ per cent spent on planning.

By 31 October 1964, thirty-four projects had been completed and 255 projects were in various stages of field operation. An amount of $233.3 million had been spent on project execution by 30 June 1964 — the equivalent of $149 million by recipient governments and $84.3 by the executive agencies on behalf of the Special Fund. As of 30 September 1964, 1,500 experts, 17,000 national personnel, including 6,000 technical staff, were working on Special-Fund-assisted projects; 600 counterparts had been awarded fellowships and 56,000 persons had completed for or were receiving advanced and technical training. What is more significant, $780-million-worth of international and domestic funds had come forward to finance development activities recommended as a result of sixteen pre-investment surveys and feasibility studies carried out at a total cost to the Fund and recipient governments of $16 million only.

The ECAFE region's share in Special Fund activities so far has been 120 projects costing altogether $274 million, of which the Fund will bear $112.5 million. Only one of these projects — an international institute of seismology and earthquake engineering costing $.76 million — is located in Japan; the rest are being operated in the developing ECAFE countries. The distribution of these projects and Special Fund allocations by country may be seen from table 13.

TABLE 13. APPROVED SPECIAL FUND PROJECTS IN ECAFE COUNTRIES
(as of 31 October 1964)
(In million dollars)

Name of country	No. of projects	Special fund allocation
Afghanistan	6	5.46
Burma	5	3.28
Cambodia	3	2.26
Ceylon	3	2.55
China (Taiwan)	7	4.62
India	27	24.80
Indonesia	5	6.35
Iran	10	12.40
Japan	1	.70
Korea, South	8	6.50
Laos	1	.58
Malaysia	4	2.78
Nepal	2	1.33
Pakistan	11	12.86
Philippines	8	6.89
Thailand	11	8.83
Viet-Nam, South	1	.27
Regional	7	9.90
Total	120	112.50

One of the three schemes in operation in Afghanistan is a higher technical college. Of the projects in Burma, one — a survey of lead and zinc mining and smelting — relates directly to industry. Cambodia has been provided a centre for technical staff training and productivity. Ceylon's projects include a small industry service institute and a pre-investment study of forest industries development. Of the projects approved for China (Taiwan) one — a metal industries development centre — relates directly to industry; another — a centre for auto-technician and instructor training — has also some industrial bearing. Iran has ten projects in operation, of which four are training or survey institutes relating to mining and industry. There is also a scheme for feasibility studies for an industrial institute.

Of the projects in operation in India, eight are vocational training institutes, three are engineering and mining research institutes, one is an institute for petroleum exploration, refining and petrochemicals, and three are surveys or pre-investment studies having a bearing on industrial and infrastructural development.

The Republic of Korea has a number of projects, but they relate to agriculture, fishing and forestry. There is only one project relating to industry — the Productivity Centre, Seoul. Malaysia has also a productivity centre and a light industry service unit. The two projects in Nepal both relate to hydropower and irrigation. The majority of the projects in Pakistan, however, relate to industrial and management training or surveys. There is a mineral survey project and four

management development and training centres and a polytechnic. There is also a project for manpower planning. The projects in operation in the Philippines include two institutes, one relating to dairy industry and the other to geology, and a scheme has been recently approved for a survey of coal resources. Thailand has a fair number of projects, of which those having a bearing on industrial development are a management development and productivity centre, a technological research institute, a technical institute, and a survey scheme for paper and pulp material.

Besides the individual country schemes, there are a few regional projects in operation in Asia. Five of them pertain to the Mekong Project. Another important project that is destined to play a significant part in the economic development of all countries of the region is the Asian Institute of Economic Development.

The requests of Governments for the Special Fund's assistance exceed its financial resources. At the fourteenth session (in June 1965) of the Governing Council, the Managing Director expressed his conviction that the next five years of the Development Decade would demand at least a doubling of the United Nations pre-investment efforts. During the discussion, most of the members, including those representing both industrialized and developing countries, expressed the view that the target of annual pledges to the Special Fund and the Expanded Programme of Technical Assistance should be raised to the level of $200 million with effect from 1966.

Colombo Plan[1]

In addition to the technical assistance provided by United Nations agencies valuable assistance is also received by the ECAFE countries under the bilateral technical assistance programme of AID and from the other members of the Colombo Plan. All developing ECAFE countries, with the exception of China (Taiwan) and Iran, are members of the Colombo Plan and, in addition to technical assistance received from AID, they get technical assistance from the United Kingdom, Canada, Australia, New Zealand, and Japan. This assistance is provided through training in the donor and third countries, and through supply of experts and equipment. During 1962-63, the value of assistance given by individual countries was: Australia, $4 million; Canada, $2 million; Japan, $1.7 million; New Zealand, $1.3 million; the United Kingdom, $5 million; and the United States, $72 million. The total technical assistance from the beginning of the Colombo Plan in 1951 up to June 1964 is reported[2] to have exceeded $500 million. Training had been given to a total of 28,613 persons from the developing member countries; 5,981 experts had been provided, and equipment valued at $196 million supplied.

[1] In addition to technical assistance, development assistance is also provided under the Colombo Plan through capital grants, loans and supply of surplus commodities. Since this is in the nature of bilateral assistance given by other countries and its value is already included in the contribution of the individual countries in section I, it is not dealt with here separately.

[2] The Colombo Plan, Vol. 9, no 12, Colombo Plan Bureau, Colombo, 1964.

V. EFFECT OF EXTERNAL ASSISTANCE ON INDUSTRIALIZATION

In the previous sections an account has been given in some detail of the assistance received from various sources by developing countries, particularly the developing ECAFE countries. It is now desirable to consider the contribution of this assistance to industrialization.

It may be stated at the very outset that no exact assessment of the results is possible. Firstly, the total flow of assistance has consists of various elements with different development potentialities. Second, the assistance has, in the main, been directed toward over-all economic development — not to industrial development as such — and, although development of transport and communications or other components of infrastructure can, up to a point, be expected to stimulate industrialization to a more or less corresponding degree, it is obvious that the correlation does not admit of quantitative measurement. Finally, the nature and extent of statistical information — which has to be gathered primarily from the balance of payments accounts of the donor and the recipient countries — is such that an accurate assessment of even the volume of the flow is not possible, not to speak of its effect on the different sectors of the countries' economies.

As has been stated before, the flow of assistance to developing countries in significant volume commenced from the early 1950's. From 1951 to 1959, developing countries as a whole received some $28 billion of official donations (grants) and official and banking and private capital from all sources.[1] The share in this of nine ECAFE developing countries — Burma, Ceylon, China (Taiwan), India, Indonesia, Pakistan, Philippines, South Korea, South Viet-Nam, and Thailand — was $6,600 million. This was mainly in official donations (four-fifths) and official and banking capital, but three countries (the Philippines, China (Taiwan) and Pakistan also received a sizable net inflow of private capital ($34,244 and 41 million respectively). The amounts received by Burma and Ceylon were negligible (average $10 million and $1 million per annum). The amounts received by Indonesia and Thailand were also comparatively small

[1] This computation is derived from "The United Nations International Flow of Long-term Capital and Official Donations 1951-59", table 7, which is based on the balance of payments statistics of the recipient countries. Since the data are not complete — all countries are not covered and in many cases figures of reinvested earnings are not recorded — there is an under-estimation. According to the statistics of the donor countries, the total contribution during the period from developed market economy countries alone was $30.4 billion. Moreover, developing countries received some $2.2 billion in commitments from centrally planned economies and about $1.6 in billion net loans from international financial institutions.

(average $20 and $22 million per annum), but Thailand received an appreciable inflow of private capital. About half of the balance of assistance was received by two countries — the Republic of Korea ($2,050 million) and India ($1,250 million), while the other half was distributed among China (Taiwan) ($805 million), South Viet-Nam[2] ($805 million), the Philippines ($622 million) and Pakistan (591 million). The bulk of the assistance was provided by the United States under the Mutual Security Programme, of which "defence support" grants were the most important element; and, under PL 480, the Republic of Korea, the Republic of Viet-Nam, Pakistan and China (Taiwan) were large recipients of defence support funds, while India received mainly PL 480 commodities and DLF and Export/Import Bank loans. Supplies from PL 480 saved foreign exchange expenditure on food and other commodity imports and was a source of large scale public saving, while the loan funds, being utilized mostly on development projects, were development capital in a direct sense.

The development effect of the flow of external assistance during the 1950's can be judged broadly in another way. The inflow of foreign saving in the form of an excess of imports over exports of goods and services made a significant addition to the resources of the recipient countries for economic development. In fact, increase in the rate of capital formation in several countries was to a large extent financed by the flow of such saving from abroad. For instance, the entire total net saving of Republic of Korea, three-fifths of the net saving of China (Taiwan) half that saving of Philippines and one-eighth of the saving of India during 1950-59 was accounted for by foreign saving[1]. But foreign saving not only supplemented domestic saving for capital formation, it also provided much needed foreign exchange to finance the import of capital goods required for general and industrial development (see paragraph 90 below).

The inflow of external assistance to developing countries considerably increased during the 1960's compared with the 1950's. As has been stated before, about one half of this flow was toward the developing countries in Asia and the Far East. The total volume of net bilateral assistance received by the developing ECAFE countries from developed market economies during 1960-63 was $7,800 million[2]. In addition, they received about $835 million of private capital (including guaranteed export credits) and $340 million from multilateral lending agencies. Adding, on a very rough estimate, some $600 million as net disbursements from centrally planned economies, the total receipts will have amounted to about $9,600 million.

Of these various categories of assistance, private capital is the most directly related to industries. The purposes for which loans from multilateral agencies and centrally planned economies were utilized have already been broadly indicated. Only about one-seventh of the total loan commitments by IBRD was in the industrial sector, while IDA concentrated mainly on infrastructure. IFC was primarily concerned with industries, but its resources are still limited. The credits from centrally planned economies were in a larger measure related to industrialization. Of the total bilateral assistance given by the industrial OECD countries during 1962-63, about 40 per cent was to finance current imports; 13 per cent for technical co-operation; 35 per cent for projects other than industrial projects, such as transport and communication, power, and social infrastructure; and 8.5 per cent was for industries as such. The major contributor of assistance to the developing ECAFE countries was the United States, the proportion of its assistance for industrialization being 6 per cent. West Germany and Japan devoted 23 and 30 per cent of their respective contributions to industries, while the United Kingdom's contribution was 10.4 per cent.

The major recipients of assistance in the ECAFE region were India ($3,300 million), Pakistan ($1,350 million), the Republic of Korea ($1,060 million), the Republic of Viet-Nam ($770 million), Indonesia ($700 million), China (Taiwan) ($430 million), and Thailand ($430 million). Most of these countries have made quite impressive industrial progress, although in volume, industrial production is not yet very significant in any of them. Since the progress of industrialization in the ECAFE region has been elaborately dealt with in another document prepared for the Conference, it will be enough if only a few broad indications are given here.

Between 1953 and 1963, industrial production in Pakistan and the Republic of Korea increased 3.5 times, in China (Taiwan) 2.8 times, in the Philippines 2.3 times and in India 2.1 times. During the first four years of the Development Decade, manufacturing production increased in Pakistan at an average annual rate of 13.2 per cent, in China (Taiwan) 12.5 per cent, in the Republic of Korea 11.2 per cent, in India 6.9 per cent, and in the Philippines 6.2 per cent. As a result of this progress, there was an appreciable change in the structure of the economies of these countries, as can be seen from the table 14 which also indicates their growth.

It is no mere coincidence that fairly rapid economic and industrial development has taken place in those developing ECAFE countries which have been the largest recipients of external assistance. This development was to a considerable extent generated by the assistance received.

The part played by external assistance in the industrial development of the developing ECAFE countries can be seen more clearly if the volume of assistance is compared to the relevant factors. The rate of fixed capital formation is the key to economic development, and, as could be expected, this rate has

[1] United Nations, *World Economic Survey*, 1960 — Table 2-2.

[2] 1956-59.

[2] This is according to information supplied by donor countries.

TABLE 14. EIGHT DEVELOPING ECAFE COUNTRIES: STRUCTIONAL CHANGE IN ECONOMY BETWEEN 1953 AND 1963

Country	1953				1963			
	GNP a	Agriculture b	Industry b	Gross domestic capital formation	GNP a	Agriculture b	Industry b	Gross domestic c capital formation
	billion dollars			percentage of GNP	billion dollars			percentage of GNP
Burma	1.02	40	10.7	19	1.67	33	19.4	15.5
Ceylon	1.03	54	13	10.6	1.48	48	12.3	14
China (Taiwan)	0.94	39	20	16	1.84	26	31	21
India	25.24	49	15.5[d]	—	33.24[e]	42	16.1[d]	18.5[f]
Korea, South	2.43	40.5	10.7	12	3.90	32.8	20	15.5[h]
Pakistan	5.47	59	9	8.4[g]	8.6	48	16	17
Philippines	3.4	43	16.8	8	5.6	33	21.3	13
Thailand	1.76	42.3	17.5	15	3.12	36	19	17

Source: United Nations, *Yearbook of National Accounts Statistics and National sources.*
[a] In constant prices.
[b] Mining, manufacturing and construction.
[c] Relates to 1962.
[d] Manufacturing, construction and utilities.
[e] Relates to 1962.
[f] Relates to 1960.
[g] Year ending June 1953-54.
[h] 1963-64.

considerably increased in the developing ECAFE countries. This would not, however, have been possible — not to the same extent — if foreign savings had not been transferred through external assistance. Their capital formation was in large part financed by their current account deficits, which enabled them to import foreign goods and services to a much greater extent than could be financed from their own earnings from exports of goods and services, and these current account deficits were almost invariably covered by external assistance (see table 15).

TABLE 15. EXTERNAL ASSISTANCE DURING 1960-63 AS PERCENTAGE OF CURRENT ACCOUNT DEFICIT AND GROSS DOMESTIC CAPITAL FORMATION OF TEN ECAFE DEVELOPING COUNTRIES

Country	Current account deficit (—) (1)	External assistance (2)	(2) as percentage of (1)	(2) as percentage of gross domestic capital formation
	million dollars			
Burma*	7	155	—	16.4
Ceylon*	— 140	85	60	14.0
China (Taiwan)*	— 389	430	110	30.0
Indonesia	—1,051	700	70	—
India	—3,375	3,300	100	13.7
Korea, South .	—1,155	1,062	99	75.0
Pakistan	—1,320	1,350	100	28.6
Philippines ...	— 224	223	100	9.0
Thailand	— 222	432	200	24.0
Viet-Nam, South	— 787	772	100	96.5

* The reserves of those countries which received more assistance than their current account deficits, increased over the period: Burma $58 million, China (Taiwan) $100 million, Thailand $205 million. The reserves of Ceylon and Indonesia, which received less, decreased by $26 million and $300 million respectively.

Even if it were possible that those countries could have increased their domestic saving to the extent required, fixed capital formation would have lagged behind on account of their inability to import a sufficient volume of capital equipment and other producer goods with their own foreign exchange resources. About 40 to 45 per cent of the imports of those countries now consist of capital goods, including materials, but they are to a large extent financed directly or indirectly by external assistance. For instance, in 1963, in the Republic of Korea and the Republic of Viet-Nam, not only the entire capital goods imports, but also a large part of consumption goods imports were financed by foreign assistance received during that year. In Pakistan, 95 per cent of capital goods imports were so financed and, in India and China (Taiwan), 75 and 59 per cent. In fact, foreign assistance has now assumed a significant proportion of the total foreign exchange availabilities of almost all developing ECAFE countries, and the increase in this assistance over the last few years has partially compensated for the slow rate of expansion of their own export earnings (see table 16). But for increasing external assistance, the developing ECAFE countries would have had to curtail their imports drastically, and it is easy to imagine what effect that would have had on the rate of their development.

External assistance has not only assisted development by providing foreign exchange, but it has also provided local capital for investment, as in the case of loans and donations from counterpart funds generated by the sale of PL 480 commodities. This has been a major source of public capital in the recipient countries and also an important source of initial and working capital for private industrialists. It has helped to overcome the difficulties and bottlenecks created by the shyness and paucity of local investment capital in these countries.

TABLE 16. EXTERNAL FINANCIAL ASSISTANCE[a] RECEIVED BY EIGHT ECAFE DEVELOPING COUNTRIES IN RELATION TO SELECTED VARIABLES, 1963

(million dollars)

Country	External assistance (1)	Merchandise exports (2)	(1) as percentage of (1) & (2) (3)	Import of[b] capital goods (4)	(1) as percentage of (4) (5)
Burma	27	265[c]	9	88[c]	30
Ceylon	21[d]	358	5	–98	21
China (Taiwan)	83	332	20	142	59
India	975	1,602[e]	37	1,294	75
Korea, South	332	87	80	208	165
Pakistan	496	416	54	519	95
Philippines	55[d]	727	7	299	18
Thailand	132	453	22	331	40
Viet-Nam, South	223	77	74	122	182

[a] Excluding assistance from centrally planned economies.
[b] Including materials for capital goods.
[c] 1962.
[d] Average of 1960-63.
[e] 1963-64 financial year.

Finally, as bilateral and multilateral capital assistance has helped development by providing much needed foreign exchange and savings, bilateral and multilateral technical assistance has helped by providing and improving the countries' know-how. This assistance is no doubt still far short of needs; but, small as it is, it has permitted the carrying out of essential resource surveys and led improved technical knowledge and skills without which the economic development of the ECAFE developing countries would have been much slower than it has been.

VI. SOME PROBLEMS CONCERNING EXTERNAL FINANCIAL ASSISTANCE AND RECOMMENDATIONS

As stated in the previous section, external financial assistance has considerably helped the economic and industrial development of the developing ECAFE countries. It must be pointed out that this assistance has not been commensurate with the total needs of these countries, however. The figures given in table 3 suggest that the current volume of assistance is very substantial, but that there is an element of exaggeration in the statements of assistance given which are made by the various countries, and also an element of duplication. Then, again, all components of the total assistance have not been of equal value in promoting development.

Developed countries have tended to include all capital transfers to developing countries in their assessment of contribution, irrespective of the reasons for particular kinds of transfer or of their terms. This includes reparation and indemnity payments as well as budgetary and other financial assistance given to dependent territories. Officially guaranteed export credits no doubt help recipient countries by enabling them to import goods which they might not be able to import otherwise, but they carry full commercial rates of interest and are thus in the nature of investments which a country with loanable funds and intending to stimulate exports could normally be expected to make in any country — developed or developing — that is prepared to receive them. The same can be said about private export credits — whether guaranteed or not. Private capital investments are also regulated by the profit motive and they are directed to countries and sectors which promise the best returns, and, although such investments have beneficial effects in promoting industrialization and exports, in imparting advanced technology and skills and in increasing employment, they have obviously to be viewed as assistance of a different category from grants and soft loans. In this connexion, it has also to be remembered that about one-half of total private investment consists of re-investment of income generated in the recipient countries themselves. Although such income is remittable and re-investment adds to foreign exchange availabilities by obviating an outflow, it does not bring any new funds.

It has been seen that bilateral financial assistance from developed market economies consists of grants, transfers of resources (as under the United States assistance programme), loans payable in the recipient countries' currencies (made out of counterpart funds generated by commodity sales) and loans repayable in donor's currencies.[1] Transfers of resources through the P.L. 480 programme are grant-like contributions, which really helps recipient countries, but such transfers of agricultural surpluses had to be very carefully programmed in order to ensure that they would not hurt the commercial exports of other developing countries or impede the agricultural production of recipients countries. Export credits are sometimes tied to procurement within the donor countries. This generally means that the recipient countries have to pay higher prices for the goods imported, which considerably reduces the value of such assistance. The extent of over-payment involved can be gauged from the fact that, in connexion with the IBRD contracts placed on a competitive basis during 1956-62, the lowest rates in more than half the cases were at least 35 per cent below the highest rates, and 20 per cent below the average rates. The loan-giving countries should agree to remove such procurement restrictions. Assistance tied to specific projects also makes utilization difficult. It will greatly facilitate proper and maximum utilization of assistance, if it is given on the basis on an over-all plan and not for selected projects only.

The abovementioned categories of assistance do not require any quid-pro-quo except of an indirect sort as indicated above. Loans in recipients' currencies also do not create any problem, but donor

[1] In 1963, the proportions of these various components in the total official bilateral assistance given to developing countries in Asia, were roughly 33, 27, 5 and 35 per cent respectively.

currency loans can cause serious difficulties if the maturity is short and the rate of interest high. All loans without maturity or maturing after one year are considered long-term, but it is obvious that loans for less than five years are not very appropriate for development projects having long gestation periods. In 1961, such loans constituted more than twelve per cent of the total official loans given by OECD countries, though their proportion has since been considerably reduced. Interest on official loans varies from less than one per cent to more than six per cent. It was recommendated by the last United Nations Conference on Trade and Development that loans to developing countries should not carry more than 3 per cent interest; but, in 1963, three-fifths of the total official loans carried interest rates higher than this and as much as 40 per cent carried interest rates above five per cent.

It is necessary that the average maturity of loans given to developing countries should be increased and that the interest rates should be made more moderate; otherwise the problem of debt-servicing, which has already become a very heavy burden on some countries, will become more serious. According to an estimate of IBRD[1], the outstanding external public and publicly guaranteed debt of developing countries amounted to over $24 billion at the end of 1962. The servicing of this debt involved an annual payment of some $900 million for interest and $2.1 billion on account of amortization, making a total of $3,000 million, which was equivalent to over 10 per cent of the developing countries' export receipts in 1962. In addition to this long-term debt, the developing countries had also outstanding short-term liabilities amounting to about $4,600 million at the end of 1962, which was equivalent to 40 per cent of their total gold and foreign exchange assets.

The volume of public debt has recently been increasing at an average annual rate of 15 per cent. The public debt of eight developing ECAFE countries mentioned in table 17 amounted to $5,048 million in 1962, compared to $936 million in 1955. Interest and amortization payments of these countries had increased from only $61 million in 1956 to $743 million in 1963. The most heavily indebted countries were India ($2,900 million), Pakistan ($830 million) and Iran ($450 million). Their debt servicing payments in 1963 amounted respectively to 15, 14, and 7 per cent of their export earnings.

The debt and amortization payments are heavy because a large portion of debts consists of medium- and short-term maturities. Twenty four and twenty three per cent of the total public debt (including undisbursed amounts) of India and Pakistan in 1962 were repayable during 1963-67 and the proportion was much higher in the case of the Philippines, Ceylon, Burma, China (Taiwan), and Thailand. The debt servicing payment of those countries in 1963 averaged as high as 18 per cent of their outstanding debts in 1962.

TABLE 17. OUTSTANDING PUBLIC DEBT[a] AND DEBT SERVICING CHARGES[b] OF LIGHT ECAFE DEVELOPING COUNTRIES 1955-65 AND 1962-63

(million dollars)

Country	1955	1956	1962	1963
	Outstanding debt	Servicing charge	Outstanding debt	Servicing charge
Burma	17.0	0.3	83.0	10.0
Ceylon	44.0	3.0	117.0	9.0
India	310.0	12.0	2,926.0	238.0
Iran	172.0	6.0	450.0	63.0
Malaya	90.0	5.0	171.0	11.0
Pakistan	147.0	21.0	829.0	58.0
Philippines	83.0	9.0	222.0	64.0
Thailand	73.0	5.0	250.0	20.0
Total	936.0	61.3	5,048.0	743.0

Source: Economic Growth and External Debt Vol. II, IBRD 1964.

[a] Public or publicly guaranteed debt, including undisbursed amounts.

[b] Gross interest and amortization payments.

In addition to the servicing of debts, the developing countries had to make large payments for investment income. For developing countries as a whole, such payments were twice as large as interest payments in 1961 and, for some regions, notably Latin America, they were much higher. In 1963, Iran, India, Pakistan, Malaya, Ceylon, and the Philippines had respectively to pay $400, $181, $34, $66, $11, and $16 million on this account.

Considering the debt and investment-servicing problems of the developing ECAFE countries which are likely to become more acute as the volume of the flow of public and private capital increases, developed countries may consider the possibility of accepting repayment at least partly in commodities.

Capital needs of the developing ECAFE countries

The ECAFE secretariat, in 1962, made an estimate of the capital needs of the ECAFE countries, based on their development plans. It amounted to $3,000 million per annum. This estimate was based on current development plans which generally run up to the middle of the 1960's. The requirements would increase by 50-60 per cent in the second half of the decade. For instance, the third five-year plan of Pakistan (1965-66 to 1969-70) envisages an increase in foreign assistance from $2,200 million to $3,900 million. If such increases are taken into account, the estimate rises to about $5,000 million by 1970.

Another estimate may be made on the basis of the Development Decade target of a five per cent annual growth rate and of the current trends of exports and imports. The United Nations Secretariat made such an estimate for UNCTAD.[1] According to this estimate,

[1] Economic Growth and External Debt, Vol. II, IBRD, 1964.

[1] United Nations; *Trade and Development*, Part I, Chapter 3.

the initial current account gap of developing countries would increase from $4,900 million in 1960 to $20,000 million in 1970. The share in the gap of the Far Eastern countries was calculated to be $6,000 million. It was estimated that, on the basis of trend in the period 1950-1960, the net inflow of long-term capital and official donations would by 1970 increase to $9,000 million, so that the gap would be reduced to $11,000 million. This calculation was based on a very important assumption that the price relaton of 1960 between exports and imports would hold a good even in 1970. This may be an optimistic assumption because, during the 1950's, the prices of the export commodities of developing countries fell in relation to the prices of their imports and the same trend is likely to continue during the 1960's. This fall in the terms of trade of developing countries has caused a reduction of their import capacity. It has been calculated[1] that, during 1951-62, the total loss of import capacity of the developing countries in Far East Asia, on account of relative price changes, amounted to $3,900 million. If it is assumed that this trend will continue during 1960-1970, then the initial current account gap of the Far East Asian countries will increase by about $3,200 million to $9,200 million. The gap has to be closed if those countries are to achieve the Development Decade target of growth.

As stated above, it is expected that the over-all gap of $20 billion will be reduced to $11 billion because of increased external assistance amounting to $9,000 million. The share of the Asian developing countries in the total flow of assistance in recent years has been about 47 per cent. On that basis they are expected to receive some $4,000 million out of the total assistance of $9,000 million in 1970. There will still be a gap of $2,000 million, even if the expected loss of import capacity due to a fall in terms of trade does not materalize. If the terms of trade deteriorate in the same proportion as in the nineteen-fifties, the net gap will increase to about $5,200 million. If the terms of trade do not deteriorate so much, and the loss is only about 50 per cent, the net gap will be about $3,600 million. If this gap is to be bridged, external assistance to the Asian developing countries will have to increase further to at least $5,500 million by 1970.

It is not too much to expect that external assistance to this region will be increased to this extent. The General Assembly Resolution (1522-XV) has set a target of one per cent of the combined gross domestic products of the economically advanced countries as the level of assistance to be given to developing countries. In 1962, the total assistance given by developed market economies (including contributions to international institutions), amounted to only 0.7 per cent of their combined gross domestic product. This combined total in 1960 amounted to $920,000 million. If the economies of these countries develop only at the rate of 3.7 per cent per annum as in the 50's, their combined gross domestic products will, by 1970, increase to about $1,500,000 million. One per cent of this would amount to $15,000 million and 0.8 per cent to $12,000 million. So, only if the rate of contribution is increased from 0.7 to 0.8 per cent of gross domestic product between 1962 and 1970 with the developed market economies be able to make available to developing countries about $12,000 million as assistance. Centrally planned economies may be expected to increase their net disbursements of credit to at least $1,000 million, so that the total available will be $13 billion. Out of this, about $6,000 million can be legitimately expected by the developing countries in Asia, because they have the largest populations and are also the poorest.

It may be mentioned here that this assistance will not be entirely a sacrifice, as a part of it may come out of the "gain" of developed countries from the expected movement of the terms of trade in their favour. It has been stated that the terms of trade "loss" of the developing countries in the Far East during 1951-1962 amounted to $3,900 million. The corresponding loss of Latin American developing countries was $12,300 million, making a total of $16,200 million. As against this, the total assistance given to these two groups of countries over the same period amounted to $25,500 million, so that only $9,300 million came out of the real resources of developed countries. Then again, the assistance given comes back to developed countries in payment for extra imports of developing countries, which obviously could not have been made otherwise. External assistance thus indirectly finances the developed countries' own exports.

Developed countries should not only increase the volume of their financial assistance, they should make it possible for developing countries to earn more foreign exchange themselves; because, even if their assistance is increased as suggested, there will still remain a gap to be bridged. In the case of the developing ECAFE countries, the additional gap may be between $2,000-2,500 million. This will have to be bridged by import substitution and export earnings, mainly the latter. It will be noted that the expected increase in export earnings on the basis of past trends has already been taken into account in arriving at the initial gap of $20,000 million. To bridge the additional gap, therefore, the Asian developing countries will have to increase their exports beyond the expected level. The only hope of increase lies in the field of manufactures. The developing countries in Far East Asia, in 1961, derived 23 per cent of their export earnings from manufactures, as against 6 per cent or less in the case of other developing regions; and, between 1955 to 1961, the rate of increase in their export of manufactures was 6.3 per cent, as

[1] United Nations *World Economic Survey 1963*, Chapter 8, table 8-15.

against the over-all rate of increase in export earnings of 1.5 per cent, and the over-all rate of increase of export earnings from primary commodities of 0.3 per cent only.

Developing Asian countries such as India, Hong Kong, Pakistan, Iran, the Philippines, and China (Taiwan) are now in a position to export manufactured goods in sizable quantities and they should be given opportunities to do so. The need of developing Asian countries for export markets for manufactured goods is proved by the fact that, out of total exports of manufactures of $2,640 million in 1961, these countries (excluding Israel) exported as much as $1,850 million. Their exports to developed market economies consist mainly of textiles, but the export of cotton textiles is being restricted under the Long-Term Cotton Textiles Arrangement of GATT. It is desirable that this restriction should be relaxed. Developed countries should also reduce their import tariffs and particularly discriminatory tariffs on processed and semi-processed goods imported from developing countries and, if possible, they should give preference to those countries. As it was pointed out in the report to UNCTAD entitled "Toward a New Trade Policy", even if exports of manufactured goods from developing countries were to increase by $10,000 million by 1970, they would absorb only four to five per cent of the expected increase in the consumption of manufactured goods by developing market economies. There is thus no real problem. There may be some temporary dislocation in a few industries, but the ultimate effect will be beneficial both to developing and to developed countries.

In the trade field it is also necessary to take steps to stabilize the prices of primary commodities, on which developing countries mainly depend for their export earnings, as they will have to do for many years to come. Various suggestions have been made for making commodity prices stable. Commodity aggreements have been negotiated for a number of commodities. It is necessary that the remaining important items be covered also.

It is also necessary that some compensatory payment arrangement should be made to take care of another perennial problem, that of primary commodity trade fluctuations in export earnings which have such unsetting effects on development. The IMF has made some arrangements for compensatory loans, but something more is needed. In UNCTAD,[1] a scheme was suggested under which developing countries would be given assistance from a special compensatory found to be created from countributions of developed and developing countries, when there was a fall in export earnings below "reasonable expectations" which would endanger development. The scheme is now under study by IBRD.

[1] See the appendix for a summary of the recommendations of UNCTAD on this subject.

VII. CONCLUSIONS

Since the beginning of the nineteen-fifties, a large volume of external assistance has flowed to developing countries in the form of grants, loans, private investments and technical assistance. While private investment in prductive undertakings in less developed countries and private lending to foreign public authorities through purchase of securities and bonds were established financial practices before the war, deliberate assistance through grants and official loans at less than commercial rates of interest is a post-war development. Initially, the assistance was directed toward a few countries with which the donor countries had special relations; but with increasing recognition of the peculiar difficulties facing developing countries (which depended on a narrow range of primary commodities for export earnings), and with recognition of the need for diversification of their economies and improvement of the standard of living of their peoples, the flow of assistance was augmented in volume and more widely distributed. More developed market economies came forward as contributors and centrally planned economies started an assistance programme of their own. Multilateral programmes through the United Nations and its specialized agencies, as well as through other international organizations, are assuming increasing importance. IBRD has shifted its emphasis from the financing of reconstruction to the financing of development, and new multilateral agencies and programmes have been established to cater for the financial needs of developing countries. As a result, external assistance has assumed a role of critical importance in the economic development of those countries.

The significance of external assistance for the development of developing countries can be judged from the fact that in 1963 it reached a volume of some $6,000 million, which amounted to one-fifth of their total export earnings. The share of the developing countries in the ECAFE region (excluding centrally planned countries) in this assistance was about $2,700 million, which worked out to an even higher proportion of their export receipts. This is because, in the post-war years, the export trade of the developing countries as a whole, and particularly of the developing ECAFE countries, failed to grow at a reasonable rate and their share in world trade was considerably reduced. External assistance has partially compensated for this failure and provided a source of foreign exchange with which to finance increasing imports needed for development. If this assistance had not been forthcoming, many developing countries would have had to curtail their development imports and their development would have been seriously hindered.

External assistance has been directed toward general development rather than industrial development. Bilateral assistance from developed market economies has been given generally for development of water resources, power, and transport and communication. International lending institutions such as IBRD

and IDA have also concentrated mainly on infrastructure; and, though centrally planned economies and the International Finance Corporation have given more attention to industrialization as such, their contribution in actual disbursements has been small compared to assistance from other sources. Nevertheless, external assistance has considerably helped the development of industries in developing countries by building the necessary infrastructure, by increasing the rate of gross domestic capital formation, by providing and improving technical know-how and by making it possible for the developing countries receiving large scale assistance to divert a large part of their own foreign exchange earnings to the import of capital goods and raw materials required for industrialization.

In the ECAFE region, large-scale assistance has been received by India, Pakistan, China (Taiwan), the Republic of Korea, the Republic of Viet-Nam, and Indonesia. Considerable assistance has also been received by the Philippines, Thailand, and Burma. There has been an appreciable growth of industrial production in all these countries during the past ten years, largely due to the external assistance received. The structure of the economies of these countries has undergone a change; but, except in the case of China (Taiwan), the industrial sector still contributes only about one-fifth or less to the gross national product and, in absolute terms, the volume of industrial production is quite small except in India and probably Pakistan. These countries still have, then, a long way to go before they can reach the stage of self-sustained growth.

This underlines the necessity of continuing external assistance to these countries on a large scale at least over the next ten or fifteen years. It has been estimated that, if the Far East Asian countries are to achieve the Development Decade target of five per cent over-all annual growth by 1970, their current account deficit will increase to $6,000 million. However, if their terms of trade deteriorate during the nineteen-sixties, as they did during the fifties, their deficit will be considerably larger. This deficit has to be met, on the one hand, by accelerating the flow of external assistance and, on the other, by increasing the countries' export earnings, primarily through the export of manufactured goods, and by the saving of foreign exchange through increased import substitution. On the basis of current trends, external assistance to the developing ECAFE countries can be expected to increase to some $4,000 million by 1970, but it is considered that it will have to increase further to at least $5,500 million, if the goal of the Development Decade is to be achieved.

Not only should external assistance be increased in volume, but also its terms should be made more favourable. A large part of the official lending consists of guaranteed export credits at commercial rates of interest. This increases the debt-servicing burden of the recipient countries, which has already become a problem for several ECAFE countries such as India and Pakistan. The fact that a considerable part of the outstanding debt is due to be repaid within the next three or four years has further aggravated this problem. The maturity period of the loans therefore should be extended and the rate of interest reduced.

Heavy investment payment is another problem of the developing ECAFE countries. In 1963, those countries received $181 million of net private capital investment (including reinvestment), whereas their net remittance of investment income amounted to about $708 million, or about four times as much. Private capital investment is crucial for industrial development and the flow of this investment to the developing ECAFE countries should be increased through co-operation of the capital-exporting countries and appropriate action on the part of the developing countries.

The difficulties of these countries will not be solved by increasing the flow of external assistance alone. Their basic problem is the sluggishness of the growth of export earnings from primary commodities. Along with taking steps to increase the flow of assistance, therefore, action is required to make primary commodity prices in international trade stable and to give increasing opportunities to their export of manufactures by removing trade barriers and by undertaking structural changes in the industrial sector of developed countries. This will benefit both groups of countries and the world as a whole by increasing world trade and prosperity. After all, the bulk of the world's population lives in under-developed areas, where potential demand for imported goods is tremendous. To realize this potential demand, it is necessary to help those countries raise the per capita income of their people through rapid economic development. The examples afforded by the industrial and economic development countries such as Canada, Australia, the United States and even China (Taiwan) prove that it is no longer necessary to wait through decades for the development process to unfold itself in the natural course, but that development can be greatly accelerated through deliberate effort and external capital assistance.

It must be emphasized, however, that, while external assistance can thus give stimulus and provide a large part of the wherewithal, actual developments will depend on the efforts and the policies of developing countries themselves. That all countries which have received large scale external assistance in the ECAFE region have not made equal economic progress is to a large part due to this internal factor. To qualify for receiving large-scale assistance and to ensure its maximum utilization, the ECAFE countries should have good plans for development. They should not go in for spectacular or prestige projects or try to develop industries without regard to natural advantages and comparative costs, or without regard to the need for regional co-operation and harmonization. They

should not develop industries at the expense of agriculture, which is their mainstay, nor devote an unduly large part of their available resources to social improvement. Above all they should realize that their development is primarily their own responsibility, and that it will require stable conditions and wise policies on the part of their governments and hard work on the part of their people.

Appendix

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT:

Summary of Recommendations on External Assistance

I. Guidelines for international financial co-operation (Res. A.IV 1)

1. Financial co-operation provided by industrialized countries to developing countries should be directed, as far as possible, to the formulation and realization of sectoral, regional, national and multinational development programmes. It should take into account:

The need to provide continuity so as to allow the most efficient planning of the economic growth of developing countries.

The importance of well-formulated and workable development plans and programmes and of adequate measures by the developing countries for their implementation.

The importance of fostering balanced and diversified growth. To that end it should promote the process of industrialization and the diversification of the economy, including an increasing degree of processing and manufacture of primary export products.

It should permit as far as possible the free use of external resources in the acquisition of goods and services in those markets which offer the best conditions of price, quality and terms.

It should take into account, in establishing repayment terms and interest rates, the over-all repayment capacity of the borrowing country.

Long-term financing needed for economic growth should be augmented and be made available to developing countries so as to limit the use of medium- and short-term credit to proportions compatible with the maintenance of their capacity to repay.

2. Since external indebtedness has become and is likely to become burdensome for a number of developing countries, industrialized countries, international institutions and individual developing countries themselves should co-operate to undertake appraisals of the external indebtedness of individual developing countries, with the objective of promoting the rescheduling or consolidation of debts with appropriate periods of grace and amortization and reasonable rates of interest.

3. Industrialized countries and regional and international organizations should endeavour to increase the flow of the technical assistance needed to accelerate the growth of developing countries; to achieve the maximum efficiency in the use of external resources. Technical assistance should be tailored to the requirements of each country.

II. Growth and aid (Res. A.IV 2)

The Conference recommends that:

Each economically advanced country should endeavour to supply, in the light of the principles of Annex A. IV 1 financial resources to the developing countries of a minimum net amount approaching as nearly as possible to one per cent of its national income, having regard, however, to the special position of certain countries which are net importers of capital.

III. Aims of international financial and technical co-operation (Res. A.IV 3)

The Conference recommends that, in granting loans to developing countries, developed countries should aim at the following:

1. The interest rate on State loans should not normally exceed three per cent annually, and steps should be taken to ensure that loans to developing countries by international organizations are granted on favourable terms;

2. Funds received in repayment of loans made to developing countries should be used to the extent possible for the purchase of goods produced in those countries, particularly in undertakings financed by such loans.

IV. Terms of financing (Res. A.IV 4)

The Conference recommends that donor countries should endeavour to meet the following objectives to secure more meaningful and progressive financial co-operation with developing countries and ensure greater efficiency in aid programmes:

I. *Repayment of loans*

1. Some part of repayment of loans may be accepted in national currencies of the debtor countries, either through bilateral or regional arrangements, through payments' unions, credit insurance arrangements or other appropriate measures;

2. Repayments should be spread over a considerably long period which should normally be not less than twenty years, and with a certain grace period, taking into account the specific nature of loans.

3. Interest rates for development loans should take into account the repayment capacity of the

borrowing country. Endeavour should be made that they should not normally exceed 3 per cent and, where this is not feasible, waivers of interest should be considered to meet this objective. In cases where necessary and justified, wherever they are in excess of this figure, they should be re-negotiated to bring them down to a reasonable level.

4. In as much as aid and trade should be co-ordinated, and where loans are repayable in convertible currencies and are tied to purchases in donor countries, ways and means should be devised both in centrally planned economies, where some such arrangements already exist, and in free market economies, for the repayment of such loans in mutually determined commodities and manufactures produced by the debtor country.

5. As far as possible, development loans should not be tied to particular projects.

6. Loans for purchase of capital equipment or non-project assistance should not ordinarily be tied to purchases in donor countries. In all cases of tied loans, where the recipient country can show that the required equipment and goods are available at cheaper rates or better terms elsewhere, either the governments should intervene to bring down prices and regulate conditions of supply or, where this is not feasible, to transfer the funds for other purchases in donor countries at competitive rates or, failing that, to release them for free purchase in the best from the point of view of the recipient country.

7. Recipient countries should not be compelled to use the shipping of a lending country for the transportation of goods purchased under loans and aid advanced by that country;

8. Recipient countries should not be compelled to insure goods purchased under loan and aid advanced by a donor country with the insurance companies of that country;

9. Appraisal procedures for assessing requests for loans, both for general plans or specific projects, should be simplified to the greatest possible extent.

V. Problem of debt service in developing countries (Res. A.IV 5)

The international financial agencies should consider the possibilities of adapting their organizations and procedures with a view to improving the terms of their transactions, keeping in view the particular problems of developing countries.

The resources available to the International Development Association should be enlarged to provide assistance to developing countries on terms with a minimal burden of debt service.

VI. Non-financial credit arrangements for the delivery of capital goods (Res. A.IV.6)

The conference recommends that in establishing new production units in developing countries owned by them from the outset, credit arrangements for the financing of capital equipment and technical co-operation could be based on the concept of remuneration by means of goods produced by the unit concerned or in other products of developing countries as appropriate.

VII. United Nations Capital Development Fund. (Res. A.IV. 7)

The Conference recommends that the United Nations Capital Development Fund should start its operations at an early date to finance on favourable terms in all developing countries, national and regional development plans, programmes and projects, particularly in the field of industrialization.

The resources of the United Nations Capital Development Fund should be derived from voluntary contributions.

VIII. Gradual transformation of the United Nations Special Fund. (Res. A.IV 8)

The Conference recommends to the Governing Council of the Special Fund that it continue to give consideration to:

1. Enlarging its activities in assisting governments — which so request — to find the necessary financing to implement the recommendations of Special Fund pre-investment surveys; and
2. Broadening its criteria so as to include increased financing of demonstration projects, thereby playing an effective role as a bridge between pre-investment and capital investment.

IX. Creation of a regional development fund. (Res. A.IV 9)

The Conference requests the Secretary-General of the United Nations Conference on Trade and Development to convene a committee of experts to study.

1. The feasibility of establishing a fund, where appropriate, for aid to developing countries for the purpose of financing long-term capital projects with particular emphasis on regional and/or sub-regional development projects, without prejudice to bilateral arrangements;
2. The possibility of utilizing suitable regional agencies engaged in development financing in the operating of such a fund.

To work out, if found necessary, a suitable scheme on the lines of the study proposed.

X. Promotion of private foreign investment in developing countries (Res. A.IV 12)

The Conference recommends the following sets of measures and actions in accordance with General Assembly resolution 1710 (XVI):

1. *Action by governments of developed countries and international institutions to promote the flow of private capital to developing countries*

The governments of capital exporting developed countries should avoid measures preventing or limiting the flow of capital from such countries to developing countries and should take all appropriate steps to encourage the flow of private investments to developing countries, such as tax exemption or reductions and giving investment guarantees to private investors investing in developing countries.

The International Finance Corporation should examine the possibility of expanding its investment activities.

2. *Action by developing countries*

The Conference recommends to the private capital-importing developing countries to take all appropriate steps to provide favourable conditions for direct private investment. The Conference further recommends to developing countries to set up investment bureaus and investment advisory services and to establish and strengthen credit institutions and development banks and to determine and publicize the areas of investment, manner of investment and investment policy;

3. *Provision of information on investment opportunities*

The Conference recommends to the developing countries, in co-operation with appropriate bodies of the United Nations and the governments and suitable organizations such as federations and chambers of commerce and industries in the industrialized countries to endeavour to establish information centres in capital markets and adopt other suitable means to supply all the necessary information about investment conditions, regulations and opportunities in the developing countries;

Requests appropriate bodies of the United Nations and governments of developed countries to consider assisting the developing countries through financial and technical assistance in establishing local agencies:

(a) To provide to private investors both domestic and foreign, information on foreign sources of finance;

(b) To furnish to private investors, both domestic and foreign, full information as regards the areas of industrial activity open to foreign enterprise and the fiscal and other facilities and incentives and to give all the assistance necessary for the pre-investment and preliminary planning activities, and preparation and presentation of projects, reports and feasibility studies;

(c) To keep ready and make available feasibility reports and a portfolio of projects and fields of investment for consideration and use of private investors;

4. *Action by investors*

The Conference recommends that foreign private investment should co-operate with local initiative and capital, and should work within the frame-work and objectives of the development plans with a view to supplying domestic markets and in particular expanding exports. The Conference expects that foreign private investment will recognize the desirability of re-investment of profits in the developing countries concerned as far as possible, availability of know-how to nationals of developing countries and training and employment opportunities to national of host countries and other corresponding measures;

5. *Studies*

The Conference requests the International Bank for Reconstruction and Development to expedite its studies on investment insurance in consultation with governments in both developing and developed countries and submit, by September 1965 at the latest, the result of its studies and consultations to the United Nations:

The Conference understands that the International Bank is examining the question of the establishment of machinery for settlement of investment disputes. The Conference requests the International Bank to submit the result of its studies and consultations to the United Nations.

XI. Study of measures related to the compensatory credit system of the International Monetary Fund (Res. A.IV 17)

The Conference recommends that Government members of the International Monetary Fund study the following measures:

1. To increase, as soon as possible, the amount allocated by the Fund to compensatory financing over and above its current transactions, from 25 per cent to 50 per cent of a member country's quota;

2. To place compensatory credits entirely outside the structure of the gold and successive credit tranches, so that the drawing of compensatory credits would not directly or indirectly prejudice a member's ability to make an ordinary drawing;

3. To explore ways to secure possible refinancing of compensatory financing obligations of the developing countries in the event

of a persistent shortfall in export receipts beyond the control of the affected country.

The Conference requests that the International Monetary Fund, in its determination of the shortfall in export receipts, consider giving greater weight to the actual experience of the three preceding years.

XII. Supplementary financial measures (Res. A.IV 18)

The Conference recommends that the International Bank for Reconstruction and Development be invited to study the feasibility of a scheme with the objective set forth in section 1 below and based on the principles set forth in section 2 below, and, if appropriate, to work out such a scheme.

1. *Objective*

(a.) The new scheme should aim to deal with problems arising from adverse movements in export proceeds which prove to be of a nature or duration which cannot adequately be dealt with by short-term balance of payments support. Its purpose should be to provide longer term assistance to developing countries which would help them to avoid disruption of their development programmes.

2. *Principles*

(b.) The scheme should be provided with resources by contributions from participating countries shared between them on an equitable basis.

(c.) Developing countries only should be eligible for assistance from the scheme; such assistance should be on concessional and flexible terms.

(d.) The scheme should normally be applicable after a developing country had had recourse to the International Monetary Fund under its compensatory financing facility and it had been possible to make a full assessment of the nature, duration and implications of any adverse movement in the export proceeds of the developing country concerned.

(e.) An adverse movement for the purposes of the scheme should be regarded as a shortfall from reasonable expectations of the level of export proceeds.

(f.) A prima facie case for assistance from the scheme should be established by reference to shortfalls from reasonable expectations and to the nature and duration of such shortfalls.

(g.) Once a prima facie case has been established there should be an examination, under the International Development Association, of all relevant economic circumstances in order to assess how far assistance from the scheme would be required and justified in order to help avoid disruption of development programmes. Subject to these points assistance could cover a substantial proportion of a shortfall from reasonable expectations.

(h.) Resources for the scheme, which would be administered under the International Development Association, should be in the form of additional commitments, prescribed in advance, for contributions to the Association; all the major Part I member countries of the Association should contribute.

B

The Conference also recommends that the continuing machinery recommended by this Conference be invited to study and organize further discussion of the following concepts and proposals for financing put forward by the delegations of the developing countries at the Conference:

1. That a fund be set up, financed by contributions from developed countries as required and administered by an appropriate agency of the United Nations;

2. That only developing countries should be eligible to draw from the Fund;

3. That disbursements should be in the form of non-reimbursable transfers and/or contingent loans on concessional terms;

4. That the criteria used in deciding upon claims should be as objective as possible and should include the following

(a) The effect of shortfalls in export earnings and the adverse movements in the terms of trade;

(b) The effect on the country's development programme;

5. That to complement this longer term approach, facilities be provided for interim financing, when warranted, to assist the developing countries concerned while the longer term problem is being assessed.

INSTITUTIONAL ARRANGEMENTS FOR INDUSTRIAL DEVELOPMENT

Prepared by the ECAFE Secretariat

I. INTRODUCTION

In the post-war years many countries in the ECAFE region attained political independence, resulting in social and economic changes. This has given them a new outlook and stimulated large-scale experimentation with institutions and policies designed to promote industrial development.

Most ECAFE countries making a determined effort to accelerate growth through industrialization need institutional arrangements for formulating and supervising the execution of industrial programmes. Many have already made appropriate institutional arrangements, though their level varies from country to country, depending on the intensity of effort and resources applied to attain industrial growth.

This paper highlights some of those which have lately attracted interest in developing countries and are considered to have a direct influence on the development of industry.

II. INDUSTRIAL PLANNING AND PROGRAMMING

1. *General*

In most countries of the ECAFE region industrial planning is not a single-agency function. A great part of it falls to industrial planners, industrial economists, administrators and specialists serving government departments concerned with exploring investment possibilities, initiating project proposals, and implementing approved programmes. It is the product of a decentralized process wherein several agencies, sometimes including non-government bodies, take part.

Consequently, industrial plans are often mere aggregations of projects. There is hardly any connexion between over-all development plans and their industrial components or between the industrial components themselves. This seems to be the common weakness of procedures now in use. In many instances even pre-investment investigations and cost-benefit analysis of individual projects are inadequate. Another common weakness is that there is often no established procedure for systematic and continuing evaluation of the progress of projects.

Such weaknesses and deficiencies in planning prompted ECAFE to appoint two expert groups, one in 1959 and another in 1961, to consider some specific aspects of the technique of economic development planning. The need for expert technical guidance to enable governments to plan more effectively has long been felt in the region, especially when problems of resource allocation are encountered.

The expert groups reviewed the experience of ECAFE countries in industrial planning and evaluated the sources of statistical and engineering data as well as methods currently used in preparing development programmes. They also surveyed some of the programming techniques that have been proposed and used in other countries — particularly in parts of Latin America and Europe — where the aims of development policy are similar to those of the countries in the ECAFE region; but where there has been greater development of statistical information. From these various elements, the groups recommended practical procedures for formulating programmes of industrial development with special reference to ECAFE countries. Their findings and appraisal of the planning situation in Asia and the recommendations made are presented below.

PLANNING AGENCIES AND PLANS IN ECAFE COUNTRIES[1]

Country	*Title of plan*	*Period*	*Planning agency*
Afghanistan	Five-year plan	1956-1960	Ministry of Planning
Brunei	Five-year plan	1957-1961	
Burma	Second four-year plan	1961/62-1964/65	Ministry of National Planning
Cambodia	First five-year plan	1960-1964	Ministry of Planning
Ceylon	Ten-year plan	1959-1968	Planning Secretariat
China (mainland)	Second five-year-plan	1958-1962	State Planning Commission
China (Taiwan)[2]	Third four-year plan	1961-1964	Ministry of Economic Affairs
Malaysia	Second five-year-plan	1961-1965	Economic Secretariat Prime Minister's Department

India	Third five-year plan	1961/62-1965/66	Planning Commission
Indonesia	First national development plan	1961-1969	National Planning Council
Iran	Second seven-year development plan	1955-1961	Plan Organization
Japan	New long-range economic plan	1961-1970	Economic Planning Agency
Laos	Economic and social development plan	1959-1960	Planning Commission
Nepal	Five-year plan	1956-1960	Planning Board
North Borneo	Four-year plan	1957-1960	
Pakistan	Second five-year plan	1960/61-1964/65	Planning Commission
Philippines	Five-year socio-economic programme	1962/63-1965/66	National Economic Council
Sarawak	Development plan	1959-1963	Development Board
Singapore	Four-year plan	1961-1964	Economic Planning Unit
Thailand	Economic development programme	1961-1966	National Economic Development Board
Viet-Nam, South	Five-year plan	1957-1961	Directorate General of Planning

[1] Source: "Programming Techniques for Economic Development with Special Reference to Asia and the Far East," Report of the Second Group of Experts on Programming Techniques, United Nations Publications Sales No. 60.11.F7, Bangkok, 1961.

[2] The Economic Stabilization Board, established in July 1953 to map out economic and fiscal policies and to formulate an over-all economic development plan, was dissolved in August 1958. Now economic development planning is the responsibility of the Ministry of Economic Affairs.

2. *Industrial planning procedure*

The plan texts of the countries in the ECAFE region do not greatly illuminate the procedure adopted in the formulation of the plan. In general, a plan in the industrial sector can be formulated in two ways: individual projects can be prepared first and then suitably aggregated, or they can be prepared after the over-all sector allocation has been fixed in view of plan objectives. In practice, targets for the industrial sector of an over-all integrated plan are usually based on both methods: various departments and ministries are asked to prepare a list of projects which could be evaluated and put together to form the industrial plan, and the ministries concerned with industrial planning are asked to formulate proposals in accordance with the broad industrial allocations.

In the initial phase of planning experience, the countries of the region resorted to aggregation of projects. In many countries, the various rehabilitation programmes designed to mend wartime damage constituted the nucleus of investment programmes, which later formed the basis of national development plans. The offer and availability of foreign aid also stimulated many recipient countries to prepare expenditure plans indicating the direction of proposed public investment.

Growing experience in planning has been accompanied by steady evolution of planning techniques, from mere aggregation of projects to the formulation of sectoral targets and selection of projects in the light of plan objectives. For example, Ceylon, China (both mainland China and Taiwan), India, Japan, Pakistan, and the Philippines try to base their plans on a desired rate of growth and a level of investment commensurate with it. It appears, however, that even with perspective plans and fixed magnitudes for sectoral allocation, the original practice of asking ministries to prepare projects continues; the over-all plan magnitudes calculated by planning authorities on the basis of growth requirements seem to be taken as broad pointers, which adjustment of the different ministerial schemes tends to approximate. As the experience and techniques of planning authorities in visualizing future growth requirements improve and necessary data become available, the planning authorities will probably tend to set targets to which ministerial plans will be required to conform.

As all the countries in the region which prepare complete plans have mixed economies, with the exception of mainland China, Mongolia, North Korea and North Viet-Nam, the procedure of drawing up private sector industrial programmes is of some interest. In the absence of complete centralization, the government can adopt measures to influence, but not determine, the actual course of investment in the private sector. The programmes are generally worked out in close collaboration with the representatives of the industries and the ministries on the basis of a careful assessment of the scope for expansion in various fields. Estimates of investment outlay in the private sector are based on judgement as to what is feasible and desirable. Difficulties arise in estimating investment in village and small industries where, in the absence of adequate and reliable data, only rough allocations are attempted.

3. *Industrial planning objectives*

The objectives of industrial planning in the countries of the region seem to have been derived from the over-all objectives of their economic development plans: improvement in the level of living, employment opportunities and balance payments are the three most common.

Emphasis on increasing national income together with estimates of the proposed increase are to be found in the plans of Burma, Taiwan, Ceylon, India,

Japan, Pakistan, and the Philippines. Expansion of employment opportunities is equally stressed in the plans of Ceylon, Malaysia, India, Japan, and Pakistan. They give population projections and estimates of anticipated additions to labour force and the employment opportunities to be created.

To attain a balance in international payments some plans stress import-replacement and export industries, so it becomes difficult to discern which of the alternatives receive greater attention. Ceylon gives high priority to import-saving production and expansion of exports, particularly in agriculture. China (Taiwan) emphasizes exports to meet import requirements. India's third five-year plan gives top priority to the need for self-sufficiency in food grains and increased agricultural production to meet the requirements of industry and exports: this is essential to enable the economy to save scarce foreign exchange needed for imports of capital goods. Pakistan also laid great stress on exports, particularly of agricultural products, with reasonable allowance for increases in the capacity of industries which earn or save foreign exchange and mainly use domestic raw materials. The Philippines has given considerable attention to dollar-saving industries such as steel, basic chemicals, textiles, pulp and paper, fertilizer, and an intensive programme to increase production of dollar-earning exports such as copra, abaca and tobacco to prevent an unfavourable balance of payments.

Almost all countries in the region seek to achieve their plan objectives through industrialization. Any difference in their industrialization approach lies in the relative extent to which the public and private sectors are encouraged to play their role. Industrial development in the public sector has claimed particular attention in Burma, Ceylon, China (both mainland China and Taiwan), and India. On the other hand, the Philippines, Malaysia, Thailand, and Hong Kong have left the initiative in the development of industries to the private sector. Singapore has attempted a four-year development plan for industrialization on a fairly large scale primarily through the initiative of the private sector.

The relative importance of the public and private sectors in some of the ECAFE countries is indicated by the proportion in which total and industrial investment are distributed between the two sectors, as shown in the table below:

SELECTED ECAFE COUNTRIES: SHARE OF PRIVATE SECTOR IN PLANNED INVESTMENT

Country	*Plan*	*Industrial investment*	*Total investment*
Ceylon	Ten-year plan	27	34
China (Taiwan)	Second four-year plan	43	38
Malaysia	Second five-year plan	n.a.	57
India[a]	Second five-year plan	42	39[b]
	Third five-year plan	43	39
Pakistan[c]	First five-year plan	n.a.	36
	Second five-year plan	71	39
Philippines	Three-year programme	77	69

Source: Report of the Second Group of Experts on Development Programming Techniques, United Nations Publication, Sales No. 61.II.F7. Bangkok, 1961, page 113.

Note: n.a. = not available.

[a] The percentage share of the private sector in industrial investment in the Indian plan includes minerals, whereas for other countries it relates to industry only. It does not include investments financed out of resources from the public sector.

[b] While the plan provision was 39 per cent, the actual figure works out at 46 per cent.

[c] Includes investment in the semi-public sector financed by funds from the private sector.

4. *Resource allocation*

Determination of the amount of investment in the industrial sector is an essential aspect of industrial planning. A tentative draft programme is worked out for the industrial sector, usually by aggregating schemes and projects submitted by various government and non-government agencies. The investment requirement is then assessed in the light of available resources, including estimated foreign aid likely to be forthcoming during the plan period. If the required investment outlay exceeds available resources, the projects are subjected to critical examination and the total is reduced under a system of priorities.

In working out sectoral investment, production targets are taken into account. Various procedures based on considerations of demand and supply have been used by the countries of the region. Ceylon relies heavily on assessment of potential markets for industrial products on the basis of estimated import requirements, increase in national income and population growth. Mainland China follows the well-developed principles of centralized planning in allocating resources and fixing production targets. The pattern of economic development is consciously moulded by regulating the proportions in which goods are produced and, accordingly, the proportions in which economic resources are distributed among various branches of production. The performance of this task depends on the preparation of estimates of the economy's material, financial and labour resources. They are in two parts: the resources consumed for production and the products consumed by the various economic branches. Projections are based on techno-productivity indices. The material balances are designed to ensure consistency of the needs of one industry with the production goals of the industries that supply it, and the consistency of the various goals with the over-all availability of resources. The material plan must be consistent with the labour and financial plan. The labour plan covers wages, productivity, and estimates of skilled and unskilled labour, by sectors, by regions and for the economy as a whole. The financial plan consists mainly of a balance estimate of the money income and expenditure of the population and the budget.

In Taiwan, the size of the domestic market and import replacement considerations are important fac-

tors in target setting and allocation of resources for manufacturing enterprises.

India's second and third plans emphasized investment allocation for producer and capital goods manufacturing, especially the steel and machine-building industries.

In Japan, aggregate projects coupled with iterative approximations have been used in fixing targets and allocating resources for major sectors. Aggregate demand for investment and consumption was projected on the basis of the capital-output ratio and saving ratio, aggregate output on that of labour supply and labour productivity in the primary, secondary and tertiary sectors, and aggregate income on that of the relative shares of different income groups. For sectoral projections, fairly detailed studies were conducted only for exports and household consumption demand, but no use was made of inter-industry analysis in the estimation of detailed sectoral targets in spite of detailed studies in the field.

Pakistan has stressed balance of payments considerations in allocating resources and fixing industrial targets in the second plan. More or less complete replacement of imports has proved practicable in the case of jute goods, cotton and woollen textiles, sugar, pulp and paper, newsprint, cardboard, cigarettes, bicycles, sewing machines, cycle tyres and tubes and a large number of light engineering and electrical products.

The industrial programme of the Philippines, besides aiming at import substitution, stresses the domestic production of raw materials to feed existing metal chemical and other industries and the development of pulp and paper, ceramics, plate glass, leather tanning, food manufacturing and cottage industries.

(a) *Estimation of consumption, intermediate demand and exports*

In fixing production targets for consumer goods meant largely for domestic consumption, very few countries have made projections on the basis of income elasticities, owing mainly to lack of reliable data. Japan, an exception, has worked out in detail the demand for various commodities that can be anticipated on the basis of the projected increase in income and elasticities of demand.

Other countries have based production targets on records of annual consumption in the past, import replacement, per capita consumption considered ideal, growth in population, and increase in consumption due to increased income.

For full and consistent estimates of intermediate demands, inter-industry analysis or the method of commodity balance is considered extremely useful. It has not been possible, however, for many countries in the region to compile inter-industry tables because of inadequacy and unreliability of the required data. Even in India and Japan, where inter-industry tables are available, they have not been used in formulating the target or output projections that are explicitly laid down in the plan documents.

In the case of exports some ECAFE countries have estimated, in varying degrees of sophistication, likely demand abroad on the basis of past and current performance, the likely competition in major markets for specific goods and from specific countries, and the likely increase in productivity and availability of import content of such exports.

(b) *Sector priority considerations*

The investments for the industrial sector arrived at on the basis of the considerations mentioned above are usually added to the investment programme of the other sectors to yield the first over-all tentative investment cost of the plan. A series of revisions then follows, in which sectoral allocations are re-adjusted in line with the total estimated resources, particularly foreign exchange. In this process of adjustment, certain core projects (such as iron and steel in mainland China and India and fertilizers in Pakistan) are retained regardless of foreign exchange costs. Any necessary trimming down is usually based on priority considerations, the industries favoured being:

(1) those offering large foreign exchange benefits;
(2) producer goods industries reducing the import component of future development expenditure;
(3) industries using indigenous raw materials;
(4) consumer goods industries meeting essential needs; and
(5) industries making the largest net contribution to national income.

The above merely represent the multiplicity of factors that are taken into consideration in fixing priorities. Determining the order of priority requires the weighing of these various factors, which has not generally been done quantitatively except in the Philippines.

In Taiwan, decisions as to the establishment or priority of an industrial project are largely influenced by the extent of the market.

India's second and third five-year plans gave priority to increased production of iron, steel, heavy chemicals and fertilizers and the development and expansion of heavy engineering and machine-building industries, including alloy tools and special steel, iron and steel and ferro-alloys.

In Japan high priority is given to machinery and chemical industries.

In Pakistan, the comparative foreign exchange benefits and social profitability of various industries were studied. The emphasis to be given to various projects was then determined by a number of factors, the main one being the importance of the product to the national economy, the potential demand for it and the export possibilities.

The industrial priority formula[1] used in the Philippine plan is based on four factors: the proportion of net value added by the industry concerned to its total investment (inclusive of circulating capital), the balance of payments ratio expressed as the proportion of net foreign exchange earned or saved by the industry to investment, the utilization of domestic material ratio, and the ratio of wage bill to investment. These four rating factors are given certain weights and are then added to arrive at the over-all priority rating. However, the planning authorities feel that the growing complexity of the Philippine economy may eventually render the formula difficult to apply in practice.

(c) *Project priority considerations*

Once the eligibility of industries is determined on the basis of sectoral priorities, the next step is project selection and combination on the basis of feasibility with respect to resources, particularly foreign exchange and technical manpower. Besides subjecting projects to general priority considerations, supplementary criteria are applied involving scale and choice of technology drawn up in the light of employment targets and resource availability.

In China (Taiwan) production capacity of new projects is kept relatively small at the beginning, although provision is made for expansion into an economical unit as demand for the product rises.

The Indian plans have recommended for first priority the expansion of existing units regarded as operating below the optimum scale. Of the 143 sugar factories, 31 had capacity below that considered economical, that is, 700 tons' daily crushing capacity; hence, licences have been granted to nine of these to increase capacity to 700 tons daily.

Pakistan made studies of minimum economical scale in some industries and allocations were made in amounts large enough to permit each industry to install at least one unit of medium size.

In most countries with a large sector of small-scale industries, such as India, Pakistan and the Philippines, the need for increased efficiency in small-scale manufacture is emphasized. The plans advocate the development of small-scale industries as ancillary to large industries by linking them in their raw material requirements to large concerns and providing power and other facilities in rural areas.

5. *Conclusion and recommendation*

Several countries of the region have now acquired five or more years of experience in formulating and executing development programmes. The first development programme of a country probably serves mainly to establish the technique of programming and co-ordination among the agencies concerned. In India and Pakistan, where subsequent plans are now in operation, there has been a notable improvement in the coverage, degree of detail, and attention to the relationship of the individual parts of the whole. It is to be expected that similar improvements will take place in other countries and that the technical apparatus of planning will be perfected through experience.

More complex methods of programming will be needed as economies in the region develop and become more industrialized. For this reason considerable attention should be given to inter-industry analysis, even though only a few countries are now in a position to use it.

As country experience accumulates, it would be valuable to compare actual plan estimates in order to improve planning techniques. The realism of cost estimates from various sources, the time taken to execute projects and many other elements could be appraised in a way that would be useful to other countries engaged in planning.

III. DEVELOPMENT AND CO-ORDINATING MACHINERY

A plan of industrialization for developing countries, even one conceived on a modest scale, requires at the very beginning the introduction of a number of fiscal and operational measures, such as tariff protection for infant industries, tax concessions and other incentives for new investment, expansion of economic infrastructure and training services, and extension of financial and technical assistance to manufacturers. These are the responsibility of government departments and other public bodies and the success of an industrial promotion scheme depends largely on the close co-ordination of such measures. In recent years, considerable progress has been made in countries of the region with the establishment of institutions and procedures for this purpose.

1. *Central planning agency*

All countries of the region now have a central planning agency in operation. Malaysia has set up a central economic planning agency under the Office of the Prime Minister, while Nepal has established a National Planning Council. Although the stage of development of the central planning bodies varies from country to country, the existence of such an agency ensures gradual improvement of the planning process with increasingly close co-ordination of the development of the industrial sector with that of other sectors. There are still institutional deficiencies in most countries, more especially in such aspects as pre-investment investigation, pre-project planning and periodic evaluation of planned progress. In this case, it appears that the establishment of a planning and evaluation unit in a suitable department of the government deserves much attention. To cope with the situation some governments create special bodies to deal with the planning of important industries. Burma for instance, through its Ministry of Industries, or-

[1] For details, see the Five Year Economic and Social Development Programme, NEC, Philippines, p.253-278.

ganized two special committees to look into the possibilities of developing heavy and secondary chemical industries. The Ministry of Industry of Thailand created a sub-committee to study ways of promoting and expanding the gunny sack industry. In Cambodia, a special committee was recently appointed to plan the key projects of the five-year plan, which include tyre and rubber products factories, a palm sugar refinery and a tractor assembly plant.

2. *Co-ordinating bodies*

Increasing attention is being given by ECAFE countries to co-ordination of the activities of various government departments concerned with the implementation of the industrial development programme. In some countries, the adoption of inconsistent policies by different government agencies has adversely affected their industrial development plans. This problem has been considerably reduced by inter-departmental advisory committees created to scrutinize all development policies which would involve two or more implementing agencies or department.

For example, Ceylon set up an Advisory Committee on Industries in which representatives from the Ministry of Finance, Industry, Commerce and Trade, National Planning and the Central Banks deliberate on policy matters brought to their attention.

A significant improvement in the processing of import licensing and investment procedures was achieved during the past two years. In India, apart from introduction of the "repeat licence" scheme the validity of import licences for many essential industrial raw materials and capital goods has been extended from 12 to 18 months. The processing of licences for certain items has also been decentralized to expedite administrative action at all levels. In Thailand, the Industrial Promotion Act of 1962 replacing that of 1960 empowers the Board of Investment to take final action, without reference to the Cabinet on a wide range of industries considered essential for the economic growth of the country, and the Act of 1965 currently in force has kept this important provision intact.

3. *Specialized institutions*

Apart from co-ordination of development policies and simplification of administrative procedures, an increasing number of specialized institutions, such as industrial development corporations, industrial development banks, industrial credit and investment corporations and investment boards and centres are being established in countries of the area. Notable among these are the Indian Investment Centre, which has been set up as an autonomous body by the Government of India with headquarters in New Delhi, the Industrial Development and Investment Centre (IDIC) of Taiwan, and the Investment Promotion Branch of the Singapore Economic Development Board (EDB), which was organized in 1959. These institutions have almost similar functions and responsibilities, foremost among which are the promotion of industrial investment and trade through incentives designed to improve the investment climate and dissemination of information about domestic potentialities to attract foreign investors. Both the Indian Investment Centre and the IDIC have established field and branch offices in New York, United States, and Dusseldorf, West Germany, to handle investment promotion and trade matters. Singapore has formed an Economic Development Board to direct its industrialization programme. The Singapore EDB has overseas representatives or offices in Australia, Japan, New

INSTITUTIONAL ARRANGEMENTS IN SELECTED ECAFE COUNTRIES

Country	*Industrial development corporations*	*Industrial development banks*	*Small industries agencies*	*Industrial development agencies*	*Industrial research institutes*	*Productivity & management centres*	*Others* [e]
Afghanistan		x					x
Australia	x	x[a]		x	x	x	x[b]
Burma	x	x			x	x	x
Brunei							x
Cambodia		x					x
Ceylon		x	x	x	x		x
China (Taiwan)	x	x	x	x	x	x	x
Hong Kong						x	x
India		x	x	x	x		x
Japan	x	x	x	x	x	x	x
Korea, South		x	x		x	x	x
Malaysia	x[c]	x	x	x	x	x	x
Nepal	x						x
New Zealand	x	x			x		x
Philippines	x	x	x[d]		x		x
Thailand		x	x		x	x	x
Viet-Nam, South	x	x	x				

[a] Commonwealth Development Bank of Australia.
[b] Department of Trade and Commerce.
[c] Proposed Federal Industrial Development Authority.
[d] National Cottage Industries Development Authority.
[e] Regular Government Departments, Ministry of Industry, etc.

York, Hawaii, London, Europe and Bangkok. China (Taiwan) and Malaysia have established a Development Corporation and an Industrial Development Finance Corporation respectively. These institutions are usually designed as autonomous bodies and hence are in a position to act more independently with minimum political interference and make decisions more quickly than a regular government functionary could. The part they play in providing assistance to industry will become increasingly important in the years to come.

They naturally have their problems: lack of trained staff, the difficulty of devising appropriate measures for achieving closely co-ordinated development of the public and private sectors. Formulation of policies designed to achieve planned objectives have received increasing attention in most ECAFE countries, several of which have encouraged the private sector to participate in the formulation, not only of industrial programmes but also of policies to support those programmes. In China (Taiwan) for example, the representatives of private enterprises are appointed to all working committees of the Industrial Planning and Co-ordination Group. India endeavours to include industrialists and experts from the private sector in all industry development councils. In Japan the long-term economic plan was drawn up in close collaboration with representatives of industry and trade. As in Pakistan, the Philippines and Thailand, major industrial policies are formulated in close consultation with the private sector.

To foster a close and cordial relationship with the private sector, manufacturing and other trade and industrial associations should be encouraged. In some countries associations have in the past played a prominent part in rationalizing and modernizing the programmes of industries. They have been largely responsible for promoting research and training in industry and have fostered inter-industry co-operation, as well as trade relations with overseas interests. In India, the trade associations are playing an increasingly important role along similar lines. In Hong Kong, the newly established Federation of Industries has now come into full operation. In countries where such specialized organizations have not yet been fully developed, it may be desirable for the government to provide them, in the initial stage, with certain assistance, perhaps including financing and administrative help to promote their growth.

Another important factor that must be considered is the need for promoting and developing cottage and samll-scale industries. Any plan of industrial development designed to increase output and solve the unemployment problem is deemed incomplete if it does not include aggressive promotion of industries on the cottage and small-scale level. Some of the schemes worked successfully in countries such as India and Japan, where a substantial portion of total manufacturing output is contributed by cottage and small-scale industries.

In other developing countries of Asia and the Far East, a comprehensive and systematic attempt to promote this sector was launched only in recent years. Experience shows that the development of cottage and small-scale industries requires a comprehensive and integrated approach with assistance in such matters as credit, marketing management and technology. A special organization is therefore required. In the Philippines, the National Cottage Industries Development Authority was established as recently as 1963 to promote and encourage the development of cottage industries. Several regional institutes have likewise been set up to provide research and training facilities for handicraft workers. As in other countries with similar institutions, such as India, China (Taiwan), Japan, Pakistan, and Singapore, the cottage and small industry development programme has shown encouraging results.

To supplement the efforts of special institutions like the one organized in the Philippines, several countries in Asia, notably India, and Ceylon, have set up industrial estate corporations whose main objective is to foster the growth of small-scale enterprises. These corporations provide local manufacturers with suitable factory sites and buildings. The industrial estate programme is meant to overcome some obstacles met by small manufacturers or enterprises in regard to the acquisition of land and the construction of factory buildings. Estates are developed in selected areas usually within easy access to communication facilities and water and power supplies. Sites and buildings are rented out to small industrialists at a nominal fee.

With the growing significance of science and technology in industry and resource development, many development-conscious governments have initiated the establishment of scientific and technological research institutions. In many research organizations grants are made available for research on deserving projects. Practically all countries in the ECAFE region have research institutions serving individual industries. However, most of the facilities in the region are considered inadequate to meet the expanding needs of industry, especially in connexion with new products and processes, improvement of existing products and processes, and development of new uses for products or materials. Much more effort is urgently needed to strengthen industrial and technological research if countries in the ECAFE region are to modernize their economies.

The part played by financial institutions in promoting and accelerating industrial development is equally if not more important. Most developing countries do not have an adequately organized capital market. However, an increasing number of institutions such as industrial development banks and industrial finance corporations are now being established. They are usually financed partly by government and partly by private capital. In some cases, such as the Industrial Credit and Investment Corporations of India and Pakistan, loans have been obtained from the Interna-

tional Bank to supplement their financial resources. Owing to the nature of their organization, development banks or industrial credit and investment corporations are in a better position to manage industrial loans. The development bank method of giving financial assistance to industrial projects is more practical than direct government loans to the private sector.

Development banks and similar financial institutions are established to meet the medium and long-term credit needs of industry. They can guarantee or underwrite issues of stocks, shares, assets and debentures of industrial establishments. In addition, they provide a wide variety of services ranging from the guarantee of obligations arising out of capital goods purchases to provision of equity capital and assistance in such fields as industrial feasibility studies, managerial and technical advisory services and, in some cases, initial organization of industrial enterprises.

By and large, the operations of these financial institutions have been quite encouraging and successful. There are however shortcomings occasioned by the rigid terms they impose on their loanable funds. The security requirements are considered too rigid by the public, who complain of the red tape involved in the processing of loan applications. This reflects both lack of trained staff and deliberate initial caution. As experience is gained, it is advisable to relax control and grant more freedom of action to these financing and development institutions to enable them to meet the needs of industries more easily.

The credit needs of the handicraft and small-scale industries are perhaps best met by a "supervised credit" system whereby financial assistance can be accompanied by managerial and technical advisory services. The granting of credit at preferential rates to industrial co-operative societies or associations would go a long way toward promoting mutual assistance among small manufacturers. The credit guarantee scheme, which is well developed in Japan and was recently introduced in India, may be equally useful to many other developing countries of the region. The significant feature of the scheme is that by means of credit insurance for loans advanced by banking institutions, it helps to mobilize a considerable amount of capital from various sources which would otherwise not be available to small manufacturers. And the cost of insurance, which is usually shared between the central and local government is small. It is therefore an effective means of channelling capital to productive use with minimum overhead expenses. The small industry loan operations should be decentralized as far as possible and handled by local governments or by branch offices of lending institutions, which, because of their intimate knowledge of the conditions and requirements of small manufacturers in their respective areas of operations, should be in a better position to respond to their needs. Last, financial problems of small entrepreneurs can best be met by supplying their machinery requirements on a rent-purchase basis or by providing factory facilities and sites at nominal rates in an industrial estate.

Conclusion

The success of the development plans and programmes undertaken by ECAFE countries will depend largely on their continuing efforts to improve the development and administrative machinery which is responsible not only for the co-ordination and effective mobilization of capital and human resources for industrial activities, but for the speedy satisfaction of the constantly changing needs of industry.

Industrialization programmes are still hampered by lack of trained personnel in the development bodies, lack of co-ordination between government departments concerned with the promotional aspects of the programme, and the reluctance of the private sector to organize industrial, trade or similar organizations to promote better relation among themselves and with the government sector. Trade and industrial associations can contribute to rapid economic growth and influence the direction of public policies. This is demonstrated in Japan, the Philippines and other ECAFE countries mentioned earlier, where government decisions and policies are formulated after consultation with appropriate industrial, trade or commercial chambers or organizations.

Close co-ordination between public agencies promoting industrialization could be achieved by creating co-ordinating bodies to examine all their policies.

Possibilities of training staff of development agencies by in-service or other methods should be explored, and full use made of opportunities available in other ECAFE countries and also in advanced countries.

IV. MANPOWER DEVELOPMENT

1. *Labour Force*

It has been estimated that the labour force in Asia is likely to increase from slightly over 600 million in 1960 to nearly 936 million in 1980, an addition of nearly 336 million.[1]

The labour force is predominantly agricultural in character, with a relatively high proportion engaged in the services sector compared with industry. The table below shows that nearly two-thirds of the labour force is engaged in the primary sector, one-fifth in the tertiary sector and only one-tenth in the secondary sector. There are however variations within the ECAFE region. The proportion of the total labour force engaged in the primary sector varies significantly from

[1] Report of the Director-General, ILO (Geneva, 1962) submitted to the Fifth Asian Regional Conference, p. 42, and ECAFE report of Asian Population Conference, 10-20 December 1963.

TABLE 1. SECTORAL DISTRIBUTION OF ECONOMICALLY ACTIVE POPULATION IN SELECTED COUNTRIES OF THE ECAFE REGION

(Per cent)

Country	Year	Males			Females			Per cent of total population living in towns with 20,000 inhabitants and over
		Primary	Secondary	Tertiary	Primary	Secondary	Tertiary	
Ceylon	1953	55.0	12.8	32.3	64.1	13.6	22.3	14.6
China (Taiwan)	1956	56.1	15.9	28.1	65.0	11.5	23.5	13.8
India	1961	68.0	12.7	19.3	81.6	9.6	8.8	14.2
Iran	1956	62.1	17.1	20.8	25.3	49.3	25.5	25.9
Japan	1960	27.8	33.9	38.3	43.9	19.9	36.2	46.1
Malaysia:								
Malaya	1957	56.2	11.7	32.0	78.9	5.4	15.6	22.4
Sabah	1960	77.0	8.0	15.0	89.4	3.1	7.5	16.6
Sarawak	1960	75.3	8.3	16.5	93.8	1.3	4.8	16.4
Nepal	1952–4	91.9	2.5	5.6	96.2	1.7	2.1	5.6
Philippines	1957	69.4	12.5	18.1	40.5	23.9	35.5	17.2
Thailand	1960	80.6	5.3	14.1	87.7	2.8	9.4	10.5
Average ECAFE countries (unweighted)		69.7	10.4	19.8	72.3	12.2	15.5	
Average, 8 semi-developed countries[1]		39.6	27.1	33.0	15.6	22.4	62.1	
Average, 9 developed countries[2]		21.5	43.2	35.4	11.1	28.5	60.4	

Source: "Demographic Factors in Problems of Manpower Supply and Utilization in Asia and the Far East", Paper jointly prepared by the United Nations Bureau of Social Affairs and the International Labour Office for the Asian Population Conference, December 1963, p. 16.

[1] Japan (1960); Argentina (1947); British Guiana (1960); Chile (1952); Cuba (1963); Puerto Rico (1960); Trinidad and Tobago (1960); Venezuela (1950).

[2] Australia (1954); Belgium (1947); Canada (1951); Denmark (1950); Germany (Federal Republic, 1950); Great Britain (1951); Netherlands (1947); New Zealand (1956); Switzerland (1950).

88 to 92 per cent in Afghanistan, Nepal and South Viet-Nam to 28 per cent in Japan. Likewise, the proportion of the total labour force engaged in secondary industry varies from two to four per cent in Afghanistan, Nepal, Cambodia and Thailand to 30 per cent in Japan. These differences in the industrial distribution of the labour force by and large reflect the differences of the labour force by and large reflect the differences in stage, level and pattern of economic development.

2. *Occupational structure*

The occupational distribution of labour force in the Asian region is characterized by the low proportion of the labour force engaged in professional, technical and related occupations. Compared to the highly developed countries like the United States, Canada, and Sweden where the proportion of these labour groups to total labour force is estimated at over ten per cent, in Asia, particularly Indonesia, Burma, Iran and Thailand, it is only around one to two per cent and in most of the Asian countries below four per cent. This occupational structure indicates the stage of economic growth and diversification of the country's economy. As the country changes its emphasis in development activities from agriculture to industry, the occupational structure of the labour force is likely to undergo significant changes.

3. *Manpower development*

Manpower development deserves priority attention in any large-scale effort to achieve economic development and sustained growth through industrialization.

In ECAFE countries the need for training at all levels of industrial personnel is widely appreciated and the number of artisan training centres, technical high-schools, technical institutes and colleges of engineering and technology has gradually increased. However, while targets have been set for investments in the different sectors of the economy in national development plans, no separate provision has been made for investment in training human skills in the ECAFE region.[1] In a few cases, the sectoral investment targets, particularly for industry, include fund allocations for manpower training.

4. *Technical assistance*

Developed countries give assistance in the field of manpower training to the underdeveloped countries in the form of expert manpower, equipment and training opportunities. Technically the assistance is directed toward the establishment of new improvement of existing institutions and facilities.

[1] Economic Development and Planning in Asia and the Far East, Economic Bulletin for Asia and the Far East Vol. XII No. 3, December 1961.

TABLE 2. PERCENTAGE DISTRIBUTION OF ECONOMICALLY ACTIVE POPULATION BY OCCUPATION

Country	Year	0 Professional technical and related workers	I Administrative, executive and managerial workers	II Clerical workers	III Sales workers	IV Farmers, fishermen, hunters, loggers and related workers	V Miners, quarrymen and related workers	VI Workers in transport and communication occupations	VII — VIII Craftsmen, production-process workers and labourers not elsewhere classified	IX Service, sport and recreation workers	Workers not classifiable by occupation
Burma	1953-54	1.2%	1.9%	— %	9.8%	62.7%	0.5%	1.8%	10.6%	11.1%	0.4%
Ceylon	1953	3.6	—	4.4	7.3	51.2	0.4	2.5	13.2	14.6	2.1
China (Taiwan) ...	1956	3.5	2.0	6.0	7.8	55.0	1.2	2.2	15.0	5.1	2.0
India	1961	5.6	3.1	5.7	12.3	10.8	1.2	3.3	47.2[a]	10.0	0.8
Indonesia	1958	1.0	2.4	—	13.7	64.1	0.1	1.7	10.7	5.1	1.3
Iran	1956	1.6	—	3.1	5.8	55.5	0.9	2.3	19.3	7.7	3.6[b]
Japan	1963	5.6	15.1		12.4	23.1	0.6	4.0	31.3		7.9[c]
Korea, South	1960	2.3	1.3	2.6	8.3	65.7	0.6	3.1	9.5	6.0	—
Malaysia:											
Malaya	1957	3.1	4.0	—	8.6	56.6	0.3	3.1	15.5	8.6	0.2
Singapore	1957	4.8	12.3	—	18.3	7.9	—	8.3	31.3	17.0	0.1
Philippines	1961	3.2	3.5	2.9	5.9	58.3	0.3	2.0	13.9	6.7	0.4
Thailand	1960	1.3	1.3	—	5.4	82.5	0.2	1.1	5.9	2.0	0.5

Sources: 1. Growth and structure of the labour force — Burma, Indonesia, Malaysia, Thailand.
2. Country statement for Asian Population Conference — Ceylon, China, India, Iran, Korea.
3. ILO, Yearbook — Philippines.
4. Questionnaire return — Japan.

[a] The percentage is greatly inflated by the inclusion of labourers, not elsewhere classified.

[b] Including Army.

[c] Including 1.1 per cent of the unemployed.

5. *Intraregional experience*

It is encouraging that ECAFE countries, for example Japan, have made expert services and training opportunities available to other members of the region. The Philippines has sponsored training courses where third country participants are welcomed. More recently emphasis has shifted to training opportunities in scientific and technological fields. A few countries in Asia now possessing training facilities for middle-level supervisors or technicians and possibilities of intraregional use of these facilities are continually being explored.

The following is a brief summary of what some countries have done or are doing toward manpower development.

Afghanistan

Organized technical training is almost nonexistent in Afghanistan. By and large industries industries have to recruit unskilled men and train them in the job as they work. The Ministry of Education has in recent years organized courses and vocational schools designed to train young people for jobs in the Government and industry. Engineering courses have been organized in Kabul University, where in 1961 about 132 students enrolled.

To meet the increasing requirement for technical personnel, ministries and a few companies have established special courses and schools for training their own personnel. Individual persons are also sent abroad on scholarships or fellowships given by friendly countries or institutions. Nevertheless, the demand for trained personnel has by no means been met and the shortage has been one of the greatest problems of Afghanistan.

Australia

The base of the national training programme is the educational system of primary, and secondary schools and colleges and universities.

Professional status can be reached by attending full-time or part-time degree courses following complete courses of secondary education, or by apprenticeship on leaving school at the age of 15, 16, or 17, followed by trade courses, and further technical education to certificate level and thence to degree or diploma level.

Managerial training has become increasingly important in recent years. Post-graduate business administration schools have been set up at two universities and special management courses and summer schools are regularly provided. Supervisory training has been available for many years at technical colleges and through institutes of management, and many firms are using the Training Within Industry service sponsored by the Government.

Burma

Burma experimentally organized a technical service in which persons with requisite experience and qualifications in selected fields are registered and can be drawn upon when needed in any sector of the economy. In this way all available experience in the country can be used.

Ceylon

Three universities offer special courses in engineering and other courses up to the level of technologists, technicians and craftsmen. There are also honours and degree courses in public and business administration. The Ceylon Technical College and the Institute of Practical Technology provided training for skilled workmen in the Railway, Postal, Public Works and other Departments and also for industrial technicians in the private sector.

Other practical training courses are provided by government institutions such as the Ceylon Government Railway Workshop, Railway Running Shed, Government Factory, Government Electrical Undertakings Department, Colombo Port Commission, Irrigation Department, Army Trade School and Mechanized School of Carpentry.

China (Taiwan)

Industrial training is among the major functions of the China Productivity and Trade Centre established in 1955. The CPTC's training programmes are for personnel ranking from top-level executives to first-line supervisors; 397 classes have been conducted for 12,996 participants. In addition to the CPTC the following institutions have trained industrial personnel.

1. Centre for Public and Business Administration, National Chengchi University — set up in 1962 to assist the government, industry and commerce with on-the-job training and to coordinate academic training in industrial management.
2. Meal Industry Development Centre — established in 1963 with the assistance of the Special Fund to promote special technical training programmes for personnel of the metal industry at all levels.
3. Management Development Centre of the Taiwan Provincial Reconstruction Department — since 1954 has trained medium-level personnel and first-line supervisors.

India

The primary insitutions for manpower training in India are colleges and universities, where courses in industrial management, business management, industrial engineering and foreman supervision are offered. Apart from conventional educational institutions, the

National Institute for Training in Industrial Engineering was recently set up in Bombay with the aid of the private sector have developed in-service training programmes. The Tata Iron and Steel Company has a staff training college at Jamshedpur for in-service training and executive development programmes at junior levels, and another at Poona for training middle and higher management personnel.

The Heavy Engineering Corporation at Ranchi has established a Central Training Institute, where facilities for training 300 engineers and technicians per year are available. Almost every sizable industrial unit has facilities for plant training skilled personnel. Apprenticeship training has also been organized in a large number of industrial undertakings.

Korea

In Korea there is a close inter-relation between manpower and educational planning, and manpower training has been a part of educational planning. The first five-year economic development plan stressed improvement of vocational education, compulsory education, vocational school facilities, and so on. The five-year technical development plan provides for projects to improve engineering and vocational education. Engineering colleges have been given better facilities and equipment to enable them to produce sufficient and better qualified engineers. There is also a plan to improve the quality of instructors nad curricula of vocational high schools.

Malaysia

The University of Malaya is the main institution offering training at managerial level. It has a section on Business Administration and Accounting in the Faculty of Economics and Administration to train under-graduates for possible appointments at managerial levels in enterprises. For the skilled foremen and operatives level there is the Central Apprenticeship Board which trains tradesmen for various industries. There are technical institutes in Penang and Kuala Lumpur and junior trade schools in Johore Bahru and Ipoh. A significant step toward meeting the growing demand for skilled technicians in Malaysia was taken when the Industrial Training Institute in Kuala Lumpur was opened this year.

In Singapore, besides the University of Singapore, Nanyang University and Ngee Ann College which provides courses for students wishing to become qualified in industrial jobs, the Singapore Polytechnic provides facilities for training in engineering, business administration and accounting. For the training of supervisors, middle-level technicians and skilled workers, the Light Industries Services of the Economic Development Board and a large number of trade schools and vocational training institutions provide workshop training. The Singapore Industrial Design Centre provides practical training in industrial design. The Singapore Institute of Management and the Singapore Productivity Centre are responsible for management training and for the TWI Schemes.

The Nautical School in Kuching, Sarawak, which was established in 1959, has been expanded to include a Commercial Institute and a Trade School.

Nepal

The principal measure adopted by the Government is education in primary schools, secondary schools and colleges, augmented by high-level professional training through scholarships in such fields as engineering, general education, health, and the sciences. On-the-job training has been planned for accountants and government workers. Training programmes for machine operators, electricians, mechanics, carpenters, fitters, and other trades are being carried out and their expansion is anticipated in the near future.

New Zealand

The basis of training is the school education system, which provides free compulsory education up to a minimum age of 15. Some vocational subjects are taught at post-primary schools.

Skilled technicians receive their training by means of apprenticeships, supplemented by part-time classes at technical schools. There are 29 New Zealand Apprenticeship Committees, which review conditions of apprenticeships and keep them up-to-date. In the major industries apprenticeship orders usually provide for four hours a week at day technical classes and the same at evening classes.

Six technical colleges provide secondary education with greater emphasis on technical subjects than other secondary schools.

Engineers receive training at universities, while training of executives and supervisors in industry comes under the Department of Labour Training Within Industry Scheme whereby conferences are organized and conducted by trained conference leaders, followed by programmes of instruction in efficient working methods. Firms are encouraged to arrange their own training courses with the help of the Government's experts and materials.

Thailand

High-level technical training is offered at seven State universities and several technical and vocational colleges, and a keen interest has been shown in manpower planning at the national level, probably to be integrated into the second economic development plan (1967—1971).

Viet-Nam, Republic of

Only partial plans for manpower training have been drawn up and launched. They cover training for personnel in public works, arts and crafts, electricity and agriculture as well as agronomists, chemical engineers and semi-qualified staff.

Conclusion

Since most of the countries in the ECAFE region have only recently launched programmes of manpower training as part of a gradual process of industrialization, they are not yet in a position to evaluate their implementation and their impact on development of industries. Transformation of the manpower structure in the context of the economic and educational structure is a long-term operation. However, generally the progress in manpower training in the ECAFE region is encouraging. Particularly noteworthy is the substantial increase in the number of training institutions for industrial workers and the vigorous campaign to expand and improve facilities of educational system both by governments and by the private sector. There is also a welcome tendency for countries within the region to profit from each other's experience. In view of the general similarity of conditions may have to be similar.

V. MANAGEMENT AND PRODUCTIVITY

1. *Facilities for training*

In most countries of the ECAFE region, particularly those which have embarked recently on industrialization programmes, facilities for managerial training are lacking. Where they exist, they are in the form of higher general education, and commercial and management training at university and college levels. Some countries have productivity centres where management development courses are occassionally offered. These facilities are generally inadequate and need to be improved.

In recent years universities and colleges in the ECAFE region have started to braden their curricula to include subjects and courses which would prepare students for work industry. Courses in subjects such as accounting, banking and finance, management, economics, market research, and business administration are now offered and the response from the public is quite enthusiastic. In the Philippines, the State University now has a post-graduate course in business administration, organized with foreign assistance, for business executives and industrialists as well as students interested in further business education. The former Industrial Development Centre, which was a project of the Philippine National Economic Council, has undertaken a comprehensive training programme of management development for members of industry and commerce, which until the end of 1964 numbered 12,000 participants. The Nepal Industrial Development Corporation has since 1961 been organizing pre-management training courses covering, among other things, organizational problems of industry and management. The Thailand Management Development and Productivity Centre, established in 1962 with the aid of the United Nations Special Fund and with the ILO as the implementing agency, has tried to introduce a comprehensive range of improved techniques and skills at all levels of management. In India, management institutes for the training of graduates have recently been established in Ahmedabad and Calcutta with assistance from the Ford Foundation. India also has an Administrative Staff College, established in 1957. The Indian Institute of Science has a Department of Management. As will be observed, most of the facilities are of recent origin and it will probably be some time before their graduates make an impact on the economy.

To cope with the expansion in their industries as a result of deliberate efforts to industrialize, most countries of the region have provided facilities to accelerate the training of urgently needed managers and supervisors. China (Taiwan) has the China Productivity and Trade Centre. Korea, Japan, and Thailand have the Korean Productivity Centre, Japan Productivity Centre, and Thailand Management and Productivity Centre, respectively. These institutions are mostly created under the auspices of the government and are usually attached to a government department or ministry. They are usually governed by an advisory council which includes representatives from other government departments or ministries, universities, employers' and workers' organizations and similar bodies. They seek to stimulate interest in productivity and their principal activities revolve around.

(a) publicity and promotional activities oriented toward productivity improvement;
(b) programmes of education and training for top and middle management, technicians, supervisors and workers' representatives;
(c) technical information and enquiry services and a reference or lending library;
(d) preparation of textbooks, training manuals, films, and the like;
(e) advisory and consultant services and research on productivity problems.

These centres usually begin by providing practical demonstrations of work study at the factory level. However, as it became obvious that increased productivity is likewise influenced by middle and senior management decisions, their programmes were expanded to include senior management training and are covering more and more aspects of management.

To enrich their training programmes, some countries have taken advantage of fellowship programmes connected with the management development and productivity centres, which give staff membes of productivity centres an opportunity to study in industrially advanced countries.

2. *Development of efficient management*

The development of efficient management may be achieved through organizational means as well as individual ingenuity and initiative. Modern industry demands that management should continue to improve to meet the ever-growing complexity that present-day operation involve. The manager particularly must continue to develop throughout his career, learning through internal and external direction, on-the-job experience and training and guidance from others.

Countries of the region differ in their approaches to the development of managerial skills. This is inevitable in view of the different conditions and requirements in different countries. In China (Taiwan) the China Productivity and Trade Centre has conducted a number of symposia for small industries in towns and industrial centres to encourage the exchange of ideas on management; a top management symposium was also conducted for high executives of nineteen local leading enterprises. In Hong Kong, the Hong Kong Management Association, sponsored by the Federation of Hong Kong Industries, was incorporated with the objective of improving management efficiency by keeping track of new management trends and changes both locally and internationally, collecting and disseminating infomation on the principles and practices of management, and providing and encouraging education and training in management. Up to the end of 1963 the Association had organized courses covering a wide field of management subjects, including financial, marketing, office, personnel, supply and production management, in which 1,600 persons have taken part.

In India the National Productivity Council undertakes development programmes designed to develop knowledge of general principles, practices and techniques of management, and also conducts top management seminars. The Japan Poductivity Centre offers courses for top, middle and junior management and organizes seminars on specific matters such as quality control, industrial financing, top management organization and long-term planning. The Korean Productivity Centre offers training courses in management and short-term special courses related to practical problems which arise from actual management situations. The Pakistan Industrial Technical Assistance Centre, formed with the aim of training and up-grading the skills of industrial personnel in technical and managerial fields, assists industries by providing solutions to technical and managerial problems through advisory services. In the Philippines the Management Training Forum Services of the defunct Industrial Development Centre undertook basic and advanced management programmes through full-time and part-time courses, workshop and orientation seminars and plant discussions for improving all levels of management. In 1964 Thailand Management Development and Productivity Centre conducted 23 major training and demonstration courses in various fields of management, with about 900 participants. The Centre also formed the Thailand Management Association with a view to advancing the principles and practices of good management in industrial and commercial enterprises in Thailand, and to provide a forum for discussion and mutual assistance among its members. In Viet-Nam, the Industrial Development Centre offers management advisory services and holds seminars and training courses on production and business management.

The above institutions in the ECAFE region and the courses they offer help in no small measure to improve management efficiency. There is room for improvement, especially in countries where facilities of the type mentioned above are wanting. There is a dearth of experienced managers capable of giving advice. Published materials are scarce and norms for reference are few. Much time and energy is devoted to actual encouragement and policy making while little time is spent on improvement of managerial competence.

3. *Productivity*

At the start, industrial production in most countries attempting industrialization is costly. It is not uncommon for plants to operate below their rated capacity and therefore production costs run above estimates. This results in substantial wastage of materials and manpower and loss of profits. This could be avoided by improving management at the top and supervisory levels and industrial relations, introducing simplified work techniques and by modifying plant layout to eliminate or minimize time-consuming operations. Experience has shown that a rational combination of these measures, without increased capital investment, can contribute to higher productivity.

In several countries of the region productivity centres have been established to promote "productivity consciousness" and train people in its principles and practice. In 1959, the First Asian Productivity Conference was held in Japan. It was followed by another meeting at Manila in 1960 and one in 1961 when the convention of the Asian Productivity Organization was signed at Manila. The following countries have sponsored productivity movements, the activities of which are briefly described.

Australia

As of 1963 forty-three productivity groups with a total membership of over 600 undertakings were operating in Australia, every state being represented. A group consists of from 15 to 20 undertakings in the same geographical area or in the same industry. Their main purposes is to raise productivity in their members' own establishments through the exchange of information and ideas. They are essentially the means of bringing people together to study practical ideas in practical situations and to discuss particular aspects of organization and control, details of plant and equipment, production methods, and so on. Group activities may take the form of a collective examination of selected practices or problems in members' establishment, leading to conclusions or recommendations; collective studies of projects in the planning stages followed by discussion of general experience in related fields; lecture-discussion meetings combined with planned visits to member undertakings; and study of selected subjects by specially appointed sub-committees. The opportunities which productivity groups provide for practical observation, close study and intimate dis-

cussion of situations and problems have been found very useful as a means of training for participants and increasing the productivity of enterprises.

Cambodia

A centre for technical staff training and productivity established with assistance from the United Nations Special Fund became operational in July 1963.

China (Taiwan)

The China Productivity and Trade Centre, established in 1955 and renamed in 1959, aims to improve industrial productivity by disseminating information on modern production and management. Its activities include six important phases: industrial engineering, marketing and distribution, technical consultation, industrial training, small industries loan services and technical information exchange services.

Hong Kong

Only last March a productivity body was organized to prepare legislation establishing a Productivity Council and Productivity Centre. The Productivity Council is expected to act as a general advisory and policy-making body, supervising the operations of the autonomous Hong Kong Productivity Centre. This will have a training section with facilities for training both industrial personnel and teachers, consultants and specialists. The Centre will serve as a channel for contact with international organizations and between local organizations engaged in productivity promotion, and will publicize the need for increased productivity. There will also be a research section in the Centre for research on productivity factors in local industry.

India

Though relatively new the productivity movement has aroused public enthusiasm and response. It began in 1958 when the National Productivity Council was established and its impact now permeates Indian industry. The Council has organized forty-four local productivity councils, developed and sponsored training programmes, held seminars and conferences among top management personnel, sponsored training programmes for instructors and productivity training for small industries personnel, and organized productivity study groups for selected industries.

Japan

The Japan Productivity Centre was established in 1955 as a central organization to promote the productivity movement, whose main objective is to strengthen Japan's economy and raise the living standard of the people by promoting widespread understanding and support of the movement and by acquiring and disseminating knowledge essential for nation-wide improvement of productivity.

Working in conjunction with the Japan Productivity Centre are a network of independent regional productivity centres and prefectural productivity councils which have been organized to promote a nationwide productivity movement.

Korea, Republic of

The Korea Productivity Centre was established in 1957 to initiate the productivity movement and inform the general public and the industrial sector of the purpose and meaning of productivity and its significance for the betterment of Korea's economy. Its functions cover industrial training, business consultation, small and medium-scale business firm guidance, publication, international co-operation, education and research.

Malaysia

The National Productivity Centre of Malaysia has embarked on a number of training courses and programmes. Seminars have been sponsored on such subjects as production management, personnel management, management accounting, production planning and control, cost accounting and budgetary control.

Nepal

The Nepal Industrial Development Corporation, established in 1959, stimulates productivity consciousness by emphasizing the importance of the various factors making for higher productivity. It plans to conduct special courses in management and production techniques.

Pakistan

The Pakistan Industrial Technical Assistance Centre (PITAC), an autonomous organization, is trying to increase the efficiency of processing techniques, introduce improved manufacturing and management practices, help in the creation of new products, promote the greater use of indigenous raw materials and improve working conditions. It has an Advisory and Consultative Service, whose experts assist industries in the examination of technical and managerial problems and provide immediate solutions to them as far as possible. They also offer technical advice to prospective industrial investors.

Philippines

The National Economic Council (NEC) organized in 1955 is concerned with the productivity movement. The former Industrial Development Centre (IDC) acted as the implementing agency until 1962, helping industrialists to solve their production problems and improve productivity. It provided in-plant audit services, plant engineering analysis, industrial engineering analysis and general management analysis. It helped with labour productivity by developing production control standards, construction of work flow

charts, job evaluation programmes and better labour-management relations. The Management Forum Services supplemented the management training by developing and sponsoring varied and intensive courses.

Thailand

The Thailand Management Development and Productivity Centre under the Ministry of Industry was created in 1962 as a United Nations Special Fund project with the ILO as executing agency. Its function is to introduce a comprehensive range of improved techniques and skills at all levels of management. Courses are offered in general management, industrial engineering, marketing and sales, financial management, supervisory training and work study.

Asian Productivity Organization

The convention of the Asian Productivity Organization was signed in 1961 and its headquarters in Tokyo has thus started to inculcate into member countries a spirit of co-operation in the pursuit of economic progress through improved techniques and ideas on productivity. The members include China (Taiwan), Hong Kong, India, the Republic of Korea, Japan, Nepal, Pakistan, the Philippines and Thailand.

The APO gives assistance in the form of technical experts, fellowships and study tours and arranges seminars and meetings in various countries. It also conducts research, collects case studies and has set up an audio-visual aids library.

4. *Suggestions for future action*

There is an immediate need in the ECAFE region to establish management development and productivity promotion organizations in countries where they do not yet exist. Institutional arrangements might take the form of national management development centres and productivity centres, with active participation of employers' and employees' organizations, either separately or in combination, consistent with the resources available. For countries lacking resources to establish their own facilities for management development and increased productivity, the possibility of intra-regional training schemes should be explored. Countries with adequate training facilities should give other countries an opportunity to participate in their training programmes. It would be useful also if the curricula of colleges and universities were expanded to include subjects pertinent to the development of management skills and industrial relations.

INDUSTRIAL CREDIT AND FINANCING

Prepared by a Group of Experts*

INTRODUCTION

This study on industrial credit and financing is part of a series of studies on various aspects of industrialization prepared for a regional conference on industrialization held in Manila in December 1965, preparatory to a world symposium to be held in 1967.

Industrialization forms an important, in many cases a crucial, sector in the economic development plans of countries in the ECAFE region. The allocation of adequate financial resources to the sector, however, often presents an extremely difficult problem.

The dimensions of this problem can be judged from a United Nations estimate of the capital required by under-developed areas in the Far East, excluding Japan, to raise their national income per capita by 2 per cent annually. This estimate puts the annual figure for industrialization at $6,610 million together with $1,056 million for agricultural development. Net domestic savings in the region were estimated at $790 million in 1949, indicating a shortfall of $6,876 million to be covered by external financing. Average annual net international flows of long-term capital and official donations amounted to $216 million for 1951-1955 and $612 million for 1956-1959.

While the figures are not up to date, it is unlikely that the dimensions of the problem have altered. In order to close the gap between needs and resources, it is essential to re-examine closely the measures for stimulating an increasing flow of capital, both domestic and foreign, into the industrial sector. Before doing this, however, a few general observations may be pertinent.

General confidence, security and internal stability are prerequisites for private domestic savings as well as private foreign capital inflow. Political insecurity or financial instability, especially through inflation, may impair the confidence of domestic savers in the future purchasing power of money. This in turn reduces their willingness to deposit their savings with banks or other financial institutions and increases the desire for present consumption as well as the preference for holding gold, real estate, foreign currency and other tangible assets.

Part 1 of this paper attempts to set out the measures adopted by the developing ECAFE countries for mobilization of financial resources domestic and external — to meet the growing needs of industrialization. It further examines the role of specialized financial institutions in channelling such resources into the industrial sector.

Part 2 deals with the specific approach made by member governments of the ECAFE region toward savings and industrial investment, the diversity of plans, policies and practices and their varying success, apparently dictated by special circumstances in each country.

Part 3 summarizes the findings of the Group. Recommendations based on the findings of the Expert Working Group are also made in Part 3 for consideration by member governments at the conference to be organized at the end of this year.

PART I. GENERAL SURVEY OF INDUSTRIAL FINANCE

I. DOMESTIC SOURCES OF FINANCE

In discussions on industrialization one of the topics that is often brought up is the lack of capital. Admittedly, this is an important subject, and scarcity of capital is a problem. This problem is sometimes more acute in certain countries where a shortage of foreign exchange exists, and it will be dealt with in the next chapter under external sources of finance. As far as domestic sources of funds are concerned, the shortage is often caused by the fact that they are not fully mobilized. How such sources of funds may be mobilized would depend upon a number of factors.

The first factor to be considered is the attitude of the people. Aside from public savings, the main source of funds comes from the people at large. Whether they prefer immediate consumption to future consumption is the deciding factor. Of course, the attitude of the people is usually influenced by many outside factors: the stability of the currency, the return on savings, and so on will have an important bearing

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on their decision. Their attitudes toward the government in general and taxation in particular will also affect public savings.

Second, the institutional arrangement to channel savings needs to be considered. Savings may be made in many different forms and they may not necessarily help capital formation. Whether individual savings may be accumulated into sizable funds depends upon whether there are proper institutions so that such savings may be concentrated and channelled into proper uses. Educational and promotional movements to make such institutions available to the people are equally as important.

Third, in the process of capital formation, the central bank usually plays a very important role, which often goes unnoticed. The monetary policy concerning money supply and interest rates will greatly affect the operations of various financial institutions, in turn affecting the attitude of the people. This is an important aspect, but owing to its indirect bearing, it has often been neglected.

Fourth, an important source of funds comes from the plough-back of profits by corporations. Many corporations have grown rapidly because of accumulation of profits. This is extremely important because a successful corporation with a sizable accumulation of surplus funds, is usually not only in a position to undertake larger projects but is also — more importantly — in a position to assume more risk.

Last, but not least, fiscal and taxation policy has a tremendous bearing on capital formation. Fiscal policy directly affects the stability of the economy, and it is of paramount importance that stability be maintained to pave the way for industrial development. Taxation policy may encourage or discourage investment as well as consumption. It is one of the most important tools a government has to attract funds into the proper channels for the purpose of industrialization. It may also serve to some extent as a means to balance income. However, over-emphasis of this aspect, especially in the earlier stages of industrialization, may retard if not defeat further development.

These are some of the important factors that will affect the sources of funds. In countries where both public and private enterprises exist, the sources of funds to finance them will necessarily have to be different. However, it must be borne in mind that there is a much closer relationship between the two than appears on the surface. Public enterprises usually provide services or infrastructure facilities and in some cases even materials to private enterprises. The pricing policy of public enterprises will naturally have a great bearing on the cost (and hence the profit of private enterprises).

The government through its fiscal and taxation policies taps funds from the public at large. It has to invest in many general infrastructure facilities as well as in the education system to provide the desirable environment and the trained human resources required for further industrialization. Therefore, in the process of mobilizing domestic funds, a proper balance should be maintained so as to encourage healthy development.

In discussing the above topic, it is important not to neglect one basic aspect: that is, whether there are savings or any possibility of savings. Methods and devices for mobilizing domestic funds are to be discussed in some detail in later sections. Unless there are savings or a possibility of savings, the end result of such measures would certainly be disappointing. (Therefore the problem of increasing the income of the people through better incentives, better technical devices or higher productivity, especially in the farm sector, becomes a fundamental issue which is beyond the scope of this paper and will not be dealt with here.)

1. *Promotion of voluntary (household) savings*

Even though in developing countries the rate of saving is comparatively low, the act of saving has been practised by many for a long time. However, the way savings were accumulated was not necessarily compatible with present-day requirements. Savings often took the form of hoarding cash, including currency, silver, gold, or foreign exchange, without putting it to proper use. Some prefer to invest in real estate apart from their housing requirements, believing that land is always the most useful property. In the process of industrialization, it is necessary that the different forms of savings be channelled into well-organized and managed institutions so that they will eventually be used for industrialization. This is easier said than done, however. There are many institutions set up for this purpose and the most sophisticated such organization is probably the savings bank. In most cases, this is the first organization people approach, next to the life insurance company, then the stock exchange and other institutions in the capital market.

Before discussing the various types of institutions, it should be recognized that owing to the different nature of their business, the circumstances conducive to channelling funds to them will differ. Savings in the form of fixed liability plus fixed interest rate require economic stability as a basis; on the other hand, under inflationary pressure, investment in stock becomes much more attractive. No matter into what form of investment the savings eventually go, generally it is necessary in most developing countries to launch educational and promotional campaigns to convert the thinking of the people not only to saving, but also to saving through the agency of an institution rather than saving privately. Such a promotional movement will have many obstacles to overcome. On the personal side, there is always the human desire to consume instead of to save. On the social side there are many customs and habits that encourage consumption instead of saving. The latter are even more difficult to change, and it takes rather a long time to do so.

There are certain basic requirements if a savings bank is to become an effective institution in the process

of capital formation. The economy must be fairly stable and the savings bank must be properly managed. Depositors send their money to the savings bank for the purpose of safekeeping and particularly for the interest earnings. Unless the economy is generally stable, the interest earned may not compensate for depreciation in the value of the currency. Of course the greatest advantage of savings banks in attracting funds lies in the fact that they are willing to cater for small depositors. Furthermore the depositors do not have to make any decision on their investment as in the case of stock, and there are practically no risks involved. But in order to cut the risks to the bare minimum, the bank must be properly managed and supervised. In many countries the central bank carries out the bank examination and supervision with due diligence. In other cases, these duties fall under the jurisdiction of the ministry of finance. The importance of this function cannot be over-emphasized.

Apart from the above basic consideration, in order to make the savings bank effective it must make itself convenient to the public. A wide network of facilities as well as simplified procedure is very important. In many countries, the postal and remittance bank, a subsidiary of the general post office system, also takes up the functions of a savings bank. The savings bank usually offers attractive interest for depositors; the interest rate generally varies according to the condition of the market and the terms of the deposit. Governments sometimes provide tax exemption on interest earned on savings deposits, in order to encourage savings. So far, in most countries, the savings bank has become an effective institution in the attraction of funds. But on the other hand, a savings bank also has its problems. Owing to prudence and often to banking law requirements, the use of such funds is quite limited. Generally savings deposits are used mainly for financing housing, therefore the effect on industrialization is very limited. It is indeed a pity that a type of institution potentially most effective in attracting funds cannot be put on more effective use.

The life insurance company is another important institution that attracts funds. Although life insurance companies in the developed countries hold a tremendous amount of funds and are extremely important as suppliers of funds, in the ECAFE region, with the exception of a few countries, life insurance is an institutional arrangement which is still in the process of being established.

The stock exchange is an institution that has played an extremely important role in the economic development of the developed countries. It is also considered as one of the pillars of the capital market. However, in the developing countries, although setting up a stock exchange is not difficult, it is certainly not easy to manage it properly. One of the basic problems is the fact there is usually not enough stock listed. In the circumstances, the market is a thin one, and subject to violent fluctuation whenever there is a buying or selling spree. On the other hand in normal circumstances, the market is too quiet even to support the brokers and dealers. The stock exchange is supposedly a very good way of spreading the ownership of a corporation and thus an excellent means of capital formation. But in many countries, even large corporations are closely held and the mere idea of spreading ownership prevents these corporations from listing their stock in the exchange. There are other instances where stock prices are manipulated and cornered, leaving the small shareholders with a heavy loss. Therefore in operating a stock exchange, extreme care must be exercised with regard to the principle of full disclosure as well as the listing system. Moreover, investing in stock requires detailed analysis and knowledge of investment. Educating the public to analyse and study the different stocks they intend to invest in is just as important as other aspects of stock exchange supervision. Despite its proved success in the developed countries, the stock exchange is an institution that cannot be expected to achieve immediate results without possible repercussions. It is an organization that must be developed, but it must only be developed slowly, and on a sound footing.

In discussing the institutions in the financial market, the importance of commercial banks must not be neglected. They are sometimes left out, because it is believed that they mainly finance short-term loans and therefore are not concerned with industrialization. Facts do indicate that a certain portion of private savings goes into commercial banks, and they also finance to a limited extent medium-term credit. Besides, as industrialization develops, the need for short-term financing also increases. Merely providing for the medium- and long-term credit requirement only solves a portion of the financial problems. Due attention must also be paid to the commercial banks so that they grow and develop parallel with the need of the growing industries.

In some countries of this region, provident trusts, investment trusts and mutual funds are gradually developing. As years go by these may become important institutions in the capital market.

2. *Corporate savings*

Corporate savings are very important sources of funds. There are many cases of the expansion or improvement of existing industries or the establishment of new industries being financed from retained earnings. In a way, this is the most efficient use of funds, because no intermediate channelling is necessary. Many industries which were originally set up on a small scale, and survived and prospered under protection, may expand or modernize and thus become efficient and economic units. Furthermore, as industrialization develops, retained earnings become more important, and supply a sizable percentage of the available funds. As ploughing-back of profit does not affect ownership, from the procedural standpoint it is also the most efficient way to increase the equity. Generally speaking, the company laws of different countries also

prescribe various degrees of compulsory retained earnings, and provision is usually made for voluntary retention. However, even with the provisions in the laws, stockholders generally expect some dividends. Unless it is a closed corporation, retention of a high percentage of profit usually invites criticism from the shareholders. This is particularly true among corporations that are listed in the stock exchange, as low dividends will also affect the price of the stock. In certain circumstances, where the government provides corporate tax exemptions for certain industries, profit retention means not only less corporate income tax but it also means loss of personal income tax. Therefore in certain countries, the tax law requires that when the retained earnings of the corporation reach a certain percentage of the paid-in capital, unless a dividend is declared, such excess retained earnings shall be subject to tax assessment. From an ownership standpoint, retained earnings certainly do not help a wider distribution. In some countries, the government with a view to encouraging the retention of profits, imposes a tax on dividends, when the rate of dividend exceeds a certain level. Retention of earnings is so important in the process of capital formation that it should certainly be encouraged.

3. *Public savings*

In the process of industrialization, the government has the responsibility of providing the general infrastructure such as power, port facilities, transportation — both highway and railroad — as well as education and health conditions. This infrastructure is costly, needless to say, and it must be provided for as the rate of industrial growth of both the private and public sectors depends upon the availability of the general infrastructure facilities. They will necessarily be provided out of public savings. The public savings may come from the following three sources:

(a) *Budget surplus*

A budget surplus may be derived from tax revenue, and other receipts less expenditures. To achieve a budget surplus is not easy. In many countries it has only been achieved through government borrowing, which will be discussed in a later section. Although tax revenue is usually the main source of income, tax measures are often used not only as a measure of income but also as an instrument for the protection and encouragement of local industries. For instance, apart from foreign exchange and trade control, customs duty, an important source of revenue for many countries is used by the government as a means to discourage imports in order to foster or encourage local industries. Domestic excise tax has the effect of discouraging consumption and its flexible use is thus very effective in providing an incentive to industrialization. Tax exemption or tax holiday measures are used extensively for this purpose. On the surface, it looks as if a tax holiday means tax exempted and therefore tax lost by the government. In fact, it is only a delayed collection; it is a way to breed new tax sources that may be collected in the future. A tax holiday usually has a limited number of years, which provides the incentive to encourage new industries, but after the holiday is over, it provides a new source of income for assessment. Furthermore, even during the tax holiday period, there is usually no tax holiday for personal income tax, which provides a new source of revenue to the government. As mentioned earlier, it is not always possible to achieve a budget surplus; therefore, in order to carry out certain planned projects of the government, it is necessary that they be provided for in the budget, and the budgetary deficit if any may be made up by government borrowing.

(b) *Government domestic borrowing (market)*

Government domestic borrowing is limited to borrowing from the capital market through treasury bills and government bonds. Although the treasury usually has some arrangement for overdraft facilities with the central bank, such an overdraft should be limited in amount and should be provided only as a facility for temporary revolving funds. Unlimited use of the central bank is inflationary and should definitely be discouraged. How successfully government borrowing may be carried out depends upon many factors. Before government borrowing takes place, an analysis must be made to show who the lenders are. If the general public as well as the financial institutions are planned to be the lenders, then the debt must be on terms that appear attractive to them. Government bonds often provide income tax exemption features, to make them attractive. In such a case, the rate of interest must be carefully considered as it will be competing with savings deposit and other equity investments for funds. If a successful issue government bonds attracts too much funds into the government, it decreases the sources of funds for private savings and more importantly for equity investment. Both high savings-deposit interest return and government bond interest return set up a practically risk-free investment guide line, and unless the equity investment provides a much higher return, including calculation of income tax liabilities, it would certainly have a direct effect on where the funds would flow. Government bonds are usually considered as liquid assets that may be readily converted into cash; however, this is true only if the issuance of such bonds is within the absorptive capacity of the capital market. Over-flooding of the market with government bonds will make them much less liquid, therefore there is a very definite limit on how many government bonds may be issued. In this connexion, due care must be exercised in deciding the priority of government projects so as not to resort to too heavy government borrowing without reference to the market.

(c) *Surplus of government enterprises*

In addition to tax revenue and other receipts as well as government borrowing, profits generated from

government enterprises in many countries provide an important source of income. This is particularly true in countries where certain monopolies are operated by the government. In other cases, the government enterprises are the only ones in that particular line of industries, therefore even though they are not legally monopolies they remain in fact without direct competition. In many countries, the profits of government enterprises, with the exception of prescribed retained earnings as required by the company law, are turned over to the government, and therefore become a part of the general revenue in the budget. In other cases, such profits are largely retained in the company for further expansion and development. Different countries have different yardsticks by which they judge what constitutes government enterprises. Some believe that certain industries, for the interest of the public, should always be operated by the government. There are cases where enterprises are set up by the government only for the purpose of sponsoring such industries, and it is willing to turn them over to private ownership, whenever such enterprises are well established and the private investors are ready to take over. In both cases, retention of profit, with the exception of reasonable dividends, is to be recommended. If we expect the public enterprise to be operated as efficiently as the private enterprise, it certainly should not be deprived of the privilege of retention of earnings which most of the private enterprises have. Furthermore, with the retention of earnings the public enterprise may really plan ahead according to its own projection, without the necessity of turning over the profit to the government on the one hand and requesting budget appropriations on the other, without any assurance that such an appropriation request will be approved.

II. EXTERNAL SOURCES OF FINANCE

The external sources of finance, which comprise external assistance (economic and technical) and the international flow of private capital, play a very crucial role in the industrialization processes of developing countries. They supplement domestic savings and thereby enable the developing countries to raise the rate of investment. The external sources also increase the import capacity of developing countries which are in great need of imports of capital goods to implement their economic plans. The relative importance of external sources of finance as a supplement to domestic savings and to import capacity depends on the stage of economic development, the pace and pattern of industrialization and the structure of the exports of a developing country. In the ECAFE region, countries such as India facing acute balance of payment problems consider external funds as relatively more useful for raising their import capacity.

External funds flow in a variety of forms: official grants, long-term official loans, suppliers' credit, technical assistance and long-term private capital. These funds are channelled either bilaterally or multilaterally through various multilateral agencies such as IBRD, European Development Fund, International Finance Corporation and International Development Association. The governments of some aid-giving countries channel a part of their bilateral aid through institutions such as the Export Import Bank in the United States and Japan and Kreditanstalt fur Wiederaufbau in Western Germany. The various forms of external aid have their own problems from the point of view of the aid-receiving countries. These will be examined in the following sections.

The usefulness of external sources of finance from the point of view of the recipient countries depends on their cost, continuity and quality as well as the capacity of the recipient countries to utilize them effectively for productive purposes. It may be emphasized that the policy of allocating external assistance among the various economic sectors has a considerable bearing on the problem of availability of finance for industrial investment. Thus, external assistance in the form of agricultural surplus under PL. 480 does not directly increase the investible funds for the industrial sector. So one of the important problems for consideration is how to make increasing amounts of external assistance available to the industrial sector.

1. *Significance of external resources*

There has been a distinct upward trend in the flow of external funds from the developed countries (both developed market economies and centrally planned economies) since early 1950 and the ECAFE region has experienced the same trend. The crucial importance of external sources of finance to the ECAFE countries is reflected in the percentage of external funds to gross national product and also as a percentage of merchandise exports. The under-developed countries of the ECAFE region except the former Federation of Malaya have benefited considerably by the flow of external sources. This is revealed in table 1.

The percentage of 'foreign savings' to gross national product varied from 9 per cent in the case of the Republic of Korea to one per cent in Indonesia. It may be noted that the proportion of "foreign savings" to total savings ranged between 15 and 70 per cent during the period 1956-1960. Similarly the external sources of finance raised the import capacity of a number of the ECAFE countries. The percentage of net flow long-term capital and official donations to merchandise export was 68 per cent in the case of China (Taiwan) during the period 1956-1960. It was 43 per cent for Pakistan, 27 per cent for India and 19 per cent for the Philippines. It is plausible that the upward trend in the flow of external funds into the ECAFE region and the sluggish exports of most of the countries of the region since 1960 would have raised the percentage contribution of external funds to the import capacity of the ECAFE countries.

TABLE 1. LEVELS OF DOMESTIC AND FOREIGN SAVING, 1956-1960[a]
(Percentage of gross national product)

Group and country	Gross domestic saving [b]	Foreign saving [c]	Total supply of saving
Developed countries:			
Japan	33	-1	32
Under-developed countries:			
Former Federation of Malaya	17	-8	9
Burma	17	3	20
India	16	3	19
Thailand	14	2	16
China (Taiwan)	11	7	19
Ceylon	9	3	13
Philippines	8	2	9
Pakistan	6	4	10
Indonesia	4	1	5
Republic of Korea	3	9	13

Source: Economic Bulletin for Asia and the Far East, December 1962.

[a] For the former Federation of Malaya, Indonesia and Thailand, 1956-1959; for Burma and Pakistan, fiscal years ending in September and June, respectively; for India, fiscal years beginning in April.

[b] For certain shortcomings of the data, see United Nations, Economic Survey of Asia and the Far East, 1961, (Sales No.: 62.II.F.1), page 24.

[c] Foreign saving is equal to payments for imports of goods and services minus receipts from exports of goods and services. A positive foreign saving indicates an excess of such payments over receipts and a negative foreign saving an excess of receipts over payments.

2. *Trends in the flow of external sources*

Realizing the growing need of the developing countries for external funds, governments in the developed countries both with market economies and centrally planned economies have significantly stepped up the level of external assistance. Thus, from 1951-1955 to 1960-1962, the net annual flow of long-term official and private funds from the developed market economies and multilateral agencies went up from $2,600 million to $6,000 million. Moreover, out of an aggregate flow of external funds amounting to $32,800 million during 1956-1962, the ECAFE region accounted for $10,700 million; thus, the share of the ECAFE region was about one-third. The centrally planned economies have also raised their credit commitments to the developing countries — the total amount rising to an average of about $750 million a year in 1960-1962. In the ECAFE region, India and Ceylon have been the main recipients of external assistance from the centrally planned economies. The amount of credit committed by the Soviet Union, Poland and Czechoslovakia to India during 1956-1962 aggregated $917 milion. Mainland China, the Soviet Union and Poland rendered assistance to Ceylon amounting to $75 milion during 1956-1963. Table 2 brings out the trends in the net international flow of long-term capital and official donations by the countries with market economies to the ECAFE region.

Table 2 reveals that the net inflow of long-term capital and official donations into developing countries rose from about $5,300 million in 1960 to a little less than $6,000 million in 1961. However, it declined slightly to $5,900 million in 1962. In the developing ECAFE region alone the inflow of all such funds remained more or less constant at $2,200 million per annum during 1960-1962. Thus the region failed to attract an increasing amount of external funds although the net international flow expanded during the period.

TABLE 2. DEVELOPING COUNTRIES: NET INTERNATIONAL FLOW OF LONG-TERM CAPITAL AND OFFICIAL DONATIONS, BY COUNTRY, 1960-1962
(million dollars)

Country	Total			Official donations			Total			Long-term capital: Official			Long-term capital: Private		
	1960	1961	1962	1960	1961	1962	1960	1961	1962	1960	1961	1962	1960	1961	1962
Burma	20	1	32	22	14	22	-2	-13	10	9	-11	10	-10	-2	-
Ceylon	16	6	16	11	9	8	4	-3	8	4	-1	8	-	-2	-2
China (Taiwan)	118	118	82	83	84	40	35	34	42	18	19	37	17	15	5
Former Federation of Malaya	45	71	79	2	6	-4	43	66	83	-1	12	17	44	54	66
India	769	683	710	69	19	102	700	664	608	641	674	608	59[a]	-10[a]	[a]
Indonesia	183	354	122	26	60	36	157	294	86	137	505	74	20	-11	12
Iran	70	111	39	37	45	16	32	66	22	12	60	14	21	6	9
Pakistan	249	220	341	134	148	207	115	72	134	91	44	110	25	28	23
Philippines	128	9	-2	60	20	14	68	-11	-16	-7	-21	4	74	10	-20
South Korea	246	224	214	256	207	200	-10	18	14	-13	17	11	3	-	3
South Viet-Nam	190	164	184	185	160	159	6	4	25	3	3	13	3[b]	1	12
Thailand	47	58	110	34	21	39	13	37	71	- 6	4	-1	18	32	72
Other[c]	(117)	(168)	(270)	(113)	(161)	(181)	(4)	(7)	(89)	(4)	(7)	(89)	(-)	(-)	(-)
Total	2,196	2,187	2,197	1,032	953	1,021	1,163	1,233	1,175	892	1,113	994	273	121	182
Grand total	5,329	5,967	5,908	2,384	2,557	2,747	2,945	3,411	3,161	1,747	2,379	1,967	1,198	1,032	1,194

Source: United Nations Statistical Yearbook; International Monetary Fund, Balance of Payments Yearbook; Organization for Economic Co-operation and Development, The Flow of Financial Resources to Developing Countries in 1961; and national sources.

[a] Other private long-term capital only.

[b] Direct investment only.

[c] Grants and loans from OECD member countries and Japan and from multilateral agencies to countries in the region except those listed.

As far as the developing ECAFE region is concerned, there were year-to-year fluctuations in the individual components of long-term funds. The amount of official donations remained more or less static. However, the flow of long-term official capital increased slightly from $892 million in 1960 to $994 million in 1962 after reaching the level of $1,113 million in 1961. Further, the flow of long-term private capital declined considerably from $273 million in 1960 to $182 million in 1962 after reaching the low level of $121 million in 1961.

(a) *External assistance*

The ECAFE region as a whole received the largest proportion of official capital flowing to all the developing countries. Among the countries of the region, the highest amount of official donations was received by South Korea followed by South Viet-Nam and Pakistan. The share of India in the long-term official capital was the highest, amounting to $608 million out of $994 million in 1962. Pakistan's share was the second highest in the ECAFE region.

Since official funds have played an increasingly important role in providing external sources of capital to developing countries, it is meaningful to analyse the flow of such funds by type. According to the data of some countries, based on the report of the Organization for Economic Co-operation and Development, about half of the gross official disbursements in 1960-1962 comprised official donations and about one-sixth consisted of transfer of United States agricultural surplus for sale against local currency. The significant point to note is that the proportion of these two forms of external financial resources declined while that of long-term official loans increased sharply. Further, the percentage of loans repayable in lenders' currency to total bilateral disbursements went up from 21 per cent in 1960 to 31 per cent in 1962.

(b) *Foreign private capital*

So far as the flow of long-term private capital is concerned, the former Federation of Malaya, Pakistan and Thailand received sizable amounts. In fact, an upward trend in the net flow of private capital is noticeable in the case of the former Federation of Malaya and Thailand. The net amount of private capital flow increased from $18 million in 1960 to $72 million in 1962 in the case of Thailand and from $44 million to $66 million in the case of the former Federation of Malaya. It is noteworthy that the flow of long-term private capital predominated over the net flow of external sources into the former Federation because both non-official donations and official long-term capital had been negligible. It may be emphasized that the developing ECAFE region was not able to attract foreign private capital in substantial amounts. It was the Latin American countries which received the bulk of private capital inflow from the developed countries. The share of Latin America in the international flow of private capital increased from more than half in 1960 to about two-thirds in 1962. On the other hand, the developing ECAFE region attracted $273 million out of the total net international flow of private capital amounting to about $1,200 million in 1960. Its share however declined in 1962. Out of the total net international flow of private capital of $1,194 million, an amount of $182 million flowed to the developing ECAFE region in 1962.

(c) *Technical assistance*

The shortage of technical skills and of trained administrative and managerial personnel is one of the major obstacles to the rapid economic growth of the developing countries. Technical assistance therefore plays a strategic role in the economic development of the ECAFE countries. Such assistance is rendered mainly in two forms: the provision of additional training facilities for nationals of developing countries and the provision of foreign experts to advise the governments, to fill the gap in trained personnel and to undertake on-the-spot training of nationals of the recipient countries. In addition, the United Nations Special Fund combines technical assistance with some supporting capital aid for pre-investment purposes such as resource services and the establishment of training and applied research facilities.

The amount of technical assistance has increased several-fold during the past decade. About one-tenth of official bilateral assistance was devoted to technical assistance in 1962. The developed countries provided financial support to aproximately 4,000 students and trainees from developing countries in 1962. 60,000 technicians and experts were supplied to developing countries under bilateral programmes. In addition, the United States financed 5,700 fellowships and provided over 5,000 experts in 1962.

(d) *Suppliers' credit*

The developing countries, in addition to long-term official and private capital, receive short-term assistance in the form of suppliers' credit. A number of developed countries operate export credit guarantee or insurance schemes for export promotion. These schemes enable the developing countries to obtain financial assistance on relatively reasonable terms for imports from the developed countries. The short-term liabilities of the ECAFE region, which can be regarded as an indicator of supplier's credit, increased from $554 million in 1961 to $662 million in 1962. The percentage share of the ECAFE countries in the total short-term liabilities of all the developing countries rose from approximately 13 per cent in 1961 to about 15 per cent in 1962.

It may be noted that suppliers' credit is offered at commercial rates to which premium for insurance coverage is also added. This premium varies with the magnitude and nature of the risk covered. Normally, suppliers' credit is for a short duration. Thus both the market rate of interest and the short-term duration of such a form of assistance increase the debt-servicing

burden of developing countries and thereby aggravate their balance of payments problem.

3. *Problems of external assistance*

From the point of view of a receiving country, it is not only the magnitude of external assistance which matters, but also the composition, the maturity of official loans, and the conditions for utilization of such assistance which are also extremely important. Moreover, from the point of view of the availability of financial resources for industrial investment, the policy of aid-giving countries regarding the purposes for which assistance can be utilized is also very significant. The distribution by country of official donations and long-term capital is another problem which needs careful consideration on the part of the developed countries.

(a) *Allocation of external assistance*

It is generally found that special political and economic ties have determined the allocation of bilateral financial assistance among the developing countries. Within the framework of political considerations, however, decisions regarding the proportion of assistance to individual countries and the type of projects to be financed have been based upon economic and social considerations. The importance of special political and economic ties is reflected in the distribution of bilateral economic assistance among the ECAFE countries. The flow of per capita aid was the highest in the case of the Republic of Viet-Nam. It amounted to $0.9 in the case of India, $10.4 in the case of China (Taiwan), and $12.5 in the case of Korea during 1956-1960. From the extent to which the size of the population of the developing countries in the ECAFE region reflects the degree of assistance required to meet the economic needs, the distribution of external assistance seems to be uneven. Table 3 underlines the importance of evolving appropriate economic criteria for allocation of external assistance among various countries so that economic assistance could prove to be most effective in achieving the objective of rapid economic development of the various receiving countries.

(b) *Tied aid*

Most developed countries restrict at least part of their bilateral assistance to purchase of their own products. Suppliers' credit also obliges the credit-receiving countries to import from the credit-giving countries and thereby should be regarded as a form of tied aid. Contributions in kind such as transfer of United States agricultural surplus under PL. 480 might also be considered as tied assistance. According to an estimate of the OECD, approximately one-fifth of bilateral aid contribution by the major donor countries in Western Europe, North America and Japan comprised direct commodity transfer and over two-fifths, tied financial assistance including suppliers' credit in 1961.

The developed countries providing tied assistance are guided by their own balance of payments difficulties or the existence of idle capacity or unemployment. A desire to promote domestic exports to compensate exporters for the loss of sales in traditional markets which may have resulted from procurement restrictions of other donor countries has also influenced government policies with respect to tied aid.

TABLE 3. PER CAPITA NET INTERNATIONAL FLOW OF LONG-TERM CAPITAL OFFICIAL DONATIONS, 1951-1955 AND 1956-1960[a] (dollars per annum)

Country [b]	*1951-1955*	*1956-1960*
Republic of Viet-Nam	22.6[c]	15.5
Republic of Korea	8.0	12.5
China (Taiwan)	10.7	10.4
Iran	2.0	4.5
Philippines	2.7	3.6
Thailand	1.3	2.8
Burma	–0.6	1.7
Pakistan	0.2	1.7
Ceylon	0.3	1.3
Indonesia	–0.1	0.9
India	0.2	0.9
Japan	–0.1	–0.9
Total	0.9	1.7
Total, excluding Japan	1.1	2.0

Source: United Nations: International Flow of Long-term Capital and Official Donations; World Economic Survey 1960.

[a] Estimated on the basis of population data for 1953 and 1958, respectively. No sign indicates net inflow of funds; minus sign indicates net outflow.

[b] Countries are ranked in descending order of the per capita flow in 1956-1960.

[c] 1955.

The practice of giving tied aid has an adverse impact on the usefulness of such assistance to the recipients. Tied assistance reduces competition between potential suppliers and may render impossible procurement of import from the most economical sources of supply, leading to a rise in the project cost and hence overcapitalization of an enterprise. This in turn affects adversely its competitive position in the international market. Procurement restrictions may also involve the purchase of equipment which may not fully meet the recipient's requirements. Moreover, the availability of aid may encourage the execution of those projects for which suitable equipment can be readily obtained in the aid-giving countries even if the recipients' development programme may not assign the highest priority to such projects. Thus tied aid becomes less effective in stimulating the economic growth of developing countries.

Loans granted by multilateral agencies such as IBRD, IFC, IDA and IDB are not tied. In fact, these agencies insist on international competitive bidding for contracts financed under such loans. A policy of channelling an increasing amount of aid through multilateral agencies can become more useful to developing countries.

(c) *External debt-servicing burden*

The composition of external assistance has a bearing on the problem of the financial burden on

developing countries. The growing importance of official loans relative to official donations increases the debt servicing burden of the loan receiving countries. It has been estimated that the outstanding external public and publicly guaranteed rate of developing countries amounted to over $24,000 million at the end of 1962 of which $17,000 million had actually been disbursed. The servicing of debt involved annual payments of $3,000 million: $900 million for interest payments and $2,100 milion on account of amortization.

TABLE 4. PUBLIC AND PUBLICLY GUARANTEED EXTERNAL DEBT, INCLUDING UNDISBURSED: FOR TWELVE COUNTRIES, OUTSTANDING AS OF 31 DECEMBER 1955 AND 1962
(million US dollars)

Countries	*1955*	*1962*
India	309.8	2,925.8
Iran	172.4	449.9
Pakistan	147.4	829.2
Burma	17.0	82.7
Ceylon	43.9	117.3
China (Taiwan)	...	89.2
Indonesia	...	...
Korea	...	78.4
Malaysia	89.9	171.4
Philippines	82.6	222.3
Thailand	73.3	249.7
Viet-Nam	...	...

Source: United Nations: Trade and Development; Financing and Invisibles: Institutional Arrangements, New York 1964.

The growth of the external public debt and debt servicing burden for the ECAFE countries is shown in table 4. The rate of increase in public debt was the highest in the case of India, followed by Pakistan. The annual average percentage increase in India was 38 per cent during the period 1955-1962 and 28 per cent in the case of Pakistan. The debt servicing burden naturally increased rapidly in the case of these two countries of the ECAFE region. Interest payments and amortization rose sharply from $12.3 million in 1956 to $238 million in 1963 in the case of India and $21.1 million to $58.1 million in the case of Pakistan. The percentage of debt service payment in 1963 as percentage of net debt outstanding in 1962 was 29.4 in the case of the Philippines and 25.9 in the case of China (Taiwan). It was 18 in the case of Pakistan and 18.5 in the case of Ceylon. It is obvious that the increasing debt service burden has aggravated the balance of payments problems of the developing countries in the ECAFE region. To this extent the usefulness of external assistance has been reduced.

(d) *Project aid*

Another aspect of external assistance is the purpose for which such assistance is provided. Several donor countries and virtually all of the multilateral lending agencies provide assistance primarily or exclusively for specified projects. The project approach has a number of drawbacks from the point of view of the developing countries. While some major projects can be effectively carried out in isolation, there are many which may require the execution of complementary or related projects in order to yield the optimum results.

TABLE 5. AMORTIZATION, INTEREST AND TOTAL PUBLIC DEBT SERVICE, EIGHT COUNTRIES, 1956-1963
(million US dollars)

I = Interest payments, gross, on public and publicly-guaranteed debt as recorded by the Bank.
A = Amortization payments, gross on public and publicly-guaranteed debt as recorded by the Bank.
T = Total service payments, gross (interest and amortization), on public and publicly-guaranteed debt as recorded by the Bank.

		1956	*1963*
India	I	8.0	99.0
	A	4.3	139.0
	T	12.3	238.0
Iran	I	0.8	15.2
	A	5.5	47.4
	T	6.3	62.6
Pakistan	I	2.5	11.6
	A	18.6	46.5
	T	21.1	58.1
Burma	I	0.2	3.0
	A	0.1	6.9
	T	0.3	9.9
Ceylon	I	1.8	4.1
	A	0.8	4.4
	T	2.6	8.5
Malaysia	I	2.7	5.6
	A	2.1	5.1
	T	4.8	10.7
Philippines	I	1.7	13.8
	A	7.1	50.1
	T	8.8	63.9
Thailand	I	1.4	6.4
	A	3.9	13.2
	T	5.3	19.6

Source: United Nations: Ibid.

In such cases the project approach gives rise to problems of timing and co-ordination. Most of the project assistance normally covers only the direct import requirements. In such cases, the recipients may be faced with the problem of finding supplementary foreign exchange resources to meet the additional import requirements arising from the increased income generated by domestic investment. In this event, the recipient countries may have to abandon the project or may be obliged to resort to short-term external credits to meet the import demand generated by domestic expenditure. The practice of limiting project assistance to direct import requirement has tended to encourage the developing countries to execute projects with a relatively large import component at the expense of many important projects which involve relatively large local expenditures.

The project approach, it may be noted, is generally confined to infrastructural facilities in such fields as power, transport, and communication. Some developing countries have, however, given priority to large-scale import substitute projects. Such aid to industry

has been received notably for the setting up of steel mills, cement plants and other major enterprises. However, the problems of making available external assistance to small industrial enterprises, export industries and other import industries in the private sector still remains. In the ECAFE region, Pakistan has been able to receive a large proportion of external assistance which has been channelled to both large-and small-scale industries. Recently, India has received an increasing amount of non-project aid which can be used to finance imports of spares and components. These trends in some of the ECAFE countries are welcome and it is hoped that external assistance for suitable industrial purposes will be forthcoming to meet the changing requirements of industrial finance in the ECAFE region.

4. *Problems of foreign private capital*

As pointed out earlier, there has been a downward trend in the flow of long-term private capital to the ECAFE region except in the case of the former Federation of Malaya and Thailand. The problem of attracting foreign private investment therefore assumes great importance. In the search for measures to stimulate the flow of private capital into the ECAFE countries, it is worthwhile to note that traditionally international private capital has flowed to export industries such as oil and mining in the developing countries. The foreign private investors have been attracted by those industries in the capital-importing countries which could supply the products required by the industries of the capital-exporting countries. Unlike Latin America and the Middle East, the ECAFE region therefore offers limited scope for foreign private investment in such industries as oil and mining. So it is essential to concentrate efforts on attracting foreign private capital to the domestic industries. Here the crucial question is whether the size of the domestic market is sufficiently large to make foreign investment remunerative.

Foreign investors are willing to invest their capital in developing countries if they can expect to earn a rate of return higher than what they could earn in their own countries. The excess rate of profit which foreign investors expect covers risk premium to compensate them for the extra risk inherent in investing abroad. The degree of risk premium depends on various factors in the capital-importing countries — political structure and situation, economic conditions and policies and degree of exchange rate stability. The policy of expanding the inflow of private capital to the ECAFE region should therefore aim at minimizing the risk premium expected by foreign investors and also at creating conditions which would in practice yield a rate of return covering the risk premium. The policy measures designed to achieve this objective will naturally include those which will ensure political and economic stability, freedom of repatriation of capital and remittance of profit, stable rate of exchange, a reasonable level of taxation combined with special tax incentives to foreign investors, adequate and timely supply of spare parts and components (both domestic and imported) and a buoyant capital market. Besides ensuring an attractive rate of return to foreign investors, it is essential that the ECAFE countries should offer enough worthwhile investment opportunities matured to the point where investment decisions and implementation can be effectively made. In other words, there should be a sufficient number of well-prepared projects that can be readily examined and if accepted, implemented by foreign enterpreneurs.

In most countries of the ECAFE region, the scope for foreign private investment is defined by the government. By and large, foreign investors are welcome to those industries to which the governments of ECAFE countries assign high development priority and whose growth depends on the import of machinery and advanced techniques of production. This policy naturally tends to restrict the flow of private capital into the ECAFE region. It may also happen that the size of the market for some of the industries to which foreign investment is welcome may not be large enough. This may be particularly so in the case of small countries like Ceylon, the Republic of Korea, the Republic of Viet-Nam, and Thailand. It is in this context that some form of economic integration among the ECAFE countries may, as experience in Central America has shown, acts as a stimulant to the inflow of foreign private capital.

The level and structure of taxation and frequent changes in taxation policy in the developing countries act as a deterrent to foreign private investment. Stability in the direct tax rates is, therefore, desirable for encouraging foreign investors. The level of taxation should also not be such as to discourage foreign private capital. Various countries of the ECAFE region offer a number of tax concessions which tend to reduce the effective rate of tax on income and profit. The tax incentives mainly consist of accelerated depreciation allowances (development rebate), tax holiday for a specified period, tax exemption of income earned by foreign technicians serving in the ECAFE countries and customs concessions which reduce the cost of imported plant and equipment required to establish an enterprise. The governments of the ECAFE countries have also entered into agreements with capital-exporting countries for the purpose of avoidance of double taxation.

Although the tax incentive policy is favourable to the flow of private capital into the ECAFE region, there are some problems in the field of taxation which still tend to discourage its flow. Foreign entrepreneurs would like the tax holiday to be effective from the date of earning profits rather than from the date of commencement of production. Capital-exporting countries desire that the concessional tax treatment accorded to foreign technicians should be extended to foreign managerial personnel. It is also essential that governments make minimum changes in tax rates especially in corporate taxation. Stability of the direct

tax structure enables foreign investors to plan their investment in a more efficient manner, because it reduces the degree of uncertainty regarding the tax liability of a corporation. Since most concessions are granted for a limited period only, a foreign investor may be more attracted by a well-balanced tax system geared to a reasonable rate level because he is more interested in the normal tax burden under which he will have to operate after the expiration of the special tax incentives. Moreover, foreign investors are also concerned about taxation of royalty income in some of the ECAFE countries.

Another deterrent to inflow of private capital is lack of infrastructure facilities in developing countries. It is, therefore, desirable that governments of ECAFE countries pay enough attention to the development of economic infrastructure by assigning high priority to infrastructure projects in their investment plans. External assistance for the development of social and economic infrastructure is conducive to the flow of private capital. The larger the flow of external assistance to ECAFE countries, the greater will therefore be the scope for foreign private capital to flow into the region.

One of the reasons for the downward trend in the flow of private capital into the ECAFE region is lack of sufficient knowledge on the part of investors about the economic conditions, government policies and regulations, and investment opportunities in the region. The establishment of investment promotion centres will go a long way in attracting foreign private capital. In fact, some of the countries in the ECAFE region have set up investment promotion centres at home and abroad. These centres find out appropriate investment projects and also foreign entrepreneurs interested in setting up joint ventures. They also assist entrepreneurs in the implementation of projects and in steering them through administrative formalities and regulations.

Another problem of foreign private investment is apprehension on the part of foreign investors about non-business risk. These apprehensions relate mainly to possible government interference, or appropriation of the investors' business or destruction of his property owing to war or civil disorder. Foreign investors are also worried about the possibility of non-convertibility. In this respect, however, governments of ECAFE countries such as India and Pakistan have entered into investment guarantee agreements with countries like the United States and West Germany. These agreements have facilitated the flow of German and American private capital into India and Pakistan by according them protection against non-business risk. In this context, it may be pointed out that the International Bank for Reconstruction and Development has drawn up a convention for the settlement of disputes between States and nationals of other States. The proposed International Centre for the Settlement of Investment Disputes is expected to provide facilities on a voluntary basis for the settlement of such disputes through conciliation and arbitration.

III. INSTITUTIONAL FRAMEWORK OF INDUSTRIAL INVESTMENT

1. *Role of financial institutions*

Earlier studies have indicated that the rate of domestic savings obtaining in ECAFE countries is not high and that most of them, excluding Japan, have a rate of net savings below their minimum requirements for financing economic development. The aggregate savings of each of these countries include a large proportion of household savings. Whereas the government and corporate or business components of savings find their way into pre-conceived investments, the household savings offer a vast potential for diversion into industrial investment. A substantial portion of household savings is held in the form of cash and financial assets which provide liquidity to the small savers. Investment in land and real estate is also an important factor in the destination of their savings as these assets represent security, provide protection against inflation, besides carrying prestige value for the owners. The direct holdings of corporate securities by households form a small percentage of their total savings in most of the ECAFE countries. The existing pattern of distribution and destination of domestic savings in these countries therefore reveals a large potential for their mobilization and direction into industrial investments.

In most of the ECAFE countries even corporate savings have not been utilized with the desired degree of efficiency owing to shortages of foreign exchange. Industrial investment involves import of machinery and equipment by payment in foreign exchange. It happens not infrequently that the balancing, modernization, expansion and new investment plans are delayed over long periods owing to non-availability of foreign exchange. Till it is available the savings are employed in other relatively liquid forms of investment such as inventory financing, government securities and so forth.

Although it may be possible for some countries to fill the gap in the volume of investment by means of foreign capital, it is considered desirable for several reasons to raise the bulk of investment capital from domestic resources. In order to achieve a continuous advance in economic development it is essential to achieve a continuous increase in the rate of domestic savings.

The scarcity of available financial resources at the disposal of ECAFE countries warrants their most profitable employment. For this purpose every country has defined certain priorities for industrial development, which vary from country to country according to the economic environment and government policy. The financial institutions operate within the framework of declared government policies. The processing of indigenous raw materials, foreign exchange savings by import substitution, foreign exchange earnings

through exports, net contribution to gross national product, and return on capital are some of the criteria for industrial investments adopted by various countries.

2. *Financial institutions*

The existence of a certain volume of domestic savings does not by itself ensure economic development. The establishment of an effective institutional mechanism is a prerequisite for their mobilization and allocation in accordance with national priorities. Industrial development as an important means to overall economic development is now the declared objective of all ECAFE countries. Since the beginning of the post-Second-World-War period, they have devised an institutional mechanism for the mobilization and direction of available resources for industrial investment. The institutional framework varies in its complexity and degree of sophistication from country to country according to the stage of economic development and special needs. It generally consists of institutions that are financial in character as well as non-financial institutions. The most common as well as the most important of these institutions are discussed below.

(a) *Commercial banking system*

The commercial banks are the oldest form of financial institution known to the ECAFE countries. They also represent the most developed and most effective mechanism for mobilizing savings and their direction into productive channels, by virtue of their access to all classes of savers through the network of their branches. In most of these countries the commercial banks combine the functions of deposit banking with savings banking. The separate "savings bank" institution is not very popular. However, the disquieting feature of the commercial banking system in the ECAFE countries is its reluctance to engage in long-term lending to industry. The system has confined itself to the financing of established industries in the form of short-term self-liquidating working capital loans. It is maintained that the short-term nature of commercial bank liabilities and their liquidity requirements do not warrant lending on a long-term basis.

Whereas the contribution of commercial banks to industrial development in the form of working capital loans has been substantial, their strict adherence to the "commercial loan theory" is not in keeping with the requirements of the dynamic situation and warrants reappraisal. The commercial banking system in all the ECAFE countries has been actively assisting in government financing by maintaining a large portfolio of government securities. The value of these securities drops in times of economic prosperity when interest rates are rising, making the investments fairly illiquid for long periods unless the banks are willing to absorb the losses of liquidation on a falling market. A portfolio of term loans on the other hand with carefully spaced maturities after short intervals, provides a regular roll-over of funds and good degree of liquidity to the individual banks. Moreover, it is uncommon that the so-called short-term loans of the commercial banks are renewed year after year, which in fact amounts to term lending.

The liquidity requirements of commercial banks depend upon the composition of their deposit liabilities and the quality of their investment. A commercial bank with a higher proportion of time deposits to total deposit liabilities is in a better position to engage in term lending than one whose liabilities predominantly consist of demand deposits. In some of the ECAFE countries deliberate attempts are being made to induce the commercial banks to undertake term lending by offering them refinance guarantees. In India for instance, the Industrial Development Bank of India provides refinancing facilities to commercial banks, which extend long-term loans to industrial concerns.

In order to engage in term lending, however, the commercial banks will need to organize special departments. Term lending is radically different from short-term lending and requires a different kind of appraisal. In the ECAFE countries, the banks are used to making short-term commercial loans normally against the security of readily marketable stocks of raw materials and finished goods. Their nature is self-liquidating. The repayment of long-term loans, however, depends upon the estimated future earnings of industrial projects which in many cases have yet to come into existence. Term lending therefore requires special appraisal of projects from the economic, financial and technical aspects, thus necessitating the employment of specialist staff. Moreover, term loans require close post-sanction supervision of the projects. In order to avoid the overhead of specialist staff the commercial banks can initially participate in industrial development through joint financing with specialized long-term lending institutions where such institutions exist. Under joint financing the commercial banks can also arrange to take over the earlier maturities of long-term loans, thereby achieving their liquidity objective.

Another aspect of commercial bank operation which needs careful attention is the concentration of bank credit among a small number of entrepreneurs. This takes place owing to the over-emphasis of commercial banks on security and their preference for clients who are already financially sound. In developed countries the decision to lend is primarily based on the anticipated income of the project and its adequacy to meet the debt obligations. The security is considered secondary. In the developing countries, with premium placed on security and the demonstrated success of the borrowers, bank credit tends to concentrate among a few families. This tendency on the part of commercial banks also prevents them from taking genuine risks and inhibits the spread of bank credit.

(b) *Stock exchanges*

The stock exchanges in the developed countries provide an important mechanism for the transfer of savings from those who have surplus to invest to those who can put them to immediate productive use. Stock exchanges have also been organized in several of the ECAFE countries. However, with the exception of a few countries, they have not been very effective in the mobilization of savings and their allocation.

Most of the stock exchanges in ECAFE countries are local in character and their impact is not widespread. The members and brokers on these exchanges mainly trade on their own, do not maintain offices throughout the country and make little effort to promote the sale of securities beyond the large cities.

The existing security markets do not possess any dimensions. The number of securities traded is small and their variety is virtually non-existent. No special effort is made by the issuing corporations or the brokers and underwriters to devise securities that suit the investment requirements of various investors.

The sole-proprietorship, the partnership and the private limited company are the predominant forms of legal organization in most of the ECAFE countries. Their requirements of finance are generally not so large that they cannot be supplied without recourse to the public security markets. The institution of the public limited company is beginning to gain popularity with the gradual growth in the size of industrial enterprises requiring large volumes of finance. Even the large public limited corporations in most of these countries are closely held and their management groups are reluctant to enlarge the ownership for fear of losing control of the enterprise. After the initial issue of capital, the large corporations are often able to generate sufficient funds internally owing to tax concessions and accelerated depreciation allowances provided by the various governments, to meet their subsequent growth requirements to a large extent. These corporations are also in a position to raise additional finance through other local financial institutions who are always willing to lend because the safety and repayment of their funds is assured by the demonstrated profitable operation of the projects and the reputation of their managements. In such cases it may be advisable to refuse finance to such companies and to force them to raise it by an additional issue of securities on the stock exchange. The Industrial Development Bank of India prefers to receive applications from those who have not received an adequate response from other financial institutions.

Adequate arrangements for underwriting new issues are not available in most of the ECAFE countries. Investment houses on the lines of those in the developed countries are non-existent. In the absence of proper underwriting arrangements, the new issues are not scientifically analysed and publicized for the information of the investors. It therefore becomes difficult for the new promoters to raise adequate finance on advantageous terms. The investors prefer to subscribe to the issues of well-known management groups rather than base their investment decisions on the intrinsic worth of the securities. The result is that the benefits of stock exchanges are confined to a few well-known groups only. Efforts have been made in some of the ECAFE countries by the development banks (discussed later in the chapter) to underwrite new issues of the projects financed by them in collaboration with other financial institutions. The Pakistan Industrial Credit and Investment Corporation, established in 1957, has underwritten eight public issues for over 50 million rupees besides its lending operations. The participation of local institutions in underwriting operations also builds up the confidence of investors in the financial soundness of the projects.

Sometimes the government regulation of financial and other institutions in the ECAFE countries has also inhibited the development of securities markets. Investments in equity securities by insurance companies are restricted to a certain percentage of their paid-up capital and reserves. Further, the investments are restricted to only those shares which have a dividend-payment record for a minimum number of years in the immediate past. Beyond that, the governments in some countries also announce an approved list of securities eligible for investment by financial and other institutions of a public character. In the developing ECAFE countries, the number of enterprises with demonstrated profitability and dividend or interest payment record is small. Besides, the payment of dividend or interest in the past is no guarantee of its continuation in the future as well. The government restrictions as such limit the choice of investments to a few securities only, which, owing to the institutional demand, also become overpriced in the market. Besides, the restrictions deprive the new entrants of an important source of funds. There is therefore a need to review and rationalize government regulations in respect of institutional investments, in accordance with the special requirements of each country's economy.

(c) *Investment trusts*

The institution of investment trusts for mobilization and allocation of savings is not common to all the ECAFE countries. Their importance, however, is beginning to be felt and the governments are showing increasing interest in their establishment. The investment trust has existed in its various forms, that is, unit trust, open-end and closed-end investment companies and so on, with varying degrees of effectiveness in some ECAFE countries, such as Japan, Malaysia, the Philippines and India. In December 1962, the National Investment Trust (NIT) was established by the Government of Pakistan. The Government of India founded the United Trust of India (UTI) in February 1964.

The investment trusts offer several advantages to investors over other savings institutions. They enable

even the very small investor to share in the benefits of a country's industrialization by the purchase of unit certificates, the proceeds of which are reinvested in various kinds of securities. In this process they also make security purchases by the general public popular. They provide expert knowledge and management of security investments to the investors, which is not commonly found in most of the developing countries. They also provide diversification to the small investors, by investing the pool of funds collected through the sale of unit certificates over a wide cross-section of securities, which would be impossible for the small investors owing to their small resources. The unit certificates also provide protection against inflation and depreciation of savings which would take place if the same were kept in the form of cash or bank deposits. The relative ease with which the unit certificates can be sold by the holder also provides liquidity to the small investors.

However, in order to mobilize small savings successfully in the developing countries, it will be necessary for the investment trusts to issue certificates of small denominations and to ensure their widespread distribution. This can be achieved by arrangements for the sale and repurchase of the unit certificates through the commercial banks and their branches.

The success of the investment trusts largely depends upon a very high degree of professional skill and management competence as well as government regulation to ensure ethical practices. In order to ensure a widespread allocation of trust funds it may be advisable to restrict the maximum holdings of a trust in a single enterprise. As a matter of policy the Unit Trust of India does not invest in any single enterprise more than five per cent of its total investible funds or 10 per cent of the total value of securities issued and outstanding of the enterprise, whichever is lower.

(d) *Industrial development banks*

The period since the Second World War has seen the rising popularity of another specialized financial institution known as the industrial development bank or the industrial development finance company, throughout the ECAFE region. The need for a specialized institutional framework to supply the enormous requirements of long-term capital, both debt as well as equity, for the implementation of the vigorous industrialization policies of the governments, has been felt all along. The establishment of industrial development banks has filled a serious gap in the institutional structure for industrial finance. Such institutions now exist in several ECAFE countries. The sponsorship, organization, procedures and scope of the development bank differ from country to country. Some are entirely government owned, while some are government sponsored and controlled jointly with other institutional and private shareholders. A number of them are entirely privately owned. Many of these banks have been established with the assistance of IBRD and IFC, a subsidiary of the World Bank which holds equity interest in them jointly with other foreign investors from several countries. The majority shares, however, in most of these institutions are held by the local institutional and private investors. IBRD-assisted development banks are operating in India, Pakistan, Iran, the Philippines, Malaysia and China (Taiwan).

As regards operations, the development banks perform a variety of functions. Some specialize in supplying the financial requirement of small- and medium-scale industries, while others may cater to the requirements of large-scale industry or certain sectors of industry only. Some of them only perform lending functions while others may also engage in underwriting functions and subscribe to equity securities also. Most of these banks operate within the framework of the economic and industrial policies laid down by their governments. Many of these development banks lend in local as well as foreign currencies.

Whatever the character of the development banks, they have proved to be very useful instruments of industrial development.

In addition to foreign capital, industrialization involves managerial skills, technical know-how, knowledge of markets and the like. The development banks have been very useful in rendering assistance for the selection of plant and equipment, processes of manufacture most suitable to local conditions, modern technical know-how, market contacts, and so forth, through their expert staff and international contacts.

The development banks in the ECAFE countries have also provided very useful support to the stimulation of capital markets where such markets are not properly developed by engaging in the underwriting of stocks and debentures.

It is therefore desirable that the organization of the development bank as a special institution for industrial development should be given more thought by the ECAFE countries.

(e) *Industrial development corporations*

Apart from the above financial institutions, the role of the industrial development corporation as an important source of industrial investment also needs special mention. Although not a financial institution, it has contributed to the industrial development of some of the ECAFE countries in no small measure. These are wholly-owned government corporations which were set up to initiate industrial development at a time when local enterprise was shy toward industry and the capital markets were not sufficiently developed to supply the large financial requirements. These corporations undertook the setting up of industries entirely through their own resources. Their policy has been to execute and operate the industries for some time and disinvest in favour of private enterprise, after an industry has demonstrated profitable operations. The Pakistan Industrial Development Corporation set up in 1952 by the Central Government (subsequently split into two provincial corporations in 1962) offers a typical

example. It was set up by the Government to promote and develop the essential industries which private enterprise found unattractive on account of either technological complexities or uncertain profitability. A salient feature of the Corporation's working is its emphasis on the promotion of projects with the ultimate object of transferring the ownership to private enterprise. The institution can be useful to the ECAFE countries which lack industrial traditions, where capital markets are underdeveloped and which are in the early stages of building up an industrial base.

3. *Financing of small- and medium-scale industries*

Whereas considerable efforts have been devoted in most of the ECAFE countries to the development of a capital market and an institutional framework for industrial finance, the success achieved so far has mostly benefited the large-scale industrial sector. The development of a specialized framework to meet the financial requirements of small- and medium-scale industries has not received its due consideration. Most of the ECAFE countries are agricultural economies, with a majority of their population living in rural areas. Owing to the low per capita incomes in these countries the size of the market is limited. In such circumstances, the establishment of small- and medium-scale industries catering to the regional requirements of the population appears to be more desirable, unless economies of scale and technical considerations decree otherwise. The small and medium industries are labour-intensive and already provide employment to a large population in these countries. With the development of large-scale industries there will be a need for services as well as feeder industries to the large industries. The manufacture of basic raw materials in the countries by the large-scale sector, will further stimulate the growth of small- and medium-scale industries for their processing.

Due to the very size of these industries, they cannot obtain this requirement of finance on the security markets. The industrial development banks are reluctant to enter into the sector, purely for reasons of commercial profitability. It takes about the same duration of time to appraise a small loan as a large one. In fact, from several aspects the appraisal of the latter is easier, owing to the sponsors' established relationships with banks and their ability to satisfy the development banks on the feasibility of the scheme by supplying studies from competent consultants. The supervision of large projects is also easy since they are normally well managed by competent managers and technicians.

The small- and medium-scale entrepreneurs, on the other hand, are unable to stand the overhead of feasibility studies and also cannot afford to employ specialist staff for management. The governments of some countries of the ECAFE region have set up special development banks, specifying their maximum lending limits, to ensure the provision of financial assistance to the small and medium industrial sectors. Several institutions have also been set up to provide technical and financial assistance to artisans and small industrialists. The institution of industrial estates for the organized development of small industries is gaining popularity among the ECAFE countries. India, Malaysia and Pakistan have already set up several estates with encouraging results. Plans for the establishment of further estates are under active consideration in Malaysia. The infrastructure of the estates is normally provided by the government in addition to the provision of free technical services and marketing advice and the like.

The small and medium sectors, however, suffer seriously from lack of equity resources. Their requirements relative to large industry are so small that the institution of public limited companies is non-existent. On the other hand the family savings of the entrepreneurs are inadequate to meet a reasonable portion of the cost of the projects. The special financial institutions cannot participate in their equity for various obvious reasons. The gap cannot be filled with debt capital as there is an optimum debt limit for every project as determined by its earning capacity and ability to service the debt obligation conveniently.

The existing institutional arrangements for the provision of long-term finance to small and medium industries are obviously inadequate in most of the ECAFE countries. The need for a special organized study is indicated, to examine the existing arrangements in the region with a view to suggesting possible improvements, removing the existing bottlenecks and ensuring a balanced and broad-based economic structure in each country.

PART II. COUNTRY STUDIES

I. AFGHANISTAN

1. *Domestic sources of finance*

The capital market has not been developed in Afghanistan. There are only three commercial banks, namely, Da Afghanistan Bank, Pashtam Tejaraty Bank and Banke Milli, the chief function of which is to extend credit to the private sector for industrial and other purposes. Credits provided by these banks have been insufficient.

2. *Specialized financial institutions*

There is no specialized financial institution so far in Afghanistan.

3. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Excluding the industries connected with the manufacture and production of war materials or power and energy, such as electricity, coal, oil, and atomic energy, the establishment of all other industrial enterprises shall be free within the framework of existing regulations for both domestic and foreign investors.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*
(Information not available.)

(3) *Provisions for remittance of profit and dividends and repatriation of capital*

The investment laws provide facilities for the remittance abroad of profits and repatriation of capital by foreign investors. The profits remitted in any one year may not exceed 15 per cent of the capital invested and the capital may be repatriated at a rate of not more than 20 per cent after a stipulated minimum period of years.

(4) *Provision for the import of technical know-how*
(Information not available.)

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

For three years after the industry commences operation, the profit will be exempted from income taxes. There are also facilities for exemption from customs duties of capital goods imported by foreign investors.

(6) *Local participation and joint ventures*
(Information not available.)

(7) *Other information*

There are at present no institutions which can provide the essential information on resources, possibilities, working conditions, and so on to an intending investor so as to help him decide in undertaking new investments in the country.

II. AUSTRALIA

1. *Domestic sources of finance*

Broadly speaking, government policy in Australia has sought to maintain the economic climate most conducive to savings, for example, by maintaining economic stability, curbing excessive developments which threaten to overheat the economy, and selectively stimulating activity in times of recession. The following steps have been taken by the Government to encourage savings:

(1) Establishment of a Government Savings Bank.
(2) Offering the following tax concessions to particular forms of private savings:
   a. concessional deductions for income tax purposes in respect of premium paid to life insurance companies and contributions to superannuation funds;
   b. investment and depreciation allowances,
   c. allowances of deductions for certain capital expenditure by primary producers;
   d. the freedom of public companies from undistributed profits tax on profits retained in the business, and the permitting of private companies generous retention allowances.
(3) The Commonwealth and state governments usually offer loan issues to the public.
(4) Special bonds are on continuous offer for the small investors.
(5) The Commonwealth also has on continuous offer three-month Treasury Notes, which are suited to the needs of the financial institutions; they carry market rates of interest.
(6) The channelling of funds by private institutions into industry is subject to official control in the case of trading banks, savings banks, and life offices and pension funds.

As a result of the foregoing measures, private investment has recorded an increase in every year between 1948 and 1964, and its share of the gross national product has risen from 9 per cent in 1948/1949 to 16 per cent in 1963/1964. Throughout the post-war period, slightly less than two-thirds of total investment expenditure has occurred in the private sector. Savings, in the form of provisions for depreciation and undistributed company profits, provide the chief source of funds for capital expenditure by private business.

In the past five years, Australian companies listed in Australian stock exchanges have raised large amounts of money by new issues of shares and fixed interest borrowing. This is because businesses are able to draw on the savings of others either directly through capital raising or indirectly through financial intermediaries such as banks and insurance companies.

The capital market in Australia is well organized. The number and variety of financial intermediaries has grown rapidly since 1950. The wide range of securities and services which these offer and the high level of savings and substantial capital inflows from overseas have, for the most part, helped to satisfy the reasonable new capital and borrowing needs of the community.

The banking system provides the main agency for the mobilization of savings and their distribution. It consists of the Reserve Bank (the central bank) and of government and private trading banks and savings banks. The Reserve Bank determines maximum interest rates which banks may offer on moneys deposited with them, regulates the advance policy being adopted by trading and savings banks, and controls trading bank liquidity through a system of statutory reserve deposits.

Besides trading banks and savings banks, life offices and superannuation funds form another major source of investment funds. Hire-purchase and finance companies have also been rapidly expanded during the 1950's. Their activities include plant and equipment leasing and real estate financing.

In addition, there is an official short-term money market for dealers. Stock exchanges are also operating in the major Australian capital cities. They assist companies to raise funds by making a market for company shares, debentures and notes.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Public ownership of the means of production in Australia is limited for the most part, to public utility type undertakings such as railways, harbour works, electricity, gas and water supply, and postal and telecommunication services. In some service industries, (such as air transport and coastal shipping), public and privately-owned undertakings operate side by side. With minor exceptions to meet the particular circumstances of certain industries, overseas companies operate on an equal footing with locally-owned companies in all respects. In the administration of exchange control, there has been no discrimination against particular countries or areas in considering proposals for overseas investment in Australia.

(2) *Provision for compensation in case of nationalization, requisition or expropriation*

The Constitution of the Commonwealth of Australia empowers the Commonwealth to acquire property from any person only "on just terms". The criteria adopted for "just terms" would apply regardless of the nationality of the owner of the property.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

All remittances abroad from Australia require exchange control approval. All current net income (after taxation), including royalties and service charges, as well as profits, dividends and interest, accruing to firms or individuals may be remitted abroad by residents overseas without restriction. Approval is also normally granted for the repatriation of capital by overseas residents.

(4) *Provisions for import of technical know-how*

Proposals for import of technical know-how, licensing arrangements, and so on, that involve payments to persons resident outside the sterling area and in Hong Kong require exchange control approval before the arrangements are entered into. Payments in accordance with approved arrangements may be freely remitted.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

Neither the Commonwealth nor the State Governments offer particular incentives, for example, tax incentives to foreign investors that are not available on the same terms to Australian investors. However, the Government provides information both in published form and through its overseas diplomatic and trade posts about the general investment opportunities available in Australia.

(6) *Local participation and joint ventures*

There are no provisions requiring local participation in the capital or management of companies set up in Australia by overseas investments. Although no rules are laid down, the Government feels that, in general, Australian participation in ownership and management is desirable and believes that fears and misunderstandings are least when this course is followed.

3. *Inflow of foreign capital*

The inflow of overseas capital has helped to accelerate the economic growth of Australia. Available data indicate that the annual inflow of direct private overseas investment to industries in the private sector has been increased from US$212 million in 1956/57 to US$443 million in 1963/64.

TABLE 6. ANNUAL INFLOW OF DIRECT PRIVATE OVERSEAS INVESTMENT TO PRIVATE SECTOR INDUSTRIES IN AUSTRALIA, 1956/57-1963/64

(million US dollars)

Industries	*1956/57*	*1963/64*
Primary production, mining and quarrying	25.8	32.7
Manufacturing		
Founding, engineering, metal-working	22.8	54.9
Vehicles, parts and accessories	20.6	66.5
Electrical goods, equipment, cables, etc.	23.3	14.4
Food, drink and tobacco	9.0	26.2
Chemicals and oil refinery	71.5	41.2
Other manufacturing	15.5	39.7
Total manufacturing	162.7	239.9
Finance and property	14.1	68.8
Commerce	8.1	87.1
Other industries	1.6	15.0
Total all industries	212.3	443.5

Besides capital inflow into the private sector, Commonwealth and state governments raise loans overseas from IBRD and other sources for investment in the public sector.

4. *Measures for servicing external public debts*

The National Debt Sinking Fund is available to meet the repayment obligations of the Commonwealth and state governments for debt raised internally and externally. Interest payments on external debts outstanding are made from revenue of the Commonwealth or of the state government to which the debt has been allocated. However, the Commonwealth meets its obligations to the International Bank and to private lenders in New York from appropriations instead of from the Sinking Fund.

5. *Capital investment in industry*

Australia's gross fixed capital expenditure for the years 1952-1964 in both private and public sectors is as shown in tables 7-9.

From these data, it can be seen that there is a sharp increase in Gross Capital Expenditure in Australia during the years indicated, especially in the private sector as represented by the increase in manufacturing industries, primary production, commerce as well as ownership of dwellings.

TABLE 7. GROSS FIXED CAPITAL EXPENDITURE

	Private (US$ million)	Public (US$ million)	Total (US$ million)	Total as a proportion of GNP
Average of 5 years ended 1952/53	954.7	632.6	1,587.3	21.5
Average of 5 years ended 1957/58	1,766.5	996.8	2,763.3	23.6
Average of 5 years ended 1962/63	2,495.8	1,367.7	3,863.5	24.1
Average of 5 years ended 1963/64	3,138.2	1,718.1	4,856.3	24.9

TABLE 8. PRIVATE EXPENDITURE ON FIXED CAPITAL EQUIPMENT BY INDUSTRY

(million US dollars)

Industry	Average of 5 years ended 1952/53	Average of 5 years ended 1957/58	Average of 4 years ended 1961/2
Primary production	246.4	352.4	400.2
Mining and quarrying	22.5	40.3	50.8
Manufacturing	217.5	431.9	562.4
Electricity, gas and water	13.8	9.7	9.7
Building and construction	14.4	40.1	57.9
Transportation and communications	32.0	79.1	102.6
Commerce	81.8	222.0	316.1
Community and business services	10.4	32.0	54.5
Finance and property	7.9	41.5)	168.7
All other industries	16.9	45.9)	
Ownership of dwellings	291.6	473.4	673.3
Difference	–0.5	–1.8	—
Total	954.7	1,766.5	2,396.2

TABLE 9. PUBLIC EXPENDITURE ON FIXED CAPITAL EQUIPMENT BY FUNCTION

(million US dollars)

	Average of 5 years ended 1952/53	Average of 5 years ended 1957/58	Average of 5 years ended 1962/63	1963/64
Education	19.1	45.5	96.8	121.0
Public health	16.4	39.6	47.9	62.7
Water supply & sewerage	44.0	84.3	144.7	179.2
Irrigation	19.5	76.6	29.1	35.8
Forestry, land settlement, etc.	33.6	43.5	44.4	44.8
Post office	47.4	64.2	99.9	152.3
Civil aviation	12.2	18.6	40.3	35.8
Railways	69.4	83.2	82.9	91.8
Roads	95.4	188.6	312.3	414.4
Other transportation and communication	19.1	26.0	43.0	47.0
Power, fuel and light	146.3	235.6	276.4	322.6
Houses, flats and hostels	73.3	67.6	54.7	73.9
All others	29.5	41.7	95.9	136.6
Difference	+7.5	−18.2	−0.6	+0.2
Total	632.6	996.8	1,367.7	1,718.1

6. *Specialized financial institutions*

The Commonwealth Development Bank of Australia is a specialized financial institution controlled by the Commonwealth Banking Corporation in assisting in the development of sound enterprises in both primary and secondary industries, which otherwise would be unable to obtain the necessary finance on reasonable and suitable terms and conditions. In secondary industries, finance is made available for the establishment or development of industrial undertakings, particularly those of small-scale industries.

III. BRUNEI

1. *Domestic sources of finance*

There is no capital market existing in Brunei.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

There is no delineation by law of fields of industrial activity reserved for the public and private sectors nor is there any differentiation made by law between domestic and overseas investors. There is no area of industrial activity closed to overseas investors.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

There is no intention to nationalize any private foreign or domestic enterprise.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

There is no prohibition on remittance of profits or dividends on foreign capital except that such remittances in currency other than sterling must have the approval of the Controller of Foreign Exchange.

(4) *Provisions for the import of technical know-how*

There are no regulations affecting the import of technical know-how. Royalties are paid only on extraction of natural resources, such as mineral and forest products.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

(Information not available.)

(6) *Local participation and joint ventures*

So far, a joint enterprise with a ship-building company from Japan has been established to construct lighters, coastal vessels and barges in Brunei. Discussions are being held with other firms concerning possible ways of utilizing the natural gas and high grade silica sands through joint ventures not only on a bilateral basis but also on a multilateral basis.

3. *Specialized financial institutions*

There is so far no specialized financial institution in Brunei. A study for the establishment of a Development Finance Corporation is under way in order to provide intermediate and long-term loans to commerce, industry, agriculture, forestry and fisheries.

IV. BURMA

1. *Domestic sources of finance*

The following steps have been taken:

(1) Measures such as an increase in rates of existing taxes, introduction of new taxes and improvement of tax collection, as well as economies in amount of expenditures, were used to attain the planned magnitude of public savings.

(2) Loans for industrial expansion as well as exemption from income tax and customs duties and accelerated depreciation were granted by the Government to deserving industries.

(3) Legislation has been passed to make life insurance compulsory for all permanent government employees. The Government has also instituted social security and provident fund schemes primarily for the benefit of employees; these funds, no doubt, help increase institutional savings.

(4) The Government has raised the rates of interest on savings certificates as well as on savings bank deposits. Interest earned on savings certificates is free from income tax.

(5) Co-operatives were exempted from income tax for a number of years and even now are treated favourably.

(6) In the past, government deficit financing was used to divert resources from the private sector to the public sector, but this practice has been stopped recently.

(7) Loans by the Industrial Development Bank and other government institutions were a means of channelling public savings into private investment.

(8) Interest rates charged by the Industrial Development Bank and other government institutions were lower than those prevailing in the unorganized sector of the money market.

There is no capital market developed so far in Burma. In order to mobilize domestic capital, the Government has initiated steps to find the best means of setting up a stock exchange in Rangoon.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

The Government has announced a list of new industries to be developed and classified by three categories:

a. those to be established exclusively by the State.

b. those to be established by Union citizens, by joint effort or by the State alone.

c. those to be undertaken by foreign enterprises, Union citizen enterprises, the State or joint efforts of any of these.

Category c consists of gas manufacture, fertilizer, pulp and paper, cotton spinning, nylon yarn spinning, chemical industries and other industries not included in categories a and b.

(2) *Provision for compensation in case of nationalization, requisition or expropriation*
(Information not available.)

(3) *Provisions for remittance of profits and dividends and repatriation of capital*
(Information not available.)

(4) *Provisions for import of technical know-how*
(Information not available.)

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

The Government announced the Investment Act of 1959 through which many incentives, including tax holidays for a period of three years which may be extended partially, exemption from customs duties on imported machinery and equipment, an accelerated rate of depreciation and other privileges, were given to deserving new industries.

(6) *Local participation and joint ventures*
(Information not available.)

(7) *Other information*

a. The Government has made successful efforts to eliminate delays in the sanctioning of remittances.

b. A special committee in the Ministry of Industry has speeded up the scrutiny of applications for the entry and stay in Burma of foreign employees of private enterprises.

c. In order to facilitate the purchase of machinery and equipment from overseas, it was announced that the Ministry of National Planning (Foreign Aid Committee) would provide assistance by arranging for such procurement on deferred payment terms from manufacturing countries. The Government would also guarantee its allocation of foreign exchange for the payment of instalments under deferred payment arrangements.

d. The Government would also permit foreign banks to grant loans to Union citizens on the mortage of properties.

3. *Inflow of foreign capital*

During the years between 1954 and 1961, total foreign loans amounted to K203.3 million, of which K99.7 million came from the United States, K31.3 million from the Soviet Union, and K72.3 million from IBRD. These foreign loans represented less than 4 per cent of Burma's total net capital formation in roughly the same period. Direct investment of private foreign capital amounted to K67.4 million, adding another 1.3 per cent only. Japanese reparations have been the most important single item of foreign receipts, totalling K599 million or 11.3 per cent of total net capital formation.

In Burma, it has been found that private foreign capital is more difficult to secure than public foreign capital.

Burma's private net fixed capital formation for the years of 1957-1965 by sector is as shown in table 10.

TABLE 10. PRIVATE NET FIXED CAPITAL FORMATION BY SECTOR, 1957-1965

(million kyats)

	1957/58	1958/59	1959/60	1961/62 to 1964/65 average
Housing (non-hut)	40	43	46	50
Agriculture	28	30	30	50
Industry, Transport	304	277	213	440
Total	372	350	289	540

The above data indicate that there has been a leap in the private net fixed capital formation since 1961/62, especially in the industrial sector under which the figure in 1961/62 to 1964/65 is more than double that in 1959/60.

4. *Specialized financial institutions*

(1) *Industrial Development Corporation*

This was established in 1954 and is responsible for the planning and implementation of projects in the public sector.

(2) *Directorate of Industries*

Among other functions, the Directorate issues loans to small-scale industries.

(3) *Industrial Development Bank*

It was established to cater for the needs of large- and medium-scale industries.

V. CAMBODIA

1. *Domestic sources of finance*

There is no capital market existing in Cambodia.

2. *Specialized financial institutions*

The National Development Bank is a specialized financial institution in Cambodia providing financial assistance to industrial enterprises.

3. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

All fields are open to the public and private sectors and to investors of any nationality.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

There is a guarantee of non-nationalization for ten to thirty years depending on the size of the enterprise. Equitable compensation will be given if nationalization is imposed.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

Transfer of profits per annum up to 10 to 15 per cent, or sometimes 20 per cent, of the capital investment is permitted.

(4) *Provisions for import of technical know-how*

A law on the protection of patents and trade marks is under study.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

a. Total or partial exemption from duties and taxes on reinvested profits and on imports of capital goods and raw materials during the first few years of operation.

b. Reduction by 30 to 50 per cent of turnover taxes on imports of producer goods.

c. Exemption from land tax for five to seven years for crops such as cotton, tobacco and copra intended to supply national industries.

(6) *Local participation and joint ventures*

(Information not available.)

The State-owned enterprises were either financed by aid from friendly countries or through bilateral agreements providing for repayment over a period. No international organizations have been called upon for assistance so far.

Cambodia's investment in its private sector industries for the years 1955-1964 is as follows:

Volume of Investment in Private Sector Industries (million rupees)

Annual average, 1955-1959 ..	135.57
1960	150.56
1961	118.18
1962	277.05
1963	259.56
1964	263.44

It is indicated that the investment in private industries increased considerably in 1964.

VI. CEYLON

1. *Domestic sources of finance*

The existing institutions to promote savings in the private sector are the Post Office Savings Bank, the Ceylon Savings Bank and other commercial banks. The Government also utilized savings certificates at one time for this purpose. The following income tax concessions and the like have been given to approved industries.

(1) A tax holiday on profits for five years. The dividends paid to shareholders during this period are also exempted from income tax.

(2) A tax holiday of three years for export profit from the export trade of approved individual undertakings.

(3) A development rebate of 40 per cent is allowed on expenditures actually incurred in purchasing and installing any plant, machin-

ery or fixture to be used in the commencement of a trade business which is an approved project.

(4) Investment relief is allowed to limited liability companies which are considered essential for the economic progress of Ceylon.

Success achieved has been reflected in the increased volume of industrial activity during the last five years and the large number of applications which the Government is at present receiving for the setting up of new industrial units.

The Colombo Share Market, organized by the members of the Colombo Brokers' Association, deals in government securities and debentures, tea shares, rubber shares, coconut shares, and commercial, industrial and financial shares. The government securities, shares and debentures, play a very prominent role, although equities show a larger relative turnover.

Steps taken to promote limited liability companies in the private industrial sector have created a greater interest among the small investors who prefer preference shares or commercial, industrial and financial shares, the yields and prices of which are more stable.

Studies of the share market movement have indicated that purchases of shares by individuals have been largely financed by savings out of current income or by the sale of other shares or real estate.

2. *Inflow of foreign capital*

The inflow of foreign capital was substantial up to the late forties, as an estimate made shows a total of 411 million rupees (approximately US$100 million) of foreign investment in Ceylon.

However, foreign investments between 1956 to 1960 totalled only US$1.2 million, indicating a sharp decline in recent years.

No financial assistance has been received from international organizations. The largest volume of assistance in this form has been received from friendly countries. Since 1950, such assistance, including grants and loans, amounted to US$41 million approximately.

3. *Measures for servicing external public debts*

The servicing of external public debts is done through the Sinking Fund and by allocations made in the foreign exchange budget.

4. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Basic industries which are reserved for development in the public sector include the following:

a. Iron and steel
b. Cement
c. Chemicals
d. Fertilizers
e. Salt and by-products
f. Mineral sands
g. Sugar, power alcohol, and rayon.

Besides the projects listed above, private foreign investments in Ceylon are welcome. There have been no specific projects ear-marked for such investments. The same conditions applicable to local entrepreneurs have been extended by law to foreign investors. However, there has been no appreciable interest shown by foreign capital in local industry.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*
(Information not available.)

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

Remittances of profits and dividends in approved industrial undertakings are permitted freely. There are no restrictions on capital repatriation either.

(4) *Provisions for the import of technical know-how*

No limitations have been placed on obtaining skilled personnel on agreement with foreign firms. The terms and conditions of such services are approved by the Exchange Control authorities. The Government has also provided tax relief in regard to the income of scientific and technical personnel obtained in such a manner. Royalties, however, are subject to a tax of 75 per cent.

(5) *Tax concessions, guarantees and arrangements for avoidance of double taxation*
(Information not available.)

(6) *Local participation and joint ventures*

There are certain projects in which such co-operation has already been established. The Government has declared that foreign capital in the form of joint enterprises would be preferable to investments made by foreign entrepreneurs on a 100 per cent ownership basis.

5. *Specialized financial institutions*

(1) *Development Finance Corporation (DFC)*

This corporation was established in 1955 on the recommendation of the IBRD for the purpose of (a) assisting the establishment, expansion and modernization of the private industrial and agricultural enterprises of Ceylon, and (b) encouraging and promoting the participation of private capital, both external and internal, in such enterprises. The Corporation is empowered to provide long-term as well as short-term credit facilities with or without guarantees by purchasing or subscribing for shares or other securities, or by acquiring any other interests. It is empowered also to underwrite new issues on stocks, shares, bonds, debentures and other securities, and to guarantee loans from other private investment agencies. The Corporation re-invests funds by selling any investments of the Corporation when and as appropriate. It is also empowered to furnish managerial, technical and administrative services to private industrial and agricultural enterprises in Ceylon.

The Corporation's medium- and long-term loans are at 7 per cent. For all redeemable preference

shares for which no security is required, the net rate is 8 per cent. The rate of interest can be varied and is dependent upon the conditions prevalent at any particular time. The terms of repayment vary from five to fifteen years. Its activities are mainly in connexion with the promotion of medium- and large-scale industries.

(2) *The Agricultural and Industrial Credit Corporation*

This corporation was established in 1945 for the purpose of refinancing agricultural debt and financing new industrial enterprises by providing long-term credit facilities. It is empowered to authorize loans for the exploitation of mineral resources, construction, repair or renewal of any building, factory, mill, mine, machinery or equipment used or to be used for any industrial undertaking, the manufacture or preparation of any industrial product or commodity for sale in the market, and for purposes of industrial activities ancillary to any of the above purposes, including liquidation of any debt in connexion with the above. The rate of interest is 5 per cent per annum. The amount of loan could be granted up to 75 per cent of its value on security of immovable property and up to 50 per cent on hypothecation of movable property. Repayment varies from 10 to 25 years.

(3) *Small Industries Service Institute*

This institute has been set up with assistance from the International Labour Organisation and has power to extend all forms of services including technical facilities and loans to small-scale industrialists. It also operates a hire-purchase scheme to assist industrialists to obtain their requirements of machinery, plant and equipment.

(4) *People's Bank*

This bank was set up in 1962 to provide short-, medium- and long-term advances to Co-operative Societies, approved societies or individuals for constructing, repairing or renovating buildings, or to any persons who intend to undertake small-scale industries.

VII. CHINA (TAIWAN)

1. *Domestic sources of finance*

The mobilization of private capital for channelling into industrial development has been a long-established government objective in Taiwan. In 1953, four large public corporations were transferred to private ownership in conjunction with the implementation of the land reform programme. Subsequently various measures for encouraging private savings and investment were taken, culminating in the enactment of the Statute for the Encouragement of Investment in September 1960, which gives tax benefits and other incentives to private investment. Since then a number of insurance companies have been established and a stock exchange was opened in 1962 to facilitate the raising of investment funds from the general public.

(a) *Measures taken to promote savings*

(1) The amount paid for the purchase of original issues of stocks or corporate bonds with three or more years maturity in a number of basic industries is deductible from taxable income for the third year of continuous holding, provided that such deduction does not exceed 25 per cent of the income for that year.

(2) Interest on savings deposits for two or more years is tax exempt.

(3) Undistributed earnings retained in a productive enterprise and actually used for expansion are tax exempt to the extent of 25 per cent of the total earnings.

(4) Shareholder's gains in the form of additional shares or increased par value of original shares, both of which are derived from a productive enterprise's expansion with its undistributed profit of the current year, no exceeding 25 per cent of the enterprise's total income, are tax exempt.

(b) *Measures taken to channel savings into industry*

(1) A productive enterprise conforming to the encouragement criteria as provided in the Statute for the Encouragement of Investment is exempted from corporate income tax for a period of five years from the starting date of its operation.

(2) Where any such enterprise has made a plant expansion resulting in a 30 per cent or more increase in its production capacity prior to the capital increase for plant expansion, it is likewise entitled to the five-year tax exemption in respect of the income derived from such expansion as computed on the basis of its total income.

(3) The highest rate of corporate income tax has been limited to 18 per cent.

(4) Premium realized from issuance of stock and set aside as reserve is tax exempt.

(5) Gains from sales of corporate stocks or bonds or government bonds held for more than one year are tax exempt.

(6) A 10-per-cent reduction of tax is applicable to public utilities, industrial, mining, transportation, agricultural, forestry, fisheries and animal husbandry enterprises.

(7) Progressive rates of land tax are not applicable to the land provided for plant or factory sites.

(8) The rate of house tax is one per cent on plant or factory buildings which are owned and used by the owner for manufacturing purposes. This rate is 50 per cent lower than that on buildings used for other business purposes.

As a result of the foregoing measures, the absolute size and share of private savings has been rising very rapidly during recent years. Net savings by the private sector rose to as much as 76.6 per cent of total savings in 1963. Capital investment by the private sector, which was 45.4 per cent of gross fixed capital investment during 1954-1959 and rose to 51.5 per

cent during 1960-1963, has overtaken that of the public sector. Accordingly, the share of the private sector in industrial output has risen at the cost of the public sector, attaining an estimated 68.9 per cent in 1964 as against 39.5 per cent in 1952.

2. *Specialized financial institutions*

The banking system in Taiwan is considered to be well organized. The Central Bank of China is primarily responsible for regulation of the money market, management of foreign exchange, and issuance of currency and it acts as the fiscal agent of the Government. In its role as regulator of the money market, the Central Bank keeps the reserves against bank deposits; regulates the interest rates, acts as last resort lender and supervises the operation of all financial institutions. In addition, there are four government banks, one Provincial Bank, four commercial banks, one development bank, one Land Bank, one co-operative bank, 295 credit departments of the Farmers Association, 82 credit co-operatives, eight mutual loans and savings associations and several foreign banks. The government banks include the following:

(1) The Bank of China is a foreign exchange bank with its branch offices in New York, Tokyo, Sydney, Bangkok, and Saigon.
(2) The Bank of Communications was founded in 1907, jointly owned by the Government and private persons. Its function is to finance the development of industry, mining and communications by providing medium- and long-term credit.
(3) The Central Trust of China acts as a government trading agency by handling most of the procurements of government organizations and engages in trust and insurance business and some commercial banking operations.
(4) The Postal Remittance and Savings Bank has a large network of post offices to collect deposits, handle domestic transfers and lodge its savings with the Central Bank.

The Bank of Taiwan, acting as fiscal agent of the Taiwan Provincial Government, is the largest commercial bank in Taiwan, with thirty branches spread over the island. It accounts for about one-third of the total deposits and loans of all banks. Being a major depository of public enterprises, it is also responsible for providing a substantial share of the necessary credit facilities to these enterprises in addition to its regular commercial banking. It also extends policy loans, such as export loans, at low rates of interest.

The four commercial banks, with a total of 184 branch offices scattered over the island, provide short-term credits to commercial and industrial concerns.

The China Development Corporation was established in 1959 to serve as a financial institution to promote and encourage industrial growth of the private sector. Its main functions include:

a) financing and shoring up private industrial enterprises in the form of long- and medium-term loans;
b) promoting and assisting private industrial enterprises in the form of equity investment;
c) issuing, floating, guaranteeing or underwriting corporate bonds in the domestic or foreign market;
d) acting as an intermediary aiming at channelling overseas Chinese or foreign investment capital into private industrial enterprises in Taiwan; and
e) undertaking trust business and provide technical and administrative advice or assistance to private industrial enterprises.

In addition to its own capital, the China Development Corporation obtains resources from international financial institutions, United States Aid as well as the Government for its loaning activities. During the six years of its operation, the annual production of its clients, their equity, employment and export proceeds have increased impressively.

The Land Bank of Taiwan provides long-term credits to farmers and fishermen while the Cooperative Bank of Taiwan provides working capital to farmers. The Land Bank also specializes in mortgage banking for housing projects. These two agricultural credit institutions have many branches throughout the island.

The 295 credit departments for the Farmers' Association form the basis of agricultural credit by receiving deposits from and extending loans to members of farmers' associations and they also serve as agents for the Land Bank, the Cooperative Bank or the government agencies for the extension of farm loans.

The 82 credit co-operatives operate commercial banking for their members and the eight mutual loan and savings associations, with 85 branches, collect savings and extend loans on a mutual benefit basis.

Foreign banks in Taiwan include the Taipei Branch of the Nippon Kanyo Bank, The Taipei Branch of the First National City Bank of New York, the Taipei Branch of the Bank of America, and the Taipei Branch of the Bank of Bangkok. All of these foreign banks have been specially authorized by the Chinese Government to engage in commercial banking activities.

The banking system also aids in the distribution of corporate bonds issued by government enterprises as well as by private enterprises. All the bonds follow a line of distribution running from the issuing corporation to the banker and then to the investing public over the counter. Since 1961, more than half of the corporate bonds have been absorbed by the banking system. The investment bankers after detailed negotiation with the corporate borrowers also guarantee and underwrite corporate bonds and agree to take over the function of merchandising the bonds to the public. However, government enterprises and a number of corporate borrowers of considerable financial strength

and prestige have been able to issue new bonds not secured by banks. Private placement of securities with institutional investors, such as insurance companies, has not yet been practised.

Stock Exchange

The Taiwan Stock Exchange started business in 1962. The market is largely devoted to the trading of corporate securities. However, owing to the lack of a short-term money market in Taiwan to facilitate the flow of funds and to aid in the marketing process, and to the non-existence of a number of other preconditions, the Stock Exchange, while displaying extreme instability of all its listed stock prices, has merely played a very insignificant part in helping to mobilize the much needed long-term capital for industrial development.

3. *External sources of finance*

The following gives the policy of as well as the measures taken for the encouragement of foreign investment by the Government of the Republic of China.

(1) *Areas of industrial activity open to overseas investors*

The policy of the Government is to encourage and assist private enterprise and, whenever practicable, to reduce the scope of government enterprises in favour of private industry. Government enterprises are limited only to a few key industries which are closely related to the nation's welfare or defence and which require massive capital investment and government initiation. Generally speaking, the Chinese Government seeks to encourage overseas investment capital in all sectors of industrial activity, provided the investment is conducive to the nation's economic and social development. In particular, foreign investors are encouraged to make investment in such sophisticated industries as petro-chemicals, basic industries (for example, integrated steel mill) and export processing (labour-intensive) industries. Investments by foreign nationals are accorded the same treatment as that given to domestic investors without any discrimination or restriction whatsoever.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

The Government has no intention of nationalizing any foreign-owned industries. The Statute for Investment by Foreign Nationals provides that in case the investor holds and maintains more than 51 per cent of the total capital of the enterprise in which he invests, the enterprise shall not be subject to requisition or expropriation within twenty years after the commencement of business, as long as the investor continues to hold no less than 51 per cent of the total capital; in case the investor holds and maintains less than 51 per cent of the total capital, he shall be reasonably compensated if the Government requisitions or expropriates the enterprise because of national defence needs. Such compensation shall be permitted to be converted into foreign exchange from time to time upon application by the investor to the authority in charge of foreign exchange.

(3) *Provisions for the remittance of profits and dividends and repatriation of capital*

There are no restrictions on the outward remittance in foreign exchange by foreign investors of profits or interest accrued from investment. The investor may repatriate annually 15 per cent of his total invested principal two years after the completion of the approved investment plan. This percentage may be raised by the Government when its balance-of-payment position is favourable.

(4) *Provisions for the import of technical know-how*

The law provides that the technician may apply for foreign exchange settlement at the prevailing exchange rate for royalty earnings to the extent of the approved amount.

(5) *Tax concessions, guarantees and arrangements for avoidence of double taxation*

a. Revision of laws for the purpose of encouraging investment by foreign nationals occurred as follows:

(a) Revision of the Statute for Investment by Foreign Nationals for the provision of unlimited remittance of profits and repatriation of capital at a minimum of 15 per cent a year.

(b) Revision of the Statute for the Encouragement of Investment to provide tax reduction, exemption and other benefits.

b. A Sino-American Investment Guaranty Agreement has been signed.

Guaranty coverage applicable to American investors in Taiwan includes non-convertibility, expropriation, damages incurred as a result of war, revolution, rebellion, riots, and general commercial risks.

(6) *Local participation and joint ventures*

The Statute for the Encouragement of Investment and the Statute for Investment by Foreign Nationals have provided the incentives for joint ventures between domestic and overseas entrepreneurs.

(7) *Other information*

The Government has also taken the following measures for the encouragement of foreign investment in Taiwan.

a. Establishment of investment service agencies, such as the Industrial Development and Investment Centre (I.D.I.C.), Taipei and the Chinese Investment and Trade Office (C.I.T.O.), New York. The former provides services to domestic and foreign investors and assists them in solving their difficulties, the latter offers assistance to prospective American investors. Moreover, the Free China-Europe Industrial Institute in Rotterdam is in a position to offer assistance to European industrialists and businessmen in contacting I.D.I.C. in matters related to their investments and technical co-operation activities in Taiwan.

b. Simplification of administrative procedures: all procedures related to investment activities in connexion with immigration procedures, procurement of land, company registration, customs declaration on imports and exports, foreign exchange settlement, tax payments, and so on, are being simplified to the greatest possible extent.

c. Development of industrial districts

(a) Liu-tu and Kaohsiung Industrial Districts are being developed, and Tin-Kai and Kwei-shan Industrial Districts are being constructed with the provision of various public facilities, such as road, water supply system, power, sewerage system, etc. for the purpose of facilitating the acquisition of land for factory buildings by investors.

(b) There are 59 industrial land lots designed for utilization by investors in their establishment of factories.

d. Establishment of Export Processing Zone

The first export processing zone, similar to a free trade zone, was located, demarcated and being readied as an independent zone within Kaohsiung Industrial District. Applications by export enterprises to establish export processing plants in that zone are being received.

e. United States Aid Cooley Loan

Long-term, low-interest loans provided under the United States Aid Cooley Loan can be made available to American companies or their branch offices in connexion with their investment activities in Taiwan.

4. *Inflow of foreign capital*

The inflow of foreign capital has been on the increase during recent years. A statement of distribution of foreign and overseas Chinese investment by types of industry shows that during 1960-1964, foreign investment tended to flow to the manufacturing of chemical products, food, textiles, electrical appliances and the construction business where there were ready domestic or foreign markets. While the Chinese Government welcomes all productive investments, foreign investment in steel and petrochemical intermediates, where a bigger amount of capital is required, is not yet large enough in spite of active government promotion.

5. *Measures for servicing external public debts*

Prior to 1960, official foreign loan assistance was dominated by United States Aid loans payable in local currency. Since 1961, United States Aid loans have gradually been diminishing, and more often, hard terms including foreign currency repayments are instituted in lieu of soft terms. Meanwhile, loan assistance from other sources, notably IBRD, has been on an increase. These loans are required to be redeemed through foreign currency payments. Periodic contributions are to be made by the loan borrowers to a special fund from which repayments are to be drawn according to each loan repayment schedule. With respect to those loans requiring foreign currency repayment, debt service charges are often tabulated in order to ascertain that the burden is within the over-all foreign exchange availabilities for the foreseeable future years. In view of the relatively light burden of foreign exchange payments for servicing such external public debts and the substantial building up of the official foreign exchange reserves in 1963 and 1964, totalling US$180 million, no additional measure has been prescribed for servicing foreign debts than those already in effect.

6. *Capital investment in industry*

Table 11 is a statement showing the fixed capital formation for the years 1959-1963 furnished by China (Taiwan).

As indicated under the fixed capital formation of public enterprises, the proportion of power, gas and water supply to the total fixed capital formation ranged from 35 to 50 per cent. The contributions of manufacturing and transportation have also been of significance. Prior to 1959, the share of manufacturing in the fixed capital formation of private enterprises was previously not very important, but now 45 per cent comes from manufacturing. This is mainly because of the fact that private manufacturing industries have developed rapidly during the industrial boom in recent years.

TABLE 11. FIXED CAPITAL FORMATION IN CHINA (TAIWAN) 1959-1963
(NT$ million)

	1959		1960		1961		1962		1963	
	Public	*Private*	*Public*	*Private*	*Public*	*Private*	*Public*	*Private*	*Public*	*Private*
Agriculture, forestry, fisheries and animal husbandry	126	787	124	786	173	907	140	787	134	900
Mining	26	100	42	165	79	142	55	162	49	158
Manufacturing	712	1165	699	1728	624	2046	644	2302	835	2255
Construction	3	58	4	32	3	63	28	20	4	38
Power, gas and water supply	1392	206	950	542	1259	400	1590	542	1443	588
Transportation, storage and communications	386	—	997	—	1378	—	729	—	933	—
Commerce	24	125	16	369	15	387	24	513	44	678
Banking	59	11	50	10	82	15	69	34	68	46
Ownership of dwellings	65	78	55	148	73	168	69	146	90	190
Others	—	58	—	42	—	55	—	63	—	307
Total	2793	2588	2937	3822	2686	4183	3368	4569	3600	5160

VIII. HONG KONG

1. *Domestic sources of finance*

Sources of financing for industries in Hong Kong may be summarized as follows:

(1) *Private finance*

Private finance is made in the form of direct risk investment or of loan against security, or even against no security. There is no formally organized market but a market of sorts operates, equipped with brokers and so on. The most normal security is a mortgage on land; plant and machinery may also be used as security. The loan is often in the form of debenture. The sources of such funds are business profits, personal savings and proceeds from the sale of land. The appreciation of real estate and stock exchange values has played a very large part in the mobilization of capital in postwar Hon Kong.

(2) *Ploughed-back profits*

Much of the expansion of established manufacturing industries and the greater part of the expansion in service industries has been financed in the way.

(3) *Public issue of shares*

The stock market has played only a small part in the finance of industry, and apart from public utility companies and the dockyards, only eight industrial concerns are quoted on the local stock market. Only well-established concerns with a profitable record have been in a position to raise fresh capital through a public issue of shares.

(4) *Bank finance*

Banks in Hong Kong regard all loans in principle as short-term and offer them on that basis. However, there has been increasingly an implicit understanding between bank and borrower that so long as the enterprise is sound, the loan will not be called in unreasonably soon. There is a development of a new type of bank with its main interest in real estate rather than commerce, because of the fact that the funds available to banks from deposits have grown very much faster than the volume of foreign trade, thus leaving a growing margin available for financing real estate and industry without prejudice to the financing of imports and exports.

(5) *Special terms for government land sales*

In order to lessen the initial capital outlay incurred by manufacturers in the purchase of land, the Government has instituted easy terms of payment for such purchases. This is tantamount to a loan by the Government, against security of land.

(6) *Rented factory premises*

The increasing interest of property investors in the construction of factories to rent, either whole or more often by the floor or part of a floor, is helping to reduce the capital burden on individual industrial entrepreneurs. The Government is also erecting flatted factories in the form of resettlement factory blocks. There are at present twelve such blocks, containing a total of 733,370 square feet of net working space.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

There is no public ownership in the industrial sector of the economy other than that of the 22-mile long railway and the very large water supply undertaking. There is also no prohibition or limitation on ownership or control of industrial enterprises by foreign investors.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

There is no provision made or contemplated for nationalization of foreign-owned industries.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

Exchange at official rates for the remittance of profits and dividends accruing from direct investment is normally granted by the Exchange Controller without difficulty. The provision of official exchange for the repatriation of capital is generally conditional upon the prior approval of the Exchange Control having been obtained in respect of the investment. There is a recognized open market in Hong Kong for the transfer of funds without reference to the Exchange Control. Profits, dividends and capital may be remitted through this channel.

(4) *Provisions for the import of technical know-how*

No special provision has been made.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

There are no such provisions or arrangement.

(6) *Local participation and joint ventures*

Although the part played by foreign capital in Hong Kong is at the moment relatively small and there is no great need for foreign capital, yet there is a need for the technical and managerial skills associated with foreign investment. Hong Kong therefore welcomes joint industrial operations and encourages them by:

a. sending trade missions to industrially more advanced countries,

b. publishing literature specially prepared for overseas industrialists interested in manufacturing in Hong Kong,

c. participating in overseas industrial and trade fairs;

d. publishing of articles in government and overseas journals; and through

e. promotional efforts on the part of Hong Kong overseas trade representatives, and

f. possible assistance given by the Commerce and Industry Department of the Hong Kong Govern-

ment to overseas industrialists visiting Hong Kong to investigate the possibility of joint ventures.

3. *Inflow of foreign capital*

During 1948 to 1949, large amounts of capital flowed into Hong Kong when industrialists migrated from mainland China. Overseas Chinese capital has also entered Hong Kong in considerable quantities since the war and a great deal of this in the initial stages was invested in property. There has also been an inflow of capital from other south-east Asian countries as well as from more developed countries. However, there are no statistics on the amount of such capital for investment in industry.

4. *Specialized financial institutions*

So far there is no industrial development corporation or bank in Hong Kong, because there is no need for such an institution since industrialists have been able to secure adequate finance through various other channels.

IX. INDIA

1. *Domestic sources of finance*

Under the impact of economic planning together with the fiscal and monetary policies adopted since 1950/51, the amount of domestic savings increased nearly three times from 5,400 million Rupees in 1950/51 to 15,000 million Rupees in 1962/63. The composition of domestic savings also changed considerably during the period. The proportion of government savings increased from 18 per cent in 1950/51 to about 28 per cent in 1962/63 while that of household sector savings declined from 75 to 65 per cent. The corporate sector continued to contribute approximately 6.9 per cent to the total domestic savings. Within the household sector, the amount of rural savings rose from 1,700 million Rupees in 1950/51 to 2,400 million Rupees in 1962/63 as against a three-fold increase in the savings of the urban household sector from 2,500 million Rupees to 7,500 million Rupees.

Domestic savings as a percentage of national income went up from 5.7 per cent in 1950/51 to 9.7 per cent in 1962/63. The percentage of government savings to national income more than doubled from 1.0 to 2.6 per cent. The proportion of savings in the corporate sector went up from 0.4 to 0.7 per cent and that in the household sector from 4.3 to 6.4 per cent.

The household sector sharply increased its savings in the form of financial assets. The value of the financial assets of the sector rose from 3,049 million Rupees in 1950/51 to 5,475 million Rupees in 1962/63, as compared with the rise in the value of household assets from about 3,900 million Rupees to about 4,900 million Rupees. Net bank deposits, insurance policies and provident funds were the typical forms of financial assets preferred by the household sector to divert its savings. This is indicated in table 12.

TABLE 12. VOLUME AND PATTERN OF SAVING OF THE HOUSEHOLD SECTOR IN INDIA, 1950/51-1962/63
(million rupees, at current prices)

	1950/51	*1962/63*
A. Financial Assets	3,049	5,475
1. Currency	796	1,731
2. Net bank deposits	377	492
3. Insurance policies	178	660
4. Provident funds	318	1,667
5. Net claims on the government sector	1,051	276
6. Corporate and co-operative shares and securities	329	649
B. Physical Assets	3,917	4,913
C. Savings of the Household Sector (A + B)	6,966	10,388

Source: Reserve Bank of India Bulletin, March 1965.

As pointed out earlier, savings of the corporate sector increased three times during the period 1950/51-1962/63. The savings were used for accelerating the rate of capital formation. This is evident in the analysis of 1,333 public limited companies operating in various industries. Their gross fixed assets increased by 1,850 million Rupees in 1961 and by 1,960 million Rupees in 1962. Inventory investment, however declined from 853 million Rupees to 788 million Rupees. The total gross assets formation by the 1333 companies amounted to 3,250 million Rupees in 1961 and 3,550 million Rupees in 1962.

The corporate sector as represented by the 1333 public limited companies financed its gross assets formation partly out of internal sources comprising retained projects, depreciation reserves and taxation reserves, and partly out of external sources comprising paid-up capital, borrowings and others. The relative importance of the various sources of funds for financing assets formation is shown in table 13.

TABLE 13. PERCENTAGE DISTRIBUTION OF THE SOURCES AND USES OF FUNDS OF PUBLIC LIMITED COMPANIES IN INDIA, 1956-1962

Source of Funds	*Average 1956/1960*	*1961*	*1962*
External Sources			
Paid-up capital (excluding capitalized reserves)	10.8	13.3[a]	11.8[a]
Borrowings	28.7	20.4	27.1
(from banks)	(16.2)	(15.5)	18.9)
Trade dues and other current liabilities	14.9	12.7	15.8
Miscellaneous non-current liabilities	0.4	0.2	—
Sub-total	54.8	46.5	54.7
Internal Sources			
Depreciation reserves	24.3	29.1	28.5
Taxation reserves	3.5	5.5	5.7
Other reserves	17.4	18.9	11.0
Sub-total	45.2	53.5	45.3
Total	100.0	100.0	100.0

Source: Reserve Bank of India Bulletin, July 1964.
[a] Includes capitalized reserves.

It may be noted that commercial banks played an important role in providing finance to the corporate sector. Bank borrowing as a percentage of total external resources increased from 16.2 per cent in 1956-1960 to 18.9 per cent in 1962. Specialized financial corporations such as the Industrial Finance Corporation and the Industrial Credit and Investment Corporation of India provided 1.1 per cent of the total financial requirement in 1956 and 1.4 per cent in 1962.

The marked rise in domestic savings in India is the result of the special measures designed to mobilize savings for capital formation. Fiscal policy has played a very significant role in stepping up considerably the rate of savings in the government sector. The taxation policy has enabled the corporate sector to plough back an increasing amount of profits. Above all, the tremendous increase in the financial assets held by the household sector underlines the crucial role of financial institutions in mobilizing domestic savings. Some of the important fiscal and institutional measures adopted by India are enumerated below.

1. Expansion of banking facilities, opening of more branches by the State Bank of India and other commercial banks.
2. Increase in interest rates on time deposits.
3. Insurance of bank deposits up to 1,500 Rupees per depositor.
4. Opening of more post offices with savings bank facilities.
5. Opening of new life insurance offices and provision of better facilities for payment of premia.
6. Introduction of new life insurance schemes to meet the requirements of low income groups.
7. Intensified effort in certain rural areas covered by the community development programmes and issue of policies to people in the rural areas, where facilities for medical examination are not available, without requiring them to undergo medical examination.
8. Giving of income tax rebates for savings in the form of insurance premium and provident funds.
9. Introduction of gift coupons exchangeable for plan savings certificates.
10. Raising of maximum limits of holdings of savings certificates and possibilities of transfer of small savings certificates to banks, and so on, as security for loans.
11. Exemption of income from small savings from income tax.
12. Introduction of the Payroll Savings Scheme in factories and establishments both of the public and the private sectors.
13. Introduction of the Compulsory Deposit Scheme in 1963 (revised later to cover only income-tax payers) and then substituted by the Annuity Deposit Scheme in 1964.
14. Introduction of Prize Bond Schemes.

2. *External sources of finance*

The flow of external funds into India has played a very crucial role especially since 1955/56 not only in suplementing domestic savings but also in augmenting the scarce foreign exchange resources. The net inflow of external funds excluding official donations rose from 632 million Rupees in 1955/56 to 4,530 million Rupees in 1962/63 according to estimates of the Reserve Bank of India. The flow of external assistance excluding official donations increased sharply from 540 million Rupees in 1955/56 to 4,240 million Rupees in 1962/63 and that of private capital from 92 million Rupees to 292 million Rupees. The amount of external assistance actually utilized by the end of March 1964 was estimated at 30,100 million Rupees as against authorized external assistance of 44,700 million Rupees. Of this, commodity assistance from the United States actually utilized amounted to 9,500 million Rupees and authorized United States commodity assistance 11,960 million Rupees. Although the large amount of external assistance was very useful in financing the development programme, it was not commensurate with the needs of India. The annual per capita amount received by the country was only $1 as compared with $10.3 received by Republic of Korea, $9.9 by China (Taiwan), $2.2 by Pakistan and $2.1 by Thailand in 1960.

3. *Inflow of foreign private capital*

The total amount of oustanding foreign business investment in India increased less than three times from 2,560 million Rupees in 1948 to 6,810 million Rupees at the end of 1961. Direct investment rose from 2,110 million Rupees to 5,880 million Rupees and portfolio investment, from 447 million Rupees to 1,520 million Rupees. Manufacturing industries received the highest proportion of foreign private investment, followed by petroleum. Foreign capital invested in the manufacturing industries was estimated at 2,950 million Rupees and in petroleum, 1,520 million Rupees, at the end of 1961. The gross annual average flow of foreign capital into the private sector of India during 1956-1961 amounted to 543 million Rupees, and net inflow 392 million Rupees. Foreign enterprises operating in the country ploughed back an annual average amount of 137 million Rupees. Non-cash inflow of private capital accounted for 170 million Rupees.

The considerable increase in the total amount of foreign capital invested in the private sector has been the result of several favourable factors—the flexible and pragmatic government policy towards foreign private capital, the favourable size and structure of the domestic market and the rapidly rising level of investment in successive five-year plans. The

taxation policy which offers various tax incentives such as 25 per cent development rebate in priority industries, five-year tax holiday, tax credit certificates and exemption of foreign technicians from income tax has been responsible for attracting foreign capital. The favourable economic policy and market conditions in India have enabled foreign investors to earn a very good rate of return. Foreign controlled rupee companies earned an average rate of 13.4 per cent gross profit as percentage of total capital employed during 1960 to 1962 and declared an average rate of dividend of 14.3 per cent.

Some of the important aspects of the government policy toward foreign private capital are explained below.

(1) *Areas of industrial activity open to overseas investors*

Foreign private capital is normally welcome to those industries in the private sector whose development depends on imports of plant and equipment as well as on advanced technical know-how. Generally this policy rules out the traditional consumer goods industries for foreign private investment. The 'growth industries' such as engineering and chemicals whose development is faster than that of traditional industries are opened to foreign private investors. In addition, the Government of India has recently welcomed foreign private capital into some of the industries reserved for the public sector such as Philips Petroleum's participation in the Cochin Refinery.

(2) *Non-discriminatory treatment*

Once foreign capital is admitted to the country, the Government accords the same treatment to Indian and foreign capital. There is absolutely no discrimination against foreign investment. Moreover, there is no discrimination between private sector enterprises and public sector enterprises in the matter of allocation of scarce resources, price fixation if any and issue of import licences.

(3) *Compensation in case of nationalization*

The Government has assured foreign investors that fair and equitable compensation will be paid in case of nationalization of foreign enterprises.

(4) *Local participation and joint ventures*

The Indian Companies Act 1956 does not impose any restriction on the extent to which foreigners can hold equity in a joint venture. The Government of India, however, prefers foreign investors to have minority equity share. The minority shareholders' interests are well protected by the Companies Act. Moreover, foreign investors can make suitable arrangements to have an effective voice in the management of joint ventures. The Government may allow majority equity shares to foreign investors in suitable cases.

(5) *Tax concessions*

The tax incentives such as development rebate, tax holiday, tax credit certificates available to Indian companies are naturally extended to joint ventures. In addition, foreign technicians serving in India are exempted from income tax for a period of two years. This exemption can be extended for an additional period of five years provided the employer of the foreign technician pays tax for his salary. In addition, foreign investors are offered a number of other tax concessions.

(6) *Provision for remittance of profits and dividends and repatriation of capital*

The income earned by non-resident investors on their investments in India is allowed to be remitted freely to their country. The subsidiaries of foreign companies in India are allowed to remit their profits and dividends in full to their parent offices after payment of all taxes due. The repatriation of capital owned by the residents of the countries of the sterling area (other than Pakistan) and Norway, Sweden and Denmark is freely allowed, while capital owned by the residents of other countries together with any capital appreciation in the value of the investment, is allowed to be repatriated at any time if the investment was made after 1st January 1950 in approved projects.

(7) *Provisions for the import of technical know-how*

The Government allows payments of patent fees, royalties, technical assistance fees, research costs and other similar items to foreign firms. It permits the employment of non-Indians in positions requiring technical skill and experience when Indians of the requisite qualifications are not available.

(8) *Investment guarantee and double taxation agreements*

The Government of India has entered into investment guarantee agreements with the United States and West Germany. Under these agreements, the interests of German and American investors in India are well protected against non-business risks.

The Government of India has also entered into agreements for avoidance of double taxation with a number of countries such as Denmark, West Germany, Japan, Norway and Sweden. A similar agreement with the United States is awaiting ratification. According to a convention, United Kingdom investors in India are able to avoid double taxation.

4. *Capital investment in industry*

Domestic savings and external funds enabled India to finance its investment programme of 19,520 million rupees in 1962/63 as compared with 5,340 million rupees in 1950/51. The rate of investment more than doubled from 5.6 per cent in 1950/51 to 12.7 per cent in 1962/63.

Investment in the industrial and mining sectors during the first plan period increased from 970 million rupees to 11,250 million rupees during the second plan period. The third plan envisages an investment

of 15,200 million rupees in the organized and minerals sectors and 2,640 million rupees in the village and small industries sector.

A detailed breakdown of industrial investment is shown in table 14.

TABLE 14. INDUSTRIAL INVESTMENT IN INDIA, 1951/52-1965/66

(million rupees)

	Under First Five-Year Plan 1951/52-1955/56	*Under Second Five-Year Plan 1956/57-1960/61*	*Under Third Plan 1961/62-1965/66*
Metallurgical industries	610	7,700	7,484
Engineering industries	460	1,750	5,252
Chemical industries	270	1,400	4,460
Cement, electric, porcelain and refractories	175	600	850
Paper, newsprint, security paper	120	400	1,055
Sugar	50	560	1,000
Textiles other than rayon and staple fibre	200	500	345
Rayon and staple fibre	80	340	750
Other industries	515	1,150	2,619
Total	2,930	14,700	24,550
Replacement and modernization	1,050	1,500	1,500
Grand total	3,980	16,200	26,050
Public sector	600	7,700	13,300
Private sector	3,380	8,500	12,750

Source: Government of India.

Table 14 indicates that there was a drastic increase in industrial investment during the years 1956/57-1960/61 under India's second five-year plan, especially in metallurgical industries which increased approximately 1300 per cent and in sugar which increased approximately 1100 per cent as compared with investment under its first five-year plan during 1951/52-1955/6. Investment in engineering and chemical industries is expected to rise three times during the third plan as compared with the second plan investment. A doubling of investment is envisaged by the third plan in the case of the paper, newsprint, sugar, rayon and staple fibre industries.

In the financing of the private sector industrial programme the financial institutions have played an increasingly important role. They provided financial resources amounting to 800 million rupees during the second plan as against 180 million during the first plan and are expected to extend assistance to the tune of 1,300 million rupees during the third plan. Private industrial enterprises increased new issues from 400 million rupees during 1951/55 to 1,500 million rupees during 1956/60. The private industrial sector depended on internal resources to the extent of about 50 per cent during 1951/52 to 1960/61. The pattern of industrial finance is reflected in table 15.

The fiscal policy of the Government of India has encouraged the corporate sector to plough back the maximum amount of profits. The capital market and especially the specialized financial institutions, have played a significant role in providing both long-term and short-term financial assistance to the private industrial sector.

5. *Specialized financial institutions*

The structure of money and capital markets in India reflects the stage of development reached by the country. Alongside well-functioning financial institutions, there exist indigenous bankers and money lenders, who play an important role in financing agriculture, small industries and trade, and constitute what is termed the "unorganized sector" of the money and capital markets.

Among the organized financial institutions which provide finance to large- and medium-scale industrial companies, there are various specialized financial institutions established for providing long- and medium-term loans as well as equity participation to industrial enterprises. Besides, although commercial banks generally provide short-term working capital, it is very well known that a part of their advances is constantly called on again and again, so that in fact they become medium- and long-term advances. The proportion of such advances is not known but it is estimated to be in the neighbourhood of 20 per cent. In recent years, there has been a distinct upward trend in the flow of bank credit into the industrial sector. Bank advances to industry as a percentage of total bank advances increased from less than 33 per cent at the end of March 1951 to about 58 per cent at the end of March 1963.

TABLE 15. FINANCING OF PRIVATE SECTOR INDUSTRIAL PROGRAMMES IN INDIA, UNDER THE FIRST, SECOND, AND THIRD DEVELOPMENT PLANS

(million rupees)

	First Plan	*Second Plan*	*Third Plan (estimates)*[a]
1. Institutional agencies	180	800	1300
2. Direct loan participation by Central and State Governments and other assistance	260	200	200
3. New issues	400	1500	2000
4. Internal resources[b]	1500	4000	6000
5. Direct foreign credit participation in capital	420–450[c]	2000	3000
6. Total	340[d]	8500	12500

Source: Planning Commission, India.

[a] Includes resources available for mineral development programmes in the private sector, which would cost Rs. 600 million. Thus, as against the total requirement of Rs. 13,350 million for the private sector's industrial and mineral development programmes in the Third Plan, the resources in sight are placed at Rs. 12,500 million.

[b] Not of repayment liabilities.

[c] Includes suppliers' credit.

[d] Includes a sum of Rs. 610-640 million from other sources such as advances from managing agents, EPT refunds, etc.

A noteworthy feature of the capital market in India is that the financial institutions have begun to play a very significant role in providing financial assistance to both large-scale and small-scale industries in the private sector. These institutions render assistance in various forms such as subscription to shares stock and debentures, long-term loans and underwriting of new issues. The two institutions—the Industrial Finance Corporation of India and the Industrial Credit and Investment Corporation of India —not only provide rupee loans but also foreign currency loans to industrial corporations in the private sector. The objectives and functions of the specialized financial institutions in India are briefly explained below.

(1) *Industrial Development Bank of India*

The Bank was established in 1964 with the main objective of co-ordinating the activities of institutions providing finance for industrial development. It provides refinance to those institutions, grants direct loans to industrial concerns and promotes and develops key industries.

(2) *United Trust of India*

The Trust was established in 1964 with the objective of enabling the large and growing number of small investors in the middle income groups to invest in the equity capital companies. It is empowered to borrow from the Reserve Bank, other banks and lending institutions.

(3) *Industrial Finance Corporation of India*

This was established in 1948 for the purpose of making medium- and long-term credits more readily available to concerns engaged in the manufacture, preservation or processing of goods or in shipping, mining, or the hotel industry, or in the generation or distribution of electricity, and to give assistance to public limited companies and co-operative societies only.

(4) *State Financial Corporations*

There are 15 such corporations established by the state governments to extend financial assistance to medium- and small-scale industrial concerns.

(5) *Industrial Credit and Investment Corporation of India*

It is a privately-owned financial institution established in 1955 to encourage and assist private industrial investment in India, with its objectives being as follows:

a) to assist in the creation, expansion and modernization of such enterprises;
b) to encourage and promote the participation of private capital, both internal and external, in such enterprises; and
c) to encourage and promote private industrial investment.

These objectives are accomplished by a) providing finance in the form of long- or medium-term loans or equity participation, b) sponsoring and underwriting new issues of shares, c) guaranteeing loans from other private investment sources, d) making funds available for reinvestment by revolving investments, and e) furnishing managerial, technical and administrative advice and assisting in obtaining such services to Indian industry. The Corporation obtains its funds through subscription of capital, and loans from the Central Government, (a part out of PL 480 counterpart funds), IBRD, United States Aid, and Kredit Anstalt in West Germany.

(6) *Refinance Corporation of Industry*

It was established in 1958 in pursuance of the decision made in an Agricultural Commodities Agreement under PL 480 signed between the Government of India and the United States for relending a sum of US$55 million reserves to private enterprises. It was taken over by the Industrial Development Bank of India from 1 September 1964.

(7) *Small Industries Corporations*

One National Small Industries Corporation was established by the Central Government and many by state governments, for providing financial assistance to promote the development of small-scale industries.

X. JAPAN

1. *Domestic sources of finance*

(1) A tax-free depreciation and reserve system has been adopted by the Government to promote business savings.

(2) Interest income is taxed separately on source at a flat rate.

(3) Interest income from small deposits is non-taxable.

(4) Interest income accruing from postal savings is non-taxable.

(5) An optional separate taxation on source is applicable to dividend income.

(6) Under the Fiscal Investment and Loan Programme, funds of the Trust Fund Bureau, which consist of funds from the general public, such as postal savings and funds from the welfare pension and national pension, are utilized to promote the national welfare and strengthen the foundation of the national economy by providing loans for those industries which are considered important, such as medium- and small-scale enterprises and key industries.

Owing to its sustained high economic growth and the people's high rate of saving, Japan has been fairly successful in the mobilization and efficient use of private capital. Through financial institutions, private capital or personal savings have been successfully channelled into industrial fields in the form of loans or security purchases. Private savings have also been directly financed to industries by the purchase of securities directly without going through financial institutions. However, the former method predominates. The development of various specialized

financial institutions together with ordinary commercial banks has contributed much to the mobilization and efficient use of private capital.

Japan's financial system has witnessed substantial development. Financial institutions for small business firms, long-term credit banks and a specialized foreign exchange bank were established during 1950-1955, and the role of trust banks was strengthened. During the same period, government financial institutions were established in the fields of long-term financing, foreign trade financing and small business financing to supplement the activity of private institutions in the respective fields. The long-term borrowings from such financial institutions account for a greater part of the whole industrial capital supply while stock and bond issues hold a relatively minor part. It was indicated that of the total supply of industrial capital in 1963, outside-financed capital accounted for 67.4 per cent and corporate retained earnings and depreciation the remaining 32.6 per cent, and of the total outside-financed capital, borrowing from public and private financial institutions registered 85 per cent while the stock and bond issues registered 11.9 per cent and 3.1 per cent respectively.

There are nine well-organized stock exchanges in nine major cities and more than 500 registered security companies. As of the end of 1964, stocks of 1,593 companies, which constitute most of the main business firms in Japan, were listed in stock exchanges and the total value of listed stocks amounted to 7,693,700 million yen. The number of stockholders was 19 million in total as of 1963. In most cases, new stocks are not offered publicly but are allotted to stockholders at nominal values. This is one of the characteristics of new stock issues in Japan. In such circumstances, underwriters find little room for their activity, and the function of the market for newly issued stocks is rather limited at present.

The role of bond floatation in financing industrial funds is much smaller in Japan than in other developed countries, owing to the fact that the market for the circulation of bonds has not been well developed. At present, banks and other financial institutions purchase about 90 per cent of total bond sales and quite a small part is purchased by individuals because of the conservative terms of bond issues.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

a. Foreign capital is limited to that kind of investment which will contribute positively to the improvement of Japan's balance of payments and to the development of key Japanese industries and public utilities. In principle, however, any foreign capital which meets the above qualifications will be valid.

b. In some fields of industry, due to their public character, industrial laws regarding respective fields impose restrictions on the stockholdings of foreign investors; for example, foreign investors are permitted to acquire only a part or none of the total stocks of the corporations regulated under the Aviation Law and the Electric Wave Law.

c. The Law concerning Foreign Investment stipulates that validation is required in principle for acquisition of stocks by foreign investors, but validation is usually granted on any investment unless it is considered to have an adverse effect upon the national economy.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

(Information not available.)

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

The Foreign Investment Law provides free remittance abroad of profit and principal of foreign investment if it obtains validation under the Law.

(4) *Provisions for import of technical know-how*

a. Technical assistance agreements require either validation or a licence which is generally approved unless they are considered to have such adverse effect upon the economy of Japan as bringing about excessive competition among domestic business firms and putting pressure on small- and medium-size enterprises.

b. The compensation for the contracts can be remitted abroad provided that either validation or a licence is given to the contracts at the time of introduction.

c. Royalties for important know-how from foreign countries are taxed at the reduced rate of 15 per cent.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

a. The Japanese Government does not take any positive measures specifically designed to encourage foreign investment in general. Its function in this respect lies in the so-called traffic control, namely, to remove the unfavourable effects of foreign investment on Japan's economy, or to prevent excessive competition among domestic business firms for foreign capital.

b. The interest on and gains from redemption of foreign currency bonds issued by Government, government-affiliated agencies and local governments are, as a rule, exempted from tax.

c. Interest on the specific foreign currency loans granted by the Government and the Bank of Japan is exempted from tax.

d. Interest on specified foreign currency loans and bonds is taxed at a reduced rate of 10 per cent.

(6) *Local participation and joint ventures*

The Japanese Government does not take any positive measures specifically designed to encourage foreign investment in the country. However, the Government takes the following measures to promote investment abroad by its nationals in joint ventures:

TABLE 16. CHANGES IN EQUIPMENT INVESTMENT IN JAPAN BY INDUSTRIES, 1954-1963

(million yen)

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Agriculture, forestry and fisheries	62,700	80,300	86,715	74,680	68,521	81,499	137,828	191,593	188,375	211,396
Mining	25,000	29,100	30,603	51,436	59,939	53,528	73,840	86,906	87,067	44,009
Metallic industries	35,500	38,200	85,863	144,584	144,270	231,289	346,673	430,296	355,321	335,978
Machinery	29,500	29,700	81,840	126,240	119,928	187,326	355,474	513,395	415,150	452,110
Chemical industry	41,400	46,800	101,335	148,123	127,323	183,869	300,603	391,499	376,138	417,371
Ceramics	16,300	17,200	29,652	26,440	23,242	32,733	49,998	77,699	85,209	90,316
Textiles	38,500	40,900	99,120	69,569	54,732	74,874	106,315	132,138	121,957	179,957
Electricity and gas	153,600	156,400	213,979	264,085	318,076	325,190	393,784	423,895	426,031	397,730
Transportation	64,500	67,700	148,758	173,190	154,642	170,647	221,422	281,243	312,576	382,491
Others	63,300	92,600	148,026	186,383	208,201	278,199	369,419	541,841	555,139	778,284
Total	530,300	598,900	1,025,891	1,264,730	1,278,884	1,619,154	2,355,356	3,070,505	2,922,963	3,289,642

TABLE 17. CONDITION OF INDUSTRIAL CAPITAL SUPPLY IN JAPAN, 1954-1963

	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Securities market	78,600	75,300	32,209	202,491	235,346	398,025	716,142	898,166	656,779	629,954
Undertaking loans	14,700	27,500	66,794	33,974	82,928	139,789	343,171	191,772	141,173	168,778
Stocks	63,900	47,800	165,415	168,523	252,418	258,236	441,229	706,394	515,606	461,176
Private financial institutions	79,800	84,700	252,705	311,059	355,231	454,555	644,183	683,991	750,752	1,060,400
Government financial institutions	88,400	75,700	76,579	133,247	142,677	161,411	163,332	224,392	241,315	258,276
Foreign capital	14,900	16,900	16,594	28,627	59,130	44,063	47,299	57,256	78,217	125,412
Own capital	190,000	271,000	415,595	386,809	151,154	163,050	—	308,534	539,121	585,646
Total	530,300	598,900	1,025,891	1,264,730	1,278,884	1,619,154	2,355,356	3,070,505	2,922,963	3,289,642

a. In order to facilitate the financial access of private investors abroad, the Government established the Japanese Export-Import Bank and the Overseas Economic Co-operation Fund, the purpose of which is to supplement private financing of overseas investment on softer terms than those available commercially.

b. In order to indemnify against overseas investment risks, an overseas investment insurance system is operated by the Government. Under this system, the Government may underwrite, on certain conditions, insurance for which private investors apply for their overseas investment.

c. In the field of taxation, the Government takes a special measure called the Overseas Investment Loss Reserves. If a certain domestic corporation has credited not more than one-half of the acquisition cost of the stocks of specified companies to the Reserve account, such amount credited is deductible as expenses under certain conditions.

3. *Capital investment in industry*

Japan's investments in equipment for the years 1954-1963 with changes by industries as well as with sources of capital supply are given in brief form in tables 16 and 17.

The tables show that during the last ten years, total equipment investment in Japan has steadily increased by approximately 610 per cent in 1963 as compared with that of 1954. This is particularly notable in metallic industries which have increased approximately 950 per cent, machinery 1,530 per cent, and the chemical industry 1,000 per cent. On the other hand, funds from private financial institutions predominate in the increase of capital supply and foreign capital has been increased to 841 per cent.

According to the data furnished, the inflow of foreign capital recorded a total of US$3,642 million during the period 1950-1964 (April-September) with an average of approximately US$251 million per year.

4. *Specialized financial institutions*

(1) *The Japan Development Bank*

The Bank was established in 1951 as a government financial organization with the purpose of developing and promoting industries. It gives monetary help to financial organizations and at the same time provides industries, that is, electric power, marine transportation, and iron and steel with funds, mostly for the facilities of these industries. Recently it has been financing funds also for such works as regional development, the replenishment of social capital, and the promotion of export, along the lines laid down in the government's economic policy. It established the basis of such industries as power, marine transportation, iron and steel and contributed greatly to Japan's economy during the developing and progressing period after the Second World War.

(2) *Hokkaido Tohoku Development Corporation*

The Corporation was established as a government financial organization for the development and promotion of industries by giving monetary help to financial organizations and providing long-term funds to industries within the districts of Hokkaido and Tohoku, where regional development was relatively delayed.

(3) *Small Business Finance Corporation and Small Business Investment Company*

Both of these institutions provide financial assistance to small business.

XI. REPUBLIC OF KOREA

1. *Domestic sources of finance*

(1) The Government of Korea is carrying out a tax reform to raise tax revenue for economic development expenditure. This reform is now under decision by the Assembly.

(2) Business savings were promoted through the process of tax holiday exemption and reduction from tax on profits retained for future investment and on incomes from foreign exchange earning business, and revaluation of assets to enable businesses to accumulate enough funds to replace worn-out equipment.

(3) Personal savings are promoted through such taxation and fiscal measures as tax exemption of deposit interest and certain dividends, a high rate of indirect taxes, and prohibiting the sale of luxurious imported.

(4) Savings are absorbed through banking institutions, insurance companies and post offices.

(5) There is occasional application of the lottery system to promote time deposits.

(6) Income from the interest on time and savings deposits at banking institutions as well as dividends on stocks are exempted from income tax.

(7) A higher rate of interest is paid on savings deposits than on ordinary pass book deposits in order to attract household savings.

(8) Interest rates on time deposits and instalment savings deposits were raised in 1961 and 1962.

Owing to an inflationary tendency, the result of the promotion of savings has not been satisfactory. However, after the drastic raising of interest rates on time and savings deposits in 1961 and 1962, there was a sharp increase in these deposits.

The capital market in Korea is rather unhealthy. In addition to four chartered banks and five commercial banks which provide financing by long-, medium- and short-term credits to business and industrial enterprises, there is a stock exchange which was set up in 1956. Owing to speculative manipulations of prices on the part of the dealers and the poor administration of the market on the part of the management, its operation was interrupted for a time. It was later reorganized in 1963 from a privately-run corporation into a public management system under the new Act

of 1963. At present, the number of companies with shares listed on the securities market is only sixteen.

The trust business in Korea has developed rapidly since 1962, but the insurance business is still in the infant stage with respect to both capital and management. Owing to unpopularity arising from the deterioration of public confidence in insurance companies as well as the depreciation of currency values, which is due to the inflationary pressure, the insurance business in Korea does not play any significant role in the capital market.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Basically, all industries are open to private investment, both domestic and foreign, except those enterprises that the private investors are not able to manage because of the enormous scale of their capital requirements and operation, or because they are of the nature of public utilities and public welfare facilities, such as industries of communications, railways, electric power, water works, or government monopoly businesses, such as cigarette manufacturing and ginseng planting.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

The Foreign Investment Encouragement Law prescribed that nationalization shall not be carried out in any case except during armed conflict. In the event of armed conflict, the Government may control or attach the property, rights and interests of the foreign national with whose government the conflict has occurred, and act as trustee safeguarding the interest of the owner until one year after the cessation of armed conflict. Fair compensation will be made for such expropriation within one year after such cessation.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

A maximum of 20 per cent of the capital investment including the amount re-invested may be repatriated annually in the same currency as that originally invested after two years from the date of registration. Transfer abroad of profits up to a maximum of 20 per cent of the verified capital per annum is permitted.

(4) *Provisions for import of technical know-how*

Income taxes or corporation taxes on payments under the terms of a Technological Assistance Contract, including the transfer of patents or technological rights and licences, shall be exempted for five years from the date on which the contract was signed, and reduced by two-thirds for the succeeding two years, and reduced by one-third for the eighth year.

(5) *Tax concessions, guarantees and arrangements for avoidance of double taxation*

Laws have been passed to encourage foreign investment. The significant points of the laws are given below:

a. Tax privileges given to foreign capital:

(a) Income taxes and corporation tax for enterprises registered by foreign investors, household tax, fishery tax and acquisition tax shall be exempted for five years from the date of commencement of the business, and reduced by two-thirds for the succeeding two years and by one-third for its eighth year.

(b) Income taxes on interest accruing from foreign loans and on dividends or surplus distributed to foreign investors shall be exempted for five years and reduced by one-half for the three succeeding years.

(c) Income taxes on remuneration to foreign nationals who are providing management supervision and techniques shall be exempted for three years from the date of entry and reduced by one-half for the five succeeding years.

(d) Registered investments shall not be subject to any form of capital levy.

(e) Customs duties and commodity taxes on commodities imported as the foreign capital base shall be exempted.

(f) Customs duties and commodity taxes on machinery, components, accessories, connecting devices and construction materials imported for new installations as well as for the rehabilitation and enlargement of the existing facilities shall be exempted until the completion of installation.

(g) Customs duties and commodity taxes on machinery imported for replacing or maintaining facilities shall be exempted for five years from the date of commencement of the business. Exemption for a maximum of three additional years may be granted when an application is submitted by the foreign investors.

(h) No duties otherwise provided for by law shall be imposed upon the importation of such commodities as stated under (e), and, (g) above. However, these exemptions shall not apply to commodities imported for personal consumption and shall not apply when the commodities imported are produced in Korea in sufficient quantity and of adequate quality.

b. Repatriation of foreign capital and remittance of profit are permitted.

c. Reinvestment of profits is permitted.

d. Registered foreign investors are treated on the same footing as enterprises operated by Korean investors and nationals.

e. Payment guarantee by the Government on the repayment of the principal and payment of interest on foreign loans is provided by law.

f. The Foreign Information Centre has been established to promote foreign investment.

(6) *Local participation and joint ventures*

Joint ventures or direct investments are given priority among various types of foreign investments.

3. *Inflow of foreign capital*

The inflow of foreign capital into Korea during the period 1961-1964 totalled US$95.7 million, of which US$60.6 million consists of foreign public loans, US$29.7 million foreign private loans and US$5.4 million foreign private direct investment. As compared with the desired inflow of US$227.9 million for the same period, as programmed in the first five-year economic development plan, the actual inflow fell far short. This may be attributable to domestic and political instability, lack of domestic capital formation and insufficient social overhead capital.

4. *Specialized financial institutions*

(1) *The Korea Reconstruction Bank (KRB)*

This was established in 1954 as a government-owned development bank charged with supplying and administering long-term credit for major industrial projects. Its main operations include:

(a) Extending credit of long-term funds to finance the acquisition and improvement of the facilities of industrial projects.
(b) Extending credit for financing the working capital of those enterprises which have been supported by KRB or in whose capital the Government has participated.
(c) Subscribing and/or guaranteeing corporate debentures or bonds and underwriting the stock of important industrial projects.
(d) Guaranteeing and/or underwriting loans or other obligations to be made by other financial institutions for the above purposes and guaranteeing for the central bank as to the reimbursement in local currency of foreign credit.
(e) Other operations such as engineering survey and appraisal, business analysis and management guidance, economic research and industrial census of mining and manufacturing.

KRB's financial resources are generally raised by means of increasing capital, issuing industrial finance debentures, receiving time deposits from the general public, and borrowing from the Government, the Bank of Korea and institutions overseas. Borrowings from the Government account for about two-thirds of the total funds raised and borrowings from foreign sources comprise only US$5 million from United States AID for financing small-scale business firms.

Annual interest rates on loans are less than 10 per cent, equivalent to about one-half of the general interest rates of the commercial banks.

(2) *The Medium Industry Bank (MIB)*

This was established in 1961, with government-paid capital of 84 per cent and a partial private capital of 16 per cent, for the financing of small and medium enterprises in the sector of the mining and manufacturing industry. It also carries out several tasks including research and survey and management guidance for them. Its financial resources are raised mainly by receiving deposits and by borrowing from the Government. The latter accounted for about 44 per cent of its total outstanding loans. Most of its credits (more than 96 per cent) are extended for short-term working capital and the least for capital funds. The annual interest rates on loans range from 8 to 15 per cent, which are a little higher than those of KRB but lower than those of the commercial banks.

XII. MALAYSIA

1. *Domestic sources of finance*

In the territories now forming Malaysia, the States of Malaya, Sabah and Sarawak were traditionally agricultural and mining economies and Singapore a mainly trading economy. Most of the local capital and financing institutions have been geared, therefore, to finance the development of the rubber, tin and timber industries in the former and trade in the latter. Capital for these purposes is not scarce in Malaysia. While no special measures have been taken to promote savings, the Government has sought to promote monetary stability and a sound financial structure conducive to savings and investment. The central bank has continued its efforts to establish a generally more efficient and more effective monetary system by encouraging and supporting the development of the money and capital markets, by exerting an influence over the direction of bank lending and by fostering sound banking practices and standards. Institutions other than the commercial banks which encourage savings include the Post Office Savings Bank, savings bank facilities in commercial banks, provident funds, insurance companies, finance companies, development and housing institutions and co-operative societies, and the Stock Exchange.

Savings are promoted by means of the following institutions:

1. At the end of 1964, there were 43 commercial banks with a total of 378 banking offices providing short- and sometimes medium-term financing.

2. The Employees Provident Fund and Central Provident Fund were established to provide some form of social security by receiving compulsory contributions from nearly all workers except the self-employed. These funds have been invested in long-term Government and Public Authority Securities and are therefore important sources of finance for the Central Government and the State Government of Singapore respectively.

3. The Post Office Savings Bank, operating 352 offices, with $221 million in deposits is an important source of finance for the second five-year plan.[1]

4. The Malayan Muslim Pilgrims Savings Corporation was established to provide savings facilities especially for pilgrimage purposes.

[1] In this section, $ refers to Malayan dollars.

5. There were 95 insurance companies registered in Malaysia with assets held in respect of policies written in Malaysia amounting to $165.3 million in 1963, of which three-quarters was for life insurance business. There were 106 insurance companies registered in Singapore.

6. The Malaya Borneo Building Society Limited is one of the important sources of finance for housing.

7. The Sarawak Development Finance Corporation and Sabah Credit Corporation were established to promote private investment through the provision of loans but with emphasis on rural projects such as livestock production, paper and rubber processing.

8. The Singapore Factory Development Limited provides mortgage financing for industrial buildings.

The Stock Exchange in Malaysia has implemented a number of important measures to strengthen its organization as a market for the equities and securities not only of Malaysia companies but also of overseas companies. At the end of 1964, there were 25 member firms operating in five states.

The first discount house formed in Malaysia commenced operation towards the end of 1963 and is subject to supervision by the central bank which extends to it discounting and lender-of-last-resort facilities. All funds held by the discount house are invested in treasury bills and short-term government securities. Deposits held at the end of the year 1964 amounted to $19.4 million, while interest paid on deposits ranged between 2 per cent and 4 per cent during the year.

Public savings from the Government's ordinary budget were small, the surplus in 1963 being only $93 million and in 1964 an estimated $25 million. Government domestic borrowing brought in $210 million in 1963 and $212 million in 1964. Development carried out by state governments from their own resources totalled $48 million in 1961, $60 million in 1962, $61 million in 1963, and $69 million in 1964, while the public authorities' own resources provided $38 million in 1961, $70 million in 1962, $62 million in 1963 and $74 million in 1964.

2. *External sources of finance*

(1) *External assistance*

The assistance received from multilateral and bilateral agencies is not significant in the financing of the Government's economic development plans. In some years, a net outflow may be expected as a result of repayments exceeding receipts. At the end of 1964, the United States Development Loan Fund loans stood at $45.5 million, showing a decline of $0.6 million from 1963. West Germany's Kreditanstalt loan stood at $1.4 million, which was received that year.

Sterling loans at $187.2 million, and the Brunei Loan at $140 million remained unchanged.

A net decline in foreign debt of about $5 million resulted in 1964, foreign loan receipts of $60 million being more than offset by repayments totalling $11.3 million.

(2) *Private sector inflow*

In 1964, it was estimated that the total private capital inflow (including loans of $135 million from abroad by commercial banks) declined by about $82 million from an estimated amount of $578 million in 1963. Figures from 1960 to 1964 are respectively $361 million, $407 million, $599 million, $578 million and $496 million.

(3) *Suppliers' credit*

No details are available of credit obtained from foreign suppliers, as these are usually arranged through commercial banks.

(4) *Areas of industrial activity open to overseas investors*

Apart from public utilities, such as the railways, harbours, electricity, gas and water supply, telephones and telecommunications, all fields of industrial activity are open to private investors, whether domestic or overseas. There are no regulations prohibiting ownership or control of foreign industrial enterprises. Overseas investors are, however, usually encouraged to form joint ventures with local entrepreneurs.

(5) *Provisions for compensation in case of nationalization, requisition or expropriation*

No provisions have been made or are intended by the Government in respect of nationalization. The Constitution of Malaysia provides, however, that no compulsory acquisition of property can be made except on adequate compensation.

(6) *Provision for remittance of profits and dividends and repatriation of capital*

No restriction is made in respect of the remittance of profits and dividends or of repatriation of foreign capital. Funds are freely transmittable to the sterling area.

(7) *Provisions for import of technical know-how*

Payment of royalties and other technical know-how fees is permitted; however, the prior written approval of the Ministry of Commerce and Industry should be obtained before any form of management or technical agreement with overseas firms is concluded.

(8) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

Under pioneer industry legislation, pioneer industries are granted a tax holiday for a period of two to five years, depending upon the amount of the investment. Depreciation allowances may also be deferred until after expiry of the tax holiday period. Import duty exemption for raw materials and machinery used in the industry is often granted. Tariff protection is given for products on the recommendation of a Tariff Advisory Board.

Moreover, two investment guarantee agreements, one with West Germany and the other with the United States, have been signed. Arrangements for avoidance of double taxation have been made with many countries including the United Kingdom, Denmark, Norway, and Sweden.

(9) *Local participation and joint ventures*

While participation of local capital and entrepreneurship is encouraged in joint ventures with foreign capital, there are no legal requirements for such participation.

3. *Inflow of foreign capital*

To date, of the 254 pioneer companies in Malaysia, capital from foreign sources amounted to approximately 49 per cent of the total called-up capital of $465.2 million.

A break-down of the figures is as follows:

	Malaya	*Singapore*	*Sabah*	*Sarawak*	*TOTAL*
Number of pioneer companies ...	108	119	12	15	254
Capital called up (million dollars)	204	233	22.3	5.9	465.2
Per cent domestic	47	56	54	53	52
Per cent foreign .	53	44	56	47	48

4. *Specialized financial institutions*

(1) *The Economic Development Board, Singapore*

A statutory organization established in 1961 as the Singapore Government's agency for promoting the industrial sector, the EDB covers a wide range of activities for this purpose. It designates certain industries and products as being desirable for industrial investment, commissions feasibility studies for specific industries, carries out promotional work at home and abroad and provides technical services to private investors which include product testing and quality control, product design and display, management training and training of technicians and skilled workers; the EDB also undertakes industrial research. It acts as an industrial bank by financing industries through loans and equity participation and by underwriting the public issues of shares by industrial firms. It also carries out the development of industrial sites and estates, among which the best known is the Jurong Industrial Estate to be developed eventually to a New Town with a 400,000 population.

(2) *Malaysian Industrial Development Finance Limited*

This is an industrial development institution with World Bank support set up to stimulate industrialization in Malaysia by assisting manufacturers with medium- and long-term loans with appropriate periods of grace for the purchase of fixed capital assets such as land, buildings, plant and machinery. It is equipped to supply long-term foreign currency credits under a loan agreement with the International Bank for Reconstruction and Development. Its activities include taking debenture, preference or equity share participation in public or private companies. It also assists with project planning, technical and financial advice.

(3) *Borneo Development Corporation Limited*

The Corporation's activities in Sabah and Sarawak consist principally of the provision of mortgage finance for the construction of industrial buildings and the development of industrial estates.

(4) *Light Industries Services*

This is a unit of the Economic Development Board which specializes in finance to small industry through the agency of commercial banks, the latter very often taking or sharing the risk under loans made to such industry. Loans for working capital are made as well as loans for the purchase of machinery.

XIII. NEPAL

1. *Domestic sources of finance*

(1) An "austerity" measure has been taken to reduce government regular expenditure by abolishing those agencies and positions no longer needed.

(2) Public utilities such as the electricity services, the ropeway and other transportation services have been converted into statutory co-operations so as to reduce the operating cost.

(3) Branches and sub-branches of the Nepal Rastra Bank and Nepal Bank Limited are being opened in several parts of the country.

(4) Priority has been given by the Government to the implementation of development projects in the rural area.

(5) The Land Reform Act was enforced in FY1964/65 in the selected sixteen districts by including a clause on compulsory saving and credit arrangements. Under this Act, every land tenant shall be required to make compulsory savings in kind at the prescribed rates from the main crop on the land owned or cultivated by him and shall deposit them with the prescribed committee, agency or authority.

As a result of such measures, the Government's regular expenditure has been reduced considerably and government saving has been increased satisfactory. The Government is now enjoying a surplus in the regular part of its budget. The compulsory saving programme under the Land Reform Act has also been implemented satisfactorily.

There are only two banks in Nepal. The Nepal Rastra Bank, the central bank of Nepal, is vested with the sole right to issue notes and is authorized to mortgage loans and engage in warehouse financing and to make loans to co-operatives. It receives private deposits and makes industrial loans to the private sector if they are considered sound by both the Bank and the Government. Nepal Bank Limited is the only commercial bank in Nepal, partly private and partly

government-owned, the Government holding 52 per cent of the shares. In the absence of discount operations by the central bank its operation to promote private savings is limited by the fact that the rate of interest paid on savings deposits is low in relation to the higher rate of interest charged on loans, and also the commercial nature of the bank limits the spread of its branches to outlying regions.

Nepal so far has no fully organized money market. In FY1963/64, government bonds to a sum of 13 million rupees were floated for the first time in the country's history. Establishment of a stock exchange has been initiated.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

a. In the establishment of basic industries, permission is given to run only such industries in the public or semi-public sector.

b. Industries relating to defence are to be run only by the Government.

c. Permissions are issued for the establishment of large-scale industries (having capital investment of more than five hundred thousand rupees) with capital investments by Nepalese citizens or foreigners or both.

d. Preference is given to Nepalese nationals or organizations controlled by Nepalese nationals in the matter of issuing permits to establish medium-size industries (having a capital investment extending from fifty thousand rupees up to fiive hundred rupees).

e. Only Nepalese nationals or organizations controlled by Nepalese nationals are permitted to establish cottage and village industries (having an investment up to fifty thousand rupees).

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*
(Information not available.)

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

a. Any person investing foreign capital in industry shall be allowed to remit annually profit up to the extent of 10 per cent of the total capital invested by him in the capital stock.

b. Foreign industrialists shall be provided with foreign currency amounting to a maximum of 25 per cent of the capital invested by them in industry for repatriation every year.

(4) *Provisions for import of technical know-how*

All banking facilities, including the facility of exchanging into foreign currency an amount not exceeding 25 per cent of their remuneration, shall be provided to foreign technicians employed in industry.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

a. Income taxes may be exempted for a period of ten years after commencement of a business.

b. Full or partial exemption of export duties may be granted for enterprises exporting their own manufactured goods.

c. Full or partial exemption from import duties may be granted to industries for the import of machinery parts or raw materials.

d. Foreign currency facilities shall be granted for the import of necessary machinery and equipment, spare parts and raw materials which are unavailable or available in inadequate quantities in Nepal, and for the remuneration of foreign technicians.

e. In dealing with industries no discriminatory treatment is allowed between foreign nationals or organizations and Nepalese nationals or organizations established within the country.

In addition, the Government has given a guarantee of profits of 5 per cent per annum for the first five years from the date of establishment of any iron industry. But if such industry earns a profit of more than 10 per cent, it shall pay to the Government 40 per cent of such profit during the ten succeeding profit years.

(6) *Local participation and joint ventures*

Joint ventures with foreign capital are encouraged.

It has been estimated that more than 50 per cent of national investment in Nepal has been financed by external sources. Out of the estimated national investment of Rs. 204 million per annum in the public sector, external sources, largely foreign grants, have financed Rs. 162.4 million.

3. *Capital investment in industry*

TABLE 18. ADDITIONAL PAID-UP CAPITAL OF FIRMS REGISTERED IN THE DEPARTMENT OF INDUSTRY, NEPAL 1955-1965

Fiscal year	*Amount ('000 Rs.)*	*Index (1956/57=100)*
1955/56	69,433	
1956/57	3,045	100
1957/58	3,565	117.8
1958/59	2,628	86.3
1959/60	8,254	271.1
1960/61	28,876	948.3
1961/62	20,079	659.4
1962/63	28,155	924.6
1963/64	39,213	1,287.8
1964/65 (first 5 months)	22,510	
Total mid-Dec. 1964	225,762	

The data in tables 18 and 19 show that there was a remarkable increase in paid-up capital after 1960/61. Notable increases were recorded in furniture and sawmills, agricultural products, engineering works and woollen mills.

4. *Specialized financial institutions*

The Nepal Industrial Development Corporation (NIDC) was established in 1959 by the Government to promote industrialization in Nepal. Its function and services include the following:

TABLE 19. AMOUNT OF PAID-UP CAPITAL OF FIRMS REGISTERED IN THE DEPARTMENT OF INDUSTRIES, NEPAL, BY TYPE OF INDUSTRY, 1955-1965

(rupees)

Type of industry	*1955/56*	*1956/57*	*1957/58*	*1958/59*	*1959/60*	*1960/61*	*1961/62*	*1962/63*	*1963/64*	*1964/65 (Nov)*
Rice oil & flour mills	6,475	416	1,862	170	1,720	1,916	2,209	5,495	12,370	7,863
Other agricultural products .	1,013	894	90	160	404	3,431	821	297	3,215	235
Jute mill & jute press	24,320	—	—	—	1,223	—	—	—	—	—
Cigarette	8,822	63	109	264	215	136	70	62	370	133
Furniture & saw mill	333	6	6	82	237	10,039	1,039	772	1,409	448
Engineering works	2,517	1,557	1,101	163	2,603	6,009	5,505	351	3,852	4,127
Mining works	1,657	—	4	300	45	120	190	60	1,117	72
Match factory	960	—	—	320	320	168	8	—	405	—
Sugar mills	2,400	—	—	—	—	—	—	—	417	450
Soap factory	452	38	68	132	137	188	201	145	71	94
Bricks & tiles	43	—	—	100	—	186	170	751	1,389	286
Transport undertakings ...	820	—	—	—	590	474	2,646	554	2,389	474
Hotels	2,192	—	—	—	—	—	150	8,113	3,205	100
Pharmaceuticals	466	—	14	40	11	2	664	36	89	—
Distillary	643	—	61	—	—	—	—	—	1,620	61
Cotton textile & handloom .	5,014	—	—	—	—	—	—	—	395	1,275
Woollen mills	—	—	—	—	—	1,000	—	10,000	—	—
Hosiery	614	—	—	3	30	128	—	270	230	30
Plywood, chipboard	—	—	—	—	—	—	—	—	1,300	4,200
Miscellaneous	10,693	71	250	895	718	4,678	6,404	1,249	6,363	2,661
Total	69,423	3,045	3,565	2,628	8,264	28,876	20,079	28,155	39,214	22,510

a) It issues long- and medium-term loans for the establishment of new industries and the modernization of existing ones.

b) It provides expert advice and training both to private industrialists and to the Government for the successful organization of industries.

c) It encourages industrial development by providing financial assistance in the form of shares, stocks, bonds and debentures.

d) It assists and organizes industries on its own initiative to demonstrate the existing potential and new possibilities for industrial growth.

During the short period of its existence, the NIDC has promoted and assisted quite a number of industries.

XIV. NEW ZEALAND

1. *Domestic sources of finance*

(1) The Government's policy is directed toward encouraging a high rate of savings to provide the necessary capital for development.

(2) The promotion of business and personal savings is achieved through the general operation of the financial and banking system.

As a result of the government effort, private capital formation was increased considerably in 1963/64. Private capital also plays a part in the capital formation of public authorities.

In New Zealand, there are many deposit-receiving institutions including banks, trading companies, short-term money market and building societies. There is also a stock exchange. Funds also flow to the capital market through the insurance companies, superannuation funds and trustees of estates or property. Individuals may seek funds to finance a business or purchase of property from other individuals, private trustees and agency companies, insurance companies, trustees savings banks, building and investment societies and the government-owned State Advances Corporation. Companies may obtain capital by issuing shares or debentures through the Stock Exchange in the case of public companies, and by private arrangement in the case of private companies. Substantial sums may also be obtained by companies from mortgages granted usually by insurance companies. The Government may obtain a proportion of its finance for capital purposes from taxation and from the Post Office Savings Bank. It also borrows by public issues of government stock.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Industries in New Zealand are mainly privately owned. The chief publicly-owned industries include electric power, railways and some public transport services, the government railway workshops, naval dockyards, State coal mines, and local authority transport workshops. There are no restrictions on overseas private direct investments in New Zealand, except for those which may apply to specific industries or projects. A New Zealand company which wishes to obtain capital overseas must get Reserve Bank approval, except where the amount to be raised in a twelve-month period is less than £10,000 (US$27,800).

TABLE 20. ANNUAL INCREASE IN PLANT, EQUIPMENT AND BUILDING VALUES IN NEW ZEALAND, BY INDUSTRY, 1946/47-1962/63
(million US dollars)

Industry	1946/47	1947/48	1948/49	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	1958/59	1959/60	1960/61	1961/62	1962/63
Food	3.9	9.4	5.7	9.6	10.5	8.5	15.09	17.9	18.3	18.4	20.5	20.2	16.8	29.9	29.1	25.1	26.4
Beverages	0.6	1.2	0.8	0.9	1.3	2.0	2.1	2.2	1.4	4.8	2.5	3.0	6.0	3.0	2.4	3.5	4.5
Tobacco manufacturing	0.1	0.6	0.2	0.5	—	0.2	0.3	0.3	0.3	0.1	0.5	0.9	0.7	0.5	0.5	1.1	0.9
Textiles	0.1	1.8	2.3	2.4	2.2	2.8	2.7	2.0	3.2	3.0	1.9	2.6	3.8	5.0	7.3	9.0	5.5
Footwear, apparel and textile goods	2.3	3.1	0.6	0.9	3.5	4.6	2.1	2.5	2.9	3.2	2.4	4.0	5.0	2.3	5.3	5.9	5.0
Wood and cork products (excl. furniture)	1.5	3.0	2.0	3.0	5.6	5.3	4.5	2.9	3.9	14.4	4.8	3.0	4.5	4.1	7.4	6.3	4.5
Furniture and fittings	0.7	0.9	0.5	0.3	1.1	1.2	1.0	0.8	0.8	0.9	0.9	1.2	1.2	1.2	1.8	2.1	1.3
Paper and paper products	0.5	1.3	0.9	0.5	1.3	1.2	1.3	11.3	1.7	42.6	8.0	2.9	5.4	6.4	10.1	18.0	46.4
Printing and publishing	0.7	1.6	1.3	1.3	3.0	3.5	3.0	3.6	4.8	5.7	4.5	4.3	5.6	5.8	7.7	7.5	7.2
Leather and leather products (excl. footwear)	0.3	0.3	0.1	0.2	0.2	0.3	0.2	0.2	0.4	0.03	0.3	0.1	0.6	0.4	1.1	0.6	0.6
Rubber products	0.5	0.8	4.5	1.4	1.0	1.8	0.5	0.7	1.4	1.8	1.6	1.1	1.4	1.3	1.7	2.0	2.2
Chemicals and chemical products	1.5	2.1	0.5	1.5	1.7	1.8	3.2	2.1	4.8	4.4	6.7	3.8	9.5	8.5	5.2	9.0	6.4
Petroleum and coal products	0.05	0.1	0.1	0.04	0.1	0.1	0.2	0.1	0.2	0.4	0.6	0.6	0.3	0.4	0.4	0.5	2.2
Non-metallic mineral products	1.5	1.2	1.1	1.2	3.7	3.7	5.9	3.5	5.5	3.4	3.9	6.7	11.0	7.5	4.9	9.8	4.8
Basic metal manufacture	0.2	0.2	0.1	0.1	0.3	0.9	0.3	–0.4	0.7	0.4	0.3	0.5	0.5	0.2	0.6	0.6	0.7
Metal products (excl. machinery etc.)	1.0	1.0	0.6	1.1	1.6	2.2	1.2	1.7	3.7	4.1	1.9	3.3	4.0	4.1	9.3	10.7	17.0
Machinery (excl. electrical)	0.9	0.3	1.4	0.7	2.0	2.3	2.5	2.7	3.6	4.6	1.9	2.0	2.5	3.1	6.1	7.0	5.3
Electrical machinery and apparatus	0.5	0.8	0.3	0.4	0.9	0.8	1.2	1.2	0.4	1.1	0.4	2.0	1.7	1.6	2.5	5.3	5.4
Transport equipment	3.9	3.3	0.8	1.5	4.4	3.7	5.1	5.5	6.7	8.8	7.5	7.7	6.6	6.9	9.0	10.1	10.8
Miscellaneous products	0.02	0.4	0.3	0.4	0.8	0.9	0.3	0.7	1.3	0.9	1.4	1.1	1.5	2.6	3.4	4.6	5.0
Gas industry	0.6	0.9	0.8	1.0	1.0	0.8	0.4	0.8	0.6	1.4	1.5	1.4	0.8	1.8	1.7	2.9	1.7
Total	21.3	33.6	25.0	29.0	46.5	48.8	53.8	62.3	76.5	124.7	74.1	72.6	89.7	96.7	117.6	141.7	163.3

The Government encourages the inflow of overseas investment when it appears to be capable of making a positive contribution to the economy and industrial structure. Criteria which are taken into account when considering government approval for an overseas investment project are: the degree of protection required by the industry, the use of local raw materials, the amount of processing carried out in the manufacturing, and whether a large value of local production is added in relation to the overseas expenditure, the potential for export, and the prospects of further technical knowledge and skill being brought into the country.

(2) *Provisions for compensation in case of nationalization*

(Information not available.)

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

Government policy allows the remittance of profits and dividends earned by foreign investment, subject only to formal authentication in some satisfactory form. The repatriation of capital, including capital gains and capitalized profits, is normally permitted subject to the formal approval of the Reserve Bank and to the funds having come to New Zealand through the banking system or some equivalent approved form.

(4) *Provisions for import of technical know-how*

The remittance of royalty payments for technical know-how and services is also subject to the control of the Reserve Bank. These payments are permitted

if justified by adequate evidence of the usefulness of the services to New Zealand and the lack of equivalent facilities or services in the country.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*
(Information not available.)

(6) *Local participation and joint ventures*

a. The Government favours joint ventures between domestic and overseas concerns. There are no legal provisions requiring a proportion of New Zealand capital or ownership in industries established by overseas interests. However, New Zealand participation in the form of a share of the equity capital is preferred.

b. Government consent is required for overseas companies to begin business in New Zealand.

3. *Inflow of foreign capital*

There are no direct controls on the inflow of foreign capital and the government policy is to welcome such investment. There are no official plans for investment in industry to be provided from internal or external sources.

The direct overseas investment in 1954/55 amounted to US$30,914 million and increased to US$53,154 million in 1963/64.

4. *Measures for servicing external public debts*

Interest payments on and repayments of overseas loans raised on government account are serviced through the Public Account. The management of the public debt is in the hands of the Reserve Bank of New Zealand which accordingly arranges for the servicing of the overseas public debt according to the conditions agreed upon.

5. *Capital investment in industry*

New Zealand's annual increase in plant, equipment and building values by industrial groups for the years 1946/47-1962/63 shows a steady increase in the value of such assets. Notable increases are represented by paper and paper products, textiles, and metal products.

6. *Specialized financial institutions*

There is at present no specialized institution for development finance in New Zealand. However, the Development Finance Corporation Act, passed in 1964, provides for the establishment of the Development Finance Corporation of New Zealand which is expected to be functioning in the near future.

XV. PAKISTAN

1. *Domestic sources of finance*

The economic development policies of the Government of Pakistan, as pronounced by various authorities connected with the country's development, and as reflected by the second and third five-year plans, place increasing reliance on domestic resources. Whereas foreign resources in the shape of foreign aid, loans and investment etc. also figure prominently in the country's development requirements, domestic resources have in the past supplied the bulk of the total needs.

The second five-year plan, 1960-1965, envisaged a revised total development expenditure of Rs. 26,330 million of which domestic resources amounted to Rs. 16,230 million or 62 per cent of the total expenditure.[1] The third five-year plan, 1965-1970, provides for an expenditure of Rs. 52,000 million of which Rs. 35,500 million, more than twice the amount during the second five-year plan and 68 per cent of the total, is expected to be contributed by domestic resources. The Planning Commission estimates that with the continuation of the incentives provided by the present system of taxation for reinvestment of industrial profits, and the increase in agricultural productivity leading to larger incomes in the agricultural sector and further improvement of the existing institutional structure for the mobilization of savings, it will be possible to raise the required volume of domestic resources for implementation of the development programmes as conceived under the third five-year plan.

Domestic resources comprise the savings of individual households, corporate or business savings and public sector savings. These resources are mobilized through the mechanism of capital markets, various incentives such as tax concessions, depreciation allowances, and so on, and the adoption of monetary and fiscal policies to encourage individual and business savings.

With a view to encouraging personal savings the Government has taken several measures, as follows:

1. An investment allowance is allowed at the rate of 30 per cent of the gross income of the tax-payer during a single year subject to a maximum of Rs. 12,000. It covers contributions to the provident funds, insurance premia, investment in government securities and approved industrial undertakings, provided that at least 10 per cent of the investment allowance is utilized solely for the purpose of paying life insurance premia.
2. Dividend income up to Rs. 2,000 is tax free.
3. Interest on Post Office Savings Banks deposits of up to Rs. 15,000 is tax free. Interest earned on other savings bank deposits is also tax free up to Rs. 50,000.
4. Salaried persons are allowed a tax-free allowance at the rate of 25 per cent of the

[1] Government of Pakistan — Planning Commission — Preliminary Evaluation of Progress during The Second Five-Year Plan.

total income subject to a maximum of Rs. 6,000. In the case of non-salaried persons, the rate of the tax free allowance is 20 per cent subject to a maximum of Rs. 4,000.

5. The income earned from units of the National Investment Trust is not subject to taxation.
6. The interest earned on the holdings of National Development Savings Certificates up to the free value of Rs. 30,000 is tax free.

The following concessions are provided for the encouragement of business or corporate savings:

1. The business profits tax which existed since pre-partition days was abolished in 1959-1960.
2. The 5-per-cent tax rebate allowed to companies with an annual income of up to Rs. 25,000 was extended to companies with an annual income of up to Rs. 50,000 in 1964/65.
3. Wealth Tax, levied by 1963/64 on business concerns, was withdrawn from private limited companies in the 1964/65 budget.
4. Industries based on indigenous raw materials are allowed a tax holiday of between two and six years, depending on the area of their location. The concession is applicable to industries set up by 30 June 1970. The budget for 1964/65 has extended the concession to some selected industries not based on local raw materials.
5. A 15 per cent rebate has been allowed in the 1964/65 budget to Pakistan enterprises in respect of income from foreign operations.

Government savings represent the difference between the revenue receipts and the revenue expenditures during a financial year. To augment government savings, the Government of Pakistan has, in recent years, given the taxation structure a broad basis at the same time as taking steps to reduce non-development expenditures. During the second five-year plan, 1960/61-1964/65, the revenue surplus aggregated Rs. 3,726 million against the plan target of Rs. 36,700 million. The total financing requirements of the government sector during the third five-year plan (1965-1970) have been projected at Rs. 30,000 million. It is expected that about 55 per cent of the public sector development programme would be financed from domestic resources, compared to 45 per cent under the second plan. A substantial part of the increased public savings is expected to come from large budgetary surpluses at existing tax rates from net capital receipts. The total budgetary surplus on revenue account is estimated at Rs. 8,600 million during the third plan. The net capital receipts during the period are estimated at Rs. 2,400 million.

In addition, the plan proposes to raise approximately 10 per cent of the public sector resources by the imposition of new taxes and another 5 per cent through deficit financing. As regards additional taxation, the National Economic Council of the Government of Pakistan has already appointed a high level Commission on Taxation and Tariffs to suggest ways and means for improving the efficiency of the tax collecting machinery and to recommend the rationalization of the existing tariff structure. During the period of the second five-year plan, the ratio of tax revenues to GNP improved from 6 per cent in 1959/60 to 9 per cent in 1964/65. With the proposed increase in taxation it is expected to improve to 10 per cent by the end of the third plan in 1969/70.

As regards deficit financing it has been the Government's policy to avoid it as far as possible. No provision was made for debt financing in the second plan, and the rate of expansion of the money supply was projected in exact proportion to the planned increase in national income. During the third plan, a sum of Rs. 1,500 million has been tentatively proposed to be mobilized through deficit financing.

2. *External sources of finance*

As in other developing countries of the ECAFE region, external resources form a crucial component of Pakistan's economic development plans and the country has been the recipient of foreign assistance in the form of foreign loans, suppliers' credits and grants-in-aid, though mostly the former, from friendly countries and international financial institutions. As of 31 December 1964, total foreign loans contracted amounted to US$2,401,763 million. Of the total commitments, an amount of $1,359,079 million had been disbursed out of which an amount of $263,158 million had been repaid leaving the net outstanding debt on the said date at $1,095,921 million. Table 21 gives the breakdown of the external debt according to sources up to 31 December 1964.

The Government of Pakistan also welcomes direct foreign investment in industry. The following extract from the policy statement of the Government embodies the various concessions admissible to foreign investors.

"The Government recognizes the vital role of foreign investment in promoting the economic development of under-developed countries, where capital formation is generally slow, technical know-how limited, and trained personnel not always available. Aware of the importance of foreign investment to the country, the Government welcomes foreign private capital with open arms. The whole field of the private sector of industry is open to foreign enterprise without any rigidity in regard to local participation.

"In pursuance of this policy, the Government offers the following facilities, concessions and safeguards to foreign private investment in industries:"

I. Remittance of profits:
There is no restriction on the remittance of current profits to the country from which the investment originated.

II. Repatriation of capital:
a. Foreign capital in approved industries established after 1 September 1954 may be repatriated at any time thereafter to the extent of the original investment to the country from which the investment originated.

TABLE 21. BREAKDOWN OF PAKISTAN EXTERNAL DEBT, ACCORDING TO SOURCES, AS OF 31 DECEMBER 1964

(thousand US dollars)

Lending agency	*Loan contracted*	*Disbursed*	*Repaid*	*Debt outstanding*
Canada	11,424	6,486	—	6,486
France	12,224	3,524	1,440	2,084
West Germany (capital aid) ..	117,000	68,940	—	68,940
West Germany (external credit)	87,076	60,613	16,167	44,446
Italy	3,394	339	339	—
Japan	138,217	57,717	10,453	47,264
United Kingdom .	179,292	118,840	39,998	78,842
United States				
D.L.F.	225,987	207,700	28,384	179,316
A.I.D.	668,450	355,637	—	355,637
Eximbank	151,850	146,054	12,410	133,644
Soviet Union ...	41,000	18,300	973	17,327
Yugoslavia	14,793	1,593	1,593	—
Denmark	7,400	—	—	—
Netherlands	1,100	100	100	—
Switzerland	10,000	—	—	—
I.B.R.D.	361,240	188,808	55,084	133,724
I.D.A.	242,790	14,709	—	14,709
I.F.C.	5,380	5,000	726	4,274
Suppliers' credit .	123,146	104,719	95,491	9,228
Actuals up to 31 December 1964	2,401,763	1,359,079	263,158	1,095,921
Estimates for Jan.-June 1965	232,059	288,850	19,760	269,090
Total	2,633,822	1,647,929	282,918	1,365,011
(Rs. million) ...	(12,537)	(7,844.1)	(1,346.7)	(6,497.5)

Source: Pakistan Economic Survey — Table No. 80, p.162 — The Economic Adviser to the Government of Pakistan, Ministry of Finance, Rawalpindi.

b. Any part of the profits derived from investment and ploughed back into approved industrial projects with the approval of the Government of Pakistan may be treated as investment for the purpose of repatriation.
c. Application of any capital investment under (a) and (b) may also be treated as investment for repatriation purposes. Such repatriation facilities will be subject to such exchange control regulations as are in force from time to time and will not apply (i) to the purchase of shares on the stock exchange, unless it is an integral part of an approved investment project, nor (ii) to capital investment in Pakistan before 1 September 1954.

III. Capital participation:
a. There will be no rigidity about the participation of Pakistani capital in any industry where foreign investment is approved by the Government.
b. Normally the Government will expect that the required local expenditure will be met from local equity capacity.
c. In the case of oil refining, the Government will expect substantial participation of Pakistani capital in the equity.

IV. Double Taxation Avoidance Agreement:
Pakistan has entered into double taxation avoidance agreements with a number of countries such as the United States, the United Kingdom, Sweden, Japan, West Germany, India, Switzerland, and Denmark with a view to encouraging investors from these countries.

V. Compensation guarantees:
a. The Government has no intention of nationalizing industries. Should circumstances or any emergency necessitate nationalization in any particular case, just compensation will be paid in the currency of the country of origin of the investment involved.
b. An investment guarantee agreement is in force between the United States and Pakistan, under which the United States Government guarantees investments by private American investors in business enterprises in Pakistan against losses arising from inconvertibility of foreign currency earnings into dollars or against expropriation.

VI. Protection of Investment:
In order to encourage the greater inflow of foreign private capital, Pakistan is endeavouring to negotiate with other countries agreements for the protection of foreign investment. A treaty of Friendsip, Commerce and Navigation has recently been signed with the United States. Pakistan has also entered into an Investment Treaty with West Germany.

VII. Opportunities for Foreign Investment:
Practically the whole range of industries in Pakistan is open to private enterprises,

foreign and local, the only exceptions being (i) manufacture of arms and ammunitions of war; (ii) production of atomic energy; and (iii) railways, air transport, and telecommunications. Some of the industries in which foreign investment is encouraged are as follows:

i) special steel;
ii) stationary and marine diesel engines;
iii) textile machinery and spares;
iv) machine tools;
v) manufacture and assembly of mechanically propelled vehicles and spare parts;
vi) manufacture of miscellaneous machinery;
vii) heavy chemicals;
viii) basic manufacture of drugs and pharmaceuticals, and insecticides and pesticides;
xi) oil and gas prospecting and development;
x) natural gas transmission; and
xi) natural gas distribution.

3. *Inflow of foreign capital*

The inflow of foreign investment in Pakistan from 1959-1962 is tabulated below:

	1962	1961	1960	1959
	('00,000 rupees)			
1. Classified by form of investment:				
Cash brought in	88	2.33	1.73	1.51
Capital equipment brought in	2.36	2.37	2.07	4.55
Reinvested earnings	3.24	4.42	3.87	2.58
Total	6.48	9.12	7.67	8.64
2. Classified by major economic groups				
Manufacturing	3.60	3.95	2.68	.77
Commerce	1.78	1.42	2.15	1.49
Mining and quarrying	.77	1.77	2.32	5.19
Others	.33	1.98	.52	1.25
Total	6.48	9.12	7.67	8.64
3. Classified by countries:				
United Kingdom	3.36	4.95	4.84	6.90
United States	1.52	3.19	1.08	.56
Others	1.60	.98	1.75	1.18
Total	6.48	9.12	7.67	8.64

4. *Capital investment in industry*

The growth and diversification of industry in Pakistan has been remarkably rapid. At the time of independence, Pakistan had virtually no industry. In 1949/50, two years after independence, the contribution of the manufacturing sector to gross national product was 7 per cent, mostly from small industries. The contribution of large-scale industry has been growing at an average rate of almost 15 per cent per year. By 1964/65, the contribution of large-scale industry is expected to increase to 7.4 per cent and that of the manufacturing sector as a whole to 11 per cent of the GNP. In absolute terms the contribution of industry to GNP (in 1956-1960) will almost treble, from 1,433 million rupees in 1949/50 to 4,440 million rupees in 1964/65. Industrial credit and finance has played an important role in the achievement of the above results.

5. *Specialized financial institutions*

Over the last decade the institutional framework for the mobilization of domestic savings and their allocation has been reorganized and improved upon considerably. Credit facilities, both in local and foreign currencies, have been made available liberally through specialized industrial financing institutions. In the framework of industrial finance and investment in Pakistan the following deserve special mention.

(1) *Stock Exchange*

There are two registered stock exchanges in the country, one at Karachi and the other at Dacca. The Karachi Stock Exchange, however, provides the only broadly based market. The total paid-up capital of the companies quoted on the Karachi Stock Exchange increased from 1,078.5 million rupees in 1949 to 2,096.46 million rupees in 1964.

(2) *National Investment Trust*

The National Investment Trust was set up in December 1962 and it started operation on 1 January 1963. The unit trust is a venture in which people of limited means pool their savings into a large fund for investment in stocks, shares, debentures, government securities, etc. The Trust also underwrites new floatations of the capital of companies quoted on the stock exchange. It completed the second year of its operation on 31 December 1964. The value of its funds has increased from 42.3 million rupees in December 1963 to 72.9 million rupees in December 1964. The number of units sold was 0.665 million on 31 December 1964. Originally the purchase and sale price of the unit certificates was fixed at 10 rupees each, to popularize them among the public. The units have since appreciated in value and by the end of December 1964, their sale price was fixed at 11.50 rupees each. Their repurchase price at the time was 11.30 rupees each net of unloading commission. The number of unit holders increased from 6,392 at the end of 1963 to 10,148 at the end of 1964, indicating their growing popularity. The funds of the Trust at the end of 1964 were spread over 83 equities, compared to 25 at the end of 1963. The Trust has produced a stabilizing influence on the securities market since it has become a significant investor on the stock exchange.

(3) *Pakistan Industrial Credit and Investment Corporation Ltd. (PICIC).*

PICIC was set up in October 1957 to further the development of industries by providing long-term financial assistance to new and existing industries in the private sector. Its authorized share capital is

150 million rupees, of which 20 million rupees was initially paid up; this was subsequently raised to 30 million rupees in 1961 and to 40 million rupees in 1963. Sixty per cent of the capital has been subscribed by private Pakistan investors and the remaining 40 per cent is held by foreign private investors in the United States, the United Kingdom, Japan, West Germany, and the IFC Washington.

PICIC lends in both local currency and foreign exchange. As of 31 December 1964, its total resources amounted to 871.3 million rupees, of which an amount of 759.8 million rupees was in foreign currency lines of credit, and the balance, amounting to 111.5 million rupees, in local currency, consisting of paid-up capital and reserves 51.5 million rupees and long-term government loan 60.0 million rupees.

PICIC provides financial facilities through the grant of loans secured by a charge on the assets of the borrowers by the purchase of mortgage debentures, by giving guarantees, and by underwriting public issues of shares. It can also assist industries by direct equity participation.

PICIC also investigates the possibilities of investments in new and untapped fields for the convenience of prospective investors. Some notable examples are the surveys of paper, cement, sugar, and sugar by-products as a result of which several projects have been developed.

From its inception until 31 December 1964, the Corporation sanctioned loans for a total of 775.1 million rupees of which 739.4 million rupees were in foreign currencies and 35.7 million rupees in local currency. During this period PICIC has assisted sixteen projects through direct equity participation of 10.3 million rupees besides underwriting eight public issues of 53.4 million rupees. It has also arranged finance from abroad for nine projects totalling 171.8 million rupees and promoted seventeen joint ventures which resulted in inflow of foreign private investment amounting to 43.4 million rupees.

(4) *Industrial Development Bank of Pakistan (IDBP)*

The IDBP was established in 1961 to provide medium- and long-term loans and guarantees for the modernization and expansion of existing industries as well as for the setting-up of new industries in the small- and medium-scale sectors. It was formed as a reorganization of the Pakistan Industrial Finance Corporation (PIFCo) which had been in existence for the previous twelve years. The decision to convert PIFCo into the IDBP was taken on the recommendation of the Credit Enquiry Commission, appointed by the Government of Pakistan to review the country's institutional framework for the provision of finance. The Commission in their report pointed out the serious inadequacy of the existing arrangements for the provision of finance to the small- and medium-scale sectors of industry and recommended the conversion of PIFCo into the Industrial Development Bank of Pakistan to meet the special needs of the sector.

The paid-up capital of the Bank is 30 million rupees, of which 51 per cent has been subscribed by the Government of Pakistan. Its assistance is available both in local and foreign currencies. In order to confine its maximum assistance to the small and medium sectors of industry, the Bank under provisions of its charter cannot lend more than 2.5 million rupees to a single enterprise incorporated under the Companies Act. Of the limit of 2.5 million rupees not more than 1.5 million rupees can be in foreign currency. The maximum limit of loan to an un-incorporated enterprise is 1.5 million rupees, subject to a maximum of 1.0 million rupees in local currency. The limit however does not apply to cotton, jute, inland transport and mining industries and such other industries as may be specially exempted by the Government from time to time.

During the four years of its operations ending 30 June 1965, the Bank sanctioned a total of 2,233 loans aggregating 927.21 million rupees in local and foreign currencies. The number and amount of foreign currency loans were 1,187 and 627.91 million rupees respectively. The number and amount of local currency loans were 1,045 and 2,992.9 million rupees respectively.

During the same period, the Bank had issued 19 guarantees in foreign and local currencies aggregating 356.49 million rupees, of which 13 guarantees amounting to 341.81 million rupees were issued on account of credits administered on behalf of the Government.

The operations of the IDBP have been mainly confined to the small- and medium-scale sectors, which play an important role in broadening the industries base by creating a class of new entrepreneurs. The enlargement of the industrial base will ensure a wider diffusion of wealth and income as well as stimulating the aptitude for investment among a large section of the community. In its lending operations the IDBP has tried to distribute its funds as widely as possible between the various types of industries and between the two wings of the country. The Bank also gives preference to the setting up of industries in the backward areas of the country to ensure regional development.

During the four years ending 30 June 1965, the Bank sanctioned 812 loans for East Pakistan aggregating 478.7 million rupees in local and foreign currencies. The number and amount of loans sanctioned in West Pakistan during the same period was 1321 and 448.4 million rupees respectively.

Out of the total of 2,233 loans sanctioned, the loans up to 500,000 repees each were 1847 in number. Loans between 500,000 to 1,000,000 rupees were 221 in number and the remaining 165 loans were above 1.0 million rupees each.

The IDBP with its Head Office at Karachi conducts its day-to-day operations through its three Re-

gional Offices at Karachi, Lahore, and Dacca and a net work of eight branches throughout the country.

(5) *Pakistan Industrial Development Corporation (PIDC)*

The PIDC was set up in January 1952 as a central government organization. Since 1962 it has been divided into two provincial corporations, namely:

1) West Pakistan Industrial Development Corporation (WPIDC) and
2) East Pakistan Industrial Development Corporation (EPIDC).

The original aim of the PIDC, which also continues to be the aim of the WPIDC and EPIDC, was the promotion and development of essential industries which private enterprise found unattractive either on account of technological complexities or uncertain profitability. Another salient feature of the working of both corporations is their emphasis on industrial promotion with the ultimate object of transferring the ownership to private hands. Efforts are first made to associate private enterprise with the corporations; but where private participation is not available, the projects are under taken by the corporations from their own resources and thereafter private enterprise is again offered participation.

The WPIDC has so far completed 70 projects, 43 in large industry and 27 in small industry, at a cost of 860 million rupees. In pursuit of its policy of associating private enterprise with industry the Corporation has so far converted 24 of its 43 large projects into public limited companies. Out of the total investment of 860 million rupees, an amount of 185 million rupees or 21 per cent has been subscribed by private enterprise. An allocation of 1,338.5 million rupees has been made for WPIDC in the third five-year plan, of which 1,156.9 million rupees is for large industry, 82.6 million rupees for mineral development and the balance, 99 million rupees, for development of the small industries.

The EPIDC is at present managing an industrial complex of 18 jute mills, eight sugar mills, two shipbuilding and repair yards, one newsprint mill, two fertilizer factories, two cotton mills, two cement mills, machine tools and diesel engine plants as well as pharmaceutical plants. In pursuance of its disinvestment policy, 49 per cent of the shares held by the Corporation in three sugar mills, involving a total investment of 28.2 million rupees, have been offered to the private shareholders. During 1964/65, the EPIDC has undertaken to execute 49 schemes for which 310 million rupees has been provided.

The development of cottage and small industries side by side with the larger industries has been a major plan of the Government's industrial policy from 1948 onwards. The Government has taken several administrative measures to implement this policy.

The institutional position at present is (1) in West Pakistan, the Small Industries Division of WPIDC looks after the development of cottage and small-scale industries (2) in East Pakistan, the East Pakistan Small Industries Corporation (EPSIC) is established as a separate entity and looks after the development of small industries in East Pakistan.

Small Industries Division (WPIDC),

The Small Industries Division, WPIDC, is responsible for the over-all development of cottage (including rural) and small-scale industries in West Pakistan. The Division has established 43 institutional projects throughout West Pakistan, which actively assist in the development of this important industrial sector. These projects include eight small industry estates, nine cottage industries development centres, rural industries extension services, a Small Industries Institute, a National Design Centre, training institutes for staff and entrepreneurs and several sales and display centres.

The Small Industries Division's programmes under the third plan (1965-1970) include setting up 19 institutes, projects at a cost of 107 million rupees. Provision of technical and managerial services is one of the major projects planned.

East Pakistan Small Industries Corporation, (EPSIC)

After its inception in 1957, the Corporation was initially operated together with some departments whose activities were mostly confined to commercial fields. With the implementation of the second-five-year plan (1960-1965), the need for a planning department was felt and a regular Planing Cell was created in 1961 under the orders of the Government of East Pakistan. Implementation of projects approved by the Planning Cell is the responsibility of the Development Department.

As in the case of Small Industries, WPIDC, the EPSIC has also established institutional projects which includes Small Industrial Estates, Common Facility Centres, Rural Industries Extension Services, Training Institutes, and Marketing (Sales) Depots.

XVI. THE PHILIPPINES

1. *Domestic sources of finance*

(1) Retrenchment measures have been adopted recently to promote government savings. The bulk of government resources is channelled to infrastructure projects to help accelerate capital formation. National highways, irrigation systems and inter-island seaports are high priority projects in the Government's infrastructure programme.

(2) A few government measures, especialy those giving exemptions, have been taken and have effected savings for certain industries.

(3) Several measures have also been adopted to promote personal savings by raising the interest rates on some government bonds and on savings deposits.

(4) Some commercial banks have offered accident insurance benefits to their depositors.

(5) Many banks have established branches all over the country in order to provide a more convenient service for savers in the remote areas.

(6) A voluntary payroll savings plan has been adopted, whereby deductions from the payroll of employees and workers are made for the purchase of government bonds and securities.

Through the implementation of such measures, there has been a gradual increase in the mobilization of private capital for the past few years, despite the limited ability of the banking system to extend credit to the private sector. This is reflected by the increase of outstanding bank credits from 16.4 per cent in 1961 to 30.7 per cent in 1962, to 23.6 per cent in 1963, and to 22.7 per cent in 1964.

The capital market in the Philippines is predominantly a "customer's" market rather than an "organized" one. Capital or credit is generally obtained from financial institutions on a case-to-case basis with close contact between lender and borrower rather than with the impersonality and objective detachment of organized markets.

Commercial banks are the principal suppliers of short-term capital while development banks, savings banks and insurance companies provide medium- and long-term credit. Long-term industrial and agricultural credits are provided mainly by the Development Bank of the Philippines and other private development banks while real estate loans are given by various other institutions. The Central Bank of the Philippines accommodates the long-term capital needs of the Government and government corporations by supplying 4 per cent bond issues and by maintaining government bonds and government corporations bonds in its portfolio.

The Manila Stock Exchange serves as the market for "old" investment.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

By virtue of the provisions of the Constitution and existing laws, foreign ownership in economic endeavours is limited, except for American citizens and corporations which have been given privileges equal to those enjoyed by Filipinos in the matter not only of natural resources and public utilities but also in all other business endeavours. Under the Philippines Constitution, the disposition, exploitation, development and utilization of natural resources are limited to Filipino citizens or to corporations or associations whose capital is at least 60 per cent Filipino. By virtue of the Parity Amendment (1947) to the Constitution, the same rights were extended to American citizens until 3 July 1974.

Industrial activities other than those mentioned above are open to foreign investment. However, the National Economic Council has adopted a policy statement welcoming foreign capital only in areas that Filipino enterprises cannot exploit owing to lack of capital or experience. Foreign investment in industrial areas already pioneered or established by Filipino capital is discouraged.

(2) *Provisions for compensation in case of nationalization requisition or expropriation*

The State may acquire ownership of private enterprises, including utilities, upon payment of just compensation.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

The remittance abroad of profits and dividends as well as the repatriation of capital on foreign investment can be effected through Authorized Agent Banks at the free market rate without prior approval.

(4) *Provisions for import of technical know-how*

Entry of foreigners is allowed by the immigration law when the employment is prearranged. Entry of foreign labour is only encouraged for foreign technicians upon certification by the Department of Labour that Filipino technicians are not available for the same work.

Royalties are fully remittable at prevailing market rates, subject only to withholding tax under the Revenue Law.

(5) *Tax concessions, guarantees and arrangement for avoidance of double taxation*

The following measures have been taken for the encouragement of foreign investment:

a. the adoption of free enterprise as a declared policy;
b. the lifting of restrictions and control on foreign exchange;
c. the granting of tax exemption to a number of private industries;
d. immigration laws granting easy entry to foreign technicians as non-quota immigrants also serve to encourage the inflow of foreign capital.

(6) *Local participation and joint ventures*

As a matter of policy the Government welcomes foreign investment in the Philippines preferably in joint venture arrangements with Filipino businessmen. The National Economic Council recently adopted a declaration of national policy to allow foreign investments that would be willing to accept equity and managerial participation. The policy adopted is based on a 60-40 formula, with Filipino control of 60 per cent.

3. *Inflow of foreign capital*

Sufficient organized data are not yet available. Generally speaking, the gross inflow of foreign capital has been declining since 1961, prior to the five-year Socio-Economic Programme.

TABLE 22. GROSS DOMESTIC INVESTMENT IN THE PHILIPPINES, BY INDUSTRIAL USES, 1956-1963
(million pesos)

Industrial use	*1956*	*1957*	*1958*	*1959*	*1960*	*1961*	*1962*	*1963*
Agriculture	94.6	62.3	78.4	45.0	110.0	97.0	177.01	208.0
Mining	41.2	35.0	20.0	29.0	20.0	34.0	34.0	23.0
Manufacturing	242.2	251.9	286.2	282.0	291.0	536.0	543.0	523.0
Transportation	42.1	68.9	71.4	82.0	317.0	338.0	247.0	393.0
Trade	18.6	126.8	48.2	71.0	86.0	115.0	137.0	175.0
Construction	363.5	399.5	368.5	377.0	391.0	504.0	540.0	684.0
Communication and utilities	34.5	50.6	35.0	64.0	44.0	87.0	105.0	134.0
Services	35.6	40.5	52.8	63.0	55.0	89.0	182.0	158.0
Total	872.3	1,035.9	959.5	1,013.0	1,208.0	1,800.0	1,965.0	2,298.0
Per cent over the preceding year		18.8	—7.4	5.6	19.2	49.0	9.2	16.9

4. *Measures for servicing external public debts*

External debts incurred by the Government or government agencies are sometimes serviced through the establishment of sinking funds. In addition, the Government or the central bank or both guarantees both the availability of foreign exchange and payment of the external debts.

5. *Capital investment in industry*

The "Gross Domestic Investment, by Industrial use" for the years 1956-1963 in table 22 indicates a steady increase in domestic investment during these years (except 1958). From 1956 to 1963, investment in transportation increased approximately 920 per cent, manufacturing 215 per cent, and agriculture 220 per cent.

6. *Specialized financial institutions*

The Development Bank of the Philippines was established to promote industrialization by providing loans to deserving industrial projects.

XVII. REPUBLIC OF VIET-NAM

1. *Domestic sources of finance*

(1) Introduction of post office current accounts.
(2) Introduction of savings banks.
(3) Introduction of the system of prize drawing for depositors in savings banks.
(4) Issuance of treasury bonds either in registered or bearer form. These treasury bonds may be discounted and deposited with the commercial banks, which in turn, have the right to deposit them with the national bank at 95 per cent of their value.
(5) The Government has proposed making the exchange of agrarian reform bonds for shares in public or semi-public industrial companies easier.

For some years now, the mobilization of capital has been deteriorating considerably because of the insecurity prevailing in the countryside and the political climate in Viet-Nam.

A stock exchange has not yet been established and capital is provided mainly by loans from banks and from two credit institutions, the Financing Company for the Development of industry in Viet-Nam and the Industrial Development Centre.

2. *External sources of finance*

(1) *Areas of industrial activity open to overseas investors*

Enterprises set up by foreign investors are treated on an equal footing with Vietnamese enterprises. In order to protect small business and for reasons of security, however, foreign investors are prohibited by the Ordinance of 6 September 1956 from carrying out the following types of activities:

A. Activities of a public utility nature and those in relation to national defence.
B. Small business occupations normally reserved for the deprived class in Viet-Nam.
C. The following eleven types of activity: 1) fish and meat trade; 2) small wares and grocery trade; 3) charcoal and firewood trade; 4) petroleum, gasoline, and lubricating oil business (excluding import companies); 5) pawnbroking; 6) trade in cotton fabrics, silk (less than 10,000 metres) and thread; 7) scrap iron trade; 8) rice milling; 9) trade in cereals; 10) transportation of passengers or goods by motor vehicles, boats or junks; 11) brokerage business.

(2) *Provisions for compensation in case of nationalization, requisition or expropriation*

The principle of non-nationalization is guaranteed for fifteen years by Article 12 of Decree-Law No. 2/63. If for some extremely important reason, foreign enterprises are nationalized, the law stipulates that compensation for the share contributed by foreign capital will be immediately transferable while compensation for the share provided by the domestic capital of the foreign entrepreneur will be transferable in accordance with the exchange regulations in force.

(3) *Provisions for remittance of profits and dividends and repatriation of capital*

Enterprises qualifying for the concessions provided by Decree-Law No. 2/63 can remit profits and capital in accordance with the following provisions:

a. Foreign residents and non-residents who have invested domestic or foreign capital in Viet-Nam must obtain from the National Exchange Office authorization to remit abroad the annual net profit and amount of capital invested.

b. The amount of profits which can be remitted annually must not exceed 20 per cent of the amount of capital invested at the time the enterprise was formed together with subsequent increase of capital.

c. The repatriation of capital is allowed when the enterprise enjoying the concessions provided by Decree-Law No. 2/63 has been in operation for more than five years for foreign capital and twenty years for domestic capital.

(4) *Provisions for import of technical know-how*

The import or payment of technical konw-how is considered by the investments Commission for each case separately.

(5) *Tax concessions, guarantees and arrange- for avoidance of double taxation*

a. Tax concessions:
   (a) Exemption from capital duty.
   (b) Exemption from duties on loan agreements for a period of two years.
   (c) Exemption from payment of the provisional of dividends.
   (d) Exemption from import duties on equipment and spare parts.
   (e) Exemption from land tax on installations up to and including the third year following the financial year in which the plant came into operation.
   (f) Exemption from land tax on crops up to and including the second harvest year.
   (g) Exemption from area and volume rents for mining or quarrying operations up to the third production year.
   (h) Exemption from taxes on incomes derived from trade and manufacture for five years, and on incomes derived from agricultural operations with deferred yield, up to the second harvest year inclusive.
   (i) Exemption from stockholder's tax on dividends distributed from profits exempted from profits tax.
   (j) Exemption from stockholder's tax in cases where the capital is increased by incorporating reserves.
   (k) Exemption from tax on the salaries and wages of technicians for a period of two years.
   (l) Exemption from provisional reserves.

b. Provision for non-nationalization and non-discrimination.

c. Provision for remittance of profits and repatriation of capital.

d. Provision for additional amortization.

(6) *Local participation and joint ventures*

The Government places no restriction on the formation of joint ventures. The partners are free to establish their own conditions for collaboration. In order to facilitate the arrangement of joint ventures, the Industrial Development Centre acts as a liaison agency bringing together foreign investors and interested local parties.

3. *Inflow of foreign capital*

The volume of foreign investment has shown a marked fall in recent years as the following statistics show:

1958-1959:	1224.61	million piastres
1960:	322.38	„ „
1961:	41.53	„ „
1962:	68.02	„ „
1963:	43.39	„ „

The fall is directly due to insecurity and probably indirectly to the strict exchange control policy necessitated by the chronic deficit in the balance of trade.

In order to counteract this decrease in foreign investment, the Government promulgated Decree-Law No. 2/63, which grants various concessions to industrial entrepreneurs.

4. *External public debts*

At present, the following external loans have been raised and have to be serviced:

1. From the United States — Development Loan Fund loans:
   3.5% per annum on loans of
   US$17,500,000 for 30 years
   US$12,700,000 for 20 years
   US$ 9,700,000 for 15 years
2. From the United States — Eximbank loans:
   3% per annum if repayable in US dollars and
   4% per annum if repayable in piastres, on a loan of US$50,000,000 for 40 years
   3.5% per annum on a loan of US$3,300,000 for 32 years repayable in any currency
3. Japanese loan:
   5.75% per annum on a loan of US$7,500,000 for 7 years
4. French loans:
   3% per annum on a loan of NF70 million for 15 years
   3% per annum on a loan of NF110 million for 7 years

No mention has been made in regard to the measures for servicing such loans.

5. *Specialized financial institutions*

(1) *The Industrial Development Centre (IDC)*

The Centre, an autonomous public body having legal status, was established in 1957 for the promotion

of industrial development. It promotes the expansion of existing enterprises and the establishment of new enterprises by providing them with technical and financial assistance. It also manages a number of public or semi-public enterprises. Its tasks include the following:

a) to set up and encourage the establishment of new industrial enterprises;
b) to give technical and financial aid to existing industrial enterprises in order to expand or improve their producion;
c) to advise and guide national and foreign entrepreneurs in investment matters and, to the extent possible, to give them the information they need concerning technical, economic and financial questions;
d) to carry out studies as requested and to draw up projects based on such studies.

It specializes in the field of medium-term loans (five to seven years) particularly to finance the purchase of capital goods and sometimes to finance construction work. It has also invested capital in a number of mixed-capital companies on behalf of the Government.

(2) *The Financing Company for the Development of Industry in Viet-Nam (FCDIV)*

This was established in 1961 as a limited company with the function of contributing to the formation and development of private-sector industries in Viet-Nam by supplying them with capital. For that purpose, the Company has been authorized to issue medium- and long-term loans, to participate financially in companies and to provide industrial enterprises with technical assistance. The creators of the Company intended that the Company should act as a development bank similar to such private development banks as the ICICI in India and the CDC in the Republic of China. However, due to the non-availability of external financial aid for performing normal loan operations, the Company has been forced to abandon this idea at least for the present, and to confine its activities to those of an investment company.

Up to the end of 1964, the value of the technical assistance provided by the Company to the industrial sector is estimated at 341 million piastres, of which 139 million was in the form of loans and 202 million in the form of capital participation.

PART III. CONCLUSIONS AND RECOMMENDATIONS

I. CONCLUSIONS

During the last decade or so the ECAFE countries have made considerable progress in mobilizing their financial resources; however, lack of sufficient funds (external and domestic) is still one of the fundamental problems. Domestic sources of funds are gradually being channelled into institutions, but there is still room to strengthen the institutional arrangement to make it more effective in mobilizing domestic sources of finance.

Corporate savings in the form of retained earnings have become more and more important in providing finance to the industrial sector. They provide the most direct means of capital formation and enable the existing enterprises to mature into more economical units and at the same time place them in a position to assume greater risks.

The need for public savings becomes more important with the increase in the requirement for general infrastructure facilities to promote further industrialization. The desire for the encouragement of industrialization has caused some competition for funds between the public and the private sectors. It is also noted that the retention of earnings of public enterprises has been practised more widely, and has constituted another important source of funds.

External funds comprising official loans and grants and long-term foreign private capital have played a very important role not only in augmenting domestic savings but also in raising the import capacity of a number of ECAFE countries, notably China (Taiwan), Republic of Korea, Pakistan, India and Burma.

The flow of external funds into the ECAFE region has been more or less constant in recent years although the aggregate flow of international capital into all the developing countries has shown an upward trend. Thus the share of the ECAFE region has declined relatively although its population is comparatively much higher than that of the other developing regions.

Among the ECAFE countries, the distribution of external assistance seems to be uneven when the economic needs of individual countries are taken into consideration.

External assistance comprising official loans and grants accounts for the highest proportion of the total flow of external funds into the ECAFE countries except in the case of Malaysia and Thailand. In these two countries, inflow of foreign private capital has played a predominant role. There also seems to be an upward trend in the flow of such capital into Malaysia.

Various restrictions on the utilization of external assistance by the ECAFE countries have reduced the effectiveness of such funds in promoting the rapid industrialization of the region by raising the cost of projects.

Suppliers' credit received by the ECAFE region accounts for a fairly large proportion of the total flow of external funds. Commercial rates of interest charged for such credit and its comparatively short duration have rapidly increased the external debt-servicing obligations of some of the ECAFE countries such as India, Pakistan and Iran.

Burma, China (Taiwan), Pakistan, the Republic of Korea, the Republic of Viet-Nam, and Thailand have received a larger proportion of official grants

than other countries of the ECAFE region whose external debt-servicing burden has therefore increased considerably.

The external indebtedness of countries like India, Pakistan, Ceylon, the Philippines, and Thailand has increased noticeably during the short period 1955-1962. The annual average rate of increase in the case of India was 38 per cent and in the case of Pakistan, 28 per cent. The rapid growth together with the composition of such indebtedness has imposed a considerable external debt-servicing burden on the ECAFE countries. This in turn has aggravated the balance of payments difficulties of some countries such as India.

There has been a downward trend in the flow of foreign private capital into the ECAFE region, the exceptions being Malaysia and Thailand. This is so in spite of a number of measures taken by most of the governments of the ECAFE countries which were designed to attract such capital. The measures include facilities for repatriation of capital as well as remittance of profits, and various tax incentives.

With regard to institutional arrangements for industrial investment, the pattern of distribution of savings at their existing levels in the ECAFE countries offers considerable scope for their further mobilization. An effective institutional framework is, however, needed with a view to attracting savings and channelling them into industrial investments. The insufficiency of available resources, however, warrants their most profitable use in accordance with defined national priorities.

Every country has designed an institutional framework for industrial investment suitable to its economic objectives. The institutions dealing directly with industrial investment commonly consist of the commercial banking system, stock exchange, investment trusts, industrial development banks, industrial development corporations, and the like. Some of these institutions are financial in character and some are non-financial. The degree of their effectiveness however varies. The commercial banking system, which is by far the most effective in the collection of savings, is reluctant to engage in term lending to industry for considerations of safety and liquidity. The underwriting facilities are not adequately developed. The quality (variety) of securities available to various kinds of investors is limited. In the initial stage of industrialization and in the absence of a proper institutional mechanism, the industrial development corporations in the ECAFE countries have been useful in undertaking industrial projects themselves with the ultimate object of transferring or enlarging ownership among general investors after they have demonstrated successful operation. The investment trust has begun to show its usefulness in attracting small savings and popularizing security holdings.

Most of the industrial investment institutions in ECAFE countries have been particularly useful for the requirements of large-scale industry, and relatively less attention has been devoted to the requirements of small- and medium-scale industrial sectors. There appears to be a need for a further special study of the sector under ECAFE sponsorship to determine its existing structure and inadequacies and to suggest possible improvements for the achievement of broad-based industrial development in the region.

II. RECOMMENDATIONS

It is recommended that an industrial development conference be held every year under the sponsorship of ECAFE or of the Asian Development Bank to review the progress that has been made by the member countries, with special reference to the recommendations made by this Expert Working Group. Such a conference would provide an instrument which could constantly review the problems of the region, as well as providing an annual opportunity for development planners and bankers and representatives of other constituents of the capital market to exchange ideas and learn each other's problems. In order to make the conference effective, it is suggested that all the institutions involved in development planning and financing should be represented, and with the exception of the opening and closing sessions, the meeting should be conducted on a round table basis. Different groups could deliberate on matters relating to their respective fields. In order that the participants may speak freely, it is further suggested that with the exception of the final consensus of opinion, no record should be kept. The success of this type of meeting depends very much on the quality of the participants.

One of the basic problems of industrial financing in the countries of the ECAFE region is the lack of sufficient funds, both domestic and external. It is essential for the Economic Commission for Asia and the Far East to undertake a study in order to estimate the finance required for the achievement of the physical targets that may be recommended by the various expert working groups on individual industries, as well as to estimate the availability of domestic resources in the ECAFE region. Such an exercise will reveal the dimensions of the gap between needs and resources for the industrialization of the ECAFE region. The Expert Working Group believes that the gap is likely to be very wide and the task of filling it will not be an easy one as it requires joint efforts not only on the part of the countries of the region but on the part of the developed countries as well. To be realistic, it is a problem that cannot be solved in a short span of time, but continuous efforts must be exercised to achieve the goal.

Apart from solving the problem of mobilizing the required funds, there remains the even more complicated problem of allocating these hard-earned funds among the various industries in a way that is consistent with the development plans and programmes of the individual ECAFE countries.

With regard to domestic sources of funds more effective means of capital formation need to be adopted. The fundamental requirement lies in maintaining a stable economy so as to provide the proper investment climate. Further strengthening of the institutional set-up to offer a wider network of facilities as well as simplified procedures and higher interest rates may help to attract more domestic household savings. With reference to corporate savings, it is recommended that measures to plough back the profit should certainly be encouraged.

As to the public savings, it is suggested that fiscal and taxation policies should be formulated in such a way as to stimulate further industrialization, with some reference to curtailment of unnecessary consumption. Care should also be exercised in the attraction of public savings so that they will not compete too stongly with the private sector. As to public enterprises, retention of earnings should certainly be encouraged so that they compete efficiently with the private enterprises and are given the opportunity to plan ahead according to their own projections.

The Expert Working Group is of the opinion that the ECAFE countries should basically depend on domestic savings to meet the needs of industrialization and that they should adopt all the necessary measures to maximum the rate of domestic savings. External resources, though very important, should be regarded as a secondary source of funds.

a. With reference to external sources of finance, further improvement of the investment climate is certainly recommended. The magnitude of the requirement of funds from external sources requires the most favorable consideration in providing the attraction. Dependence on a single type of aid or assistance will not be sufficient to perform the duties required; therefore, every possible means of attracting external funds must be used. As the multilateral type of assistance provides certain advantages over the bilateral type of assistance, it is suggested that further strengthening and expansion of multilateral assistance institutions be carried out so as to make these institutions even more effective.

b. In this connexion, it is suggested that the flow of external assistance may be made a positive function of the level of savings in a country according to a 'matching' formula shown below:

$$Fn-(Fn-1) \geqq K\left[\frac{\frac{Sn-1}{Yn-1}+\frac{Sn-2}{Yn-2}}{2}\right] Yn-1$$

Where F = Flow of external assistance
S = Domestic savings
Y = National income
K = Multiplier
n = Year

The main characteristics of the formula may be noted.

It induces an aid receiving country to raise the level of domestic savings increasingly so as to attract more and more external assistance.

Second, by reducing the degree of uncertainty, the formula enables a recipient country to plan its investment programme more effectively.

Third, the formula, by linking the flow of official loans and grants in a given year to the rate of savings in the preceding two years, tends to mitigate extreme short-term fluctuations in external assistance.

Last, the multiplier K, whose value will be greater than zero, provides scope for determining the importance of specific economic variables influencing the economic needs of a particular country for external assistance. Thus, the value of K will vary from country to country and in a given country over a period of time.

The Expert Working Group would very much emphasize that to make external assistance more effective, the aid receiving country should carefully examine the implications of the formula or of any other measures consistent with the specific requirements of an individual country which is receiving external assistance. Furthermore, the recipient countries should be given more freedom in utilizing this assistance, freedom in their choice of foreign suppliers of equipment and machinery as well as in the nature of imports to be financed by external assistance. Continuity in the flow of such funds on a long-term basis is also desirable to enable the ECAFE countries to plan their industrialization programmes well in advance.

c. The Group further believes that the cost of external loans should be considerably reduced by lowering interest rates and lengthening the maturity period. This, in the opinion of the Group, is a very crucial problem since the cost of servicing external debts at present puts a heavy strain on the balance of payments of most of the ECAFE countries.

d. Foreign private capital, a very versatile type of funds, is also usually the most difficult to attract and must be lured by all suitable measures. It is believed that only when such funds start to flow in reasonable amounts, the shortage of external funds may come to an end. However, in order to provide incentives for such funds to flow in, further removal of unnecessary restrictions both by the fund recipient countries and capital exporting countries as well as multilateral institutions is called for.

Regarding the institutional framework for industrial investment, the Group would like to make a number of recommendations.

(a) The banking laws in the ECAFE countries should be revised so as to encourage commercial banks to participate more actively in term financing for industry. The techniques of long-term lending for industry require specialized appraised with which the commercial banks are not familiar. It is recommended that the commercial banks, to start with,

engage in such operations jointly with industrial financing institutions, which should be mainly responsible for appraisal of loan applications.

(b) Special efforts should be made to provide underwriting facilities for the floatation of new issues. These facilities will also lead to improvement in the quality of offerings. It is further recommended that the possibility of organizing special investment corporations to undertake underwriting of shares and stock should be considered. The initial capital of such corporations may be subscribed by the commercial banks, industrial finance institutions and insurance companies.

(c) The ECAFE countries in which institutions for industrial finance are not developed should consider the establishment of industrial development corporations. It is however recommended that such corporations instead of undertaking the projects entirely by themselves, should associate with private enterprise at the initial stages and should restrict their participation to such levels as would be necessary to lend confidence to and attract the private investors.

(d) The Group firmly believes that sufficient attention has not been paid by the ECAFE countries to the development of an institutional framework for small- and medium-scale industries, commensurate with the importance and needs of this sector in their economies. The Group recommends that a special study be conducted on the subject under the auspices of ECAFE, with a view to determining the existing inadequacies and recommending further improvements.

It is also recommended that the Asian Development Bank should be able to supplement the deficiency that exists today in financing the requirements of industries in the ECAFE region. Close co-operation with the development agencies of member countries will certainly help to make the task easier and more effective.

STUDY ON STANDARDIZATION, PATENTS AND MARKETING

Prepared by a Group of Experts*

SUMMARY

Although man has used all kinds of standards from the very earliest era of human civilization, standardization as an organized activity made a slow beginning with the industrial revolution, which began about 200 years ago. It may be said to be both the cause and the effect of the development of mass production techniques.

Standardization has grown and is today most effective in the countries having a strong industrial base. However, standardization as a regulatory instrument for the proper development of industry with the minimum waste of resources—both materials and manpower—is most effective in developing countries which are aiming to achieve rapid development within the framework of national plans. As a matter of fact, the establishment of national standards bodies in these countries should take place simultaneously with, if not prior to, the formulation of the national plans.

In developing standards, any country — but particularly a developing country — should draw freely upon the accumulated experience in the world through the published standards of other countries and the recommendations of international bodies such as the International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC). While adopting these foreign or international standards wholly or with modifications, it is necessary to bear in mind the special needs of the country adopting them. In many cases, modifications, large or small, needing investigation and research will be called for. For this latter purpose, it may be necessary to establish special laboratories (standards laboratories) or to utilize the resources of the country's existing Laboratories in the various fields of science and technology.

The movement for standardization among a group of countries either on the basis of regional affinity or other considerations, political or economic, began during the last few decades. The formulation of standards on such a group basis can be justified only if the efforts further the cause of international standardization. There seems to be a particular need for the establishment of a regional standards body in the ECAFE region as a whole for formulating regional standards in fields of common and vital interest to the whole region such as the generation of electric energy, the housing industry, the steel industry, and so on.

The establishment of standards is only the first step. This must be followed by their wide implementation so as to give the maximum benefit to industry. Special efforts will have to be made to see that standards formulated at all levels are widely implemented by manufacturers, designers, technicians, users, and by all those concerned with them. One effective method of implementation of standards is the adoption of certification marking as a third party guarantee of quality of products manufactured to a published standard. The national standards body is undoubtedly the body best suited to work as a third party giving the guarantee; however, other organizations could and do act in the same capacity.

Control of quality of goods for the market, domestic or export, is of vital importance to all concerned. For developing countries, quality control of export goods before they are shipped assumes great importance as a means of expanding their foreign earnings. The experience of Japan in preshipment inspection and quality control is well worth emulating by all developing countries. Japan's phenomenal economic recovery after the Second World War very largely resulted from its exports of quality goods which were achieved through carefully planned preshipment inspection and quality control. India is making very great efforts on the same lines. All developing countries of the ECAFE region should give serious consideration to this discipline which is really an extension of standardization technique. These ideas have been developed in detail in the paper and certain important conclusions have been drawn (see page 104).

A number of recommendations for action by ECAFE and the governments of ECAFE countries have also been made (see page 106) which, if implemented, will greatly help the industrialization of the

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developing countries by the application of techniques of standardization.

I. STANDARDIZATION AS A REGULATORY FORCE

As an instrument of economic planning under a regulatory force in industry, standardization is of comparatively recent origin. There is an intimate relation between standardization and industrial growth. Standardization is at once a cause and an effect of the expansion of industry in modern times. Standardization has played a very important part ever since the factory system of mechanical production took root. It has helped the advancement of science which has led to modern techniques of mass production culminating in automation.

Although it would appear that standardization is most remunerative in the industrially advanced countries, there is no doubt that countries which are planning large-scale economic expansion to raise the living levels of their peoples will find it a very powerful tool. It may be said that, without proper standardization, the development plans are bound to encounter difficulty at some stage. It is, therefore, worthwhile to examine how far the experiences of the developed countries are applicable to the developing countries and how the theory and practice of standardization as evolved in the former countries can be transferred to the latter.

The modern phase of standardization in the developed countries began when the industrial revolution brought about the factory system of production. A significant result of the factory system was the change in the status of the worker vis-à-vis the machine. In the pre-revolution days, skill resided in the artisan and each product bore the unmistakable evidence of the skill of the worker. This skill then passed to the machine — a development which paved the way for important economic and social changes. To this fact may be traced the beginning of industrial standardization.

A machine performs a task repetitively by operating under invariable conditions of service, which means that the product of a machine becomes standardized both in respect of the material it works upon and the process it employs, thus working within certain predetermined limits of variation.

At the beginning, little conscious thought was given to the very close link between standardization and machine production. As the scale of production rose and more and more products reached the consumer, lack of uniformity and particularly dimensional interchangeability became a source of annoyance and waste. Classic examples include the various types and sizes of nuts and bolts which would not fit, electric plugs and sockets of different makes which would not mate, not only in different countries, but sometimes in regions of the same country. Not very long ago, in the United States, different track gauges and sizes of rolling-stock were common on the rail-roads. Such confusions and difficulties led to conscious efforts toward standardization.

Development prior to the twentieth century

An American manufacturer, Eli Whitney, who may be considered the father of the mass production technique in the United States, made very effective and large-scale use of standardization for interchangeability. In 1793, when Whitney received an order for 10,000 muskets, he planned to fulfil this large order by appointing an army of highly skilled workers each of whom produced one part of the product, which was thereafter assembled to form a whole instrument. Various tasks were sub-divided and a group of workers was kept busy at each operation. Tools were standardized. "From first to last a model musket was copied with precision so that every lock, for example, was exactly like every other among thousands. When all the parts needed to form a weapon were assembled, they united to form a weapon much superior to a musket formed on any other plan."

In this way, standardization of products and processes in industry received a firm base to start from. This was the picture of the general evolution of the technique of standardization during the nineteenth century. Although standards were being used on an ever-increasing scale by individual industries or perhaps a group of industries, hardly any attempt was made to standardize on a wider sphere, as for example on a national basis.

Impetus given to standardization by world wars

Things began to change with the dawn of the twentieth century and, by the time of the First World War, standardization had been well recognized as essential not only within a given factory but also from one factory to another and the importance of creating industrial standards and perhaps national standards was beginning to be realized. Also, in one field, an international standardization movement (the International Electrotechnical Commission established in 1906) came into being. However, it was the experience of the First World War that brought most prominently to the attention of the world the potentialities of standardization. Because of an acute shortage of men and material due to war conditions, conservation in every aspect became very vital. The United States achieved conspicuous conservation through a process of strict standardization. Drastic restrictions of variety brought about a substantial increase in productivity.

With the cessation of hostilities, industries tended to revert to the traditional freedom of variety so that the advantages of variety reduction tended to be lost. However, in the United States the trend was checked by the timely action of Mr. Herbert Hoover (one-time President of the United States), who appointed a Committee on the Elimination of Wastage in Industry. In 1928, the Committee published its conclusions, which

indicated that the overall productivity of American industry was reduced by 50 per cent as a result of the large variety of products of the same kind being made. The report received all the attention and publicity it deserved and a nation-wide movement for simplification of variety was started through the agency of the Simplified Practice Division of the United States Department of Commerce. In many cases, a reduction in variety ranging from 24 to 98 per cent was achieved. For example, hospital beds of 33 different lengths and 44 different heights were replaced by three types of standard bed. Forty-nine varieties of milk bottle were reduced to 4. Thus, standardization, which began merely as an associate of the machine process and developed into a means of ensuring interchangeability, later emerged as a technique of simplification for the conservation of resources and increase of production capacity.

In the period between the First and the Second World Wars, a number of countries in Europe and America started organizing their national standards through the various committees or institutions. An international standards association was created in 1926 when twenty countries agreed to the formation of an International Federation of the National Standardizing Associations — ISA. Though great deal of work was done in the national sphere during this period, the work of the International Association did not proceed fast enough. At the time of the Second World War, the Association ceased to function, for obvious reasons. One effect of the Second World War was to bring the urgency of international standardization very forcefully to the attention of all. The supply and maintenance facilities of the allies were severely strained because of different standards leading to lack of interchangeability of tools and even of common engineering stores. Vast amounts of money and effort were wasted by the need to service American war-stores. Complete workshop equipment had to be shifted from the United States to the European theatres of war and that at a very critical time. The development of supply management, enlarged during the war, re-emphasized the importance of standardization and variety reduction in materials and products. The result was the development of many new techniques including operational research, value analysis, linear programming and so on.

A committee under the Chairmanship of Sir Earnest Lemon was set up in 1948 "to investigate in consultation with the British Standards Institution (which had its origin in 1901) and appropriate organizations methods by which manufacturers and users of engineering products determine whether any reduction in the variety of products manufactured is desirable in the light of technical, commercial and other considerations; to report whether these methods are adequate and what if any further measures should be taken by industry or by the government to ensure that such simplifications, as are determined, are put into effect". The Committee came to the following conclusion.[1]

> "There can be no question that unnecessary variety of product at any stage of manufacture lowers efficiency. The loss is not confined to any one stage of manufacture, but extends to the supply of raw materials and components. It also applies to all phases of distribution and to the ultimate user. The latter is not only faced with the resulting higher prices but often with related problems of non-interchangeability, delay in obtaining non-standard spare parts, increased stocks and unnecessary design and administrative work. Because the technical and economic problems of standardization and reduction of variety are complex, it is often not realized how large are the overall savings which can be made by increasing the length of production runs as a result of eliminating or reducing the manufacture of specials or small batches".

At about this time, a group of British experts went to the United States to gather practical evidence of benefits which could be derived from the policy of deliberate reduction in variety in spheres of production. This group, in its report 'Simplification on Industry', summarizes[2] the advantage of standardization in the following terms:

To the producer:

(i) longer runs with fewer changes on the production line;
(ii) reduced tooling and set-up time;
(iii) possibilities of increased mechanization and special-purpose plant;
(iv) easier training of operatives;
(v) simpler and cheaper inspection;
(vi) less capital invested in idle plant, tools and space;
(vii) reduction of stocks of materials, components and end-products;
(viii) reduced call on drawing office and design staff for special orders, leaving them free for work on new designs or improvements;
(ix) simpler clerical and administrative work;
(x) easier service and maintenance;
(xi) concentration of sales and advertising effort on a narrower range;
(xii) and hence, increased productivity, leading to reduction in cost and prices and to increased sales.

To the user:

(i) lower price for a given quality or performance;
(ii) reduced variety and level of stocks at all distribution points;
(iii) readier availability; and
(iv) improved service and maintenance facilities.

[1] See item 20 in appendix J.
[2] See item 11 in appendix J.

II. APPLICABILITY OF STANDARDIZATION IN DEVELOPING ECONOMIES

Role of standards

There is thus no doubt that, in most industrially developed countries such as the United Kingdom and the United States, standardization followed industrialization and grew out of the needs to co-ordinate, adjust and bring about economy and harmony in the existing patterns of the industry which were, to say the least, quite confused. It may, therefore, be asked why there is a need for standardization in the developing countries where industry is far from being developed to the adequate scale. In the developed countries, industrial development during the eighteenth and nineteenth centuries took place under conditions totally different from those existing today in the developing countries. The latter are attempting to create, within a short time, dynamic societies from limited resources, often under severe population pressure. Those conditions require a great deal of national planning, direction and control which was hardly imaginable under the conditions existing in the eighteenth and nineteenth centuries in Europe and America. It is in this context that the role of standardization in the developing countries has to be evaluated.

Standards come into play whenever there is transition from production to consumption, requiring the establishment of a link between the two. This transition naturally works not only at the ultimate point of use but also at a number of intermediary states. The total growth of production in a country is marked by a corresponding rise in the interdependence of different active production centres. Each has to look to the other for the supply of raw materials, machinery, tools and even services. This results in a very complex relationship and interdependence and it is here that standards become most effective; for one of their main functions is to facilitate the flow through these transition points.

It has previously been pointed out how standards help production by reducing unnecessary variety, ensuring interchangeability and, in general, making mass production possible. Thus standards lead to the optimum utilization of resources — human and material. For a country attempting large-scale development to catch up with the rest of the world, such utilization of resources and the achievement of higher productions are of very obvious importance. Further, there is the need for ever-increasing export trade to provide foreign exchange for the growing industry which will need capital equipment for further development. The increase of foreign trade is very much stimulated by improving the quality of exportable products and adherence to high standards of quality.

A developing country has to depend on outside assistance in the form of technical personnel, industrial know-how, capital equipment, and the like, for its rapid and planned development. The sources from which such assistance will be derived will naturally vary. They may come from the different sectors of the same overseas country or even from different overseas collaborators. The import of collaboration from different parts of the world will naturally bring in different patterns of standardization depending upon the nationality of the collaborating organization. For the same type of material, there might be different varieties based on the different standards of the collaborating nations. This is perhaps the time when national standards are most needed to co-ordinate and simplify the standards and norms of production, but all too often they are conspicuous by their absence. It is thus clear that the developing countries need to establish their national standards to help their industries from the very earliest stage of planning and design, through erection, production, and distribution. It is through this approach that the limited resources of man, materials, and technical know-how can be most effectively put to work to achieve massive industrial and economic growth within a relatively short period.

It was fortunate that in India the Indian Standards Institution was established in the year of the country's independence. By the time the national planning started, a strong industrial base had been laid by the institution. It was possible for the Institution to preplan the development of standards in helping the several five-year development plans. The industries of the country had the advantage of getting guidance from this Institution in their efforts to rationalize their production and to help export promotion.

A question may be raised as to why national standards should be developed instead of adopting international standards or those developed by other countries. It must be remembered that standards in any sphere need be developed only if they serve the common need and are likely to contribute to the overall economy. Therefore, if an available international standard or one borrowed from a developed country could serve the interest of a particular nation, then there should be no hesitation in adopting it. As a matter of fact, this should be encouraged as it facilitates international co-ordination, saves a great deal of effort, and leads to economy. In adopting an outside standard, it may be necessary to make one or more minor or major variations dictated by special conditions holding in the country. It must not, however, be forgotten that there are conditions in which neither international nor overseas standards exist, or in which, if they do exist, they are completely unsuitable. In either case, it becomes necessary to evolve independent national standards. Many such cases have been handled by ISI.

A country's special need may necessitate the development of completely new standards which no other country or international group has attempted. This will depend upon its raw materials, industrial requirements and various other factors. As a rule, every item taken up for standardization presents its own peculiar problem which requires individual

examination. A standard, whether originally developed or adapted, should be produced to suit the special requirements of the country, while keeping an eye on the immediate or ultimate international co-ordination of standard.

Field and aims of standardization

The basic principles and purposes of standardization remain the same whether standardization takes place in a developed or in a developing country. The International Organization for Standardization's definitions of standardization[1] make it quite clear. They are as follows:

Standardization

"Standardization is the process of formulating and applying rules for an orderly approach to a specific activity for the benefit and with the co-operation of all concerned, and in particular for the promotion of optimum overall economy taking due account of functional conditions and safety requirements."

"It is based on the consolidated results of science, technique and experience. It determines not only the basis for the present but also for future development, and it should keep pace with the progress achieved."

"Some particular applications are:

(1) Units of measurement
(2) Terminology and symbolic representation
(3) Products and processes (definition and selection of characteristics of products, testing measuring methods, specification of characteristics of products for defining their quality, regulation of variety, interchangeability, etc.)
(4) Safety of persons and goods."

Standard

"A standard is the result of a particular standardization effort, approved by a recognized authority. It may take the form of

(1) A document containing a set of conditions to be fulfilled (In French "norme")
(2) A fundamental unit or physical constant — example: ampere, absolute zero (Kelvin) (In French "étalon")"

Specification

"A specification is a concise statement of a set of requirements to be satisfied by a product, a material or a process indicating, whenever appropriate, the procedure by means of which it may be determined whether the requirements given are satisfied.

Notes: (1) A specification may be a standard, a part of a standard, or independent of a standard.

(2) As far as practicable, it is desirable that the requirements are expressed numerically in terms of appropriate units together with their limits."

For proper understanding of the meaning of the different terms used in the field of standardization see definitions given in appendix A.

In order to grasp the field of standardization a three-dimensional space diagram is presented.

(a) *Subject:* Subjects coming under the review of standardization are material things, abstract notions, formal symbols, and so on, which are suitable for being standardized. A group of related subjects in a certain branch of economic or cultural activities is considered as a standardization domain. Evidently such groups may be constituted in different ways. Some examples are given in the 'X' axis of fig. 1. Since there are many standardization subjects for each standardization domin, for the sake of simplicity only standardization domains are indicated.

(b) *Standardization aspect:* An aspect is a group of similar or related requirements of a standardization subject which are dealt with in a given standard. A number of examples are indicated along the 'Y' axis in the figure.

(c) *Standardization level:* A level defines a group of persons or interests who are to use the standards. The more important levels occurring in contemporary practice may be classified as a company, an association, a nation and an international body. These are indicated along the 'Z' axis in the figure.

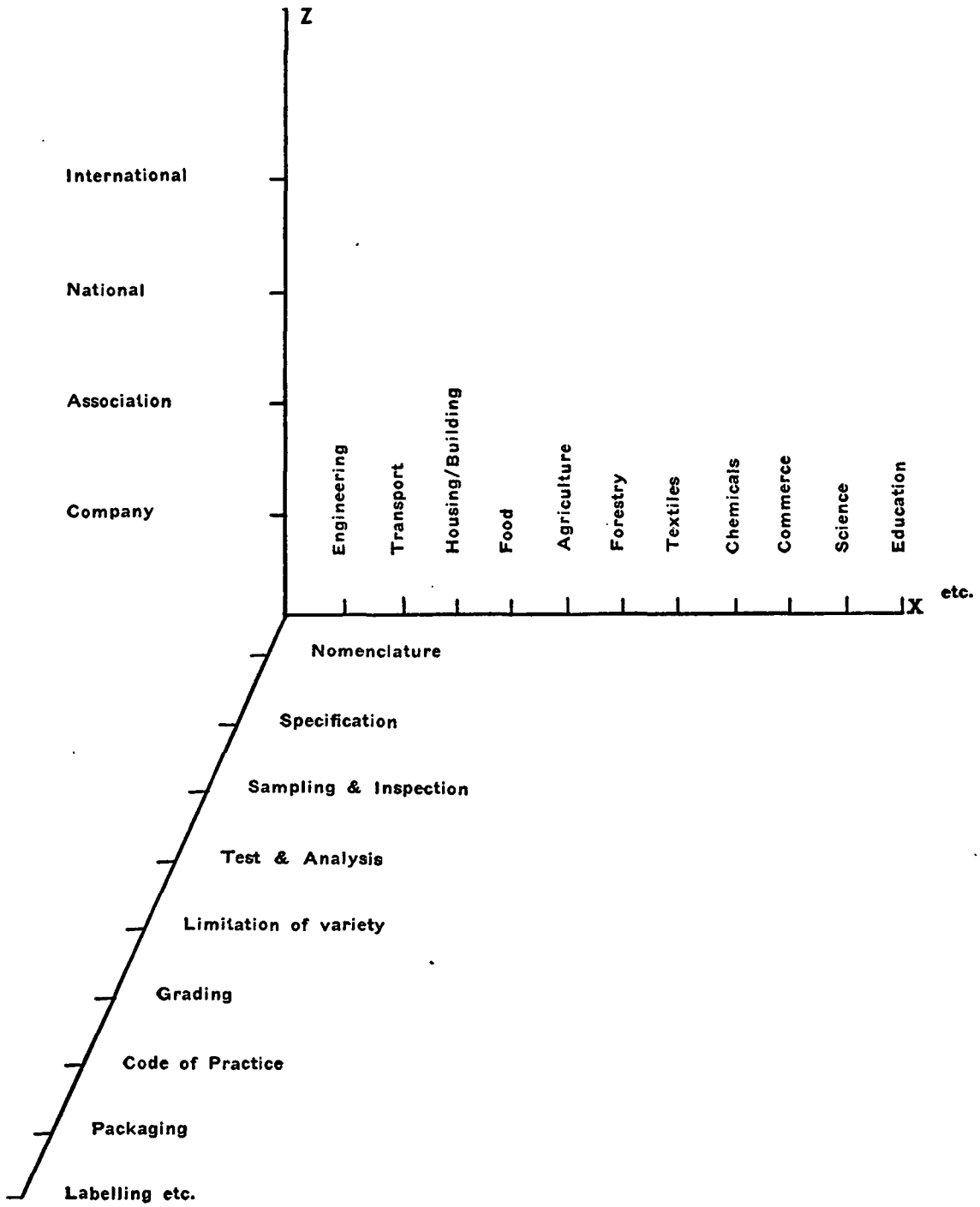
Obviously the standardization space is not a mathematical space of either continuous or discrete variables. It is just a convenient device to illustrate the various attributes of standardization which are in the nature of independent variables. The fundamental standards of science, those of weights and measures for example, are not expected to be changed from time to time, although refinements are effected in defining and maintaining them. Industrial standards, on the other hand, are more temporary in character and they should be subject to revision with developments of science and progress of technology.[1]

Standardization, according to the definition above, is an activity and, like all other activities, it must have an aim. In general, the aim of standardization applicable to all levels is (a) to achieve over-all economy, (b) to protect consumer's interest, and (c) to safeguard and protect health and life.

(a) *Over-all economy:* Over-all economy comprises the economic use of human effort, materials and machines, power and energy for the maximum benefit of producers and the consumers. Its attainment creates maximum productivity in the country as a whole, even though each component may not obtain its optimum economy. The greatest economy in material in certain cases may preclude economy in

[1] ISO/STACO (Secretariat-39) 265E.

[1] In this consideration of standardization and standards no attempt is made to review the work on fundamental units or physical constants, or on standards of weights and measures which come within the preview or metrology and are not dealt with by ISO or IEC.



See Items 21 — 22 in Appendix J.

labour. Over-all simplification and reduction of variety of products and components, and elimination of avoidable waste during handling of materials, processing, transport and, in general, exchange of goods must be aimed at. Sometimes this involves the saving of essential raw materials by substituting more readily available materials for them. This may not lead to immediate saving of cost or human effort, but it is of national economic importance.

(b) *Protection of consumers' interest:* Quality of service covers not only material service, such as attainment of high-quality or performance or functional interchangeability, but also non-material services such as ready availability, simplicity coupled with serviceability and with whatever makes man's life and work easier, more effective and pleasant.

(c) *Safety and protection of health and life:* It has been said that "standardization is to industry and commerce what culture is to society." Just as rules of civilized behaviour regulate the social intercourse of man and his appreciation of cultural values, so does standardization help to regulate the conduct of commerce and trade in a smooth and efficient manner and assist in improving the productivity and efficiency of man and machine. Therefore standards must provide safety and protection of health and life in many ways; this aspect of standardization activity is of great human importance.

Standardization at the international level (ISO & IEC)

Origin — The International Federation of the National Standardizing Associations (ICA) set up in 1926 compared about twenty countries. The ISA laid the foundation for international co-operation in the field of standardization and made great efforts to further the unification of the national standards of its member bodies. The work proceeded at a very slow pace and came to almost a standstill at the outbreak of World War II (1939). It officially ceased to function in 1942. In 1944, eighteen allied countries formed the United Nations Standards Co-ordinating Committee (UNSCO), which succeeded ISA.

Creation — In October 1946, the representatives of UNSCC met in London together with the representatives of the standardization bodies of some of the countries which were not members of UNSCC. The discussions held led to the foundation of the International Organization for Standardization (ISO). The Provisional General Assembly of ISO was held on 24 October 1946 at London. It was decided that ISO should begin to function officially as soon as the provision was ratified by 15 national standardization committees. ISO was officially created by the fifteenth ratification on 23 February 1947.

Objective — The objective of the Organization is to promote development of standards in the world with a view to facilitating international exchanges of goods and services and to developing mutual co-operation in the sphere of intellectual, scientific, technological and economic activity. As a means to this end it may:

(a) take action to facilitate co-ordination and unification of national standards and issue necessary recommendations to member bodies for this purpose;
(b) set up international standards provided, in each case, no member body dissents;
(c) encourage and facilitate, as action demands, the development of new standards having common requirements of use in national and international spheres;
(d) arrange for exchanges of information regarding the work of its member bodies and of its technical committees; and,
(e) co-operate with other international organizations interested in related matters, particularly by undertaking at their request studies relating to standardization projects.

ISO membership is open to all national bodies engaged in the standardization work in the countries of the world. The work of ISO is conducted through technical committees composed of delegations from member bodies wishing to take part in it. As of today, ISO has a membership of 50 national bodies which are the most representatives of their countries. The seat of the organization is Geneva.

Sir Jehangir J. Ghandy of India holds the office of President till 1967; Mr. H.A.R. Binney, Director of British Standards Institution, holds the office of Vice-President till 1966. Monsieur Jacques de Saugy holds the office of Treasurer. Mr. Henry Saint Leger is the General Secretary.

The governing body is the General Assembly constituted by a meeting of Delegates nominated by member bodies; in other words, all member bodies are members of the General Assembly through their nominated representatives.

Council — The Council consists of a President and 14 representatives of the member countries. For the year 1965, members of the Council are Argentina, Belgium, Brazil, Bulgaria, Denmark, France, Germany, Hungary, South Africa, Switzerland, Turkey, the Soviet Union, the United Kingdom and the United States. There are several administrative committees to help the President. These are under the chairmanship of prominent standardization authorities in different member countries of ISO.

ISO has liaison through certain members with the United Nations' ECAFE, ECLA, FAO, ILO, IMCO, UNESCO and the International Union of Railways.

International Electrotechnical Commission (IEC): This international body is affiliated to ISO, but came into being much earlier than ISO and its predecessor ISA. It was established in 1906, as a result of the resolution of the Chamber of Government Deputies at the International Electrotechnical Congress in 1904, held at St. Louis, Missouri, in the United States. The members of IEC are national committees engaged in the work of standardization in the electrotechnical field (not necessarily national standards bodies), one from

each country. It deals with the international standardization aspects of electrotechnology. The scope of its work may be described as falling into the following two general categories:

(a) work aimed at improving of the understanding among electrical engineers of all countries by drawing up common means of expression, unification of nomenclature, agreement on quantities and units and their symbols and abbreviations, standardization of system of units and graphical symbols for diagrams; and

(b) standardization of electrical equipment involving the study of problems of electrical properties of materials used in electrical equipment; standardization of guarantees to be given for certain equipment as to its characteristics, methods of tests, quality, safety and dimensions controlling the interchangeability.

Like ISO, the technical work of the Commission is carried out by technical committees. The scope and terms of reference of each technical committee are subject to approval of the higher authority, the Committee of Action. Each Technical Committee has a secretariat, the duties of which are carried out by one of the national committees.

Relation of ISO and IEC — Although IEC is affiliated to ISO, as an older organization and a very active one, the Commission has maintained its autonomy and works quite independently of the ISO. It has its own President and General-Secretariat as well as an elected Committee of Action.

Apart from these two international organizations, there are quite a number of other international and general organizations which, from time to time, take up the work of standardization in their particular fields. ISO and IEC have close liaison with many of these bodies.

International standardization and developing countries

International standardization through ISO and IEC is of considerable importance in promoting external trade. The advantages to trade and industry of being able to import and export on the basis of the same international specifications for all countries are obvious. For this reason, all national bodies should take an active interest in the work of ISO and IEC. India has done so from the beginning. It actively participates in the 73 ISO committees and all the IEC committees and serves as the secrtariat of several of these committees.

A developing country has to safeguard its interest in international standardization as much as any developed country. Special requirements to suit its state of industrial development, climatic conditions and raw materials, and so on, need to be built into international recommendations through the action of the relevant committees. An example is provided by the recently developed tropical and subtropical standards atmosphere for testing so often used for conditioning materials prior to testing to ensure their compliance to specifications. At the beginning, the atmospheres considered for adoption by ISO and IEC were those widely used in Europe and North America. They were unsuitable for tropical and subtropical regions where temperatures are much higher during most of the year. If the European standards were adopted in these regions, testing laboratories would have to maintain costly equipment for air conditioning. The Indian Standards Institution proposed a different atmosphere for tropical conditions which has been accepted both by ISO and IEC. This step is of great importance to all countries of the region.

Another example from Indian experience may be cited. Like other developing countries, India imports machines from many parts of the world, many of which are equipped with electric motors. Because of lack of interchangeability, a motor made in one country may not fit a machine made in another country. IEC, which was engaged on the problem, ultimately found a solution at India's suggestion of a compromise formula. Thus a single series of dimensions both for inch and metric sizes was evolved. Many examples could be cited where the needs of developing countries and their knowledge and experience could help in solving difficult international standardization problems and in making international recommendations truly world-wide in their coverage.

Thus the countries of Asia and the Far East have a very definite role to play in the work of perparing international standards. The present membership of ISO from this region is only nine, including Australia and New Zealand. This is small compared both to the total of ECAFE member countries and membership of 50 countries in ISO and certainly very insignificant when comparison is made with the number of countries which have joined the United Nations. The corresponding membership of IEC is still smaller: six countries. Viewed from the angle of important work that is being done in the international sphere of standardization, the contributions made by the developing countries of the world are indeed insignificant. An international recommendation, in order to be useful to all nations of the world, must take into consideration the need of all the countries of the world. Therefore, it becomes necessary for every country from the ECAFE region to come into the ISO/IEC fold. By doing so they will not only receive the benefits of the work on standardization being developed at the international level — which would a good basis for their own standards if not wholly adoptable — but also contribute their share to the proper development of international recommendations. ISO has been making efforts to see that more nations at the early stages of development become members. The Development Council (DEVCO) of ISO has made certain recommendations which will be effective in making available the good work being done by ISO to those countries even when they do not have a

national standards body and are not members of ISO. If for any reason it has not yet been possible for any individual country to become a fell member of ISO, a mechanism is being worked out by which a few countries could combine to obtain corporate membership of ISO.

Regional standardization

While ISO and IEC are world organizations in which all countries with organized standardization facilities co-operate, a number of consultative forums have been set up by groups of countries with common economic problems and interests. These agencies implement and develop common standards within the group and contribute to the over-all world standardization effort by resolving many differences that might exist among the members. Their work often represents the initial stages of international standardization and enables them to make most effective contributions to standardization at the world level. While some of these agencies carry on their work by periodic conferences, meetings of technical committees or working groups, others have established central secretariats and some even have institutions for research and testing. Among those organizations are the British Commonwealth Standards Conference; the European Standards Co-ordinating Committee, whose principal members are the six countries of the European Economic Community and the seven countries of the European Free Trade Association; the 'ABC' conference between Canada, Britain and the United States; the International Commission on rules for approval of Electrical Equipment, grouping fifteen European countries; the Pan-American Standards Committee, whose members are seven Latin American countries, as well as six Central American countries represented by the Instituto Centroamericano de Investigación y Technologia Industrial (ICAITI), which besides its research and testing work extends advice on standardization matters; and the United States.

These regional and sectional organizations created by the industrially devloped or developing countries are most welcome as long as they serve the specific purpose for which they are intended and align their activities with the international work. They are instruments in furthering the cause of industrial understanding of standardization problems.

Among the developing countries of the world, such a movement deserves every encouragement. This is particularly so in the ECAFE region where the resources for organizing independent national standards bodies are limited and further common interests in very many fields exist.

From time to time, attempts have been made through the Economic Commission for Asia and the Far East to bring together a number of member countries to encourage standardization on a regional basis. At the Trade Promotion Conference held under the auspices of ECAFE in October 1961 in Singapore, recommendations were made which were expected to give an impetus to the standardization movement in the region and increase standards consciousness in ECAFE countries. From time to time, ECAFE has held seminars on important subjects such as standardization of voltages, which would be a necessary corollary to rapid expansion of generation and utilization of electric power in the region. In July 1964, the Sub-committee of Metals & Engineering of the Industry and Natural Resources Division considered at its tenth session the question of standards and specifications in the field of metals and metal products. The Commission has just concluded a group meeting on building and housing in which important recommendations have been made about regional standardization and the need to give training to engineers of different countries of the region regarding the standardization of building and house industry in countries which have well established standards bodies. These are all very welcome signs, but the need for standardization in the context of the rapid industrial development envisaged in the countries of this region is so great that more definite steps must be taken to consolidate the work already done, and pool the limited resources of technical manpower. This could be done by establishing under the auspices of the ECAFE an Asiatic and Far East Standards Committee similar to the Pan American Standards Committee. This committee would have as members countries already having strong standards organizations, such as Australia, Burma, China (Taiwan), India, Indonesia, Iran, Japan, the Republic of Korea, New Zealand, Pakistan, and the Philippines. Ceylon would join when the Bureau of Standards now being organized is established, and the other countries would be represented by the ECAFE Secretariat Standards Section. This Section would undertake investigation in the field of standardization and also advise the countries on standardization matters. Countries such as India, which have already organized training courses on standardization should expand such facilities to enable more engineers from countries of Asia and the Far East to take advantage of them.

International Bureau of Weights and Measures

An early example of international standardization is the International Bureau of Weights and Measures (IBWM). In 1870, at the invitation of the French Government, some 28 countries sent delegations to Paris to discuss the subject. As a result of the preliminary conference, the IBWM was established in 1875. It concerned itself only with the metric system; the British units were not covered, neither were the American. In 1921, a new convention came into being enlarging the scope to include electrical units and standards. These electrical units were finally given worldwide recognition in 1948. The functions of IBWM include:

comparison, verification and calibration of international, national and other standards;

custody and preservation of physical standards;

investigation of new standards of weights and measures.

Its executive organs are:

(a) a General Conference, usually convened once every six years, composed of government delegates and members of the International Committee;
(b) an International Committee of Weights and Measures, composed of 18 members, each from a different member state;
(c) a Consultative Committee called to advise the International Committee.

As of 1964 the membership of the IBWM was as follows:

Argentina
Australia
Austria
Belgium
Brazil
Bulgaria
Canada
Chile
China (Taiwan)
Czechoslovakia
Denmark
Dominican Republic
Finland
France
Germany
Hungary
India
Indonesia
Ireland
Italy
Japan
Korea
Mexico
Netherlands
Norway
Poland
Portugal
Roumania
South Africa
Spain
Sweden
Switzerland
Thailand
Turkey
Soviet Union
United Arab Republic
United Kingdom
United States
Uruguay
Venezuela
Yugoslavia

III. ORGANIZATION AT THE NATIONAL LEVEL

Introduction

The aim of standardization at the national level would be to look after the over-all economic benefit both of the producers and the consumers. Therefore, it will be necessary in the formulation of standards to adopt the method of intensive consultation among all the interests concerned. The extent and details of such consultation will vary from country to country according to their socio-political structures, but rarely are standards laid down completely arbitrarily by a superior authority without consultation of the people concerned. So, although the procedure may vary, the principle of consultation is more or less universal in all national standards activity.

The national body provides the forum for consultation among the national group interests, for the development of standards. The usual procedure is to form expert committees with representatives from producers, consumers and technologists, who prepare draft standards on the basis of common agreement on the data available in the country as well as overseas and the particular needs of the country. They also keep in mind any international agreement that might have been reached. The drafts are then circulated for comments so as to get the largest consensus of opinion. These comments influence the final shape in which the standard is issued. When a standard is developed by the above procedure, it is generally expected to ensure the widest possible acceptability. While the status and pattern of national standards body will vary from country to country, they should obviously be such as to facilitate bringing together the diverse interests among which a standard will form the link. Among the standards bodies of the world, the status and pattern vary from purely official to purely non-official, depending again on the socio-economic structure. In a developing country where official planning and direction co-exist with free enterprise, a national standards body sponsored jointly by the two groups — government and private enterprise — but working under an autonomous council of official and non-official representatives should prove a good pattern. Such is the structure of ISI. That such an arrangement could be effective is borne out by the rapid progress achieved in standardization at the national level in the Indian union. The following list of ECAFE countries shows which of them are members of IEC and ISO.

1. Afghanistan
*2. Australia[a]
*3. Burma (since withdrawn from ISO)
4. Cambodia
5. Ceylon
6. China (Taiwan)
*7. France[a]
*8. India[a]
*9. Indonesia
*10. Iran
*11. Japan[a]
*12. Korea (Republic of)
13. Laos
14. Malaysia
15. Mongolia
16. Nepal
*17. Netherlands[a]
*18. New Zealand[a]
*19. Pakistan[a]
20. Philippines
21. Thailand
*22. Soviet Union[a]
*23. United Kingdom[a]
*24. United States[a]
25. Viet-Nam (Republic of)

Associate Members

26. Brunei
27. Hong Kong
28. Western Samoa

In the following sections, the structures of national standards bodies and their role in shaping standards and specifications are given.

The United States, United Kingdom, Soviet Union, France, and the Netherlands, although members of ECAFE, are not geographically situated in the ECAFE region; and, as they are among the most developed countries of the world, their national standards bodies have not been described. The national standards bodies of Australia, New Zealand and Japan have been included, although they can hardly be con-

Ref. Appendix J(5).

[a] Members of IEC.
* Members of ISO.

sidered as developing countries in the same sense as countries such as Burma, India, Indonesia, and the rest.

Afghanistan

There is no established standards body in the country. The Ministry of Commerce plans to expand its marketing department which will be charged with the responsibility of establishing and enforcing standards of grading of all export commodities. The step is considered to be an important part in the programme of increase of exports. The reputation of high quality which Afghan products have must not be allowed to suffer because of improper grading.

Australia

The Standards Association of Australia is the national standards body of the Australian continent.

Creation — The Australian Commonwealth Engineering Standards Association was formed in 1922 by the professional organizations of the Commonwealth Institute of Science and Industry; the Institution of Engineers Australia; the Australian Institute of Mining and Metallurgy and the Australian Chemical Institute. The Australian Federal Government recognized and supported the Association by annual grant. There is, however, no legislative enactment creating the Association and it follows constitutional procedures very close to that of the British Engineering Standards Association — the forerunner of the British Standards Institution. In 1929 ACESA and its kindred body the Australian Commonwealth Association of Simplified Practice was amalgamated into a Standards Association of Australia. In 1950, SAA received the Royal Charter.

Members: nature and number — There is one class of subscribing members of SAA. They can be individuals, private firms, trade associations, government and semi-government departments, or the like. They make an annual contribution to the association. As of 31 December 1963 there were 2,346 subscribing members.

Finance — The three main sources of revenue are:

1. Annual grants from the Federal Government and from state governments. The Federal Government's contribution accounts for about 50 per cent of the total income, whereas the state governments' is negligible.
2. Annual membership subscriptions from subscribing members yielding approximately 25 per cent of total income.
3. Revenue from sale of publications accounting for 20 per cent.

Staff — The permanent staff comprises a director, technical director, professional staff responsible for the operation and working of the technical committees, and general administration. As of 31 December 1963, the staff totalled 93, of whom 29 were technical people.

Organizational structure — The Association is an independent organization which is governed by a Council of 63 representatives, which lays down the general policies. The representatives are from professional and scientific associations, manufacturing and commercial organizations, the Federal Government and state governments and government departments. In addition, there are a limited number of co-opted members of Council. The Council has two subcommittees; the Executive and Finance Committee and the Staff Appointments Committee.

The actual preparation of national standards is the responsibility of the working committees which are divided into groups under the supervision of the industry standards committees appointed by the General Council. The groups are (1) mechanical engineering, (2) electrical engineering, (3) building, (4) chemical industry, and so on. As of 31 December 1963, there were about 4,000 members constituting the various committees. They were representatives of the various facets — commercial, technical, scientific — concerned with the evolution of standards.

Under these industry standards committees, there are technical committees responsible for the specific subjects; for example, paints and concrete structure, boilers and unfired pressure vessels. As of 31 December 1963, there were 500 technical committees and subcommittees.

Functions — The Association is a service organization intended to provide the industry with national standards and associated information. It is entirely voluntary and democratic in its procedure of work.

It undertakes preparation of standards on requests from the industry and only after it has been satisfied that there is a general support within the industry concerned for the preparation of a standard and that it will serve a national need. These standards are prepared by the representative committees as indicated above. The standards produced by the Association are voluntary and do not possess any statutory force of their own. There are, however, certain standards affecting the safety of life or property which are adopted by the state governments as the basis of statutory regulation. In other words such standards become statutory as a part of some government statute.

Methods used for drafting standards — The responsibility for the drafting of standards lies with the technical committees comprising experts nominated by the industrial and other organizations interested in the development of the standard. The normal stages are as follows:

(1) Preparation of preliminary draft by some organization as a basis for further discussion and processing.

(2) *Committee drafts* — These are documents representing successive stages in the committee review of the preliminary draft in the light of experience, special tests, and so forth.

(3) *Draft for public critical review* — The final draft is widely circulated locally and overseas to invite public comments and criticism.
(4) *Postal ballot draft* — This is prepared by the Committee after a review of comments on the drafts for public review and is formally submitted to all members of the Committee for acceptance by letter ballot.

Nature of standards — Many different kinds of standard are published by the Association; they embrace standard-material specifications, dimensional standards, standard terminology, standard methods of test, recommended codes of practice, and standard safety codes expressed in mandatory form.

Number of standards published — As of December 1963, the Association had published 1,290 publications consisting of standard specifications 958, standard codes 77, interim and emergency specifications 239 and miscellaneous reports 16.

Other publications — These are the Annual List of Publications, Annual Report and Monthly Information Sheet.

Other forms of propaganda — Nil.

Marks indicating conformity with standards — The Association has applied for registration of a mark indicated below for registration under the Trade Marks law in Australia. The mark has not yet been registered under the Trade Marks Law in Australia. The mark has not yet been registered under the Trade Marks Law. It is intended that the organization of the scheme and policy matters shall follow as closely as possible the certification marking scheme of the British Standards Institution.

Brunei

No information is so far available on any standardization activity in the country of Brunei.

Burma

The Union of Burma Applied Research Institute is the national standards body in Burma.

Origin — The Union of Burma Applied Research Institute is the national body charged with the task of preparing national standards as well as maintaining the primary standards. The two jobs of preparing standards and metrology are the responsibilities of this Institute, which was created in 1947 under its former name of State Industrial Research Institute (SIRI).

Creation — In February 1954, the standardization programme of SIRI was endorsed by the Prime Minister's Implementation Meeting on the Institute's activity. The standards programme and its implementation were delayed considerably for lack of trained personnel and some officers were sent abroad for special training. Since then the Institute has been pursuing some programmes of preparing national standards.

Members: nature and number — There is no provision for membership.

Finances — The Programme of Standards is financed entirely by the budget allotment by the Government through the Burma Research Fund.

Organizational structure — As one of the 12 existing departments of the Applied Research Institute, the Standards Department is controlled by:

(1) the Cabinet of Ministers
(2) the Burma Research Board
(3) the Burma Research Council
(4) the Executive Research Committee, and
(5) the Standards Steering Committee

The head of the Department of Standards is subordinate to the director general of the Union of Burma Applied Research Institute. The Department is composed of two sections: the Burma Standards Association and the National Physical Laboratory.

Functions — (1) to advise the Government of the Union of Burma on standards and specifications activities for the development of the nation; and
(2) to provide scientific and engineering services for the Union of Burma in the standards and specifications field.

Methods used for drafting standards
No information is available
Nature of standards
No information is available
Number of standards published
No information is available
Other publications — Nil
Other forms of propaganda — Nil
Mark indicating conformity with standards — Nil

Cambodia

No formal organization on the lines of ISI or BSI exists in Cambodia.

Prakas No. 2241 of 15/7/53 defined the standards of products likely to be exported.

The Ministry of Trade has drawn up a set of standards covering 56 products which are being exported out of Cambodia.

Ceylon

Origin — The first step toward standardization was taken in 1949 when the Foods and Drugs Act was passed, but its implementation was not very effective. In 1954, a Standards Laboratory for Weights & Measures was established in the Department of Commerce.

Creation — In 1955, a Standards Advisory Council was set up by the then Department of Industries. This was a purely advisory body composed of officials, planting and manufacturing interests. This body drafted some standards for local products, but its usefulness was limited as it had no legal basis for its work. This limitation of the Standards Advisory Coun-

cil led the Government to pass an act in the Parliament, providing for the establishment of the Bureau of Ceylon Standards. Action is now being taken to set up the Bureau in a formal manner.

Membership — The Bureau will be established as a corporation, and its powers, duties and finances will be vested in a council consisting of

(a) four members appointed by the Ministry of Industries;
(b) one member nominated by the Minister of Finance;
(c) one member nominated by the Ceylon Institute of Engineers;
(d) one member nominated by the Ceylon Association for the Advancement of Science;
(e) one member nominated by the Ceylon Institute of Scientific and Industrial Research; and
(f) three ex-officio members:
  (i) Director of Development of the Ministry of Industries and Fisheries,
  (ii) Director of the Bureau, and
  (iii) the Director of Commerce.

The period of office of the appointed and nominated members will be two years, but they will be eligible for reappointment or for re-election.

Functions — The Bureau will be empowered to

(a) prepare standards specifications and codes of practice;
(b) make arrangements for testing products and materials;
(c) make arrangements for testing and calibration of testing instruments and scientific apparatus, and
(d) administer a standards marks scheme.

The Bureau can set up its own laboratory or make use of other laboratories of any organization or private party. The Council will have the power to establish committees to assist it in the performance of its functions, and the work of formulating standards is to be carried out on the same lines as those followed in India.

Provision has been made in the Act for the Minister to declare by order published in the Government Gazette that any standards specifications shall be compulsory; on such declaration no person shall offer for sale a commodity covered by the order unless it complies with the compulsory standard and after a certificate is obtained from the Bureau to that effect. Before a standard is declared compulsory, wide publicity of such action must be given, so that any interested party may file an objection if he so desires.

The Act specifies the offences under the Act and lays down the penalties.

Finance — The Bureau is financed entirely by budgetary allotments made by Parliament.

Number of standards produced — Nil.

This is just the beginning of the establishment of a standardization body in Ceylon. The Bureau has yet to be formally constituted. It has also the responsibility of doing work on metrology.

China (Taiwan)

The precedent of the National Bureau of Standards, Ministry of Economic Affairs is the former National Bureau of Weights and Measures and former Industrial Standards Committee.

The former National Bureau of Weights and Measures was established by former Ministry of Industry and Commerce in 1930. The chief responsibility of which was to administer the weights and measures and was empowered in 1932 to take over the administration of industrial standardization. Meanwhile, the former Industry Standards Committee was established in charge of the industrial standards but failed to develop its work in a satisfactory manner for certain reasons. Later, the Committee was reorganized in 1943.

In view of the importance of the post-war industrial standardization in China, the National Government promulgated the Standards Law in September 1946. The Regulation Governing the Organization of National Bureau of Standards was promulgated in February 1947. On 1 March 1947, the aforesaid two agencies were incorporated into the present National Bureau of Standards.

I. *Organization*

The National Bureau of Standards comprises:
- Standards Committee
- Technical Committees and their Sub-Committees
- Office of Technics
- Office of Patent
- Office of Trademark
- Office of Account
- Office of Personal Affairs
- First Section (National Standards Administration)
- Second Section (Standards Publication)
- Third Section (Weights and Measures)
- Fourth Section (General Affairs)
- Laboratories (Calibrating and Testing)

Under the Bureau, there are the Standards Committee and 11 technical committees including a number of sub-committees.

The 11 technical committees are:
- Technical committee on civil engineering
- Technical committee on mechanical engineering
- Technical committee on electrical engineering
- Technical committee on chemical industry
- Technical committee on textile industry
- Technical committee on mining and metallurgy
- Technical committee on agriculture
- Technical committee on foods
- Technical committee on industrial safety
- Technical committee on quality control
- Technical committee on packaging and packing

II. *Responsibility*

A. Standards Committee — The Standards Committee is a top organization in establishing national standards, the responsibility of which is to approve or reject the draft standards from the concerned technical committees.

It comprises 21-25 members who are nominated by this Bureau and appointed by Minister of Economic Affairs. Most of them are distinguished professors, authorized government officials, leading industrialist, or experts.

B. Technical Committees — The technical committees are responsible for draft standards. The resolution on the standard draft has to be reached by a majority vote of the members represented, who must examine in advance the standard draft from the sponsored sub-committees.

Like the members of the Standards Committee, the members of each technical committee are appointed by the Minister of Economic Affairs through the nomination of the National Bureau of Standards. Most of them are distinguished professors, authorized government officials, leading industrialists, or experts.

C. Office of Technics — The Office of Technics is in charge of the establishment of national standards under the legal procedure, and assists the members of technical committees in solving technical problems.

D. Office of Patents — The Office of Patents is responsible for the disposal of any patent files or claims or oppositions, for advertisement of patent cases, and for registration of the patent rights.

E. Office of Trademark — The Office of Trademark is in charge of trademark applications claims or oppositions, of the advertisement of trademark cases, and of the registration of exclusive use of trademarks.

F. First Section — The First Section is responsible for the promulgation and practice of national standards, including the control of products to which the use of the CNS-Certificate mark is granted.

G. Second Section — The Second Section is responsible for collecting the standards of foreign countries, and for printing and selling the national standards.

H. Third Section — The Third Section is responsible for the weights and measures administration, including the calibration of the instruments of weights and measures and measuring apparatus.

III. *Reports*

1. *Standards Administration*

a. *Standards Issued* — The adoption of the national standards by both producers and consumers is increasing year by year. From the following table of new and revised standards over more than a decade, the development and progress of national standards in China can be gauged.

CHINA (TAIWAN): NUMBERS OF NATIONAL STANDARDS APPROVED, 1949-1964

	Year	*New standards*	*Revised standards*
Before	1949	179	—
	1950	10	—
	1951	29	—
	1952	97	4
	1953	65	1
	1954	76	—
	1955	139	5
	1956	155	26
	1957	194	56
	1958	100	58
	1959	163	70
	1960	120	29
	1961	95	28
	1962	176	115
	1963	171	73
Before	1964	164	48
Total		1933	513

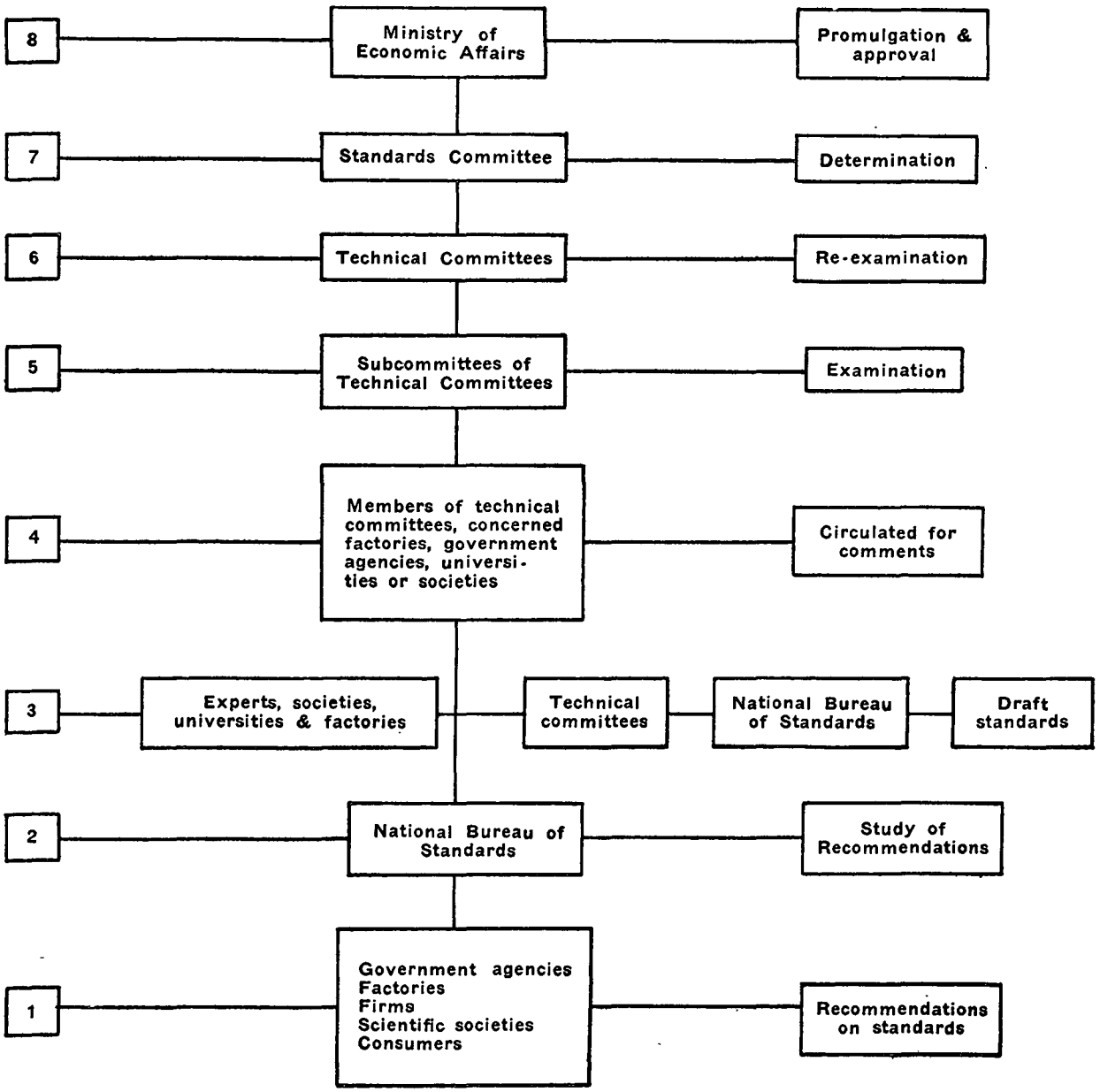
b. *CNS-Certification Marks* — For promoting the standardization work, the National Bureau of Standards has put the CNS-certification system in force since 1952. The mark of CNS-Certification is granted to put on the products which have been examined and which meet the requirements of Chinese National Standards.

Some 242 manufactures are now issued with the CNS-Certification licences, including totally some 935 items listed:

Incandescent and fluorescent lamps	35
Mono-sodium l-glutamates	11
Soaps	54
Bicycle spare parts	29
Matches	9
Paints and varnishes	396
Plastic products	9
Stationary instruments	22
Acids and alkalies	35
Miscellaneous chemical products	60
Electrical appliances	76
Inks	8
Rubber articles	69
Cement and its products	57
Others	65
Total	935

For promotion of standardization, the new and revised Chinese National Standards are published and circulated among the manufacturers, distributors, consumers and others concerned. The standards are purchasable from the Bureau in single copies or in whole sets. Besides, the Bureau is issuing journal. "The Standardization Monthly" covering the Official Gazette of Patents and Trademarks. These publications are exchanged with most of the foreign national standards organizations in the world.

Chart of the legal procedure for the establishment of Chinese national standards.



Hong Kong

Hong Kong has no standards body and the need for a consolidated standards movement has not yet developed.

However, during the past two or three years, the need for quality control and standardization of products has been felt in some forward-looking industries of Hong Kong. Negotiations have been going on with the British Retail Trading Standards Association and the British Standards Institution for identification (in the sense of certification) of products manufactured in Hong Kong which measure up to the standards of those bodies. Agreement has been reached with BRTSA by which testing of certain textile production will be done at Hong Kong according to BRTSA methods, and identification marks will be attached to the fabrics indicating that the materials have passed the requirement of BRTSA standards. Testing will be done at the Hong Kong Technical College. The Federation of Industries of Hong Kong will do the inspecting and policing of the scheme.

British Standards Institution certification marking of non-textile products is still under negotiation. The more advanced local industries, in particular the cotton spinning industry, have their own research laboratories and employ modern methods of quality control.

India

The national standards body in India is the Indian Standards Institution.

I. *Origin*

Prior to the establishment in 1946 of the national standards institution, standardization work was being looked after by the institution engineers in India, which acted as an Indian committee of the British Standards Institution. Generally British standards and some American standards were adopted from time to time. However, it was realized early that no foreign standards could completely satisfy the needs of the growing industry because of the diversity of raw materials, the processes employed in manufacture and the widely varying climatic conditions. Thus, there arose the necessity for the establishment of a central standards organization in India.

II. *Creation*

The Indian Standards Institution (ISI) was established in pursuance of a Government of India resolution dated 3 September 1946 and was charged with the responsibility of preparing and promoting standards for Indian industry. This was a fulfilment of a great industrial need voiced as early as 1940 at the twelfth Industries Conference held at Lucknow. The Industrial Research Planning Committee of the Congress in 1945 had also underlined this need. The inaugural meeting of the General Council of ISI took place in January 1947, the year of India's independence.

III. *Members: Nature and number*

The members of the Indian Standards Institution can be conveniently grouped into two broad categories, namely, subscribing members and committee members. The subscribing members may, however, be classified into three classes, namely, (i) sustaining members, (ii) sustaining members (associates), and (iii) ordinary members. The sustaining members include the governments of the various states of the Union of India, participating countries outside India, firms, companies, commercial bodies, scientific, technological, professional, educational and other allied institutions. The associated membership, however, is limited to firms with an annual business of under 250,000[1] rupees and to professional, scientific, technical and educational institutions. Ordinary membership is open to individuals interested in the subject and work of the institution. The committee members are technical experts who serve on various committees of the institution and thus contribute their specialized knowledge and render such technical laboratory assistance as may be required to develop standards. As of December 1964, the numbers of members were — sustaining members 2148, sustaining members (associates) 964, ordinary members 536 and committee members 17,742.

New system of members

The General Council decided in March 1965 that, from January 1966, the ISI will have the following classes of membership:

	Annual subscription in rupees[2]
Patron	25,000
Donor member	10,000
Sustaining member	500
Associate member	200
Individual member	50

IV. *Finance*

The institution is supported by grant-in-aid from the Government of India and subscriptions from its subscribing members. The other sources of income are sale of standards, advertisements in the bulletin published by ISI, fees collected under the Certification Marks Scheme. In the year ending 31 March 1965, the income of the Institution was as follows:

	(In 100,000 rupees)	
Membership subscription	9.0	
Government grants	29.0	(52% of the total)
Sale of standards	8.1	
Advertisements in bulletin	1.1	
Fees of ISI Certification Marks	8.1	
Miscellaneous	0.5	
Conferences	8.0	63.8

[1] One rupee — 0.21 US$ (before devaluation in 1966).
[2] 1 US$ = 4.76 Rupees.

V. *Staff*

The Institution is at present manned by some 820 employees of all classes out of which there are 141 technical and other officers, the remainder being supporting secretariat staff. Over-all control of ISI rests with the General Council on which are represented industry, the Central Government and state governments, scientific organizations, subscribing members, and representatives of the Division Council of ISI. The Minister of Industry of the Government of India is the ex-officio President of the Indian Standards Institution. The Executive Committee appointed by the General Council is responsible for the actual management of the affairs of the Institution. Financial matters are under the purview of the Finance Committee similarly constituted: The ISI Directorate headed by the Director implements the decisions of the General Council and Executive Committee. The Director is the member-secretary of the General Council, Executive Committee and the Finance Committee. He is also an ex-officio member of all committees of ISI. He is assisted in his work by two joint directors, deputy directors, assistant directors and other technical and non-technical staff at headquarters at New Delhi and at branch offices at Bombay, Calcutta, Kanpur, and Madras.

VI. *Functions*

The preparation of standards is carried out by the technical committees which consist of scientists, technologists and industrialists and their representatives drawn from the private and public sectors. There are at present over 1524 such technical committees, subcommittees and panels with a membership of about 17,742 which embraces the country's diverse interests of trade, commerce, industry, technology and government and even the common consumer. These committees are appointed by the Division Councils which are responsible for all technical work. There are at present the following Division Councils:

(i) Agricultural and Food Products,
(ii) Chemical,
(iii) Civil Engineering,
(iv) Consumer Products,
(v) Electrotechnical,
(vi) Mechanical,
(vii) Structural and Metals, and
(viii) Textiles.

It is the responsibility of staff members to assist the committees in their technical work, which includes arranging meetings, making bibliographies, conducting surveys, gathering technical information, preparing drawings, assisting in formulating drafts, collecting comments, arranging for research work to be carried out, and finally editing and publishing standards.

VII. *Methods used for drafting standards*

The methods used for drafting standards involve a number of steps. (i) The proposal should be received from any authoritative body, or from an association of trade or industry, or a government department, or an ISI subscriber or a committee member. The ISI Directorate does not itself initiate work on any subject. (ii) Investigation by the Directorate as to the need of a standard is undertaken and the subject approved for standardization. (iii) The appropriate Division Council entrusts the work to a sectional committee if it exists, or it sets up a sectional committee to undertake this work. (iv) The committee prepares a draft and circulates it for comments to interested parties in India and abroad. A press note is issued for general information and a copy of the draft is sent to all who ask for it. (v) The comments received are carefully considered by the committee. (vi) The draft, after revision in the light of the comments received, is then submitted to the Division Council for approval before it is published as an Indian Standard. (The schematic diagram on the following page shows the method of preparing a standard.)

VIII. *Nature of standards*

Indian Standards serve as a guide to manufactures, as a basis of trade transactions, as instruments to help technologists judge quality and performance values, and as solutions to recurrent problems of designers and builders and so on. Adoption of these standards is purely voluntary; they generally deal with raw materials, finished products and contentious problems of definitions and terminology, codes of practice, and limitation in the number of size and varieties of product to the essential minimum; they also lay down methods of sampling, testing and analysis of materials, and the like.

IX. *Number of standards published*

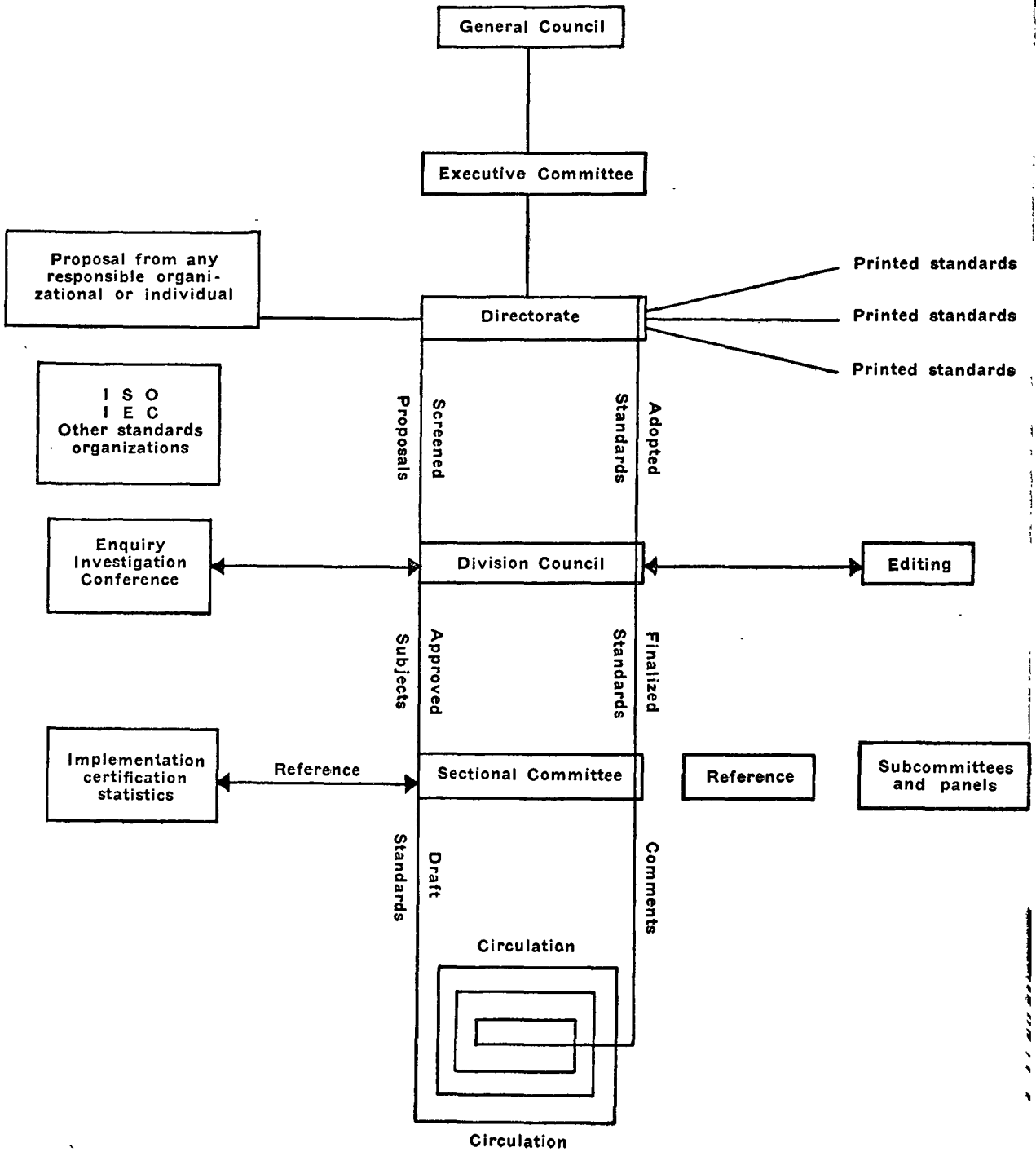
During its short span of about seventeen years, ISI has published 3,115 standards which have been adopted by various purchasing departments of the Central Government and state governments, public utility concerns, and so on.

X. *Other publications*

(i) ISI publishes a monthly bulletin, which contains articles, research papers and other information relating to standardization matters and activities in India abroad. (ii) Standards Monthly Additions gives particulars of new draft Indian standards issued each month and any standards received from the United Kingdom, Germany, Japan, ISO and IEC during that period. (iii) The Annual Report reviews important developments during the financial year. (iv) An up-to-date list of Indian Standards.

XI. *Other forms of propaganda*

Conventions — Almost every year, a week-long standards convention is organized by the Institution to foster standards consciousness in the country. Lately, neighbouring countries have also participated in these annual functions. At each of these conventions, seven or eight technical sessions are held, to which papers are contributed on topics of current interest from the


General Council
Executive Committee
Proposal from any responsible organizational or individual
Directorate
Printed standards
Printed standards
Printed standards
I S O
I E C
Other standards organizations
Proposals
Screened
Standards
Adopted
Enquiry
Investigation
Conference
Division Council
Editing
Subjects
Approved
Standards
Finalized
Implementation certification statistics
Reference
Sectional Committee
Reference
Subcommittees and panels
Standards
Draft
Comments
Circulation
Circulation

standardization point of view. These conventions have become extremely popular and have raised a very large number of interesting points.

Lectures — The technical officers of ISI deliver lectures at technical colleges and also at the meetings of manufacturers, traders, industrialists, associations, chambers, and clubs. The demand for such talks is becoming more and more frequent. Broadcasts from All India Radio relating to the standards movement in the country are given by leaders of Indian industry and members of the staff.

Press publicity — Articles written by staff members and technical experts are contributed to technical journals and to newspapers, particularly their technical supplementary issues. ISI also issues press advertisements popularizing the ISI and particularly its Certification Marking.

Film — At the instance of the Institution, the Government of India produces from time to time documentary films on aspects of quality standardization.

Exposition — To explain the concept, objects and scope of standardization, and the progress made by the Institution in the field of standardization and certification marking, the exposition has been set up at the headquarters of the Institution. From time to time, ISI participates in the various exhibitions that are held in the country under the auspices of the Central Government and state governments and other institutions such as chambers of commerce and industrial organizations. In these exhibitions, the work done by the Institution and the facilities that it makes available to the country are exhibited.

XII. *Training*

The Institution undertakes the training of young engineers and scientists to develop them into standards engineers. This training scheme is primarily meant to meet the acute shortage of experienced standards engineers for the work of the Institution and to serve the purpose of training engineers for standardization work in other departments in India as well as in other countries in Asia and Africa. Others are free to take advantage of this training. Recently, seven young scientists and engineers from the Philippines, Malaysia, and Thailand took a course. More are expected to join this training from countries of Asia and Africa in the next programme, which is to start early in 1966.

To promote company standardization in the country and to create a nucleus of standards engineers capable of organizing standards activities in their own companies, ISI also conducts several training programmes for industrial executives. This work has been carried on for the last three years and has created a good deal of interest. The demand for such courses is increasing.

XIII. *Marks undertaking conformity with standards*

Legislation — ISI works a Certification Marks Scheme under the provision of the Indian Standards Institution (Certification Marks) Act 1952, as amended from time to time, and the rules and regulations made thereunder. The standard mark monogram is affixed to an article for the standard quality of which the institution stands a third party guarantee. (See appendix K figure 1.)

Status and protection — The mark derives the status of a national standard mark from the Act. The Act and rules made thereunder provide for fines for infringement and improper use of the mark, thus affording adequate protection. This protection is wider than the ordinary protection granted to registered trade marks or certification trade marks.

Administrative organization — The Act, as promulgated, makes the use of ISI certification marks voluntary; but the government may make its use mandatory in exceptional cases, particularly where safety and health matters are involved or where overseas trade interests may have to be protected.

The use of the ISI mark is permitted only through licence granted by ISI. The Act empowers the Government of India in consultation with ISI to appoint competent authorities who may exercise such inspection powers of ISI as may be delegated to them.

No licence is granted for products manufactured in foreign countries.

Technical conditions — The licensee must not only be able to produce products that conform with the relevant Indian Standards, but must also make them available for inspection and control at any time. The scheme of routine inspection and testing forms a part of the protection scheme and has to be maintained according to the procedure laid down by the Institution. Therefore, a licensee is required to set up the necessary organization to facilitate inspection. The regulations also empower ISI to set up special inspectorates for the inspection and marking of products of small-scale manufacturers, processors or producers who are individually unable to arrange for inspection and marking of products.

Inspection — Before a licence is granted, a preliminary inspection is made to assess whether the applicant is properly equipped to comply with all the obligations of a licensee. After the grant of licence, ISI makes a number of inspections of the licensee's work to ascertain that the scheme of routine and inspection is being followed correctly and in every detail; it also ensures that the marked products comply with the relevant standard. In addition to inspection of the licensees' work, check samples are taken from the licensees' factories or godowns or are even brought from the open market or obtained from large consumers. These are tested at the Institution's own or any independent testing organization recognized by ISI for the purpose.

Financial System — An application for a licence must be accompanied with application fee. Each licensee pays an annual fee and also a small marking fee on the quantum of production marked in the year.

Penalties — Any improper use of a standard mark or any contravention of the provision of the Act is punishable. Any property in respect of which contravention takes place may also be forfeited to the Government.

Application — The standard mark is applicable in respect of any published Indian standard. By recent amendments, ISI is empowered to recognize a standard published by any other institution in India or abroad as an Indian standard for the purpose of Certification Marking. More than 1,100 licences have been issued, of which 928 are currently in force. The products covered include chemicals, food and agricultural products, electrical equipment accessories, metallurgical and building materials and other engineering items. When a licence is granted, the particulars including the name of the licensee are notified in the Official Gazette. The institution maintains a register of the licensees and issues lists from time to time.

International protection — The ISI mark is not registered in any other country. It cannot be used for overseas products sold in India or abroad. A foreign national mark can be protected in India by registering it under the Trade Marks Act. India is prepared to study any proposal covering mutual recognition of national marks. If infringement of any foreign national mark is detected in India, such actions are taken as are legally permissible to stop the infringement.

Indonesia

Dewan Normalisasi Indonesia (DNI)

Origin — The Jajasan "Dana Normalisasi Indonesia". This is actually a continuation of the standardizing body established by the Dutch.

Creation — After the transfer of sovereignty, the present name was given to the Institution on 24 April 1954. The principal aim pursued is to foster technical standards for the economic development of Indonesia by:

(1) instituting new standards and reviewing established ones;
(2) consulting on standards with members and interested persons and parties;
(3) giving general information concerning standardization;
(4) documenting foreign standards;
(5) establishing and/or fostering co-operation with other organizations national or international, in the field of technology, science, and economics in matters relating to standardization;
(6) issuing magazines or other periodicals; or
(7) other suitable means.

Members: nature and number — Members of the Foundation are:

(1) *Honorary members* — without any financial obligations, but entitled to the same rights as those granted to the ordinary members.
(2) *Ordinary members* — private persons or bodies who pay a subscription of 5,000 rupiahs* a year.
(3) *Associate members* — private persons or bodies elected by the Board, paying no subscriptions.
(4) *Supporters* — private persons or bodies who support the Fund with at least 1,500 rupiahs per annum. They enjoy advisory status in the General Assembly.

Finances — consist of:

(1) government subsidy;
(2) contributions and subscriptions, or membership fees;
(3) donations, legacies and other incidental profits;
(4) grants and other subsidies;
(5) interest from capital.

Twenty seats in the General Council are reserved for the Government of the Republic of Indonesia against the yearly state aid. The Foundation is a private, non-profit-making organization.

Staff — As of 1964, there was a total staff of 78 engineers. The Secretariat has a staff of eleven members.

Organizational structure — provides for:

(1) A General Council of not less than 25 and not more than 30 members appointed by the General Assembly which is held annually and 20 delegates from the ministries, making a maximum total of 50 members.

(2) The General Council elects from among its members, for a period of one year, an executive body of seven persons called the Board. The President of the General Council is also the Chairman of the Board, which also has an acting chairman, a treasurer and four ordinary members. For the day to day working of the Foundation, the authority of the General Council is delegated to the Board.

(3) The Board has established a Standardization Office, which is under the control of the Director. The Director is the Joint Secretary of the General Council and of the Board. As the head is appointed by the Board, he is not given the status of a member of the Board. He is responsible for the smooth running of the office and its financial arrangements; for the latter he is accountable to the treasurer of the Board. The treasurer delegates certain powers to the head of the office.

(4) Division councils for the different fields of science and technology, supervising the technical working committees in their special branches and sections, have been established.

* Value in US$ not stable within reasonable limits.

(5) Technical committees — These bodies are responsible for studying and setting up technical standards on subjects within their scope.

Functions — Standardization of any definite subject is only undertaken by request and after making sure that the standard is desirable. The Division Council, after consultation with the Board, sets up a standardization study Committee or technical committee. When necessary, these technical committees can be divided and subdivided into smaller bodies with restricted fields of interest.

Methods used for drafting standards — The draft standards developed by the technical committees, after being approved by the division councils, is circulated among experts for criticism and comment. They are considered by the Committee and the final version, after examination by the division council and the Board, is authorized for publication, of course with due editing by the head of the Standards Office and his staff, who are responsible for this technical work involved in the preparation of the standard.

Nature of standards — The Indonesian standards which emerge after careful deliberation and consultation between all parties are applied voluntarily. However, in certain circumstances, the Government may make the standards compulsory under certain statutory obligations.

The standards may be the basis of the trade transactions for manufacturer as well as consumer. They guide the designer and the constructor as well as the technologists to judge the quality and performance. They give correct definitions and terminology. They assure interchangeability and limit the number of sizes and variety. In short, they are instruments for economic growth.

Number of standards published — Up to 1964, 17 original Indonesian standards and four translated Dutch standards were published.

Other publications — Besides a bi-monthly professional periodical called "Berita DNI", several other brochures and articles in technical periodicals dealing with standardization subjects in general have also been published.

Other forms of propaganda —

(a) A seminar on standardization for Indonesian engineers was held on 6 November for four days.

(b) Lectures on industrial management including economic aspects of standardization are given regularly in the Indonesian institute for technology in Bandung (ITB).

(c) A three-month training course on standardization for government officials was held in 1962-1963.

Marks indicating conformity with standards — Nil.

Iran

The Standards Organization of Iran is the national body for standardization in Iran.

Origin — Iran adopted the metric system of weights and measures in 1938, and this must be considered to be the origin of the standards movement in the country.

Creation — In 1952, need was felt to co-ordinate the efforts of agriculture and the manufacturing industries through the provision of reliable and accepted standards for products and fits and tolerances to facilitate the domestic and foreign commerce of Iran; this led to the creation of the Standards Organization of Iran. The physical installation was completed in 1959. The official date of founding this Institution was 2 July1960 when the bill establishing the SOI was approved by the Parliament of Iran.

Members: Nature and Number — SOI a government organization and as such has no subscribing members.

Finances — Annual grants from the Government of Iran are the only source of income of this organization.

Staff — The Office of the Director serves as the secretariat. The laboratory staff consists of four engineers — three agricultural and one chemical — and a supporting staff of 12 technicians.

Organizational structure — SOI is a part of the Ministry of Commerce, which is governed by a representative council responsible for general policy determinations and consists of nominated representatives of professional and scientific organizations and of representatives of the government departments. Under this Council function two committees, the Executive and the Financial, as well as a Staff Appointments Committee.

There are committees dealing with the actual preparation of national standards. The Council delegates responsibility for supervising the working of these committees to experts working in industry, each of whom is responsible in his field of technical work. The Committee is responsible for the technical work. The members are nominated by appropriate organizations.

Functions — SOI is essentially a public service organization intended to provide industry and agriculture such services by way of national standards and associated information as they may require. It undertakes the preparation of standards requested by industry and operates on a voluntary basis. Standards promulgated by SOI have no statutory force. Certain standards covering weights and measures are however enforced by the appropriate authority on the basis of statutory regulations.

Methods used for drafting standards — A draft is worked out by the technical staff and submitted for study to a committee consisting of representatives of producers and consumers and sometimes government officials. Consultation with the public about the proposed standard follows so that anyone interested in it may comment. These comments are considered and the draft, after due alteration, is submitted to the Director for revision and approval. It then goes to

the Council, which sends it, after giving its approval, to the ministry concerned. It is then published. The Standard may be declared by the Government to be an official standard of the Government of Iran and therefore compulsory for all services of public administration. For private institutions or persons, the standard is not compulsory except in cases where the health and life of citizens may be involved.

Nature of standards — The standards refer to units, symbols, terminology, building materials, design of structures, statistical control, industrial, mining and agricultural products, safety devices, and safety codes, testing methods, and so forth.

Number of standards published — Not much information is available except regarding the publication of a standard on raisins. Numerous drafts are under preparation.

Other publications — None

Marks indicating conformity with standards — No mark as yet.

Japan

The Japanese Industrial Standards Committee is the national body for standardization in Japan.

Origin

The establishment of a Committee of Weights and Measures and Engineering Standards in 1919 started the real standards movement in Japan. The Committee recommended the adoption of the metric system of weights and measures and the formation of the Japanese Engineering Standards Committee (JESC). An ordinance of 1921 set up JESC as the central organ for the establishment of national standards. This Committee remained active until the end of the Second World War. There were two distinct periods of its activity, one prior to 1938, the other subsequent to that date. During the first period engineering standards were established after a great deal of study and deliberation, including study of standards of various countries and the conditions prevailing in them. The standards were then announced under the authority of competent ministers who also consulted the other ministers concerned. The standards were published in the official gazette. During this period, beginning in 1929, JESC actively participated in the work of the International Federation of National Standardizing Associations (ISA).

It was under the aggravating international situation from 1938 that this second period of rapid standardization was started to meet military and other urgent needs. JESC began issuing Temporary Japanese Engineering Standards — "TJES" — where committee deliberations were cut drastically and stress was laid on efficacious use of materials rather than highly refined technical requirements. Simultaneously, more emphasis was laid on standardization work for new materials, as for aircraft. With the end of the war in 1945, the excellent work done by JESC was brought to a complete standstill. The Japanese Standards Committee (JSC) replaced the dissolved JESC in February 1946. JSC naturally studied the standards developed by JESC but in its work laid more emphasis on the development of peace-time industries, particularly export industries. JSC has published no less than 1,854 standards.

Creation. In 1949, Industrial Standardization Law was promulgated for the purpose of utilizing the tool of standardization forged by the joint efforts of the Government and industry to ensure the country's quick recovery through enhanced industrialization and productivity.

The law set up the Japanese Industrial Standards Committee (JISC) as the national organization to establish or abolish standards in the country through proper scientific and democratic procedure. It also established the system of certification marking on products conforming to the Japanese Industrial Standards and set forth two main purposes:

1) to establish standards democratically, so that they may be rationalized and unified on a country-wide scale; and
2) to enforce the certification marks system to cover specific commodity items, in accordance with national requirements.

JISC re-examines JESC standards which are re-issued in a new form under JISC designations. The Committee also became the Japanese member body of both the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) in 1952 and 1953 respectively.

Members. The Committee is composed of 240 commissioners and a number of Temporary Commissioners and Technical Commissioners, with a General Assembly, a Standards Council and Divisional Council. Members of the Standards Council, Divisional Council and technical committees are appointed by the Minister of International Trade and Industry, from various spheres of the community, including consumers, sellers, scientists and men of practical experience and government officials — a total of more than 15,000 persons.

Finances. All expenses of JISC come from government funds.

Staff. About 200 government officials of the Agency of Industrial Science and Technology of the Ministry of International Trade and Industry form the staff of JISC.

Organizational Structure

The present pattern (1963) of the Divisional Council is as follows:

Divisional Council	Technical Committee
1. Fundamental Affairs	58
2. Civil Engineering	27
3. Architecture	104
4. Ferrous Metallurgy	84
5. Non-ferrous Metallurgy	72
6. Welding	26

7.	Mining	53
8.	Ceramic Industry	65
9.	Chemical Industry	159
10.	Macro-molecules	126
11.	Daily Necessaries	109
12.	Packing	76
13.	Textiles Industry	146
14.	Machine Tools	65
15.	Machine Elements	114
16.	General Machinery	100
17.	Precision Machinery	68
18.	Shipbuilding	33
19.	Railways	70
20.	Automobiles	86
21.	Electrical Engineering	95
22.	Electronics	69
23.	Materials for Electrical Use	50
24.	Medical Instruments and Appliances	52
25.	Aeronautics	84
26.	Atomic Energy	51
27.	ISO	
28.	IEC	
		2,042 TC

Functions

The Committee has the following functions:

(1) To make the final decision on draft standards submitted by the competent minister prior to the formal establishment of standards.
(2) To submit the committee's opinion on draft standards when third parties request such standards and to present the original draft to the competent minister.
(3) To study the drafting of standards in line with procedures, reporting results to the competent minister.
(4) To reconsider established standards at least every three years and advise reaffirmation, revision or abolition of them.
(5) To decide which commodity items shall be designated in connexion with the certification mark system, before the competent minister makes the actual designation.
(6) To study and aid the drafting of international standards in ISO and IEC on behalf of Japan.
(7) To make reports in response to enquiries of ministers and to submit advice on ways to accelerate standardization.

Drafting of standards. A ministry desirous of establishing a standard brings a draft to a conference of the Industrial Standards Committee for examination. Suggestions and comments are also entertained from other interested parties who offer these, and the standard is made.

The general procedure of preparation of a JISC standard is shown schematically later.

The Standards Committee sets up a technical committee to examine the draft. The technical committee investigates and sends its recommendation to the Divisional Council where the subject is reinvestigated for submission of a report to the President of the Standards Committee. If necessary the Standards Council may also examine the draft before it goes to the President. When the final decision is taken for finalization, the President reports to the Minister, who finally establishes it as a JISC Standard. The same procedure is followed for reaffirming, revising or abolishing a standard.

Nature of standards. JISC standards are national standards ratified by the Government. They reflect the largest concensus of opinion of all concerned: producer, seller, and consumer. Under the conditions holding in Japan, it has been felt that the state development of standards is the best form of establishment of industrial standards. Establishment of national standards by the Government does not mean that standards are imposed from the top, since the procedure adopted is highly democratic. The standards are not static and are constantly revised at least every three years in view of the progress taking place in science and technology.

Japanese industrial standards cover mineral and industrial products (excluding pharmaceutical goods coming under the Pharmaceutical Affairs Law, agricultural and forestry products coming under the Agricultural Standards Law, for which special standards exist). Moreover, items of fashion, luxury, taste, works of art, and so on are excluded:

JISC deals with the following aspects:

1) Technical terms, notations, etc.
2) Kind, shape, quality, etc., of minerals and industrial products.
3) Testing, analysis, inspection, methods of measurement, etc.
4) Methods of design, manufacture, use, packing, etc.

Number of standards published. Some 6,251 had been published by the end of March 1963.

Other publications. None.

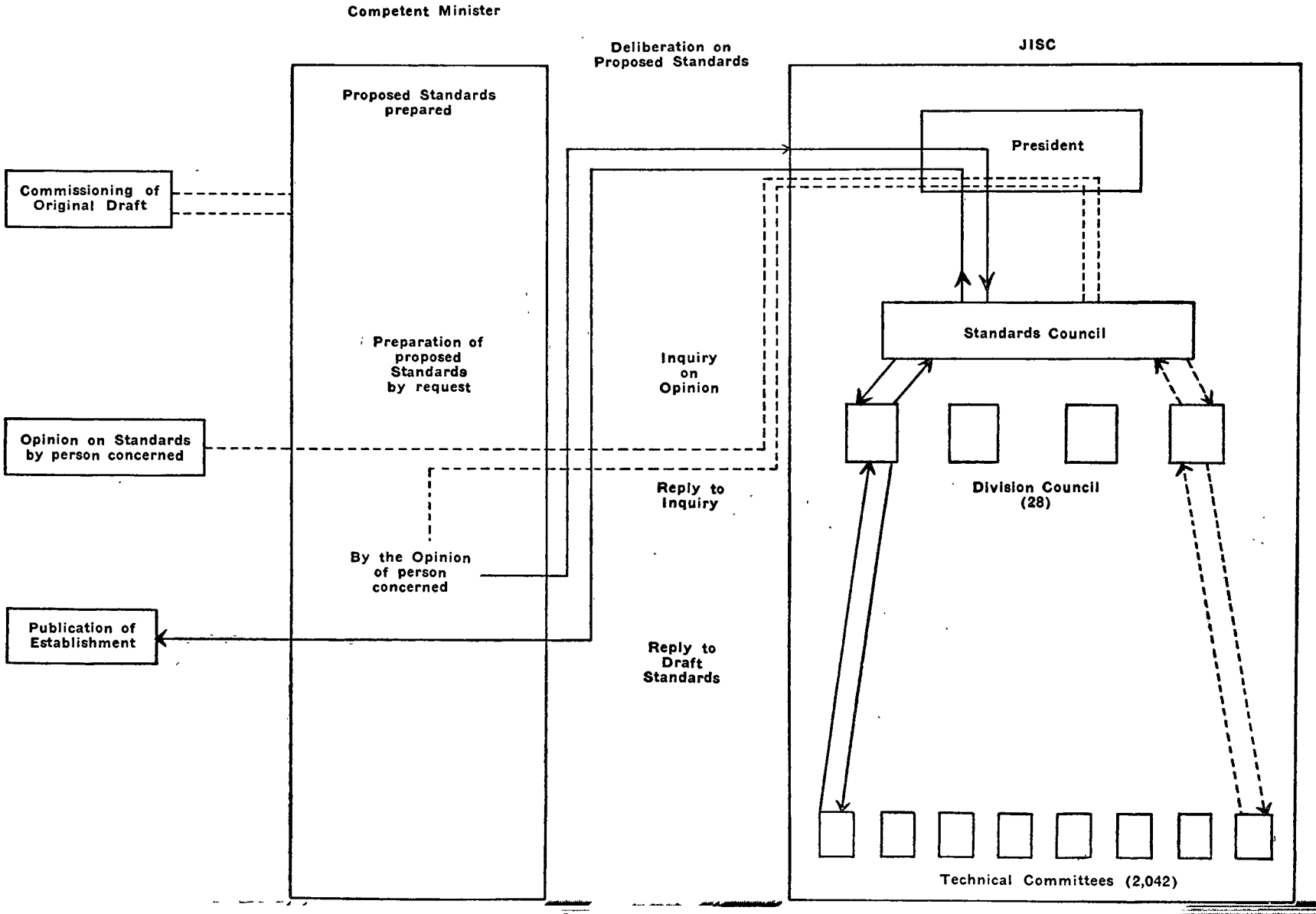
Other forms of propaganda. None.

Marks indicating conformity with standards

By article 19 of the Industrial Standardization Law, manufacturers of such commodities as are designated by a competent minister may apply for affixation of the special certification mark showing that the commodity is up to the JISC standard. This is a third-party guarantee by the government.

The designated commodities are published in official gazettes. The competent minister who receives the application for certification marking examines the manufacturer's equipment necessary to maintain quality control and other technical conditions for production needed to maintain the quality of the product. The minister may continue to inspect the factory even after the grant is made, to see that the checks on quality are

METHOD USED FOR DRAFTING STANDARDS



constantly maintained. He may cancel the licence and prohibit the sale of products at any time if he is not satisfied that the product is up to the standard. For any infringement of the regulation, a fine can be imposed.

This system not only guarantees the quality of products on a national basis, but also serves to encourage systematic quality control in the Japanese industry, providing a scientific basis of maintenance of quality in the products.

Up to December 1963, the Government had designated 1058 commodity items under this system. Applications had been received from 10,962 factories for permission to use the JIS mark and some 10,380 of these had been examined; 7,906 factories are currently permitted to affix the JIS mark to their designated products. (See appendix K figure 2).

Korea (Republic of)

The Korea Bureau of Standards is the national body for standardization in Korea.

Origin and Creation — Industrial standardization in South Korea had its origin in the procurement programme of armed forces supplies. The general necessity for industrial standardization became more urgent with the establishment of the office of supply in 1961. Simplification of procurement procedures for various kinds of goods as a positive step towards greater industrialization led to the establishment of Industrial Standardization Law in September 1961 which included inspection of exports. The Korean Bureau of Standards was made responsible for the administration of industrial standardization and it was set up under the aegis of the Ministry of Commerce and Industry in November 1961. The Korean Council for Industrial Standardization, which advises the Minister of Commerce and Industry, was set up in February 1962.

Members: nature and number — Being a Government agency, it has no provision for membership. The staff of the Bureau are all government officials. The Council for Industrial Standardization is an advisory body attached to the Ministry of Commerce and consisting of 197 Commissioners representing the various industrial fields. In addition, there are about 1,100 expert commissioners attached to the technical committees. The Council Commissioners are appointed by the Government and the experts to the technical committees are appointed by the Director on the recommendations of the Chief Expert Commissioner of each technical committee.

Finances — All finances of the Bureau come from the Government.

Staff — The Bureau has 48 government officials including a Director.

They act as the secretariat to the technical committees.

Organizational structure — The Bureau is divided into an administration division, a specification division and a standards division. The Council consists of 20 divisional committees, which are:

1. Fundamental and Miscellaneous
2. Machine Elements
3. General and Industrial Machinery
4. Transportation Machinery
5. Electrical Engineering
6. Electronics
7. Materials for Electrical Purposes
8. Ferrous Metallurgy
9. Nonferrous Metallurgy
10. Mining
11. Civil Engineering
12. Building construction
13. Daily necessaries
14. Food products
15. Textile industry
16. Ceramics
17. Chemical industry
18. Chemical analysis
19. ISO
20. IEC

Technical committees are organized under the divisional committees for specific technical problems. There is also a directional committee whose job is to co-ordinate the work of the technical committees and report to the divisional committees. It tries to settle any disagreements between the technical committee and the divisional committee.

Functions — The Bureau of Standards has the following tasks:

(1) Preparation of draft standards — Selection of items for standardization, investigation of domestic situation and standards, investigation of foreign standards.
(2) Operation of technical, divisional and directional committees.
(3) Technical guidance and popularization of industrial standardization.
(4) Operation of the standard marking system.

The Korean Standards Association, established in 1961, assists the government organization in issuing and popularizing the standards.

Methods used for drafting standards — Korean industrial standards may be established at the request of an individual or an organization, who applies with a complete draft to the Bureau of Standards for the establishment of a national standard. The Bureau investigates the proposed draft. When investigation is completed, the draft is transmitted to the pertinent technical committees for deliberations. It is then transmitted to the pertinent divisional committee for review, then undergoes a final review by the Bureau. If necessary, the draft is submitted to the Minister concerned before final approval is given by the Ministry of Commerce and Industry. The final standards are then announced in the newspaper, as to the title and in the Bureau's official journal as to the detail. A Korean industrial standard, once established, is effective for full three years and then re-deliberated for possible amendment, abolition or re-confirmation. A

temporary industrial standard is effective for two years before it is deliberated for amendment.

Nature of standards — Industrial standards are developed to unify or simplify the following:

(1) Kinds, shapes, dimensions, structures, equipment, quality, grades, ingredients, performances, degree of safety, etc.
(2) Methods of production, design, drawing, operation, fundamental units, etc.
(3) Materials and methods of packing products.
(4) Methods of testing, analysis, etc.
(5) Terminology, abbreviations, symbols, etc.

Number of Standards published — KBS published 300 standards per year and by the end of 1963 a total of 600 national standards had been established.

Other publications — KBS publishes a monthly magazine "Industrial Standardization".

Other forms of propaganda — The Bureau organizes lectures on quality control, international standardization, methods of inspection, how to draw up company standards and information on standard marking system.

Film — "How to authorize KS-marking."

Marks indicating conformity with standards — Only those commodities qualified for the Korean industrial standards are authorized to carry the KS-Mark. The Bureau makes a survey in the market to find out which commodities would benefit the consumer most if they bore the KS-mark. A producer usually comes forward to request the Bureau to grant him a licence. The Bureau makes an investigation to find out whether the factory is able to turn out products meeting the pertinent Korean industrial standards. Modern quality control and internal standardization are required to ensure satisfactory quality of the product. The Government occasionally inspects the KS-marked goods. If they are found to be deficient, a remedial order is given. The Industrial Standardization Law provides that, when a remedial order is ignored and in cases of unauthorized KS-marking, the criminal code shall apply. It also provides that the KS-marked goods shall have priority for procurement by government agencies, public organizations and enterprises under direct government control; moreover, priority for the allocation of foreign exchange required in the procurement of raw materials and operational local funds is given to the firms producing the KS-marked goods as a policy of the Government. (See appendix K figure 3.)

Laos

No information to date.

Malaysia

No properly constituted national standards body has been formed, but the Industrial Research Ministry of the Economic Development Board of Singapore has the responsibility of drawing up of industrial standards for *Singapore*. The national physical standards are the concern of a central institute in the national capital of Kuala Lumpur. A foreign expert has been advising the Central Government regarding the establishment of a national standards body. Three young engineers from Singapore were recently trained in standards engineering at the Indian Standards Institution.

Mongolia

No information is so far available for any standardization activity in Mongolia.

Nepal

No information is available about any activity directed to establish national standards in Nepal.

New Zealand

New Zealand Standards Institute

Origin — In 1936, the New Zealand Standards Institute was formed as the successor of the New Zealand Standards Institution.

Creation — The Institute was established by the Government to function under the direction of a Standards Council, whose members were appointed by a minister of the Government on the nomination of the principal national bodies interested in standardization. In 1941, the Standards Act was passed by the Parliament which formally defined the constitutional powers and functions of the Standards Council and provided for the declaration and publication of standard specifications and the establishment of Standard Marks.

Members: nature and number — The Institute operates as a government department and therefore has no members.

Finances — The Institute is financed by government funds through the Department of Industries and Commerce. The receipts from the sale of standards and Standard Marks Licence are paid into the Public Account of the Government.

Staff — The staff are officers of the Department of Industries and Commerce and as of 1964 were 39 in number. There are six officers in administrative and executive positions, five technical officers and 9 Committee Secretaries, a Public Relation Officer, Librarian, records and sales staff etc.

Organizational structure — The Standards Council, which recommends to the Ministry of Commerce and Industry the formal declaration of a standard, comprises of 12 to 25 members appointed by the Minister and is responsible for general policy. The representatives are drawn from manufactures, farmers, traders, trade unions, scientific and professional bodies, universities, local government associations, women's organizations, and government departments. To assist it in its work, the Standards Council establishes various committees, each responsible for formulating standard specifications in a particular field of work. All the various interests concerned are represented fully in

these committees. As necessary, they set up sub-committees to deal with particular aspects of their work.

Functions — NZSI develops the following types of standard:

(a) original standard specification;
(b) adoption of overseas standards;
(c) government purchasing standards;
(d) model by-laws.

The task of formulating original New Zealand standard specifications, recommendations, and so forth, has become more important recently, owing to developing industrialization. New projects are undertaken only after requests from responsible national organizations, public or private, and have been approved by the Standards Council. Such new projects are referred by the Council either to an existing committee or to a new committee established for the purpose. When the draft has been completed, the Council recommends its standard for formal declaration by the Minister. Such declaration is announced in the official gazette.

In view of the very close relation between New Zealand and the United Kingdom, with whom more than 50 per cent of the New Zealand overseas trade is conducted, NZSI relies very heavily on the British Standards Institution. All British standards are considered by appropriate committees for the suitability for use in New Zealand. When suitable, they are adopted. A number of Australian standards have been similarly declared as New Zealand standard specifications and, wherever necessary, amendments are made to suit the New Zealand requirements. Specification for government purchasing is prepared where suitable national standards do not exist.

One of the major functions of NZSI is to prepare building codes in the form of model building by-law and also model by-law in other fields, for adoption by local government authorities throughout New Zealand. This work was initiated after the disastrous earthquake in Hawkes Bay Province in 1931.

NZSI also acts as the New Zealand Memberbody of ISO, consults closely with the New Zealand Consumer Council in its work relating to the quality of consumer goods and supervises the Standard Marks as referred to hereunder. Whenever possible, ISO Recommendations are used new documents are in preparation and old ones under revision.

Methods used for drafting standards — Preliminary proposals for draft specifications are either obtained from the organization which requested the project or prepared by the Institute's own technical officers. These preliminary proposals are then developed by the committee to the draft stage, when they are widely circulated for technical comments. On the basis of these comments a final specification is submitted to the Council.

In view of the limited resources and the small number of technical officers, considerable reliance is placed on the preliminary draft, as well as on the research done by committee members, who are more highly qualified since they belong to industry, government departments, or technological or academic institutions. Testing and research work necessary for the development of standards is carried out usually free of charge either by the Institute under the Scientific and Industrial Research Institute by private industry or otherwise. The Standards Institute has no testing facilities and there is very little finance for such work.

Nature of standards — The use of standards issued by NZSI is entirely voluntary except when they are made mandatory by statutory authority.

Number of Standards Published — As of 1963, the number of New Zealand standards published was as follows:

Developed by New Zealand	253
Adopted from overseas standards in certain cases with amendments to suit the New Zealand requirements	
British	1,375
Australia	17
American	3

making a total of 1,648.

Other publications — NZSI publishes a quarterly bulletin listing draft and final New Zealand and British standards as well as giving information on standardization activities and development. It intends to publish an Annual Index of New Zealand Standards.

Other forms of propaganda — When the new specification is issued, a newsletter is sent to all interested persons and organizations giving a general idea of its contents. Several speeches have been given to commercial groups in various parts of New Zealand.

Marks indicating conformity with standards — In terms of the Standards Act, the Standards Mark may be used on or in connexion with a commodity or practice only in accordance with a licence issued by the Minister. Adherence to the provisions of the provisions of the relevant specification is required, and such other conditions as the Minister thinks fit may be imposed. The Standard Mark is registered as a certification trade mark under the Patents, Designs and Trade Marks Act.

Applicants for such licences for the use of the Standard Mark must give an undertaking that their products or processes will conform; and one or more samples of the product concerned must be submitted to an appropriate testing authority for testing for conformance, prior to the issue of the licence. The cost of such type-testing is borne by the licensee. Further tests of continuing compliance are generally required on the occasions of annual renewals, and spot tests are arranged during the annual period of a licence. The Standards Council has an Advisory Committee to assist it in the administration relating to the use of the Standard Mark. As of 31 December 1963, there were 116 licences in force. (See appendix K figure 4.)

Pakistan

Pakistan Standards Institution (PSI)

Origin — The Pakistan Industrial Conference held in December 1947 recommended the establishment of a Central Standards Organization in Pakistan. The scheme prepared by the Government met with the general approval of the provincial and state governments, chambers of commerce and industry.

Creation — In 1951, PSI, attached to the Department in the Ministry of Industries, was established. The Institution was first registered as an autonomous body by an Act of the Government in 1958. The first meeting of the General Council of the Institution was held on 21 November 1959.

Members: nature and number — The consitution provides for three classes of membership:

(1) *Sustaining members* are the various ministries and divisions of the Government, governments of provinces and other territories in Pakistan, the governments of participating countries, and organization, companies, firms, commercial bodies, professional, scientific, educational and other institutions.

The sustaining membership has two categories: (1) sustaining members with annual turnovers of more than Rs 200,000 and (2) firms and companies and commercial bodies with annual turnovers of less than Rs 200,000. In the second category could be included professional, scientific, technological and other institutional bodies which specifically apply for membership in this sub-class. In 1964, there were 33 sustaining members of PSI of which two were associates.

(2) *Ordinary members* are individuals interested in the objects and the work of this Institution. As of 1964, there was only one ordinary member.

(3) *Committee members* — Any person serving on the general Council, or on a division council or any committee of the Institution, who does not represent a sustaining member or is not himself an ordinary member, is a Committee member during the period of his service. There are more than 1,500 Committee members working in 90 sectional committees under 6 divisional councils.

Finances — The income is derived from the following sources:

government grants,
philanthropic contributions,
membership fees,
sales of publications,
certification marks licence fee.

Staff — The headquarters of the Institution is manned by 81 employees of which 20 are technical hands; the rest are the secretariat staff and certain other categories of service personnel. In their branch office at Dacca in East Pakistan, there is staff of seven members, two of whom are technical.

Organizational structure — The General Council is the supreme body for policy making and the managing institution; it is composed of 69 members representing industry, the Central Government and provincial governments, chambers of commerce, scientific, engineering, testing and research organizations and the chairmen of the divisional councils. The Minister of Industry is ex-officio President. There are two vice-presidents of the General Council, one of them is elected from the members of the GC. The other is a joint secretary of the Ministry of Industry.

The actual management of the Institution is delegated to the Executive Committee chosen from the members of the GC. There is also an advisory Finance Committee to advise the Executive Committee and the Council on financial matters.

The Director of the Institution, who is appointed by the Government, is the head of the Office and is also ex-officio secretary of the General Council and all the committees set up by PSI. The supporting staff are deputy directors, assistant directors, administrative officers and other ministerial staff at the headquarters and at branch offices.

Functions — For the preparation of Pakistan standards, six divisional councils have been appointed: agricultural and food products, building and building materials, chemical, electrotechnical, mechanical engineering, and textiles. Each is composed of representatives of the interests of users, manufacturers and other persons or bodies concerned in or associated with the industries included in the division; government ministries and departments interested in such industries are also included.

The division councils set up sectional committees competent to deal with various subjects coming under each division for the technical work on preparation of standards. Recommendations of the sectional committee on standards are submitted to the appropriate divisional councils for approval as PSI standards.

Methods used for drafting standards — A divisional council takes up the work of standardization on a subject after it has been satisfied that the necessity for a standard has been established. The subject is then allotted to a sectional committee, which puts up the draft after due consultation among its members and others competent to take part. This draft is circulated for comments widely in the country and to the members of the Commonwealth Standards Organization and the ISO.

The comments are duly considered and a final draft emerges to be approved by the divisional council concerned and then it goes to the Executive Committee, which authorizes its publication as a Pakistan standard.

The staff of the Institution assists the different councils and committees in all technical matters including the preparation, editing, and publishing of the standards.

Nature of standards — The Pakistan standards are printed documents intended to serve as guides to manufacturers, technologists, designers and constructors on such matters as quality, dimensions, performances, methods of testing, general conditions, operation, and so on.

Number of standards published — The total number of standards published as of 1964 was 1964.

Other publications — PSI Standards Bulletin (quarterly), Annual Report on the activities of the Institution.

Other forms of propaganda—

(1) *Lectures* — Lectures and symposia are occasionally arranged to disseminate the concept of standardization, quality control, productivity, industrial management, metric practice, and the like.

(2) *Training courses of standards engineers* — PSI has sent some of its staff members under the Colombo Plan for training abroad, but as of 1964 there was as yet no programme of standards engineers.

(3) *Films* — No films on the activities of the Institution have so far been produced, but films occasionally borrowed from foreign embassies have been shown to the staff and industrialists.

(4) *Broadcast talks* — Talks on standardization, metric practice, and so on are occasionally broadcast from Radio Pakistan.

Marks indicating conformity with standards

Origin — The Pakistan Standards Institution Certification Mark derives its authority from the Pakistan Standards Institution (Certification Marks) Ordinance 1961 promulgated by the Government on 22 December 1961.

Nature — The adoption of the mark is voluntary, but there is in the ordinance a provision for compulsory enforcement by the Government, in case it so desires. PSI is the authority to grant this licence.

Procedure — On receipt of an application from the factory for certification marking, an inspector is deputized to gather first-hand information about the manufacturing equipment and process and determines whether adequate facilities including testing are available in the factory to check the raw materials used and the finished product. It should also have sufficient facilities to carry out the testing at different levels of control during production to ensure compliance with the relevant standard specification. Samples are drawn from the production line for testing in the approved laboratories.

When the PSI is satisfied with this examination, it grants a licence to the party to apply the standards mark on the understanding that the entropeneur follows a general scheme of quality control laid down by th Institution. The licensee has also to maintain an adequate record of production process on prescribed forms.

In addition to checks maintained by the licensees themselves, PSI will carry out surprise inspection of the licensee's factories and production records to ensure that the production is up to the mark of the standard. Samples are bought from the open market by the Institution and tested to see whether the quality is being maintained. Thus PSI will maintain a constant watch over the quality of the marked product.

Philippines

Origin — The standardization work in the Philippines was formerly the responsibility of the Bureau of Commerce in the Ministry of Commerce and Industry. Standards prepared were issued under administrative orders of the Government.

Creation — On 20 May 1964, by Republic Act No. 4109, a Bureau of Standards was created as a separate body under the Department of Commerce and Industry.

Functions — The Bureau of Standards is charged with the following tasks:

(1) Establishing standards and inspecting all agricultural, forest, mineral, fish, industrial and other products of the country for which no standards have been fixed by administrative orders.
(2) Inspecting and certifying commodities (imported).
(3) Inspecting and certifying
   a) commodities and products to be purchased by the Government or government-controlled corporations;
   b) food products for sale which may constitute safety or health hazards to the public;
(4) Inspecting goods offered for export prior to shipment;
(5) As well as doing various jobs which are done in other countries by the customs laboratories.

Standards so far produced under the Standards Administrative Order

1. Rules and Regulations on the Standardization and Inspection of Philippines standardized Commodities, etc.
2. Standardization of Philippine Raw Coffee Beans.
3. Standardization of Philippine Potatoes.
4. Standardization and Inspection of Commercial Shells, etc. (including amendment)
5. Standardization and Inspection of Shelled Peanuts.
6 Standardization and Inspection of Palsan Poles.
7. Standardization and Inspection of Manila Copals.
8. Standardization and Inspection of Manila Elemi (amendment).
9. Standardization & Inspection of Hemp Squares, Hemp Rugs. Carton Squares. Carton Rugs. (Amendment)
10. Standardization & Inspection of Furnished Buttons.
11. Standardization & Inspection of Glue Stocks (amend).
12. Standardization & Inspection of Philippine made Hats (amend).

13. Standardization & Inspection of Hides, Kipps and Skins (amend).
14. Standardization & Inspection of Buri Raffia Cloth (Saguran).
15. Standardization & Inspection of Placemats.
16. Standardization & Inspection of Abaca Burlap

Members. The following organizations concerned with standardization collaborate with the Government in maintaining standards:

1. The Philippines Standards Association.
2. The Philippines Sugar Institute.
3. The Philippines Cement Institute.
4. The Philippines Pharmaceuticals Manufacturers Association.
5. The Philippines Association for Construction Materials and Manufactures.
6. The Philippines Association of Flour Millers.
7. Plywood manufacturers Association of Philippines Incorporated.
8. Pulp and Paper Manufacturers Association.
9. Textile Mills Association of the Philippines.
10. Chamber of Filipino Food Manufacturers Inc.
11. Chamber of Home Industries of the Philippines Inc.
12. The Philippines Leather Shoe Manufacturers Association Inc.
13. National Master Plumbers Association of the Philippines Inc.

Thailand

No standard body has so far been established but some Government departments in several ministries have been formulating standards for use in governmental purchasing.

Viet-Nam (Republic of)

Laws: Although no system of industrial standardization has yet been adopted in Viet-Nam and the establishment of the standards bureau is still at the project stage, some legislation has been introduced to fix standards for local products such as

1) cotton and silk fabrics
2) permanent wave lotions
3) toilet soaps
4) detergents
5) bicycle frames

With regard to quality control the enactments are:

1. Act No. 14/59 of 11/6/59 relating to control of food products.
2. Act No. 15/2 of 19/12/58 fixing the control measures and producers.

Organization:

The study and publication of standards is undertaken on a provisional basis by the Directorate of Industries and Handicrafts (DIH). (Ministry of Economic Affairs). Eight stages are involved in the establishment of a standard:

1. preliminary study of the question of standardization by DIH;
2. meeting of producers concerned;
3. appointment of a study committee of representatives of private organizations and from the government;
4. drafting of an order fixing the standard;
5. consultation with interested parties;
6. revision by DIH of draft;
7. submission of the final draft to Ministry of Economic Affairs;
8. publication of a definitive order fixing the standard in the official gazette and distribution of the copies of the order to organization concerned.

The methods of applying sanctions are specified in each order.

The standards fixed so far are compulsory and involve products harmful to health. Penalty for infringement of standards is closure of the factory.

Detailed studies by the Ministry of Economic Affairs, in collaboration with Industrial Department Centre, are being carried out on the establishment of a system of industrial standards: the advantages of which are widely recognized.

Western Samoa

No information is so far available of any standardization activity in Western Samoa.

IV. COMPANY STANDARDIZATION PRACTICE

Standardization at national, regional or international levels lays down optimum performance and quality requirements and determines the minimum variety of products or materials required for meeting the demands of all sectors concerned. Ensuring that the desired quality is attained in practice standards for raw materials, designs, processes, and equipments should often be developed at the level of enterprise. The development of a system of in-plant standards is not necessarily restricted to technical issues; it can be and frequently is extended to administrative practices and procedures. The idea is to simplify, rationalize, and standardize company practice, be it in respect of products, raw material, or scope of variety or in respect of organizational matters, methods and procedures which have to be followed repeatedly.

Reference has already been made to the economic and technical implication of excessive variety and the advantages which follow simplification, rationalization, and standardization. Company standardization provides an organizational means by which variety of parts is kept within limits without sacrificing the competitive status of the company. In developing economies, the need for variety reduction is even more acute than in the advanced countries, especially as many of the latter are involved in promoting the industrialization of the former. The transfer of technology from

different quarters of the globe brings with it a variety of industrial standards and practices requiring a large number of parts, materials and tools which have to be continuously imported to keep up production. If the scope of variety is not reduced by standardization, industrial growth will be hampered and a large proportion of foreign exchange earning of the country absorbed in maintenance import.

In-plant or company standardization practice is an activity which strengthens, stimulates and complements the national standards movement. Standards developed in the plants are based on the process capabilities of current production methods, raw materials, and so on, and provide a ready basis on which national standards are built. Conversely, available national standards furnish the models for adopting (or revising, if needs be) existing company standards. The traffic is thus two-way and keeps both practices dynamic and abreast of advancing technology. It also enables industry and the country to derive the utmost benefits from standardization.

Company standardization practice as a formalized activity is comparatively new, even in some of the technically advanced countries. In a developing country, a great deal of promotional work is required in the beginning to create conciousness of its productivity potentials. However, there can be little doubt that any effort spent in that direction will be much more than repaid by gains to be achieved in industrial development. Often technical assistance from outside will be necessary if standards consciousness on the part of the company management is to be brought about. India has already recognized this need, and ISI has been engaged for the past three years in conducting special programmes to propagate the idea through organized training courses. (See appendix B.)

V. NATIONAL STANDARDS PUBLISHED IN ECAFE COUNTRIES

Standards published by different national organizations in the ECAFE region number several thousands and cover many diverse fields, as indicated in the chapter on national organization. The following table gives the number of such standards developed by countries which have some form of standardization movement. No attempt at listing these several thousand standards has been made, as it would serve no useful purpose. Printed lists can usually be obtained from the national bodies.

TABLE

Country	*No. of standards*	*Fields* [a]
1. Afghanistan	Nil	——
2. Australia	1290 (1963)	Mechanical, electrical, civil, chemical, textile, engineering, etc.
3. Brunei	No information	——
4. Burma	,,	——
5. Cambodia	,,	——
6. Ceylon	the Bureau is just being established	
7. China (Republic of)	2446	Civil, mechanical, electrical and chemical engineering; textiles, mining, metallurgy, agriculture, food safety, etc.
8. France	5100	Different fields of science and technology.
9. Hong Kong	—	——
10. India	3115	Agriculture, food, civil, chemical, electrical, mechanical Engineers; structural, metallurgical, textiles & consumer goods.
11. Indonesia	57 (1964)	Different fields of science and technology.
12. Iran	1	——
13. Japan	6251 (March 1965)	30 different branches of technology including railway, aeronautics atomic energy, etc.
14. Korea (Republic of)	600 (1963)	20 different branches of technology such as electrical, metallurgic, civil engineering, chemical industry, etc.
15. Laos	No information	——
16. Malaysia	No information	——
17. Mongolia	,,	No information.
18. Nepal	,,	,,
19. Netherlands	1770	Different fields of technology including earthquake engineering.
20. New Zealand	1648	,, ,,
21. Pakistan	164 (1964)	Agriculture, food, civil engineering, chemical, electrical, mechanical & textile engineering.
22. Philippines	19	Different local products.
23. Soviet Union	27000	Different fields of technology and science.
24. United Kingdom	4500 (1964)	,, ,, ,,
25. United States	2323 (Jan. 1964)	,, ,, ,,
26. Western Samoa	No information	

[a] See under National Bodies for more details.

VI. IMPLEMENTATION OF STANDARDS

These standards have all been developed by the standard bodies through various processes, but they have one common feature of intensive consultation among all parties concerned with their use. Full benefits can be provided by standards only if they are widely adopted and used by all sectors of an economy wherever they are applicable. A recent study was undertaken by ISO regarding the implementation of the published ISO recommendations by its member bodies. Appendix C gives the results of this study in respect of the ISO members among the ECAFE countries. Standards may be implemented either voluntarily or under obligation through legislation or order of higher authority. In developed countries where the benefits of standardization are well understood and appreciated, through wide participation in the development of standards, voluntary implementation of standards proceeds rather smoothly. In developing countries, however, deliberate efforts at creating standards consciousness would be advantageous and often essential. The social and economic structure of a country will determine whether voluntary or mandatory enforcement is called for. Where the economy is completely controlled, there is little difficulty in making standards compulsory in every production unit. In a free or partially free economy, standards are expected to be used without compulsion, except in certain limited and special spheres.

As standards are developed by the common consent of all interests, they should receive general common acceptance. However, there is one fact which needs close consideration. Since standards are developed to satisfy the over-all economy, they sometimes involve overlooking the maximum economy of a particular use, or of an individual user who may be called upon to sacrifice to some extent. Compromise between individual and over-all economy, a usual feature of standardization, may initially cause some hardship. Better understanding of the ultimate benefits of standardization grows with the growth of industry, but not without efforts to promote that understanding. Many established entrepreneurs may find that standardization requires a change of pattern of production and is therefore unremunerative. This naturally will lead to resistance to implementing new standards. Long-term gains and the national interest should be emphasized in such cases. In this connexion, the "Eight Commandments for Standardization" ennunciated by Technical Committee TC/88 of IEC will be of interest. (See appendix D).

Persuasion and promotional work are necessary to secure the voluntary implementation of standards in a developing country. National standards organizations in those countries have to make particular efforts in this direction by organizing conferences and seminars to popularize standards. The Indian Standards Institution was perhaps the first such body to organize elaborate plans to publicize standards through advertisements in the press, exhibitions, conferences and conventions.

However, there are spheres of public life where the observation of standards cannot be left to voluntary organizations, as when public health and hazards are concerned. Standards of purity of drugs and food-stuffs or rules of safety such as those regarding electricity or fire (boiler regulations) are some examples. With the development of the use of electricity and gas in home and industry, there is great need for vigilance in safeguarding health and property. In a less developed country, very often this aspect is overlooked though it deserves more serious attention than in developed countries. In any country, organized consumers can set the pace for the implementation of standards. If the demand for standard items were large enough, producers would adjust their production accordingly. Large-scale production of standard items would make it uneconomical to produce non-standard or special products for small purchasers. Thus normal rules of demand and supply would lead to the implementation of standards.

In many countries, government departments and their attached or associated organizations and public utility corporations constitute the largest body of organized consumers. This is particularly so in developing countries where general consumers are not organized at all. It is, therefore, fitting for such central buying authorities to adopt national standards as a basis for their purchases. Policy directives from the highest authority would, however, be necessary to crystallize action and give the necessary clearance to purchasing officials. In India, the Central Government has issued such a directive, which is being followed by state government and public utility concerns and by local authorities. This has largely been brought about by insisting that all consumer government departments such as railways, defence, post and telegraphs as well as the central purchasing authorities are represented and take active part in all stages of the preparation of the standards.

Consumers, that is, the general public, have become organized in many of the developed countries and have formed consumers' unions for the maintenance and improvement of quality of consumer goods, which enjoy very great influence in their own countries, as well as internationally through the world union. Unfortunately this consumer movement has not been established in the developing countries, where every encouragement should be given to organizing it. The Indian Standards Institution recognizes the importance of the consumers' voice in the technical committees and has been trying to give weight to consumer representation in its committees. Unfortunately, organized consumer organizations representing the ordinary buyer, such as the housewife, are hard to find. Consumer co-operatives, wherever they have been

established, would do well to bear in mind their responsibility with regard to the standardization movement.

In this connexion, it is emphasized that the wording of a standard should be as clear and simple as possible, so as to be clearly understood even by ordinary consumers.

VII. CERTIFICATION MARKING

Another means to implement standards and to bring the advantages of standards to the door of ordinary consumers, such as the housewife, is to provide certification marking facilities to ensure good conforming with accepted standards. A certification mark (CM) is a third party guarantee to the purchaser that the goods have been inspected, tested, and certified by a competent agency and may be purchased with reasonable assurance of quality according to an established standard. CM serves to convey this assurance to the purchaser when the latter has no facility, knowledge and skill for inspection or testing or when such testing is distinctly uneconomical, as when the purchase is small. Even large-scale purchasers such as a central purchase organization could profitably reduce, if not completely avoid, inspection and testing of those goods which bear the CM of the national bodies.

CM schemes operate on two principles. First, the organization operating the scheme must be an independent and technically competent body with no business interests concerned with the production, distribution or supply of goods. Second, the operating organization must be satisfied that the equipment used, system of control of quality, and inspection of the manufacturing unit are adequate to ensure conformity with accepted standards. In addition to this in-plant control, independent vigilance is maintained by drawing samples of raw materials and finished products from the production line, stock, and open market for tests to be conducted by the CM operating organization itself or, at its insistence, by independant agencies.

The national standards body is undoubtedly the agency best suited for operating the schemes, and many countries, including China (Taiwan), India, Japan, South Korea, New Zealand, Pakistan and the Philippines, now undertake this activity. The authority for operating such a scheme is often derived from existing legislation, which may permit registration and operation of CM (such as a Registration of Trade Marks Act) or from special legislation enacted for the purpose (such as the Pakistan Standard Institution—Certification Marks—Ordinance). The latter type of approval is better suited to developing countries.

In India, the Indian Standards Institution (Certification Marks) Act, 1952, empowers ISI to

a) establish and publish, in such a manner as may be prescribed, the Indian Standard in relation to any article or process;
b) specify a standard mark to be called the Indian Standard Institution Certification Mark, as may be prescribed, is to represent a particular Indian Standard;
c) grant, renew, suspend or cancel, as may be prescribed, a licence for the use of the standard mark;
d) levy such fees for the grant or renewal of any licence, as may be prescribed; and
e) make such inspection and take such samples of any material or substance as may be necessary to see whether any article or process in relation to which standards mark has been used conforms to the Indian Standard or whether the standard mark has been improperly used in relation to any article or process with or without licence.

Under this legislation, ISI has so far issued licences to some 500 units of production. The total annual production under these licences will be equivalent to US$735 million. The entire production of many types of structural steel sections produced in the country has come under the ISI certification marking from 1 April 1965. A large part of jute material for export is being compulsorily certified under its CM scheme from 1 January 1965. Under another legislative enactment, agricultural products including a good many export commodities are graded and certified. This scheme, known as "Agmark Grading Scheme", is controlled by the Central Government under the Agricultural Produce Grading and Marking Act 1937. Licensed packers under the control of marketing officers do the grading and packing. Official control laboratories maintain continuous supervision over the grading and take check samples from time to time. For export commodities the Central Government has created special facilities. A self-contained inspection staff and a chain of laboratories are maintained to carry out inspection for quality before parking. A super check is exercised by checking test samples on the spot and random examination of various lots.

Certification marking schemes have also been working in some ECAFE countries for several years. The progress made in various countries is indicated below.

Australia — The Standards Association of Australia has applied for registration of their certification trade mark under Trade Marks Law of Australia. It is intended to organize the scheme on the model of British Standards Institution CM scheme, the so-called Kite Mark. A Marks Committee of the Association is responsible for the details of the marking scheme.

China (Taiwan) — The CM system has been in force since 1952. Some 242 manufacturers are now issued with CNS certification licences including some 935 items, such as incandescent and flourescent lamps, chemicals, soaps, bicycle parts, matches, paints

and varnishes, plastic products, stationery instruments, acids and alkalies, electrical appliances, inks, rubber articles, cement and its products, and so forth.

India — Details already discussed above.

Japan — The Japanese Industrial Standards Committee has been extremely active since 1949 in granting this third party guarantee to manufacturing units. The Government had by 31 December 1963 designated some 1058 commodity items under this system and 7906 factories are currently permitted to affix the JIS mark on the designated products. It is quite a common experience in overseas markets to see Japanese goods bearing the well-known JIS facsimile. The total value of products covered by the JIS mark must run into several thousand million US dollars. For agricultural and forestry commodities, also, the JIS mark is effective.

Korea (Republic of) — the Korean Bureau of standards makes surveys of production and consumption patterns of commodities and designates the commodities to be marked Organizations having facilities for production, including modern quality control and internal standardization that conforms with the Bureau's standards, are authorized to apply the mark. No details are available about the number of licences issued and value of products covered. Every encouragement is given for industries to take the CM. The law provides that KS-marked goods should have priority in procurement by government agencies, public enterprises, and the like. Further priorities for allocation of foreign exchange required for procurement for raw materials and so on are given

New Zealand — The NZS mark may be used on or in connexion with a commodity or practice only in accordance with a licence issued by the Minister of Industries and Commerce. The standards mark is registered as a Certification Trade-Mark under the Patents, Design and Trade-Marks Act. An advisory committee assists in the administration of the NZS mark.

As on 31 October 1963, there were 166 licences in force.

Pakistan — The standards mark of PSI is based on the PSI monogram and the numerical designation of the standard is subscribed on the monogram. The marking procedure is similar to the ISI CM scheme. No information is available about the number of licences issued and the general coverage of certified commodities.

VIII. QUALITY CONTROL AND INSPECTION FOR EXPORT

Obligatory certification of export products is one of the various measures now being taken in India to promote and stabilize export trade. This and the other measures of preshipment inspection come under the purview of standardization and will be discussed in this paper. These measures will be of interest to other developing countries of Asia and the Far East.

Preshipment inspection schemes are of course not an innovation, but their integration into a comprehensive scheme for control of quality of export will be of general interest to all developing countries. Japan has attained conspicuous success in such a scheme for rebuilding and expanding its export trade after the Second World War. In spite of the differences existing in the industrial conditions, much of the system described here will be found applicable to developing countries.

In 1948, the Japanese Government enacted the Export Inspection Law which was amended in 1957. Under this law, a number of agencies were established to conduct compulsory preshipment inspection of certain designated commodities. A total of 143 important item have been designated so far, constituting more than 40 per cent of Japan's total export (see appendix F). Export inspection is classified under this arrangement in three categories:

(a) inspection of quality,
(b) inspection of packing conditions,
(c) inspection of material and manufacturing processes.

The type and extent of inspection will depend on the nature of the commodity, its end use and other factors. The inspection agencies are official or private agencies. Government authorities have the power to inspect the private agencies and examine their conduct of business and financial conditions at any time. Their business rules, business plans, receipts and expenditure budgets and rules relating to appointment and dismissal of officers are subject to governmental sanction. The Law also provides for the establishment of an Export Inspection Council to consider all important matters relating to export inspection, such as the designation of new commodities for compulsory inspection.

Standards of quality, such as appearance, structure, and size of commodities, as well as methods of inspection, are laid down by the Government. When goods are found to conform to the standards prescribed, they are marked "passed". In certain cases, quality standards designate different grades, and marks denoting these grades are applied to the goods.

In respect of certain commodities which are not amenable to inspection on the above basis, provision has been made to entrust exporters and manufacturers themselves with indicating that goods satisfy export specifications by marking them "export standard". There is a provision for spot inspection by government agencies of such goods. Persons exporting any of the specified goods in violation of this law are liable to prosecution, fine or imprisonment or all three.

Some other countries in the ECAFE region have embarked on such schemes of preshipment inspection or are contemplating doing so.

In India, quality control and preshipment inspection schemes for certain commodities are provided for by statutory regulations. Many schemes are admin-

istered by Export Promotion Councils for various industries set up to meet the increasingly urgent need to promote exports. The Ministry of Commerce (previously Ministry of International Trade) ensures the proper planning and direction of all export efforts.

The Government a few years ago constituted an official committee (under the chairmanship of the Director of ISI) to review the existing mechanism for compulsory and voluntary quality control and preshipment inspection and make recommendations for further steps to be taken to increase export trade.[1] The committee made the following important recommendations:

(a) There should be prohibition on export of articles intended for human consumption or application as well as those affecting the health and safety of persons unless they confirm to rigid quality standards. Items falling within this category are drugs, medicines, toilet articles, articles of food, poisonous substances, explosives and other such articles which are prohibited from being imported by consuming countries under their own law and regulations.

(b) Where a buyer stipulates certain specifications for goods, provision should be made to prevent the export of articles which are not certified by an inspection agency as conforming to these specifications. This would require official recognition of many private and public sector agencies which are in a position to issue test certificates and survey reports for miscellaneous commodities.

(c) Goods which are considered important for the export market and for which standards specifications have been or could be laid down should be required to be inspected and certified before export, through appropriate agencies, at the time of manufacture or packaging.

(d) For other commodities where standards specifications may not exist or where it would not be advisable to formulate such specifications, it would be useful to introduce factual inspection for issuing reports regarding actual condition of the goods so that the overseas buyer may be made aware of the nature of the consignment. Factual inspection for goods where standards specifications exist should be discouraged and should be replaced by compulsory certification.

The statutory laws existing in India were not adequate to enable the Government to institute compulsory quality control and preshipment inspection of the type recommended. The Export (Quality Control and Inspection) Act 1963 was, therefore, passed by the Indian Parliament empowering the Government to impose compulsory quality control and preshipment inspection on commodities for export as and when it deems fit. The Export Inspection Advisory Council, composed of official and non-official representatives, has been formed to advise the Government on related matters. A Quality Control Directorate has also been established in the Ministry of Commerce to act as executive organ to the Council. Already many articles have come under compulsory control (see appendix E); others are being covered gradually as industry becomes more quality-conscious and production comes up to standards. Many private and public sector agencies have been recognized under recommendation (b) to issue test certificates and survey reports. A chain of testing laboratories is being established and existing ones are being further expanded.

This extension of the standardization movement which has enormously benefited Japan and is helping Indian export, will, if properly adapted, assist the economic development of other developing countries.

Some countries, such as China, Pakistan, and the Philippines, have also taken steps in the right direction and their efforts will soon gather momentum.

Pakistan

In order to make an appraisal as to the adequacy of existing arrangements of specification of standards, and preshipment inspection agencies, the Export Promotion Bureau engaged a team of Japanese experts to survey various manufacturing units, testing laboratories, and so on. The survey has been completed and action is being taken to implement the recommendation of the team as far as is possible.

IX. ECONOMIC EFFECT OF THE INTRODUCTION OF STANDARDS

General

It is very difficult to estimate in exact money value the effect of the introduction of standards on the sale of products, and so on. It has, however, been roughly estimated by several well-known industrial houses in the United States and elsewhere, where in-plant or company standardization practice has been introduced, that every dollar spent on company standardization has meant an over-all saving of 7 to 10 dollars. A few examples can be cited from the experience in the United States and West Germany.

United States

(1) The Aerojet Corporation has estimated that every dollar invested in standards activity has resulted in a saving of $10.

(2) A safe estimate made at the General Motors Corporation at the insistence of the members of the Team[1] indicated that savings from centralized standards programme would be of

[1] See item 14, appendix J.

[1] National Productivity Council India (NPC) Team on Standardization and Variety Production in Factories.

the order of 10 to 15 times the expenditure on maintaining the programmes.

(3) At Martin Company, estimates made on more apparent benefits indicated a saving of $3.5 million in 1962 for $396,000 spent on a company standards programme. For 1963, for a standardization budget of $585,000, the savings were expected to be at least three times those of 1962.

(4) At the Eastman Kodak Product Company, the estimates were of the order of a saving of $1.5 million annually.

(5) At the Atlantic Refining Company, the estimated result was a saving of $1 million annually.

(6) The adoption of Standardized General Purpose Cabinet by various operating divisions of the Radio Corporation of America (RCA) resulted in a saving of over $200,000 through the first bulk order for the Corporation.

West Germany

Two examples[1] are also given from the experience of Mak Maschinenbau Kiel Ltd. of Alfred Krupp, West Germany.

Example 1:

Stores and maintenance standards: In 1956 the Company used 179 different kinds of lubricating, cooling, cutting and heat-treatment oils and lubricants with a total consumption of 129 tons per annum, at about DM[a] 169,000 worth of materials in store. By the end of 1956, standardization brought down the variety to 25 different types and the cost came down to DM 87,000 from DM 169,000, while the consumption at the end of 1958 still remained at about 120 tons per annum. In this way, the Company saved 82,000 Marks and this single activity of the standards department accounted for all the expenses for the Standardization Department, which undertook many other such jobs of rationalization for the company.

Example 2:

This relates to the reduction of the varieties of screws and fasteners in the Company. There were more than 7,500 different types of screw and the money value was about DM 426,000. The reasons for this large variety were two:

(1) the Company's spare parts for production made at the time of the First World War were still under construction;

(2) three different design departments were doing their work without any co-ordination.

After much effort, the Standardization Department was able to reduce the variety to 2,308, the value of screws in store in 1959 being not more than 211,000 German Marks.

[1] Given by Mr. Hans Riebensahm, United Nations Expert on Company Standardization, India.

[a] 1 U.S.$ = DM 4.1.

The experience of Japan in the post-war period is also very illuminating. JIS-Certification marking of the Japanese Industrial Standards Committee has shown phenomenal rise indicating that the industry, which has been growing at a very rapid rate, lays great emphasis on quality control and standardization. Also the compulsory QC and Export inspection or preshipment inspection of goods in Japan has completely revolutionized the Japanese export trade. Today, Japanese goods enjoy a reputation for high quality and excellence of performance the world over. India's experience of working the ISI.CM scheme gives the same indication of raising productivity and quality in the organization.

Effect on the Steel Economy in India

It would not be feasible to undertake to estimate the quantitative effect of introduction of QC and standardization on an over-all basis. However, the experience of the economic effect of national standardization in one sector of industry can be exemplified by the experience of India in the steel economy project carried out by the Indian Standards Institution. The aim of this project was to achieve economy in the use of structural steel by adopting standards from the stage of production of structure through designing, fabricating and erecting to maintenance of structures. Considerable emphasis was laid on rationalization of shapes and sizes of sections where design had been frozen years before. Entire ranges of steel sections have been standardized in metric sizes including designs based on new knowledge and an extensive application of the principle of rationalization. Substantial savings on steel will result. All production, present or future, will be based on these new standard sections. Cold formed light gauge sections are being progressively standardized; it was estimated by ISI that as much as 40 per cent saving of material will result. Further economies of steel will result by eliminating the wasteful process of fabrication involving riveting. Further standards for welding equipment and accessories have been developed. Similarly, improved design codes for steel structures now enable Indian engineers to use more rational safety factors and loading criteria and permit the use of more economical and up-to-date formulae for design.

It was conservatively estimated by ISI that about 20 per cent of steel might be saved if all measures now available were fully implemented. Instead of relying on this rough estimate, a more quantitative economic "Assessment of Saving in Structural Steel Through Implementation of Indian Standards" was undertaken by the National Council of Applied Economic Research, New Delhi. After making an exhaustive study, the NCAER came to the following conclusion as to the saving which would have been effected during the second five-year plan.

There would have been a total saving of 23.6 per cent of steel during the second five-year plan period, if all the Indian standards had been fully implemented.

The details are given below:

SL. No.	Description	Estimated possible saving in steel (tons)	Percentage saving
1.	Standardization & Rationalization of Steel Sections and design practices	28,505	4.18
2.	Adoption of Welding ...	104,150	14.6
3.	Adoption of tubular construction	6,348	30.4
4.	Adoption of cold formed light gauge sections	19,476	42.9
		158,479	23.6
		672,534	

Actually, 42,000 tons of steel were saved by adopting the measures stated above, adoption not being 100 per cent. The value of the steel saved was US$6.2 million.

This has more than justified the conservative estimate of 20 per cent economy made by ISI. In the context of many million tons of production envisaged for the future in India, the economic effect of this standardization activity may be gauged.

NCAER has given the following breakdown of its estimates of saving in the third, fourth, and fifth plan periods if all the standards evolved by ISI are fully implemented:

	III	IV	V
Anticipated production of fabricated steel structures (1,000 tons)	3,900	7,600	12,600
Saving (1,000 tons)	920	1,790	2,970
Saving (1,000 US$)	136	264	625

This authoritative study most effectively demonstrates the economic effect that has resulted and will result from standardization activity.

A part of the steel economy project was concerned with the rationalization of the variety of alloy and special steels required for miscellaneous industrial uses. The import to India of equipment and export knowledge from all parts of the world has generated a demand for well over a thousand types of alloy and special steels. This is not only wasteful but also precludes the development of indigenous production which would be very uneconomical in view of the limited demand for each kind of steel. After an extensive study, it became possible for ISI to reduce variety to some 130 types, to minimize the use of imported alloying elements such as nickel and molybdenum, and to encourage the use of indigenously available alloying elements, such as manganese and chromium. The project made it possible to plan the establishment of several new alloy steel plants, a number of which are currently under construction. This would mean a great deal of over-all economic benefit accruing to India.

The Latin American countries took particular interest in the work done by India with regard to the standardization of steel projects. The Economic Commission for Latin America (ECLA) resolved in October 1956 that a similar project should be undertaken in Latin America. The project, worked in co-operation with the Pan American Standards Committee, the Latin American Iron and Steel Institute and the Organization of American States, began in 1961 with the training of standards engineers. Three seminars were held in different parts of Latin America for unification and simplification of steel products. The assistance of the Indian Standards Institution was sought in organizing these seminars and an officer of ISI was deputed for the Seminar on Steel Products Specification and Simplification, held in Santiago. Eleven draft recommendations for semi-finished steel products and sections were formulated. Latin American countries are also considering standardization of carbon, alloy and tool steels along the lines developed by ISI.

The work done by ISI in the field of standardization and rationalization of steel rolled sections has also attracted the attention of ISO and work based on ISI standards is being processed through the technical committee dealing with steel. ISI has been given the responsibility of organizing the work and is holding the secretariat of the relevant working group.

In many more fields of industry, drastic reduction of variety on the basis of rationalization has been effected during the development of Indian standards, which has naturally resulted in a great deal of economy by increasing productivity and eliminating waste. The experience of Japan, Australia, New Zealand and other countries which possess effective and lively standards organizations is likely to have been similar.

X. LAWS AND REGULATIONS FOR THE ESTABLISHMENT OF STANDARDS AND THE ORGANIZATIONAL STRUCTURES FOR THEIR ENFORCEMENT

(See under National Standards Bodies for more details of their working)

Countries	Laws and regulations	Organizations and their function
1. Afghanistan	No laws or regulations have so far been enacted.	The Government has plans for establishing and enforcing standards for exports.
2. Australia	1. Customs Act 1901-1963. 2. Commerce (Trade Descriptions) Act 1905-1950. 3. Export regulations on (a) Canned and Frozen fruits (b) Dairy Products (c) Fish (d) Dried Fruit	Inspection Branch of Dept. of Primary Industries. Functions of this branch are broadly undertaking the formulation (in collaboration with Standards Association of Australia), modification and application of standards of quality for an condition of preparation, packaging and labelling of prescribed goods. All powers are prescribed.

		(e) Meat (f) General 4. Electricity Rules.	
3.	Brunei	No information.	
4.	Burma		Standardization programme was endorsed by Prime Minister's Implementation meeting February 1954.
5.	Cambodia	Prakas No. 2241 of 15/7/53 defines standards of products likely to be exported.	Ministry of Trade plans controlling export of 56 products according to standards developed by it. The quality of products exported is controlled by "Co-operation de Surveillance pour les Produits d' Exportation", COSUR, and the "Service de Conditionement et de la Repression des Fraudes".
6.	Ceylon	Parliamentary Act of 1964 established Ceylon Bureau of Standards. Government has authority to declare some standards mandatory.	Ceylon Bureau of Standards.
7.	Republic of China	1. Standards Law of September 1946. 2. Regulation governing establishment of National Standards. 3. Regulations governing establishment of certification marks.	National Bureau of Standards under Ministry of Eonomic Affairs and other branches of Ministry of Economic Affairs.
8.	Hong Kong	No laws have so far been passed.	
9.	India	1. Government of India resolution of 3/9/46 establishing ISI and subsequent signing of ISI constitution with its regulations.	Indian Standards Institution.
		2. Indian Standards Institute (Certification Marks) Act 1952 (as amended from time to time) and Regulation there under.	
		3. The Drugs Act 1940 (amended) and Drugs Rules 1945 (corrected 1961).	Controller of Drugs, Government of India.
		4. Agricultural Produce (Grading and Marking) Act 1937.	Agricultural Marketing Adviser, Government of India.
		5. The Fruit Products Order 1955.	
		6. Prevention of Food Adulteration Rules 1955.	Central Committee of Food Standards for fixing purity levels of food products.
		7. Essential Commodities Act 1955.	
10.	Indonesia	Government Charter establishing Standards Organization in Indonesia.	Dewar Normalisasi Indonesia (DNI).
11.	Iran	Parliamentary Bill, establishing national standards body (approved on 2 July 1960).	Standards Organization of Iran.
12.	Japan	Industrial Standardization Law of 1949. Agricultural and Forestry Commodities Standards Law — 1950. Export Inspection Law 1957.	Japanese Industrial Standards Committee (for establishment of national standards and working of certification marks.)
13.	Korea, Republic of	Industrial Standardization Law (including inspection for exports) 1961.	Korean Bureau of Standards.
14.	Laos		
15.	Malaysia		
16.	Mongolia	No information.	
17.	Nepal		
18.	New Zealand	Standards Act of 1941 establishing standards organization (including certification marking) in New Zealand.	New Zealand Standards Institute.
		Electrical Wiring Regulations; Food Drugs Regulation.	New Zealand Electricity Department; Health Department.
19.	Pakistan	Pakistan Standards Act 1958 Pakistan Standards Institution (Certification Marks) Ordinance 1961. Other acts controlling purity of Drugs, Food, etc.	Pakistan Standards Institution.Other Government Agencies, like Controller of Drugs.
20.	Philippines	Republic Act No. 4107 converting the Division of Standards into Bureau of Standards to provide for Standardization and/or inspection of products and imports of the Philippines and for other purposes.	Bureau of Standards under the Department of Commerce and Industry also authorized to issue CM.
21.	Thailand	No acts or laws passed so far. No information.	Certain Government departments are preparing standards for use in Government purchase.
22.	Western Samoa		Nil.

XI. ROLE OF MANUFACTURERS ORGANIZATIONS IN ESTABLISHING AND MAINTAINING STANDARDS

In the development of national standards, the common principle followed is that of intensive and extensive consultation and, in almost every case, very close co-operation with all parties concerned with the use of standards, that is, with manufacturers, designers, scientists, technicians, traders, users, and so on. Therefore, in general, manufactures organizations in all countries, having established standards bodies, collaborate effectively in establishing and maintaining standards (see appendix G). In countries such as India and Pakistan, where standards are developed by competent technical committees, the preparation is done with the active technical participation of personnel from many manufacturing organizations together with persons drawn from technical institutions, government departments, universities, research organization and consumer representatives.

Afghanistan: Only a beginning in the field of standardization is being contemplated in the Department of Marketing of the Ministry of Commerce. There is no scope yet for trade or manufacturers' organizations to collaborate in this venture.

Australia: Australian standards are developed by representative technical committees organized and administered by the Standards Association of Australia SAA. The committees are composed of experts representing all interests associated with the subject. The standards are thus developed by co-operative effort and negotiation on the part of those most concerned, whether users or manufacturers. SAA has 2,346 subscribing members who help in maintaining standards; many of them are trade associations and industrial organizations.

The functions of the SAA are linked with the National Association of Testing Authorities (NATA) which is recognized as a national organization for coordination of testing facilities.

Ceylon: The Bureau of Ceylon Standards will be adopting the committee methods used by India in preparing Ceylon Standard. The committees will give due representation to manufacturing organizations along with others interested in the development of standards.

China, (Taiwan): The Standards Committee — the technical committees consist of distinguished professors, leading industrialists in the country, authorized government officials and experts. Thus the industrial organizations are vitally concerned with the evolution and maintenance of standards of each kind of product.

India: The development of standards is the responsibility of some 1,200 committees and subcommittees including panels, where together with government representatives, consumers, manufacturers' representatives are very strongly represented. Manufacturing houses and such organizations as chambers of commerce and the All-India Manufacturers Organization, through their technical representatives, take a very active part in framing standards. Many manufacturing units have taken the ISI Certification marks, thus implementing the standards completely and also coming under the quality control system envisaged in the scheme of marking. Apart from this, the Institution is sustained financially by more than 3,000 sustaining members, including the state governments of the Indian Union, public sector projects, public utility concerns and all the well-known manufacturing houses of India, as well as many chambers of commerce and industry.

Japan: In the procedure adopted for developing JIS standards the principle of intensive consultation is maintained throughout so that comments and criticism can be voiced by all, including manufacturing concerns and their organizations, although the method adopted is different from the procedure adopted by India or Pakistan. The collaboration from manufacturing organizations is adequate. The Commissions (including the temporary and technical), the Standards Council, the division councils and the technical committees are appointed from various spheres of the community, including sellers, manufactures, and so on. Furthermore, the largest number of licences granted for the JIS mark is indicative of industry's widespread collaboration in maintaining standards.

New Zealand: Although NZSI is a purely governmental organization, the method of development of standards is such that there is much scope for the association of industries and other production units in the formulation of New Zealand standards.

Pakistan: As in India, Pakistan standards are evolved through committees on which manufacturers are adequately represented. PSI is also supported by sustaining members who participate in the administration of the institution. The PSI.CM mark is also gaining in importance.

Philippines: The following organizations concerned with standards are collaborating with the Government in maintaining standards:

Philippines Standards Association
Philippines Sugar Institute
Philippines Cement Institute
Philippines Pharmaceutical Manufacturers Association
Philippines Association of Construction Materials Manufacturers
Philippines Association of Flour Mills
Plywood Manufacturers Association, Inc.
Textile Mills Association of Philippines
Chamber of Filipino Food Manufacturers Inc.
Chamber of Home Industries of the Philippines, Inc.
Philippines Leather & Shoes Manufacturers Association Inc.

XII. ROLE OF RESEARCH IN STANDARDIZATION

Research connected with standardization and preparation of standards is somewhat different from fundamental scientific research, and also applied research, which aims at a development of new products and processes. This type of research is of great importance, since it is essential for the preparation of sound standards which will guide and ensure an orderly development of industry leading to over-all economy. The purpose of this research is very well defined.

While preparing any standards, the standards writer should be advised to draw freely from suitable standards which other bodies or countries have prepared. If these other standards are suitable, there should be no hesitation in adopting them. In many cases, a degree of change may be necessary; but, by and large, with minor changes or adaptations, they may be suitable. In many other cases however, adaptation would not serve the need and new data must be collected and sorted out pertaining to raw materials, processes and technical know-how existing in the country for which standards are being developed. Fresh investigations and research may be necessary.

When other standard models are not available, research and investigation become more significant and call for greater effort. First, all characteristics amenable to standardization have to be decided upon. Then, for each of them, suitable specification limits have to be decided upon on the basis of available data, not from one laboratory or a single industry, but from a series of them working in close co-operation. Results will need statiscal analysis and treatment before they can be incorporated in the standards.

Normally, the research for standardization involves:

(a) Laying down suitable methods of test sampling for guidance of quality specified in the standard.
(b) Recommending new and standard materials for use in industry.
(c) Drawing up codes of practice for establishing sound practices on a country wide basis.
(d) Suggesting the best available materials and methods, keeping in view the climatic conditions (tropical in most of the ECAFE countries) prevailing in the country.
(e) Fitting in with special projects, such as the steel economy programme of ISI (India).
(f) Breaking completely new ground, such as the work done in India on olfactory assessment of the odoriferous principles of essential oils.

Apart from work in the national field, a country participating in the international standards work will be called upon to formulate the country's view-point regarding technical matters discussed in the international forum. This involves compilation of technical data and carrying out research investigations by different organizations in the country. This research data, after due statistical analysis, will form the basis of the country's technical stand-point at international gatherings.

In India, research institutions belonging to the Government Council of Scientific and Industrial Research, that is, private bodies in all sections, have actively co-operated in carrying out research and investigation for standards work both in the national and international fields. The subject of standards covers a very wide field, so the research organizations of almost all branches of science and technology get involved in this work.

ISI has produced 3,151 standards to date, and the research associated with the production of many of them was indeed colossal. The same will be the experience of other national organizations which are developing standards for their countries and which participate in international standardization work. Some examples have been chosen from the Indian standards under preparation and published on the research involved in their making. (See appendix H.).

XIII. CONCLUSIONS

The account given in this paper of the evolution of standardization from early times to its present form in the national and international fields has amply stressed the importance of standardization for both developed and developing countries. A world-wide network already exists, consisting of national standards bodies in more than fifty countries and two international agencies, ISO and IEC. The growth of standardization over the past half century or more has adequately proved that the basic concepts and procedures evolved during this time are sound and that the benefits of standardization are well appreciated and recognized. However, much more effort has to be made to promote standardization in the developing countries of Asia and the Far East as well as in Africa and in other underdeveloped areas of the world.

The planned development of industry in the developing economies — which has been to a great extent accepted by all developing countries — will be greatly assisted if standardization is preplanned or planned at the same time as the development of the industry. In planning standardization, developing countries should draw from the accumulated experience of other countries as reflected in the published standards and the recommendations of ISO and IEC. In order to draw upon this store of knowledge and experience most effectively, and with proper discrimination to suit the nations' over-all economic needs with the least wastage, the existence of a national standards body is a prerequisite. It is only through such an organization that a developing country can share the information flowing through multiple channels.

In the ECAFE region, the national standardization movement, except in a few countries, such as Australia, China, India, and Japan, has been rather weak. Assistance to many of the developing countries from outside sources for organizing and strengthening the national standards movements will be particularly fruitful.

The United Nations, other aid-giving organizations, and the developed countries are giving valuable assistance, but there is a great deal of scope for augmenting the help needed for the proper development of standards.

There is a great need to co-ordinate these national standards efforts in respect of many common problems and interests of the region. Regional standards associations or committees on the pattern of the Pan American Standards Committee or the European Standards Co-ordinating Committee, with a Standard Section in ECAFE as the executive cell, would be a step in the right direction.

Help to countries which have not yet established standard organizations on the national level could also be rendered by the countries of the ECAFE region which have active standard bodies: Australia, China (Taiwan), Japan and India.

To benefit from the experience of advanced countries, it is essential for countries which have not yet enrolled themselves as members of ISO and IEC to get from other countries the standards published or in the process of publication or evolution. This would establish a basis for exchanges of standards and other publications among all countries of the region. The Indian Standard Institute has already made available all its standards and publications to many countries and gladly responds to requests for such publications. Another means of getting the benefits from countries with developed standardizations programmes would be exchanges of technical personnel with them. Standards technicians from advanced countries would be able to help organize standards bodies or help in the formulation of standards in the less developed countries. Technicians from the less developed institutions could get experience and training in the more developed institutions.

Export promotion is vital to all developing countries to improve their foreign exchange earnings, so as to sustain their economic development through industrialization. Quality control for export in association with pre-shipment inspection, which is really an extension of the standardization movement to promote, extend and stabilize exports, should be properly adapted by all developing countries of the region from the patterns developed by Japan and India to assist their export drives.

XIV. RECOMMENDATIONS

All countries of the ECAFE region should establish national standards bodies organized on the patterns best suited to each of them, but embodying the basic principle of intensive consultation among all interests concerned.

All national standards bodies should, as soon as possible, join ISO and IEC as members and participate to the greatest extent possible in the technical activities of these agencies. If regular membership is not feasible, corporate membership may be sought in collaboration with other countries which are also not able to join as full members, on the basis of a procedure now being worked out by ISO.

A Standards Section should be established in the ECAFE Industries Division for co-ordinating the standardization activities of the region. It would undertake investigations in the field of standardization, organize standards symposia and training courses, and undertake all such activity as will accelerate standards movement in the region.

A regional standards committee — The Asian and the Far East Standards Committee should be constituted. Countries such as China (Taiwan), India, Iran, Japan, Korea (Republic of), New Zealand, Pakistan, and the Philippines should be full members. The other countries would be represented by the ECAFE Standards Section (Recommendation 3). The Standards Section also act as executive body of the Asian and the Far East Standards Committee. As soon as non-member countries establish their national standards bodies, they should become full member of AFESC.

All standards organizations of the ECAFE region which have no exchange arrangements should enter into bilateral arrangements with other countries for the exchange of standards and other publications. This will help greater co-ordination of standards on the regional basis.

Countries of ECAFE area which have established standards bodies should help other less developed countries by:

(a) Making available facilities for training in the techniques of standardization to technicians from less advanced countries.

(b) Making available experts to other countries which require their services to help organize standards bodies, or help with special assignments such as steel economy, or with the establishment of certification marking procedure or quality control organization for export.

(c) Carrying out investigations on standardization matters at the request of other countries.

Countries of the ECAFE region should consider the extension of the standardization movement to the field of quality control of products both for the domestic (certification marking by standards bodies) and export market. For the latter, procdure for pre-shipment inspection and control of quality should be established.

The governments of countries of the region which utilize certification marks as a third-party guarantee

should consider giving preference in their purchase to products bearing such marks.

Countries should start bilateral discussions to consider giving mutual recognition to one another's national certification marks.

ECAFE countries should take steps to organize consumer co-operative movements for the improvement of consumer goods. These organized bodies could give most effective help to the national standardization movements, authoritatively stating the consumer viewpoint to the committees establishing standards. They could also assist in the implementation of those standards in the field of consumer products.

ECAFE (through its AFESC) should initiate work in various fields of common interest to this region, such as standardization in the steel industry, in the aluminium industry, in the building and housing industry, in the building and housing industry, in the development of standard terms and definitions, standardization and unification of measuring units, and so on.

Appendix A

DEFINITIONS IN STANDARDIZATION

A standard has the following characteristics:

(1) A standard is a rule.
(2) A standard usually covers recurring problems.
(3) A standard is the solution to a real technological problem that for all practical purposes has been solved.
(4) A standard is temporary.
(5) A standard is the result of selection.
(6) A standard is a written statement.
(7) The foundation of each standard is a specification defined to record one experience of a problem which subsequently becomes recognized as a recurring problem.
(8) Standards are established only if the problem has elements of universality or general application.
(9) To standardize is to manage routine operations.
(10) A standard must be accepted by the consensus of its users.

Keeping in mind the above enumerated characteristics of standards, the following definitions can be formulated.

Specification

A specification is a concise statement of the requirements for a material, process, method, procedure, or service, including, whenever possible, the exact procedure by which it can be determined that the conditions are met within the tolerances specified in the statement.

A specification does not have to cover specifically recurring subjects or objects of wide use, or even existing subjects.

Standard

A standard is a specification accepted by recognized authority as the most practical and appropriate current solution of a recurring problem.

Appendix B

ISI TRAINING COURSE COMPANY STANDARDIZATION — PROGRAMME OUTLINE

In all, 34 sessions will be held during the ten-day programme. The sessions for the programme are designated as A, B, C and D.

FIRST DAY

Session IA Opening Session Opening remarks. Introduction of participants.	Session IC General Concept. Historical background. Concept and significance of standardization. Definition of terms.
Session IB Programme Objectives. Explanation of programme objectives. Method of conduct and outline of assignment.	

SECOND DAY

Session 2A Aims and Objectives. Aims and objectives of standardization. Levels of standarization.	Session C Standards Functions. Outline of major standards functions in a company and other related functions, such as co-ordination, simplification and unification.
Session 2 B Indian Standards Institution. ISI organization and its working. Types of national standards.	Session 2 D Review. Review of theory and material covered. Answers to questions from participants.

THIRD DAY

Session 3A Company Standards Programme. Managerial backing. Source of information and programme for organized company standards activity. Levels of company standardization. Session 3B Formulation of Company Standards. Value of documented standards. Various methods used in the formulation of standards depending on the types required. When to set up standards and how.	Session 3C Overseas Technical Collaboration and Standardization. Problems of collaboration vis-a-vis use of national standards.

FOURTH DAY

Session 4A Standardization in Design. Design manual. Use of common materials, parts and drawings.	Session 4C Standardization in Scheduling and Controlling. Scheduling, controlling and checking. Flow of raw materials to finish products.

Session 4B Standardization in Design. (continued)

Session 4D Specific Standardization Situations. Discussion on types of standards necessary for regulating company practices. Adoption of national standards, foreign standards and other company documents.

FIFTH DAY

Session 5A Cost Reduction Through Standardization.

Examples from overseas experiences — report by UNTAB Expert.

Session 5B Material Management.

Relation of standards to procurement practice. Value and use of purchase specifications.

Session 5C Material Management. (continued)

SIXTH DAY

Session 6A Value Analysis. What it is. How standards can be used to help this analysis.

Session 6B Value Analysis. (continued)

Session 6C Report. Summary and presentation of solutions to the problems discussed at session 4D.

SEVENTH DAY

Session 7A Systems for Identification. Numbering of documents and drawings. Coding of stores and materials.

Session 7B Management Support of Standards.

Place of standards in management. Responsibility of management to standards.

Session 7C Management Support of standards. (continued)

What steps are necessary to convince management to initiate standards programme. Discussion by participants.

Session 7D Assignment.

Each participant to prepare a draft scheme of his choice on numbering of drawing or coding of stores or coding of parts.

EIGHTH DAY

Session 8A Case Histories.

How to set up and operate a company standards department. Case histories of successful company standards activities.

Session 8B where Companies Require Immediate Standardization. Areas within a company requiring standardization.

Session 8C Format of Company Standards. Layout and style for drafting company standards.

Session 8D Assignment. Each participant to draft a standards specification on an item of his choice.

NINTH DAY

Session 9A Drawing Control.

Control of drawings in view of standardization, efficient manufacturing, economic use of materials, instructions on finish, etc.

Session 9B Drawing Control. (continued) Discussion.

Session 9C Review. Answers to questions.

TENTH DAY

Session 10A Report.

Presentation of individual participants' reports. Discussion and answers to participants.

Session IOB Report. (continued)

Session 10C Concluding Session. Concluding remarks. Final review. Group discussions.

Appendix C

NUMBER OF ISO RECOMMENDATIONS APPLIED BY THE MEMBER BODIES

Original: ISO/RAP (GS-2) 2, Jan., 1964

No.	Member [a] Body	Number of ISO recommendations applied by the Member Body: all together	totally	partially	Number of ISO recommendations the application of which is:	
		T + P	T	P	in process	envisaged
1.	United Kingdom	244	172	72	6	51
2.	Soviet Union	195	112	83	34	45
3.	India	168	116	52	37	51
4.	Netherlands	166	128	38	46	76
5.	France	156	140	116	50	58
6.	Japan	139	61	78	8	48
7.	New Zealand	113	76	37	10	40
8.	Australia	86	39	47	13	58
9.	United States	74	37	37	7	15
10.	Korea, Rep. of	21	0	21	9	12
11.	Pakistan	18	18	0	11	0
12.	Burma	5	2	3	3	2
13.	Indonesia	did not reply	—	—	—	—
14.	Iran	did not reply	—	—	—	—

[a] Only those ISO member bodies who are members of ECAFE are listed.

Appendix D

INTERNATIONAL ELECTROTECHNICAL COMMISSION TC/18 — EIGHT COMMANDMENTS FOR STANDARDIZATION

(1) *Standardization means sacrifice*

Do not enter here with the intention that all your own ideas will be realized.

(2) *"This is our standard practice"* is no argument. The practice in other countries may be equally good.

(3) *Each proposal has to be judged by its own merits*

Experience and unbiased judgement must be taken fully into account.

(4) *If the ideal solution cannot be reached at this moment we must adopt the best compromise*

This is better than no decision at all.

(5) *If you cannot make a decision for your own country do not condemn the opinions of others*

It may collide with your own national regulations but be internationally of great help and

perhaps in the future be adopted also in your own country.

(6) *Do not insist on discussion of matters of minor importance*

We have no time to spare.

(7) *Do not try to change the sequence of paragraphs or argue about editorial arrangements*

The editing committee will be glad to correct any error or to consider major rearrangements in the second edition.

(8) *Standardization means co-operation*

If we now succeed all parties will have great moral and material profit.

Appendix E

While the Indian Government has all along been alive to the need for introducing compulsory quality control and preshipment export goods and has introduced some action in respect of some goods, the measures thus far taken have been somewhat *ad hoc*. Planned activity in this respect followed the enactment of the Export (Quality Control and Inspection) Act 1963, and formation of the Export Inspection Council —the operational body.

Compulsory quality control and preshipment inspection have already been introduced in respect of the following products:

Sann hemp; unmanufactured tobacco; raw wool; bristles; goat hair; lemongrass; sandalwood oil; palmarosa oil; black peper; cardomom, chillies; myrobalan; cashew kernels; walnuts; table potatoes; vegetable oils: viz, castor oil, refined safflower oil, refined cotton seed oil, linseed oil (including refined oils), groundnut oil; hydrogenated vegetable oil; vetiver oil; mica, all forms (other than micanite and micanite products, fabricated mica parts and mica power); salt; Etawah bedspread (handloom); bleeding Madras (handloom); Tussar silk fabrics, woollen fabrics; woollen yarn and woollen hoisery; rayon and synthetic fibre goods; jute hessian; heavy cee jute bags; A-twill jute bags; jute corn sacks; aluminium utensils; tea-chest plywood; frozen prawns; prawns cannot in brine or dry packed; animal casings; fruit and vegetable products; steel sections; drugs and pharmaceuticals (under the Drug Act).

Commodities which are likely to be brought under compulsory quality control during the year 1965-66 are:

Pulses; onions; garlic; ginger; turmeric; edible mushrooms; tendu leaves; H.P.S. groundnut kernels; oil cakes; frog legs; dried prawns and other fish products; P.V.C. leather cloth and other plastic goods; footwear; mineral ores (iron ore, manganese ore, chrome ore, silimanite, kyanité, bauxite, ilmenite); other forms of jute products; coir yarn and coir products; all forms of cotton textiles; other forms of handloom products such as handkerchiefs, furnishing fabrics; pure silk (mulberry); important items of engineering products such as heavy machinery, disesel engnies, sewing machines, cycles, machine tools, household appliances; handicrafts items, such as carpets, druggets, metalwares, woodwares, jewellery; important items of chemicals.

Processed Foods

Compulsory quality control is already being exercised for

(1) fruits and vegetable products — Fruit Products Control Order, 1955 under Essential Commodities Act, 1955.

(2) vegetable oil products through Vegetable Oil Products Control Order, 1955, under Essential Commodities Act.

(3) food articles through the provisions of Food Adulterations Act, 1955.

Salt

Shipments of salt can be made only if certified as worthy of export by the Salt Commissioner.

Drugs

Quality of drugs for export and internal consumption is regulated by the Drugs Act. Drugs can be exported only if they conform to standards under the Drugs Act. Indigenous medicines are not covered. Measures for bringing in control in the sphere of the country system of drugs are being contemplated.

Textiles

The Textiles Committee Act 1963 is intended to control the quality of textile goods of all types as well as textile machinery, both for the export and the internal market. The Textile Commissioner and the Cotton Textile Fund Committee are in the process of implementing the arrangements for control. Bleeding Madras export is already under control under a scheme worked by Control Textiles Fund Committee. Etawah bedspreads are similarly under control exercised by the Cotton Textiles Fund Committee or the Industries Department of U.P. state government.

Rayon, articificial silk, and pure silk goods are subject to compulsory preshipment inspection and certification is given on the buyers' requirements if stipulated in the contract. Cotton textiles for export are also subject to preshipment inspection through ITEX or the FACTUAL certification marking system operated by the Cotton Textile Fund Committee.

Jute

The jute industry has come under quality control and preshipment inspection in respect of the main items of export from 1 January 1965. The goods carry the ISI certification mark.

Engineering Productions

Engineering products have been divided into six categories for the purpose of control of quality.

Group A consists of the following items:

Motor vehicles, scooters, motorcycles, mopeds, diesel engines, air compressors, power

driven pumps, electric motors, transformers and switch gears, electric wires and cables, dry batteries, storage batteries, electric fans, G.I.S. electric lamp and fluorescent tubes, radio receivers and P.A. equipments; refrigeration and air-conditioning equipment, fabricated steel structures, transmission line towers, bicycles, sewing machines, typewriters and duplicators, small tools, coated bonded abrasives, crown cork, metal domes, capsules and cap seals, bolts, nuts, rivets, screws, wire nails, etc., aluminium and tin plate packages in made up or component form, printed metal hardware, toys and advertisement novelties, steel furniture including tubular articles for all purposes, steel pipes and tubes, cast iron pressure and non-pressure pipes, steel castings, precision iron castings (lathe beds; cylinder blocks, crank cases and machine castings), dies, jigs and fixtures, non-ferrous alloys, semi-finished extrusions and forgings.

Group B

Items such as:

Machine tools, railway track fasteners and accessories, railway signalling equipment and train lighting equipment, railway wagons. Inspection for export can be undertaken by the inspection wing of the Director-General of Supplies and Disposals.

Group C

Locomotives
Industrial shunters
Integral coaches

For this type of article, no export inspection is considered necessary because of the high quality of production and quality control exercised by the manufacturers concerned.

Group D

The machinery listed here will be treated as those is group A.
Textile machinery
Jute mill machinery
Sugar mill machinery
Paper and pulp mill machinery
Tea processing machinery
Industrial machinery not otherwise specified
Automobile ancillaries
High-tension power transmission line equipment (where package contracts are concerned)

Group E

Utensils of metal, buckets and bath tube, other kitchen and household hardware, EPNS ware, locks and padlocks, builders hardware, steel trunks, umbrellas and umbrella fittings, barbed wire, wire gauze, mesh etc., expanded metal, pressure lamps and stoves, and so forth.

These items of consumer goods should come under ISI certification marking to indicate their sea-worthiness.

Group F

In this group are: rolled steel sections produced by the five large integrated steel plants in the public and private sectors, as well as by rerollers. The whole scheme of certification under ISI has been successfully worked out and the country's entire production is being certified by ISI from 1 April 1965. The Metallurgical Inspectorate of the Directorate General of Supplies and Disposals is the competent authority controlling the scheme on behalf of ISI.

Chemical and Allied Products

A very large number of chemical products enter the export field and these have been classified into nine broad categories:

1. Inorganic miscellaneous chemicals
2. Organic chemicals
3. Pigments, paints, varnishes, etc.
4. Soap, cosmetics and toiletries, etc.
5. Plastics and their products.
6. Rubber goods
7. Glass and glassware
8. Ceramics and refractories
9. Paper and paper products

No single approach will solve quality control problems of such varied products; however, there cannot be two opinions as to the importance of application of techniques during production, particularly as it is difficult to sort out goods for export from goods for indigenous consumption. Quality control will have to be organized by the manufacturer under some super-inspection by organizations like ISI Certification Marking Scheme. After this has been done, quality checking on samples and preshipment inspection could be carried out on lots intended for export. A phased programme is being worked out as to which item should receive priority for introducing quality control and preshipment inspection on a compulsory basis.

A. Laboratories of the Council of Scientific and Industrial Research — 29
B. Central Government Laboratories — 68
C. Quasi-Government Laboratories — 22
D. State Government Laboratories — 80
E. Quality Marking and Inspection Depots for Handicrafts — 69
F. University and Research Institution Laboratories — 91
G. Private Laboratories
H. Laboratories under Agmark Scheme — 23
I. Laboratories where Paints and Varnishes are graded — 4
J. Laboratories for Soap Analyses — 39
K. Laboratories under Small Industries Service Institute — 7

Cargo Inspecting forms in India — 16

Appendix F

JAPANESE INSPECTION SYSTEM OF EXPORTS

List of commodities designated and prescribed for compulsory inspection of quality under the Article 2 of the appropriate Law.

I. Machinery & Metals

1. Wire nettings
2. Tolls—13 items
3. Bearing and its parts —9 items
4. Screw items rivets and spikes—6 items
5. Parts and accessories of textile machines—6 items
6. Handknitting machines for home and parts—3 items
7. Survey instruments—4 items
8. Farm machines — 5 items

8–2. Sprayer and spreader —4 items

9. Saws — 4 items
10. Sewing machine for home use and parts — 30 items
11. Accessories of sewing machines — 2 items
12. Timepiece and parts — 4 items
13. Biological microscope — 1 item
14. Refracting telescope and parts — 4 items
15. Hand camera and lens — 1 item
16. Cine camera and parts — 2 items
17. Projectors — 3 items
18. Metal working machine — 6 items
19. Electrical Machines and Appliances — 12 items
20. Electrical communication instruments and parts — 11 items
21. Automobile parts, accessories and equipment for adjustment — 21 items
22. Internal combustion engines — 13 items
23. Marine use non-ferrous propellor (less than 2500 mm) — 1 item.
24. Bicycle tricar and parts and accessories — 23 items
25. Measuring instruments — 3 items

II. Chemical Goods

26. Reagent Chemicals — 68 items

III. Sundries

27. Rubber goods — 19 items
28. Glassware & articles — 11 items
29. Mirror — 1 item
30. Opthalmic glass goods and parts — 3 items
31. Personal ornaments (artificial jewels etc.) — 1 item
32. Celluloid sheet, bar and tubes — item
33. Celluloid goods — 1 item
34. Synthetic resin goods — 4 items
35. Chinaware — 3 items
36. Enamelled ironware except for brewing, car and marine uses — 1 item
37. Metal tableware except aluminium, almite, antimony, tin and cast iron goods — 1 item
38. Aluminium sheet products except for industrial furniture building material medical treatment, toys cigarette case & electric appliance use — 1 item
39. Antimony ware except for industrial use — item
40. Metal watch band — 1 item
41. Smoking articles — 2 items
42. Bending type pocket knife — 1 item
43. Handsewing needle — 1 item
44. Umbrella & parts — 4 items
45. Toys — 2 items
46. Fishing hook — 1 item
47. Musical Instrument — 3 items
48. Stationery — 5 items
49. Brush — 1 item
50. Wooden tableware and kitchenware — 1 item
51. Lacquered articles — 7 items
52. Bamboo articles — 2 items
53. Badminton rackets — 1 item
54. Bristle
55. Bangkok paper hat body — 1 item.

IV. Textiles and Products

56. Viscose staple fibre — 1 item
57. Acetate staple fibre — 1 item
58. Yarn containing over 10% wool in composition — 1 item
59. Spun silk yarn
60. Linen yarn except spun yarn — 1 item
61. Rayon yarn except sewing thread — 1 item
62. Staple fibre yarn except sewing thread — 1 item
63. Bemberg yarn, except sewing thread — 1 item
64. Acetate rayon yarn except sewing thread — 1 item
65. Cotton yarn
66. Fabric containing over 10% wool except that which is less than 2 metres in length — 1 item
67. Silk fabric — 1 item
68. Bolting cloth & stencil cloth — 1 item
69. Linen fabrics — 1 item
70. Rayon fabric — 1 item
71. Staple fibre fabric — 1 item
72. Bemberg fabric — 1 item
73. Acetate rayon fabric — 1 item
74. Cotton fabric — 1 item
75. Blanket, Kakumaki, & rugs not made of synthetic fibre — 1 item.
76. Endless felt and jacket — 1 item
77. Press felt — 1 item
78. Felt hat and body
79. Carpet — 1 item
80. Gunny bags
81. Linen hose
82. Knitted cloth
83. Knitted goods
84. Sarong, saree and the like
85. Lappet-yashimagh
86. Table cloth
87. Muffler, scarf, etc.
88. Bed sheets and spread
89. Undershirt
90. White shirt and blouse items
91. Outer coat made of textile
92. Dress accessories — textile
93. Textiles — furnishing
94. Paper hat
95. Hemp braid, etc.
96. Umbrella cloth
97. Towelling and towel
98. Towel goods
99. Rubber thread-woven in fibric
100. Embroidery lace
101. Chemical lace
102. Bobbin lace
103. Textile tassel, etc.
104. Fishing yarn
105. Twine for fishing net

A. Agricultural, Forestry and Marine Products

106. Tea
107. Chillies, not powdered
108. Dried mushroom
109. String beans, soybeans, etc.
110. Fruit — 4 items
111. Vegetables — 3 items
112. Pickles — 7 items
113. Bulb — 2 items
114. Seed
115. Pyrethrum
116. Peppermint — 2 items
117. Straw braid
118. Figured straw matting
119. Grass matting
120. Raw furs — 7 items
121. Angora rabbit hair
122. Plywood for general purpose
123. Veneer chest
124. Board structure for fir chest.
125. Flooring
126. Lauan board and hardwood board.
127. Bobbin plank
128. Sleeper
129. Wooden electric pole
130. Frozen marine products
131. Dried aquatic products
132. Salted aquatic products — 2 items
133. Crude liver oil
134. Agar-agar
135. Fish meal and fish scrap
136. Seed oyster
137. Soy-sauce
138. Condensed & powdered milk
139. Canned and bottled food
140. Monosodium glutamate
141. Vegetable wax

VI. Medicine and Medical Instruments

142. Injection syringe, injection needle and gut string for surgical operation.
143. Medicines.

Under the Export Inspection Law, the Government has designated 74 institutions and laboratories as inspection organs. The institutions are classified as

Governmental	— 35
a) Ministry of International Trade & Industry	— 10
b) Ministry of Agriculture & Foresty	— 5
c) Ministry of Health & Welfare	— 1
d) Ministry of Transport	— 19
Non-Governmental	— 39

Appendix G

ASSOCIATIONS COLLABORATING WITH ISI IN ESTABLISHING AND MAINTAINING STANDARDS

1. Ahmedabad Millowners' Association
2. Ahmedabad Textile Industry's Research Association
3. All India Automobile & Ancillary Industries Association
4. All India Bobbin Mfrs. Association
5. All India Distillers Association
6. All India Federation of Master Printers
7. All India Handicrafts Board
8. All India Handicrafts Board
9. All India Instrument Manufacturers & Dealers Association
10. All India Non-Ferrous Metal Industries Association
11. All India Plastics Manufacturers Association
12. All India Pottery Manufacturers Association Ltd.
13. All India Radio Merchants' Association
14. All India Stainless Steel Industries Association
15. All India Starch Mfrs Association Private Ltd.
16. Associated Chambers of Commerce of India
17. Association of Man-Made Fibre Industry
18. Association of Merchants & Mfs of Textile Stores and Machinery, India
19. Automotive Mfrs. Association of India
20. Bengal Chamber of Commerce and Industry
21. Bengal Glass Manufacturers' Association
22. Bengal Hosiery Manufacturers' Association
23. Bengal Millowners' Association
24. Bengal National Chamber of Commerce & Industry
25. Bharat Chamber of Commerce
26. Bombay Chamber of Commerce & Industry
27. Bucket Manufacturers Association of India
28. Builders' Association of India
29. Calcutta Paper Traders' Association
30. Calcutta Tea Chest Fittings Manufacturers' Association
31. Coal Consumers' Association of India
32. Cochin Chamber of Commerce & Industry
33. Concrete Association of India
34. Cycle Manufacturers' Association of India
35. Eastern Regional Electrical Contractors' Association (India) Ltd.
36. East India Cotton Association Ltd.
37. Engineering Association of India
38. Fan Makers' Association of India
39. Federation of Biscuit Mfrs. of India
40. Federation of Electricity Undertakings of India
41. Federation of Gujarat Mills and Industries
42. Federation of Indian Chambers of Commerce and Industry
43. Federation of Sports Industries
44. Grain, Rice & Oilseeds Merchants' Association
45. Indian Battery Manufacturers' Association
46. Indian Chamber of Commerce
47. Indian Chemical Manufacturers Association
48. Indian Colliery Owners' Association
49. Indian Confectionery Manufacturers' Association
50. Indian Cotton Mills' Federation
51. Indian Electrical Mfrs' Association
52. Indian Engineering Association
53. Indian Foundry Association
54. Indian Jute Mills Association
55. Indian Lamp Factories' Association
56. Indian Machine Tool Manufacturers' Association
57. Indian Merchants' Chamber
58. Indian Paint Association
59. Indian Mining Association
60. Indian Non-Ferrous Metals Mfrs' Association
61. Indian Paper Makers' Association
62. Indian Paper Mills Association
63. Indian Patent Stone Co. Ltd.
64. Indian Plastics Federation
65. Indian Plywood Industries' Research Association
66. Indian Pump Manufacturers' Association
67. Indian Refractory makers Association
68. Indian Rope Manufacturers' Association
69. Indian Rubber Industries Association
70. Indian Salt Manufacturers' Association
71. Indian Sugar Mills Association
72. Indian Tea Association
73. Indo-German Chamber of Commerce
74. Insurance Association of India
75. Madhya Pradesh Millowners' Association
76. Madras Chamber of Commerce
77. Maharashtra Chamber of Commerce
78. Mahratta Chamber of Commerce and Industries
79. Merchants Chamber of Commerce
80. Millowners' Association
81. Non - Power Soap Manufacturers Association
82. Pepper & Ginger Merchants' Association Ltd.
83. Plywood Manufacturers Association of India
84. Punjab & Delhi Chamber of Commerce
85. Radio Manufacturers' Association of India
86. Roller Flour Millers' Federation of India
87. Silk and Art Silk Mills' Research Association
88. Silk and Art Silk Mills' Research Association
89. Southern India Chamber of Commerce
90. Southern India Millowners' Association
91. Southern India Skin & Hides Merchants Association
92. South India Textile Research Association
93. Steel Re-Rolling Mills Association of India
94. Surat Chamber of Commerce
95. Tea Chest Fittings Manufacturers Association of India
96. Textile Association (India) Regd.
97. Textile Machinery Manufacturers' Association
98. Textile Processors' Association
99. Tinplate Fabricators Association
100. U. P. Cotton Textile Mill Owners' Association
101. Upper India Chamber of Commerce
102. Vanaspati Manufacturers' Association of India
103. Vitreous Enamellers Association
104. West Bengal Hosiery Association
105. Agra Shoe Manufacturers' Association
106. Agra Iron Founders' Association
107. Ahmedabad Mill & Gin Stores Merchants' Association
108. All India Cottonseed Crushers' Association
109. All India Dental Traders' Association
110. All India Food Preservers' Association
111. All India Ice Cream Manufacturers' Association

112. All India Non-Edible Oil Industry Association
113. Andhra Chamber of Commerce
114. Association of Electrical Undertakings
115. Bihar Chamber of Commerce
116. Bombay Industries Association
117. Bombay Pipes & Fittings Merchants Association
118. Bombay Suburban Village Industries Association
119. Delhi Brick Kiln Owners' Association
120. Delhi Katha Dealers Association (Regd)
121. Delhi Milk & Sweet Merchants Association (Regd)
122. Electrical Contractors' Association of Eastern India
123. Employers' Association of Northern India
124. Federation of All India Food grain Dealers' Association
125. Federation of Hotel & Restaurant Association of India
126. Federation of Plywood Industry
127. Hindustan Chamber of Commerce
128. Howrah Manufacturers Association
129. Illuminating Engineering Society of India
130. Indian Chamber of Commerce
131. Indian Lac Exporters' Association
132. Indian Lemongrass Oil Exporters' Association
133. India Metal Window Association
134. Indian Mining Federation
135. Indian Produce Association
136. Indian Roads and Transport Development Association Ltd.
137. Indian Soap & Toiletries Makers' Association
138. Indian Society of Refrigerating Engineers.
139. Indian Tea Planters' Association
140. Industrial Labour Welfare Association Ltd.
141. Insulation Manufacturers, Distributors and Contractors Association Ltd.
142. Iron, Steel & Hardware Merchants Manufacturers Chamber of India
143. Jute Machinery Manufacturers' Association
144. Lantern Manufacturers' Association
145. Leather Goods Manufacturers' & Dealers' Association
146. Lime Manufacturers' Association India
147. Madras Jewellers' Diamond Merchants' Association
148. Madura Ra nad Chamber of Commerce
149. Malabar Tile Manufacturers' Association
150. Mechanical Engineers Association (India)
151. Meter Manufacturers Association of India
152. Nagpur Orange Growers' Cooperative Association Ltd.
153. National Insulation Manufacturers' Association
154. Nawanager Chamber of Commerce
155. Northern Indian Chamber of Commerce and Industry
156. Plywood Manufacturers' Association of West Bengal
157. Quality Marked Footwear Manufacturers' Co-operative Association Ltd.
158. Solvent Extractors' Association of India
159. South Indian Plywood Manufacturers' Association
160. Tanners' Federation of India
161. Trade Marks Owners Association of India Ltd.
162. Travancore Coir Mats & Matting Manufacturers' Association
163. Travancore Tile Manufacturers' Association
164. United Planters' Association of Southern India
165. U.P. Roller Flour Manufacturers' Association
166. Association of Indian Automobile Manufacturers
167. Calcutta Jute Fabrics Shippers Association
168. Indian Silk Association
169. Cement Manufacturers' Association
170. Western Indian Tile Manufacturers' Association

Appendix H

EXAMPLES OF RESEARCH FOR INDIAN STANDARDS

These are given under the following heads:

(1) *Specifications* for which characteristics amendable to standardization have been worked out and their values prescibed;

(2) *Methods of Test and/or Sampling* in which the best available methods has been prescribed keeping in view the laboratory conditions and other facilities in India;

(3) *Recommendations* for use of new, standard and cheap materials for use in industry;

(4) *Codes of Practice* for establishing a uniform and sound practice in industry;

(5) *Tropicalization Problems* which necessitate departure from overseas standards; on many occasions these require to be presented at the meetings of ISO and IEC technical committees for making their recommendations truly international; and

(6) *Steel Economy Programme* which has been launched by ISI; it is estimated that implementation of Indian Standards published under this scheme can save steel up to 20 per cent.

Under each of these heads, the information relating to the different research projects covers the particulars of problem and the numbers and years of the published Indian Standard(s) concerned or the manner in which the research project had been or is being utilized. Under 'Specification' the research projects have been grouped under Agriculture and Food Products, Building, Chemical, and so on.

I. SPECIFICATIONS

I.1. *Agricultural and food products*

(a) Sugar — bacteriological contamination, limits for colour requirements, method for determination and limits for hardness (IS: 1151-1958, IS: 1168-1958 and IS: 1679-1960).

(b) Chocolates — limits for starch, non-fat milk solids and crude fibre (IS: 1163-1958); and toffees — limits for acid insoluble ash (IS: 1667-1960).

(c) Commercial Beeswax-analysis and determination of various characteristics (IS: 1504-1959).

(d) Infant Foods — determination of limits for bacterial count (IS: 1547-1960, IS: 1656-1960 and IS: 1657-1960).

(e) Bonemeal-methods of detection of Bacillus anthracis and Clostridia of various species (IS: 1942-1961).

(f) Spices and Condiments — determination of analytical constants (IS: 1798-1961, IS: 1907-1961, IS: 1908-1961 and IS: 1909-1961).

(g) Pesticides and Pesticidal Formulations — Suspensibility, flocculation, apparent density,

biological efficacy, emulsion, stability, etc. (IS: 560-1961 to IS: 565-1961, IS: 632-1958 to IS: 634-1957, IS: 881-1956, IS: 882-1956, IS: 1050-1957 to IS: 1055-1957, IS: 1251-1958, IS: 1306-1958 to IS: 1312-1958, IS: 1486-1959, IS: 1488-1959, IS: 1506-1959, IS: 1507-1959, IS: 1665-1960, IS: 1669-1960, IS: 1682-1960; IS: 1824-1961, IS: 1827-1961, IS: 1832-1961 and IS: 1833-1961).

(h) White bread — determination of total ash, acid insoluble ash and crude fibre (IS: 1483-1954).

(j) Cornflakes — total ash content (IS: 1158-1957).

(k) Edible Groundnut flour — determination of analytical constants (IS: 1487-1959).

(m) Roasted Chicory Powder — determination of analytical constants (IS: 612-1962).

(n) Idli Mix — determination of analytical constants (IS: 2234-1962).

(o) Wheatmeal Bread — estimation of total solid contents (IS: 1960-1961).

(p) Oilcakes Used as Liverstock Feed — Collection of analytical data for evolving standards (IS: 1712-1960, IS: 1713-1960, IS: 1714-1960, IS: 1932-1961, IS: 1934-1961, and IS: 1935-1961 and IS: 2151-1962 Maize Germ Oilcake).

(q) Characteristics for standardization of special indigenous items Besan (IS: 2400-1963) Papad (IA: 2639-1964) Chewing Tobacco (IS: 2344-1963 and IS: 3041-1965) Soluble coffee powder (IS: 2791-1964) Wafer Biscuits (IS: 2397-1963) and Bombay.

I.2. *Building*

(a) Cement and Concrete — water-cement ration and strength of mortar and concrete, strength of concrete of different ages, quantity of water to be used in the compressive strength test for concrete, etc. (IS: 269-1958).

(b) Glazed Earthenware Tiles — performance requirements (IS: 777-1961).

(c) Modular Bricks — drying time (IS: 1077-1957).

(d) Surki — Lime Mixture (under preparation).

I.3. *Chemical*

(a) Denatured Spirit — testing of pyridine base and caoutchoucine, test for suitability of pyronimin and total bitters of neem as alternative complete denaturants (IS: 324-1959).

(b) Raw Materials for Rubber Industry — testing of sample (IS: 1683-1960, IS: 1684-1960 and IS: 1685-1960).

(c) Seedlac, Shellac and Bleached Lac — Round Robin tests for bleach index and bleachability (IS: 15-1956 to IS: 17-1956, and Recommendations of the International Organization for Standardization, namely ISO/R 55 to 57).

(d) Glass Containers for Fruit Preserves — thermal shock and alkalinity tests (IS: 1494-1959).

(e) Liquid Gold — comparative study of Indian and imported samples (IS: 1922-1961).

(f) Essential Oils — physico-chemical examination, determination of distinctive characteristics and their methods of tests. This has been completed in respect of oil of lemongrass (IS: 327-1961), aid of sandalwood (IS: 329-1961), oil of vetiver (IS: 1177-1957) and (IS: 1614-1960), citral (IS: 1799-1961), geraniol (IS: 1800-1961), citronellol (IS: 1801-1961) and ionones (IS: 1802-1961).

(g) Snake skins and Lizard skins — sampling and working out the physical and chemical requirements (IS: 2276-1962 and IS: 2545-1962).

(h) Phenolic Moulding Powders — analysis of indigenous and imported samples (IS: 867-1959 and IS: 1300-1959).

(j) Bleaching Earths — testing various samples for collection of technical data (IS: 1965-1961).

(k) Mutton Tallow — determination of analytical characteristics (IS: 887-1960).

(m) White Oil — testing of indigenous samples (IS: 1083-1957).

(n) Grease, Graphited for Leaf Spring — testing of various samples. Revision of IS: 508 incorporating this grease also under print.

(o) Bristeb (IS: 1844-1962), Nylon Monofilament (1843-1963) and orthopaedic Leather (to be issued).

I.4. *Electrotechnical*

(a) Air Circulator Fans and Pedestal Fans — performance values, determination of the value of tangent of loss angle of fan capacitors at 27°C, effect of variation in temperature and humidity on air delivery, etc. (IS: 374-1960, IS: 555-1960 and IS: 1169-1957).

(b) Three-Phase Induction Motors — performance of motors with class E insulation (IS: 325-1959).

(c) Electric lamps and Accessories — determination of insulation resistance of bayonet-caps and holder, and tests for vibration and torsion on lamps of locohead lamps at elevated temperature and higher humidity (IS: 418-1957, IS: 897-1957 and IS: 1258-1958).

(d) Domestic Radio Receivers — collection of data on a number of current models (IS: 615-1954).

(e) Loud Speakers — testing of different types for collection of data for leakage resistance after climatic tests (IS: 1490-1959).

(f) Lamps for Flashlights — determination of initial lumen and lumen maintenance percentage values (IS: 2261-1963).

(g) Power transformers — analytical constants (IS: 2026-1962).

(h) Leclanché type dry batteries for telecommunication (revision of IS: 586-1964).

(j) Domestic radio receivers — dry heat tests, endurance tests and overload tests (to be issued).

I.5. *Engineering*

(a) Pencils — beneficiation of Indian graphite, electrical resistance and other qualities of pencil lead, etc. (IS: 1375-1959).

(b) Cutlery & strain resistance of knife blades (IS: 921-1959) to (IS: 924-1959, IS: 992-1957 to IS: 994-1957, etc.).

(c) Hurricane Lanterns — lighting efficiency, storm proofness, surface temperature, fuel consumption, etc. (IS: 1238-1958).

(d) Metric Weights and Measures — designing (IS: 1056-1957 to IS: 1058-1957).

I.6. *Structural and metals*

(a) Chrome Molybdenum Steel Bars and Rods for Aircraft Purposes — effect of sizes and shapes of tensile test speciments on the yield stress values (IS: 963-1958).

(b) Graphite for Use as Foundry Facing Material — non-graphitic carbon content (IS: 1305-1963).

(c) Fireclay Refractories for Glass Melting Tank Furnaces — testing of indigenous and imported samples (IS: 1522-1960).

I.7. *Textile*

(a) Handloom Cotton Durries — determination of count of warp and weft yarn, count of yarn in selvedges, ends and picks per inch, weight per square yard, warpway and weftway breaking strength, etc. (IS: 1450-1959 and IS: 1557-1960).

(b) Jute Bags for Packing Cement — determination of length, width, weight, porter, shots, breaking load, bursting strength, seam strength etc. (IS: 2580-1963).

(c) Cotton Yarn for Handloom Cloth — testing of samples (IS: 1539-1960).

(d) Braided Cords — determination of length per unit weight, number of threads, etc. (Is: 1402-1959).

(e) Linen Sewing Thread — testing of samples for determining number of plies, count, length, direction of twist, etc. (IS: 2196-1962).

(f) Silk Fabrics — determining the denier of warp and weft, number of plies weave, ends and picks per inch, weight per square yard, breaking strength, shrinkage, etc. (IS: 1583-1960, IS: 1584-1960, IS: 1686-1960 and IS: 1687-1960).

(g) Cotton Calico — determination of width, count of yarn used, weight per square yard, threads per inch, breaking strength, etc. (IS: 1544-1960).

(h) Leather Picking bands for looms — determination of tensile strength, tear strength, tear strength, temporary and permanent elongation, supplenes, etc. (IS: 1255-1958).

(j) Flat Cotton Wicks for Hurricane Lanterns — rate of absorption of kerosene oil, pliability, swelling after immersion, etc. (IS: 1740-1960).

(k) Cotton Umbrella Cloth — investigations including determination of water absorption and water penetration (IS: 2457-1963).

(m) Tapioca Starch — viscosity values (IS: 1184-1957 and IS: 1605-1960).

(n) Cotton Embroidery Thread — determination of count of yarn; number of plies, turns per inch; direction of twist, length per weight, breaking strength, etc. (IS: 1803-1961).

(o) Cotton Selvedge Tape for Electrical purposes — determination of count of warp and weft, ends in full width, picks per inch, weave, width, weight, thickness, breaking strength, etc. (IS: 1923-1961).

(p) Cotton Spindle Tape for Jute Mills — tests for determining width, weave, weight, count of yarn, number of plies, breaking strength, percentage elongation at break, etc. (IS: 1974-1961).

(q) Shuttles for Plain Calico Looms — values for hardness of tips.

(r) Handloom Cotton Lungies — determination of values for various characteristic prescribed for certain varieties (IS: 750-1956).

(s) Linen Braided Cords — determination of count of the component single thread of the braid, length per unit weight, diameter of cordage, breaking strength, etc. (IS: 2197-1962).

(t) Cotton Webbing for Aircraft Safety Belts — determination of construction; number of ground ends, binding ends, wadding threads and picks per inch; count of yarn and weave (IS: 2651-1964).

(u) Several other materials were investigated for determination of characteristics amenable to standardization and standards issued.

(v) Inset Mail Wire Healds — determination of rigidity of wire in making (IS: 1936-1961).
(w) Worsted Socks — determination of stretchability (IS: 2187-1962).

II. METHODS OF TESTS AND/OR SAMPLING

(a) Sampling and tests for coal tar food colours (IS: 1699-1960).
(b) Tests for bituminous roofing felts (IS: 1322-1959).
(c) Testing and calibration of sieve shaker (Revision of IS: 1607-1960 under preparation. Work still in progress).
(d) Improvement in the Gutzeit test for arsenic (IS: 2088-1962).
(e) Tests for plastic bitumen for water-proofing purposes (IS: 1322-1959 and IS: 1580-1960).
(f) Method for protection against corrosion at high temperature and humidity (IS: 958-1958, IS: 1153-1957, IS: 1154-1957, IS: 1674-1960, etc.).
(g) Secondary cells and batteries: resistance to overcharge test (IS: 395-1959).
(h) Methods of sampling and testing refractory materials (IS: 1523-1960, IS: 1524-1960 and IS: 1528-1962).
(j) Method for determining silicon content in samples of aluminium and aluminium alloys (this work was required for an ISO technical committee; it has been completed and passed on for formulation of an International Recommendation).
(k) Sampling of gypsum (IS: 1289-1961) and coals (IS: 436-1953).
(m) Detection and estimation of damage in cotton yarn and cordage due to micro-organisms (IS: 1815-1961).
(n) Detection and estimation of damage in jute fabrics, yarn and cordages due to micro-organisms (IS: 2010-1962 and IS: 2011-1962).
(o) Estimation of carboxylic acid groups in cellulosic textile materials (IS: 1560-1962).
(p) Determination of strength of anthraquinonoid type of vat dyes (more work in progress).
(q) Sampling of bauxite (IS: 1999-1962).
(r) Tests on light electrical appliances (revised standard, namely IS: 302-1963 issued).
(s) Tests for contact resistance of switches used in flashlights (IS: 2083-1962).
(t) Insulation resistance of heating and cooking appliances after subjection to moisture treatment (revised standards, namely, IS: 365-1965 and IS: 369-1965 issued).
(u) Minimum life duration of dry batteries for transistor radio receivers (IS: 2576-1963).
(v) Measurement of noise and hum emitted by motor vehicles (IS: 3026-1965).
(w) Testing highly absorbent materials such as cotton gauze and cotton wool (IS: 2369-1963).
(x) Determination of total sulphur in rayon yarn (IS: 2427-1963).
(y) Thermal shock test for glassware (IS: 2619-1963, IS: 2620-1963 and IS: 2626-1963).
(z) Assessment of vegetable tanned leather against resistance to mould growth (revised standards, namely, IS: 579-1962 and IS: 580-1962 issued).
(a_1) Detection of adulteration of palmarosa oil and ginger grass oil (revision of IS: 326-1954 to be issued).
(b_1) Method of sampling lime stones (IS: 2109-1962).
(c_1) Method of grading glass for alkalinity (IS: 2303-1963).
(d_1) Olfactory assessment of natural and synthetic perfumery materials (IS: 2284-1963.

As India holds the secretariat of ISO/TC 113, several problems related to fluid flow measurement are being tackled to evolve ISO recommendations and revise IS: 1192-1959 and IS: 1193-1959.

Some of these problems are:

(i) Effect of silk quantity on (a) velocity distribution and discharge, (b) rating of current meter, and (c) discharge of coefficients of notches, weirs and flumes;
(ii) Use of bubble gauge.
(iii) Position of current meter with reference to the position of boat, and
(iv) Instructions for collection of data for determination of errors in flow measurements by Velocity Area Methods.

III. RECOMMENDATIONS FOR USE OF NEWS, STANDARD AND CHEAP MATERIALS

(a) Natural building stones — characteristics (IS: 1121-1957 to IS: 1126-1957).
(b) Gypsum building boards (IS: 2095-1964 Gypsum plaster boards).
(c) Magnesium oxychloride flooring compositions — tests for durability. (Revision of IS: 657-1956 under preparation. IS: 657-1962 issued).
(d) Recommendations for minimum electrical performance requirements of domestic radio receivers (IS: 615-1954).
(e) High silica sand for foundry purposes (IS: 1987-1962).
(f) Tamarind kernel powder — testing of samples (IS: 189-1956 and IS: 511-1954).
(g) A-twill jute bags for packing sugar — evaluation of performance (IS: 1943-1961).
(h) Indigenous building boards of which acoustic characteristics and functional requirement were determined (IS: 1950-1962 and IS: 2526-1963).

(j) Fly ash for use in pozzolanic cement slag for addition in concrete (IS: 2686-1964).
(k) Polythene pipes and PVC pipes for potable water supply (IS: 3076 Part I-1965).
(m) Mortar making properties of Ennore Sand (Revision of IS: 269-1958 under study).
(n) Lime Concrete — strength characteristics of different mixes being studied to prepare an Indian Standard.
(o) Composition of soils suitable for use in manufacturing tiles (Revised standard, namely, IS: 654-1962 issued).
(p) Suitability of aluminium for link clips for electrical wiring (IS: 2412-1963).
(q) Mica tapes — determination of dielectric strength (IS: 2464-1963).
(r) Effect of aluminium cap on brass holder of electric lamps (IS: 418-1963).
(s) Indigenous stoneware articles, industrial and household (IS: 2838-1964 and IS: 2839-1964).
(t) Cadmium plated wire healds (work in progress for revision of IS: 1190-1957).

IV. CODES OF PRACTICE AND REFERENCE MATERIALS

(a) On the basis of a survey of noise levels and noise comfort conditions, a code on sound insulation is being prepared (IS: 1950-1962 issued).
(b) Investigations on brightness ratio have been used in the preparation of a code on day-lighting of buildings (IS: 2440-1963 issued).
(c) After testing a number of samples of paper, a code for determination of weight factor of different types of paper pulp is being prepared (IS: 2724-1964 issued).
(d) Pile foundations specially suited for use in black cotton soils (IS: 2911-((Part I and II))-1964).
(e) Design and installation of thermally efficient brick kilns (data being collected to prepare Indian Standard).

V. TROPICALIZATION PROBLEMS

(a) Cables and conductors; the three problems are as follows:
  (i) Calculation and verification of values of physical constants for copper conductors at 27°C, the standard temperature for tropical countries (IS: 2982-1964 issued).
  (ii) Performance of rubber-insulated cables with reduced thickness of rubber-insulation to ascertain the suitability of the reduced rubber thickness in tropical climates (IS: 434 ((Part I & II))-1964).
  (iii) A comparative study of the behaviour of rubber-insulalted, PVC-insulated cables and insulated aluminium conductors for determining their suitability in tropical conditions (IS: 1554 ((Part I))-1964).
(b) Preconditioning tests to determine the behaviour of materials (particularly insulation) that go into the construction of domestic electrical appliances in tropical countries (Revised standards namely, IS: 365-1964, IS: 366-1965, IS: 367-1965 and IS: 369-1964 issued).
(c) Tests on caps of electric lamps to ascertain their suitability to withstand the temperatures encountered in the country (IS: 418-1963 ((revised)) issued).
(d) Tests on ballasts for fluorescent lamps to obtain data regarding their characteristics at 27°C (IS: 2418-1964).
(e) Values of leakage current for tropical countries (information required for IEC, but after the investigations have been completed, an Indian Standard is also to be prepared (Revision of IS: 616 being processed).
(f) Procedures for basic climatic tests for electronic components (IS: 589-1961 issued).
(g) A comprehensive study of corrosion phenomena in tropical atmosphere with special reference to Indian conditions; this includes the study of light-gauge structures, transmission towers, foundation steel work, etc. (Work in progress). CERI, NML and DRL, Kanpur, have completed the exposure tests. Three other laboratories are conducting their investigations.
(h) Determination of sp-gr at 27°/27°C of crotonaldehyde (IS: 2632-1964), industrial benzole (IS: 358-1964), butyl acetate (IS: 203-1963) and dinitrobenzene (IS to be issued).

VI. STEEL ECONOMY PROGRAMME

(a) Indian Standard Specification for: (i) Rolled steel beam, channel and angle sections, (IS: 808-1957); (ii) Rolled steel sections, bulb angles (IS: 1252-1958); and (iii) rolled steel sections, tee-bars (IS: 1173-1957) have already been published, besides a number of standards relating to the use of structural steel in general building construction and welding technology.
(b) The Indian Standard Schedules for Wrought Steels for General Engineering Purposes (IS: 1570-1961) has also been prepared with a view to reducing the number of steels manufactured in the country and conserving the indigenously available alloying elements.

(c) A typical crane was designed in accordance with the Australian, British and German codes and a draft code prepared by ISI. This comparative study has been found very useful in preparing an Indian Standard Code of practice for Design of Cranes and Hoists. (IS: 807-1963 issued).

(d) In addition, research work is in progress for the following:

(i) Development, design, use and protection of cold-rolled light gauge steel sections, including the study of the effect of cold straightening, punching shearing, etc; proportioning of sections; development of connecting methods and design procedures; protection against atmospheric corrosion; etc.

(ii) Certain basis problems of structural design, including design of rigid steel frames; investigations related of effective lengths of columns and struts in different structures and establishing design procedures and typical designs for columns and struts, development of design criteria for shear connectors for composite I-Beams and concrete slabs, determination of the effect of encasing steel columns and steel beams in concrete, etc. (Work at NTH is in progress).

(iii) Production of reference radiographs for steel welds for facilities of radiographic inspection and control. National Metallurgical Laboratory has brought out a Memorandum on the subject. The data are being examined further.

(iv) Determination of the lowest ambient temperature below which welding should not be recommended.

Structural shapes (IS: 808-1964, IS: 811-1961, IS: 1173-1957, IS: 1252-1958, IS: 1730-1961, IS: 1731-1961, IS: 1732-1961 IS: 1852-1962, IS: 1963-1961, IS: 1864-1963, IS: 2314-1963, IS: 2713-1964).

Codes of practice (IS: 800-1962, IS: 801-1958, IS: 803-1962, IS: 804-1958, IS: 806-1957, IS: 807-1963);

Welding (IS: 814-1963, ISL 916-1957, IS: 817-1957, IS: 823-1964, IS: 1181-1957, IS: 1323-1959; and

Standardization and rationalization of steels (IS: 1570-1961).

Appendix J

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APPENDIX K

Certification Marks Used in Some Countries of the Region.

Figure 1
India

(a) (b)

Figure 2
Japan

Figure 3
Republic of Korea

Figure 4
New Zealand

PART II. PATENTS

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SUMMARY

A patent is defined broadly as a statutory grant of monopoly for working an invention, and vending the resulting product. This grant is justified on the ground that it encourages invention and affords initiative for industrial development with all its concomitant benefits. It encourages research and invention; induces an inventor to disclose his secret; offers a reward for the expenses of developing inventions to the stage at which they are commercially practicable; and provides an inducement to invest capital in new lines of production which would not appear profitable if competing producers embarked on them simultaneously.

It is not enough to reward the inventor. The new invention should be brought into commercial use in the country and without undue delay. For this purpose certain conditions must be fulfilled, such as:

(1) the availability of a degree of non-patented technological base in the country on which the patented industry would be established;
(2) the availability of technical and managerial skill to make the patent workable; and
(3) the availability of capital ready to be invested on the patented process.

Many of these conditions are not completely fulfilled in various countries of the ECAFE region; therefore, many patents sealed in those countries have not led to establishment of industries, which would have meant greater industrialization.

Further there has been some abuse of patent laws in those countries and the patent laws are being amended or have already been amended in many of them. Other legislative action is being taken or is contemplated to prevent such abuses; however, prevention of such abuses would not automatically lead to industrial progress. The factors already mentioned complicate the issue. The role of patents in the technology of developing countries has been the subject of the study by the Secretary General of the United Nations and the conclusions drawn by the Secretary General for consideration by the United Nations have been included with chapter on conclusions.

PATENTS

I. GENERAL CONSIDERATIONS

Invention

The basis of all technical progress at all times has been the researches and inventions that have been carried out by inquisitive minds. While quite a number of inventors have been actuated by exclusively idealistic motives, the majority have been prompted principally by profit motives. The policy of encouraging inventions by statute, that is, granting of patents to secure to the inventor the exclusive right to control the production and to sell the product thereof for a number of years, dates back to 16th century England. This policy of patenting an invention has since been developed in all civilized countries of the world and today there is an elaborate system in accordance with which the respective rights of the patentee, of competing inventors and the public, are carefully defined and protected.

Basis of the patent system

A 'patent' may broadly be defined as a statutory grant of monopoly for working an invention and vending the resulting product. The use of the term 'monopoly' in the above definition may not be strictly accurate. The inventor does not get the right to work his invention only after the patent has been granted; that right is inherent in him. The patent only prohibits others than the patentee, or those authorized by him, from using the inventions by manufacture or selling the patented article or using or imitating the patented process or vending the resulting product.

If the patent system brought advantage only to the patentee, its existence could not be justified in terms of modern social law. The grant of such statutory patents is justified on the ground that it encourages invention and affords increased initiative for industrial development with all its concomitant benefits. In the words of the Swan Committee:

> "The theory upon which the patent system is based is that the opportunity of aquiring exclusive rights in an invention stimulates technical progress in four ways:
>
> 1. that it encourages research and invention;
> 2. that it induces an inventor to disclose his secret (which he would otherwise not do);
> 3. it offers a reward for the expenses of developing inventions to the stage at which they are commercially practicable; and
> 4. that it provides an inducement to invest capital in new lines of production, which would not appear profitable if any competing producers embarked on them simultaneously.
>
> Manufacturers would not be prepared to develop and produce important machinery if others get the results of their work with impunity."

The industrial progress of a country will, therefore, be considerably stimulated or retarded by its patent system, that is, depending on whether the system is suited to it or not.

In order to see what is suited to a country, it is necessary to consider the following points which govern decisions regarding the grant of patents.

The patent system is created not only in the interest of an inventor, but also in the interest of national economy. If the rules and regulations of the patent system are based on any consideration other than that of national economy, there is need to alter them. A grant of a monopoly was at one time justified in the United Kingdom, if it introduced a new manufacture *within the country*. The British Board of Trade in connexion with the Patent and Designs Amendment Bill of 1919 stated:

> "that the object of granting patents for new inventions is to benefit the trade or industry of the United Kingdom[1]. For this purpose, it is not enough to reward the inventor. It is also necessary to secure that new inventions be brought into commercial use without delay. To bring the new inventions to commercial use requires, in many cases, the co-operation of capitalists and the readiest way of securing this co-operation is a grant of monopoly.....
>
> .....
>
> The consideration of a grant of a monopoly for a new invention is not only the disclosure to the public of information which they can use when the period of monopoly expires, but the benefit to trade by new invention being brought into commercial use during that period. The public, therefore, are entitled to have the monopoly so framed and guarded that they are not deprived of this consideration. The real difficulty is to prevent the abuse of the patent monopoly."

The advantages to a nation's economy of granting patent for a limited period depend on two factors:

[1] Holds good for any country.

(1) The country must be sufficiently advanced technologically to maintain the rate of invention which is brought forth by the promise of reward. This would mean (a) a degree of diffusion of scientific and technological education, (b) massive industrial production, (c) an amount of speculative capital available for new ventures and profitable utilization in such industries.

(2) The patented invention must work in the country which grants the patent. It will thus be seen that the monopoly created by the patent offers advantages when the country is highly industrialized, when large capital is available and when a high degree of scientific and technological education exists.

The patent system in under-developed countries

As many of these conditions are in some degree not fulfilled in the various countries of the ECAFF region, critical study must be made and action taken to abrogate or alter the existing patent laws in these countries for their own benefit. An authoritative Committee[1] in India has stated: "The Indian patent system has failed in its main purpose, namely, to stimulate invention among Indians and to encourage development and exploitation of new inventions for industrial purposes in the country so as to secure the benefits thereof to the larger sections of the public." The Committee, however, strongly felt that the patent system should continue to be enforced in the country. Patent offices have been established in most countries of the world; appendix A gives (as far as is known) the designation and addresses of authorities responsible for granting and control of patents in the countries of the ECAFE region. It is not enough for the patent office to protect patent holders frome exploitation of their inventions by others, by granting them a monopoly use of their inventions for a limited period; it is also necessary to see that the industrial progress of the nation is not in any way jeopardized by the patentees' misusing the patent rights to the detriment of the nation. A critical examination of the various lacunae that exist in the Patents Act of 1911, which is still in force in India, will disclose the general lines on which patent laws for the developing countries (such as India) should be altered.

According to the Patent Act in India, at present (1) there is, with the exception noted below, no category of process or product which is excluded from the scope of patentability. Chemical and pharmaceutical products are patentable. Inventions relating to atomic energy, however, have been rendered unpatentable under the Atomic Energy Act 1962, the Government of India having assumed sole responsibility for the development of atomic energy in its territory. (2) An application for a patent may be made by any person whether he is a citizen of India or not, either alone or jointly with any other person. Once a patent has been granted, the rights accruing therefrom are the same for a foreigner or an Indian. The grant carries with it the right to licence or assign. The Indian Patent Act contains provision for compulsory licensing. Greater use should be made of this provision on the ground that the patent is not being worked or worked to the fullest extent or that the demand for the patented article in the country is not being met to an adequate extent. Under the present statute, there is no provision for the revocation of a patent on the ground of non-working; however, provision exists for such revocation on public grounds. If the Government considers that a patent or the mode in which it is exercised is mischievous and prejudicial to the public, the patent can be revoked.

It is difficult to assert categorically to what extent the existence of patent laws has hindered or helped the transfer of technology to the under-developed countries, as several other factors are relevant to the issue. Yet, as far as India is concerned, "the patent system has been misused and in some cases abused to the detriment of Indian interest, particularly for blocking free use of industrial processes for the growth and development of industries in the country and foreign nations who own most of the patents in this country do not generally work the inventions in the country." India is not unique in having to face this problem of patents, because of vital inventions being owned by foreigners who evince no desire to work them within the country; the problem is likely to be common to all under-developed countries which have adopted the patent system. Legislative measures have, therefore, to be taken under the new laws to minimize, if not eliminate, such abuses. One important provision would relate to foods, drugs and medicine, as these classes of invention touch public health and the well-being of the country. Such inventions should be free for all. This could be secured if all patents in this class are endorsed with the words "licence of right" so that any person interested can, as a right, demand a licence (on terms to be fixed by the authorities in the event of disagreement between the parties themselves.)

On the basis of these and other general considerations, the following important recommendations have been made by authorities in India[2] and these could be useful for other developing countries:

(1) *Inventions not patentable* — There should be certain classes of invention which by law should not be given patent monopolies. They include:

(a) Inventions contrary to law or morality or injurious to public health, frivolous inventions, discoveries of scientific principles, methods of agriculture or horticulture, medicinal, surgical or curative treatments

[1] Report on the "Revision of the Patent Law" by Shri Justice N. Rajagopala Ayyangar, Government of India Press, New Delhi 1959.

[2] See footnote[1] on this page.

or processes and methods, or processes of testing;

(b) Inventions relating to atomic energy;

(c) Patents are not to be granted for chemical products or substances in the case of chemical inventions. Inventions relating to chemical processes should, however, be patentable.

(d) Inventions relating to foods, drugs and medicines, that is, substances which are intended to be or are capable of being used as food, beverages or medicines, including vaccine, anti-biotics, insecticides, and germicides to be rendered unpatentable; and only process claims for manufacture of such substance should be patentable.

(2) *Government use* — The Government, and public corporations or public undertakings carried by the government departments should be authorized by the Act to use patented inventions, subject to payment of reasonable compensation, by statutory procedure without having recourse to application for compulsory licence.

(3) *Rights of patentees* — The importation of an article or substance which is protected under a patent in India should constitute infringements of the patentee's rights. A licensee of a patent should not ordinarily be permitted to import the patented article or substance, as the licence is granted for the purpose of working the invention in India. However, the Government should be vested with the power to permit, in special cases, importation of the patented article by the person to whom compulsory licence is granted subject to a condition to be fixed by the Government as to the quantum of import, permissible sale price of the imported article and the period for which permit for importation will be valid. This would permit importation of the article covered by the patent from the cheapest market, thus leading to a certain amount of competition and reduction of prices of the article. It would have a special advantage in the case of products which are essential for industrial development. The sale price fixation of the imported article should be based on certain well-established principles, taking into account cost of production, taxes, a reasonable profit margin and other factors, and it should include an element of royalty to the patentee by the licence.

(4) *Revocation of patents for non working* — The controller of patents, on application made by the Central Government or by any person interested in revoking a patent on the ground of the failure to work the patented invention in India so as to satisfy the reasonable requirements of the public, may agree to revoke it. Such applications could be made only after two years from the date of the first compulsory licences and the endorsement of "licence of right" and the provision should apply irrespective of whether or not the invention is one which can commercially work in India.

In the case of patents for food, medicine, and the like, their not working commercially or to an adequate extent at any time after the expiration of four years from the date of sealing should be grounds for revocation.

(5) *Compulsory licence and endorsement of "licence of right"* — The statutory provision for compulsory licensing and compulsory requirements of "licensing of right" should be extended in the following manner;

(i) It should not be necessary for the applicant to establish that the invention relating to a patent "is capable of being commercially worked in the country", before compulsory licence is ordered. It should be sufficient that the reasonable requirements of public interest in respect of the patent have not been satisfied in the country. This would include (a) non-working of the invention on a commercial scale in the country; and (b) the demand for the article to be patented being met to a substantial extent by importation and not by indigenous manufacture.

(ii) Compulsory licence should be ordered on the ground of non-working to an adequate extent in India, not only to meet the internal demand but also to meet the requirement of new export market.

(iii) Where two or more patents are held by the same patentee and compulsory licence has been granted in respect of only one of them, if the licensee of that patentee is unable to work the invention efficiently or satisfactorily without infringing the other patents held by the patentee, the authority may grant him a licence in respect of other patents also, subject of course to the payment of royalties.

(iv) Where a patentee is unable to work his invention without infringing the rights of a prior patentee, he may apply to the authorities for licence on reasonable terms, provided he is also willing and able to grant a licence in spite of his invention on reasonable terms if the prior patentee so desires.

(v) Every patent relating to the invention in the field of chemical industry, in general, should be deemed to be endorsed with the words "licence of right". The effect of this provision would be that any person interested could, at any time after the date of sealing of patent, apply as a right for a licence under the patent and his application would be granted subject only to terms as to royalty, irrespective of whether the patentee himself works or not. This provision would help the development of chemical industries and also the exploitation of inventions relating to food, drugs and medicines.

(6) *Inventions relevant for defence* — The provision for secret patents should be amended so as to enable the Government to make use of any patent which it deems essential for the defence of the country.

(7) *Patent agents* — In certain countries such as India, the profession of patent agent is subject to no regulation. It is desirable that, as in other countries, patent agents should be persons properly qualified to do the work which involves special technical skill and responsibility. This aspect of the question may be considered in several developing countries.

(8) *International Convention for Protection of Industrial Property* — One of the objectives of this Convention is to confer priorities by virtue of which any person who first applies for a patent in any one of the member states on a particular date would, if his application for patent in any other member state is filed within one year thereafter, be entitled to have this patent in the said other states dated as from the date of the application made in State of origin. This provision enables an inventor to obtain priorities in other countries which he would otherwise be denied. But it has been pointed out that the difference between the economic and industrial conditions of the member nations of the International Convention, that is, between the backward territories and the advanced ones, are so great that membership of the Convention, instead of aiding development of a backward territory will retard it.

The Articles of the Convention leave considerable latitude for the operation of municipal laws; but, in so far as the Articles on patents and inventions are concerned, they appear more suited to the industrially advanced than to the developing countries. Furthermore, certain recommendations made in the foregoing paragraphs would contravene Article 5 (a) (iii) which runs as follows:

> "Revocation of the patent shall not be provided for except in the case where the granting of compulsory licence would have been sufficient to prevent such abuses. No proceedings for cancellation or revocation of patent may be instituted before the expiration of two years from the granting of first compulsory licence."

Moreover, under certain patent laws (as for example in the Patent Law in India) provision has been made for reciprocal arrangements which the country can enter into with another country on the basis of which protection of industrial property including patents can easily be arranged. Such arrangements will naturally be made when the advantage is reciprocal and not otherwise.

It has, therefore, been felt by the Indian authorities on the subject that India would gain no advantage from being a member of this Convention. This would, by and large, hold good for any developing country of the ECAFE region.

The special provisions described above to be included in the patent laws of the developing countries are based on the experience of the working of the patent laws and regulations in India for the past hundred years. The changes suggested in its existing laws and regulations are not new. They have been incorporated in some form or other in the existing patent laws of different countries of the world, including countries of the ECAFE region. Countries of the ECAFE region such as Iran and Japan are also members of International Conventions, while countries like India, Pakistan and the Philippines and others are not.

II. THE ROLE OF PATENTS IN THE TECHNOLOGY OF DEVELOPING COUNTRIES

The role played by patents in the technology of developing countries is considered of great importance by the United Nations, because it is realized that the protection of the rights of patent holders, both in the country of origin and in foreign countries, has contributed to technical research and, therefore, to international and national industrial progress.

The United Nations General Assembly felt that a study should be undertaken by the Secretary-General to prepare a report containing among other things, the following:

(a) A study of the effect of patents on the economies of underdeveloped countries.

(b) A survey of patent legislation in selected developed and underdeveloped countries, with emphasis on treatment given to foreign patents.

(c) An analysis of the characteristics of the patent legislation of under-developed countries in the light of economic development objectives, taking into account the need for rapid absorption of new products and technology, and the rise of productivity levels of their economies.

The Secretary-General's report[1] was published in 1964. It is a valuable document which deserves very close and wide study by all countries — developed and developing — which desire the world-wide economic and industrial advancement of the human race. The Secretary-General summarizes his findings under the following heads:

A. *National patent system*

The study has considered whether on balance the patent system can play a useful role in encouraging the transfer of technology to developing countries and contribute to their economic development, whether the interest of the inventor in his creation, the social interest of encouraging invention, the consumers' interest in enjoying the fruits of the invention and the national interest in accelerating the economic development of the country, are met.

Two primary justifications are the basis of the grant of patents' rights to the inventor: (1) his exclusive right to his invention which the patent grant recognizes. (2) The rights constitute exclusive privileges for a limited term of years and this serves

[1] "The Role of Patents in the Transfer of Technology to Developing Countries" (E/3861/Rev. 1).

the public interest by encouraging research and invention through disclosure of the discoveries, instead of keeping them secret. It promotes economic development by providing the incentive of capital for new lines of production.

It is apparent that the patent office staff should be highly qualified and have enough time to examine the patent applications and scrutinize the criteria of industrial credit and novelty before the grant of a patent. Patent offices of developing countries are likely to have limited staff and can rarely afford the resources of skilled manpower and cost of comprehensive patent offices review procedure. For this reason, some of the neighbouring developing countries could pool their resources together and set up a regional patent office with uniform patent laws. This would enable a smaller staff of patent technologists to give the required services for comprehensive reviews. The first regional patent office of this kind, in the African and Malagasy Industrial Patent Office, has been created by the twelve African countries of the African Malagasy Union.

Under-developed countries could also consider pooling their research efforts and might consider two alternative methods of meeting problems raised. They might dispense with strict standards in the review of patent application and issue patents of importation, confirmation or revalidation, that is, patents issued on inventions already patented in another country, or they might call on the service of an organization such as the International Patent Institute of the Hague.

B. *International patent relations*

Statistics indicate that, in many countries of the world, including under-developed countries, the patents held by foreigners are more numerous than those granted to nationals. It is, therefore, significant that the patent laws of the countries of the world generally make no distinction between domestic and foreign applicants. There is general equity of treatment for nationals and non-nationals.

Sixty-four industrialized and under-developed countries are parties to international treaties and conventions relating to the protection of foreign inventors. A most important principle is contained in the Convention of the Paris Union regarding national treatment and the right of priority whereby a national of a member country who has filed a patent application in a member country of the Paris Union has twelve months' priority over any other person for filing the application of the same invention in all other member countries of the Union.

C. *Government regulations and patent uses*

There is an extensive range of national legislation directed against practices that are considered abuses of the national system. Chiefly, they are: non-use of patents; restrictive business practices and excessive royalties. These apply both to nationals and non-nationals, although the legislation dealing with non-exploitation of patents has been primarily directed toward foreign nationals.

Provision for the revocation or compulsory licensing of patents which have not been commercially exploited in the country within the prescribed time is made in the patent laws of both industrial and under-developed countries. The legislation has been adopted because of the concern over the fact that foreign owners of inventions could, by refusing to exploit the patents, deprive the developing countries of national industries which might give employment to nationals and utilize available natural resources. By excluding other producers of patented articles from the market, the foreign patent holder is able to extract higher prices from domestic consumers.

Statutes in force in some under-developed countries provide for the revocation of a patent: 1) where it has not been exploited within (usually) two years of its issuance; 2) where its use has been discontinued for more than two years. More recent laws issued have favoured less stringent measures of compulsory licensing of patents under which any one ready to work an unused patent may compel the patentee to issue him a licence. The Paris Convention recommends that revocation is permissible only if the granting of compulsory licence does not suffice to prevent abuses resulting from the exercise of patent rights. In the case of developing countries, there may be advantage in a third method of automatic lapse of the patent. Thus, the public would become possessed of the invention without any administrative or judicial action.

In cases of inventions of special interest to the public welfare or security, provisions have been made in many laws to extend their use to others than the inventor. Thus, in many countries, no patents may be issued for inventions in certain spheres — especially those of food and medicine. In other cases where patents are issued, provision is made in the public interest for:

(a) compulsory licensing of the patent to the Government or any other interested party;

(b) the expropriation of the patent invention by the Government. In both cases, there arise issues relating to compensation of the patentee and other administrative procedures.

National policies differ from country to country. Thus, there exist differences as to the nature of public interest that would justify the compulsory licensing or expropriation of patent inventions. Each country therefore will have its own variations of the special requirements to prevent abuses.

Many countries which have reached a certain level of industrialization have taken legislative, administrative or judicial action against restrictive business practices. (Some of the proposed action

has been included in the paragraphs dealing with changes proposed by India in its patent laws.)

National governments have sought to cope with problems of restrictive business practices in the international patent licence agreement by taking legal action against abuses at home or abroad of patents issued by them, or by treaties dealing with restrictive business practice in international trade. There are at present two multilateral treaties in effect. These are the Paris Treaty of 1951 establishing the European Coal and Steel Community and the Rome Treaty of 1957 establishing the European Common Market.

In many countries, the terms and conditions of patent assignments or licence agreements with foreign patentees are generally subject to governmental review, chiefly from the point of view of the probable effect on domestic private and public interests. One area of judicial abuse by foreign patentees is the charging of excessively high royalties of fees. For this reason, governments review the royalty terms chiefly with a view to ensuring the reasonableness of the royalty and transfers abroad of royalty payments.

D. *Economic effects of patents*

For the economic development of under-developed countries, transfer of technology is only one of the many important factors. Within the purview of the transfer of technology, the role of patents is again limited, partly because much of the technology required in those countries is not at the stage required for the effective use of the patents. General know-how and managerial skill to utilize the patents to their best advantage are not usually established.

On the other hand, the significance of patents may go much beyond the transfer of technology. Under-developed countries are also affected by the importation of commodites covered by patents either of the products or of the processes. Finally, the patent process not only transfers technology but also leads to the creation of new techniques. To this extent, patents issued to nationals as well as to foreigners promote the development of indigenous technology. In most cases, the working of the foreign patents without outside help in regard to technical, managerial, or financial co-operation would be rather exceptional in the developing countries. This is commonly so because operations and applications of new inventions are not feasible without the relevant unpatented technology and know-how embodied in the formulae, processes, and blue-prints.

Thus, the working of patents held by foreigners in the developing countries will not always be economically profitable for the patentees who would like to obtain certain guarantees for their profitable working.

The terms and conditions of licensing agreements are legitimately a subject for concern and control by the governments of underdeveloped countries. Of particular concern to them are the undue financial sacrifices extracted from national licensees resulting in balance of payments burdens, and the other unduly restrictive features of licensing agreements. These diminish the benefits of introducing patented innovations into the developing countries.

There are other difficulties such as the excessive balance of payments burden, the burden of royalty payments to foreigners, and other factors of economy which really confuse the issue and make evaluation difficult, in terms of the contribution that the technology in question makes to the development of a particular industry within the country. Further, the long-term contribution made by a new patent being worked in the country may, in the long run, contribute to decreasing the country's dependence on foreign imports and ultimately increasing its export of the product in question. It will be seen that the financial terms of the agreements regarding royalties and so on, are highly complex and that their effective control calls for considerable administrative resources and flexibility.

The handicaps and possible abuses from which under-developed countries may suffer in connexion with patent licensing are basically due to the monopoly of technical knowledge, management capacity, capital resources and marketing access enjoyed by the firms and economies of the more advanced countries rather than to the existence of patents as such.

Although the burden of the patent system is most readily apparent in the form of heavy payments which are made for licensing fees and royalties, or profit transfers to foreign patentees, serious burdens may lie in precisely the opposite direction; that is, those patents not being utilized within an under-developed country, although they could be used advantageously in a productive economy. This burden is not in terms of royalties, as no royalties are paid when the patent is not worked at all. The true burden here lies in the absence of social and economic benefits which the working of the patent would have developed in the country. Thus, the under-developed country is unable to utilize its resources in the fullest and best possible way.[1]

Further, where a patent is not working in the country for economic reasons, the country may have to pay higher prices for the patented article as a result of the monopoly position gained by the inventor through the grant of domestic patents. Unless the price of the imported product is controlled by the patent or the market situation in the developed countries from which the product is obtained, the country's economy will suffer. However, the effect of higher prices due to patent production is almost impossible to disentangle from higher prices due to many other factors, such as exclusive know-how, trade secrets, restrictive practices and so on. Therefore, it is for consideration whether measures directly affecting price

[1] See also: Report of the United Nations Inter-Regional Conference on the Development of Petrochemical Industry in Developing Countries, p. 112.

levels or general antitrust legislation are not more effective and feasible techniques for coping with the problem than the legislation devoted specifically to the patent system.

The encouragement of national and resident innovators and inventors in under-developed countries is particularly important to counteract the effect of too many foreign patents being sealed in the country, with the resultant ill-effect of patents not being effectively used for indigenous manufactures or blocking the bringing into the country of patented articles at cheap prices. Insofar as patent grants provide encouragement and protection, they may serve in some measure as an offset to many risks that national innovators are running and handicaps they are facing compared with their counterparts in the industrially more advanced countries.

III. ROLE OF RESEARCH IN ESTABLISHING PATENTS

The inventors of the 17th, 18th and 19th centuries were individual persons. They worked alone perhaps with the help of few friends and assistants. They were their own thinkers, designers and often their own mechanics. The individual inventor is found even today. He may be a free-lance inventor who makes inventing his profession and his principle source of income; moreover, he may be a handyman utilizing his practical experience. Some of his inventions are really innovations leading to industrial progress and economic benefit, but mostly they are contraptions.

Like the majority of professionals today, the successful inventor usually works as one of a group or a team. Today's inventions are born in the large organized laboratories where physicists, chemists, and engineers work hand in hand. These research laboratories may be owned by public institutions, state bodies or private industries. All the facilities of a large organization are at their disposal and usually backed by huge funds. The research is given a directive from the top management and is carried out with a fixed purpose of developing some definite material, machine or a process already laid down. There is a lot of division of labour in a modern research institute and there is a tendency to specialization. This specialization may sometimes lead to people working in close circles with no capacity for visualizing anything radically new. Therefore, there is now a tendency for all pioneering invention to be done by individual inventors in a particular industry. Organized researches planned and conducted in big institutions have led to great technical progress and may be cited as one of the reasons that countries such as the United States and the Soviet Union have made such rapid strides toward industrialization and broken new grounds such as space travel.

It is necessary, therefore, that the developing countries foster researches in institutions with particular emphasis on applied research to make inventions, including improvement of processes to help rapid industrialization of the country based on its own raw materials and genius. In India, the chain of laboratories under the Council of Scientific and Industrial Research has laid special emphasis on the development of materials and processes which are suitable for patenting. The Council has a patents office which has the responsibility of helping the scientists to obtain patents for their inventions. In order to foster this idea still further, the Government of India has also established a National Research Development Council (NRDC) to help the patentees find capitalists to take over the patents for commercial utilization.

The Invention Promotion Board is another organization which has been set up by the Government of India to encourage small inventors by giving them certain monetary help and prizes. These and various other means should be established in all developing countries as an incentive to the inventive genius that is dormant there.

The part played by organized research under CSIR (In India) and NRDC is shown in the appendix B. It cannot, however, be denied that much yet remains to be done. A more vigorous and healthy growth of patents must be generated to sustain the pace of industrial advance to enable a developing nation such as India to catch up with the industrially developed countries of the world.

IV. CONCLUSIONS

Patent laws as they exist today in the ECAFE countries are adequately effective in giving protection to the inventor in respect of his inventions by granting him a monopoly for a limited period to enable him to reap the rewards of his inventions. The countries make no distinction between nationals and non-nationals in the grant of patents.

However, the developing countries have not been able to secure the other advantages of the patent system. The system has been created not only in the interests of the inventor, but also in the interests of the national economy, as it leads to new industries being established by the patent or its licensee working the patent in the country. There has been a great deal of abuse of patent rights by foreign patentees in these under-developed countries. All nations, including the developing countries, have taken or are taking steps to prevent such abuses either by amending patent laws and regulations thereunder or by enacting other legislation. Such steps as the revocation of patents, compulsory licensing, and so on, are being increasingly applied and advocated. Steps have also been taken to make certain items and processes non-patentable, particularly those touching on the health and well-being of the nation.

The advantage which accrues to a nation's economy from the grant of patents for a limited period depends on two factors.

1. The country must be technologically advanced so as to take advantage of the patent which is based on the latest non-patented technology. It must have the necessary technical and managerial skill to enable it to build industries based on the new patent.

2. There must be enough speculative capital available for new ventures, and profitable utilization of such industries in most of the developing countries of Asia and the Far East, these two conditions are seldom fulfilled. Where such favourable conditions exist, the patent system has acted as a catalyst to technological progress, as in the case of Japan. (See appendix C, Japan)

* "The issue of patents to nationals and residents is one — though not the only — method at the disposal of the governments of underdeveloped countries for encouraging and rewarding inventions and technical progress. The establishment of the patent system in underdeveloped countries for nationals and residents raises no specific problems, except as regards the possible need for technical assistance or pooling arrangements in administering such systems and the general importance of conserving scarce scientific manpower for directly productive tasks. In this direction, non-examination systems of patent issue may recommend themselves especially to underdeveloped countries. The possibility of utilizing international resources for the purpose of examination of patent applications from underdeveloped countries clearly suggests itself."

As regards the role of patents in the transfer technology to under-developed countries where the patents are not worked, they may result in artificially high prices of the imported patented articles, but such high prices may be the result of other factors than the exclusionary monopoly. The patent system may thus be an element in the over-all picture, but its impact is not separately measurable. The situation may be eased from the point of view of the under-developed countries if the more developed countries operate the patent system in the context of general lgislation which serves to reduce or counteract the possible misuses of the system for restrictive or price-raising purposes, not only at home but also abroad. The under-developed countries have already adopted or are adopting measures to control unreasonable prices and other abuses of the patent system (see the case of India above). Where the patented products or processes can be introduced into the under-developed countries without the importation of technical co-operation, because of the existence of a sufficient technological background, the provision for compulsory working or licensing will deal with the situation fairly effectively. This will also be the case where the patent can be worked with such additional know-how as can be acquired from third parties or from the open market. In many cases, however, the technological background will scarcely justify the granting of licences or compulsory working without more foreign aid, technical, financial, or managerial. The best course of action by the under-developed country will depend on (1) whether it prefers the patentee to come and work his invention himself (possibly in a joint venture with local enterprise) provided he is willing to do so on acceptable conditions; or (2) whether it prefers the invention to be worked wholly by its nationals. There may be sound economic reasons for either preference.

In spheres of production vital to the national interest and the development of special resources, or to public health, limitations on patentability or provision for limiting the scope of the patent grant by special working or compulsory licensing in the public interest are natural. Such limitations have been included in the legislation of many countries.

Where the technical services, management experience and perhaps capital resources of the foreign patentee himself are essential and cannot be procured elsewhere, his minimum terms and conditions will have to be met with if it is decided to bring the innovation to the under-developed country. Such results are not attributable to the patent system as such, nor is its resulting burden properly measured by the patent royalties.

Developing countries have a legitimate interest in preventing excessive exploitation of their technological and financial dependence. One possible method is the screening and control of licence agreements and avoidance of harsh restrictive features. The world community can assist by inducing patentees not to be unduly restrictive in deciding the conditions and terms on which they will work in underdeveloped countries. A variety of policy measures including domestic compensation of patentees and provision of international funds for this purpose or for operations abroad could be used.

Every developing country should foster research in organized institutions. They should emphasize applied research leading to invention, including improvement and adoption of processes to help the industrialization of the country based on its own raw materials and genius. Individual inventors working on their own or in small private groups should be helped financially and by other measures, and even encouraged by financial and other rewards for their inventions and further processing of inventions. Every step should be taken in the developing countries to develop technological and managerial skill in management of industry and generally create conditions whereby advantage could be taken of the latest technological advances introduced in the working of the new patents.

* United Nations publication referred to on p. 284.

Appendix A

PATENT OFFICES OF ECAFE COUNTRIES IN THE REGION

AFGHANISTAN	Directeur Général de la Chambre de Commerce, *Kabul*
AUSTRALIA	Commissioner of Patents, Patent Office, Commonwealth Offices, 5, Hickson Road, *Canberra,* A.C.T.
BRUNEI	The British Resident, State of Brunei
BURMA	Council of Burma Industries, 128/132, Phayre Street, *Rangoon*
CAMBODIA	Direction du Service des Mines, de l'Industrie et de l'Artisanat, 8, Moha Vithai Preache Norodom, *Phnom-Penh*
CEYLON	Registrar of Companies, Department of the Registrar of Companies, Block 5, Echelon Square, *Colombo* (P.O. Box 1502)
CHINA (Taiwan)	The Director National Bureau of Standards Ministry of Economic Affairs NI, 1st Street Cheng Kung Road Taipeh, *Taiwan*
HONG KONG	Registrar of Patents Registrar General's Department Courts of Justice *Hong Kong*
INDIA	Controller of Patents and Designs, Acharya Jegdish Chand Road, *Calcutta*
INDONESIA	Djawatan Milik Perindustran Kementerian Kehakiman Djalan Segara III, No. 8A *Djakarta*
IRAN	The Director Edareh Sabt Cherkatha va Alaem Bazergani va Ekhtaraat Avenue Forought *Teheran*
JAPAN	Director General Tokkyocho 1, Sannen-Cho Chiyoda-Ku *Tokyo*
KOREA	The Director The Patent Office Department of Commerce, *Seoul*
LAOS	No Patent Office
MALAYSIA Former Federation of Malaya	Registrar of Patents *Kuala Lumpur*
SABAH	Registrar of Patents and Trade Marks *Jesselton*
SARAWAK	The Registrar of Trade Marks The Office of the Registrar of Trade Marks *Kuching*
SINGAPORE	Registrar of Trade Marks and Patents Registration of Trade Marks and Patents Supreme Court *Singapore*
NEW ZEALAND	Commissioner of Patents, Designs and Trade Marks, Department of Justice, (Patent, Design and Trade Mark Division) Departmental Building (P.O. Box 5093) Stout Street *Wellington* C.I.
PAKISTAN	The Controller Patent Office Muhammadi House McLeod Road *Karachi*
PHILIPPINES	The Director of Patents Patent Office Department of Commerce and Industry Ayuntamiento Compound Aduana Street, Intramuros *Manila*
THAILAND	Department of Commercial Registration Ministry of Economic Affairs *Bangkok*
VIET-NAM	The Director, Bureau de la Propriété Industrielle Secrétariat d'Etat à l'Economie Nationale 59, Boulevard Gialong, *Saigon*

APPENDIX B

SPONSORED RESEARCH PROJECTS IN INDIA WHICH HAVE RESULTED IN GRANT OF PATENTS AND EXTENT OF UTILIZATION

S. No.	Name of the Laboratory/Inst.	Number of inventors made																	No. of inventions referred to NRDC	No. of effective inventions [a]	No. of licensed inventions NRDC		Inventions released free
		Before 1950	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	Total			Total	In production	
1.	NCL, Poona	6	3	9	19	10	5	12	9	13	15	10	12	9	9	7	7	155	106	68	25	7	14
2.	NPL, New Delhi ...	2	—	2	2	1	3	5	7	4	2	4	2	1	2	3	6	46	35	26	12	6	9
3.	CFRI, Jealgera	—	—	1	2	2	1	6	3	5	6	9	2	4	—	5	1	47	23	14	8	4	2
4.	CGCRI, Calcutta ...	3	—	—	2	4	2	6	1	2	2	3	5	—	—	6	—	37	29	21	11	6	5
5.	CFTRI, Mysore	—	—	—	7	6	4	—	—	2	7	2	2	5	1	4	7	47	39	27	12	8	8
6.	NML, Jamshedpur ..	—	—	4	4	1	4	2	7	6	7	4	—	4	8	1	8	60	32	29	14	2	6
7.	CDRI, Lucknow	—	—	—	—	2	2	—	1	8	2	1	1	1	1	3	2	24	11	6	—	—	11
8.	CRRI, N. Delhi	—	—	—	—	—	—	1	2	—	2	—	—	—	1	2	5	13	5	5	1	—	3
9.	CECRI, Karaikudi ..	—	—	—	—	—	4	—	9	14	7	6	2	2	1	23	27	75	28	12	7	1	3
10.	CLRI, Madras	—	1	1	1	10	18	10	3	1	1	1	—	—	—	3	3	53	50	49	4	2	41
11.	CBRI, Roorkee	—	1	—	—	3	2	4	1	3	2	3	3	3	2	1	2	30	21	11	5	4	5
12.	NBG, Lucknow	—	—	—	—	—	—	—	—	1	—	6	3	—	1	1	7	7	4	3	—	—	—
13.	CEERI, Pilani	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—
14.	CS & MCRI, Bhavnager	—	—	—	—	—	1	2	2	1	—	1	—	—	—	1	—	8	8	3	1	1	1
15.	CMRS, Dhanbad ...	—	—	—	—	—	—	—	—	—	—	1	—	2	—	1	1	5	3	3	—	—	2
16.	RRL, Hyderabad	—	1	3	—	1	2	1	2	2	3	13	11	8	17	10	13	87	36	17	2	1	7
17.	IIB & EM, Calcutta .	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—
18.	RRL, Jammu	—	—	—	—	—	—	—	—	—	1	—	—	—	—	1	1	3	3	3	1	1	—
19.	CMERI, Durgapur ..	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	—
20.	IIP, Dehradun	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	2	—	—	—	—	—
21.	Delhi Laboratories ..	57	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	59	—	—	—	—	—
22.	Calcutta Laboratories	16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16	—	—	—	—	—
23.	CSIR Schemes	47	2	9	3	4	1	1	10	4	4	3	3	2	2	1	8	104	54	31	16	5	2
	TOTAL	131	9	30	40	44	49	50	57	66	61	61	46	41	47	55	94	881	487	328	119	48	109

[a] Total inventions less inventions dropped or withdrawn.
[b] Council of Scientific and Industrial Research.

1. NCL = National Chemistry Laboratory.
2. NPL = National Physical Laboratory.
3. NML = National Metallurgical Laboratory.
4. CGCRI = Central Glass & Ceramics Research Institute.
5. CFTRI = Central Food Technology Research Institute.
6. CDRI = Central Drug Research Institute.
7. CRRI = Central Road Research Institute.
8. CECRI = Central Electrochemical Research Institute.
9. CLRI = Central Leather Research Institute.
10. CBRI = Central Building Research Institute.
11. CS & MRI = Central Salt & Marinchemicals Research Institute.
12. CMRS = Central Mining Research Centre.
13. CMERI = Central Mechanical Engineering Research Institute.
14. RRL = Regional Research Laboratory (Hyderabad).
15. RRL = Regional Research Laboratory (Jammu).
16. CFRI = Central Fuel Research Institute.
17. NBG = National Botannical Garden.
18. IIP = Indian Institute of Petroleum.
19. IIB & EM = Indian Institute of Biochemistry and Experimental Medicine.
20 CEERI = Central Electric Engineering Research Institute.

Appendix C

"Governments' evaluation of the manner in which access to inventions and know-how had been helped or hindered through the existence or non-existence of a national patent system"

(From the replies received from the various countries which were sent questionnaires by the Secretary-General of the United Nations,[1] the following table has been worked out in regard to countries of the ECAFE region).

Australia

No reliable evaluation has been or can be made, but it is believed that the patent system has fulfilled its function of stimulating industrial progress.

Ceylon

By the registration of foreign patents in Ceylon, this know-how is made available to this country.

China (Taiwan)

Access to foreign inventions and related know-how has been helped through the existence of a national patents system. Exclusion from patentability of certain kinds of products or processes with sound reasons has certainly had a beneficial effect. (Translation from Chinese).

France

An examination of the data shows that patent applications of foreign origin account for more than 60 per cent of all patent applications filed in France in 1962. Furthermore, the balance of payments involving the sale and purchase of patents and licence concessions shows a deficit of some 300 million new francs during the years. These figures suggest that French industry is not primarily, but to a large extent, a recipient of foreign know-how. This situation is obviously facilitated by the existence of the patent system which, by giving the owners of such know-how the assurance of being protected in France both by domestic legislation and by the International Convention, enables them to license or assign.

India

Although the patent system has been working in India for over a century, hardly 10 per cent of the patent granted under the Indian statute have been to Indian nationals, and more than 90 per cent of the patents are owned by foreigners. The position has not improved since the attainment of independence by India. The Indian public has access to the specifications of the foreign-owned patents, as all these specifications are open to public inspection. Nevertheless, India has not derived any substantial benefit by these patents. This is due to the reluctance of the patentees to work their inventions in this country either by themselves or by granting licences to Indian concerns, and probably also due to the fact that the country has not advanced far enough technologically to work most of the inventions. It would thus appear that the patent system, the advantages of which are applicable to highly industrialized countries, does not yield the same results when applied to under-developed countries. The foreign patents are not taken in the interests of the economy of the country granting the patents, but merely to protect the export market from competition from rival manufacturers, particularly manufacturers from other countries. As has been stated by Shri Justice Rajagopala Ayyangar in his report, "the costs in underdeveloped countries where a patent is worked wholly abroad far exceed any possible gains".

Inventions relating to Atomic Energy have recently been rendered unpatentable under the Atomic Energy Act, 1962. With regard to this class of invention, however, there are special considerations; for example, all the applications in India are of foreign origin and the Government has taken the sole responsibility for the development of Atomic Energy in India.

The absence of a provision in the Indian Patents and Designs Act, 1911, for revocation of a patent on the ground of non-working or failure to work adequately is considered detrimental to the interests of the country. As has been stated by Edith Penrose in her book entitled "Economics of the International Patent System," "When a country grants patents to foreigners for inventions which the foreigner is not going to 'work' in the country himself, but which he is willing to make available to domestic producers at a price, the price paid to the foreigner is clearly one of the costs of granting the patents and just as clearly must restrict the use of the invention of those who can pay the price. From the point of view of producers this cost is simply the royalty payment made to foreign firms." Again "There is no doubt that normally granting of patents to foreign firms stimulates the rate of invention in the foreign country . . . . . Most countries have little if anything to gain economically from granting patents to foreign firms." The question has been carefully considered by Shri Justice Rajagopala Ayyangar in his report, where he comes to a similar conclusion. On the effect of non-working of foreign patents, the Judge says

[1] Appendix — The Role of Patents in the Transfer of Technology to Developing Countries.

that the country is deprived of getting in many cases goods, even though they are essential for industrial production or for the health and safety of the community, at cheaper prices from available alternative sources, because of the patents protection granted in India.

The matter assumes great importance in respect of patents for drugs and articles of food. (See, for instance, the Kefauver Report regarding the United States). It is a fact that the price of the same drug varies considerably from country to country. The question of public interest is involved in these cases.

India is primarily not a supplier of inventions and "know-how" to other countries. As already stated, only about 10 per cent of the patents granted under the Indian Act are owned by Indians and even those deal mostly with cottage and small-scale industries. The number of patents by Indians in respect of major industries which might facilitate exports of manufactured goods is negligible.

Japan

Seen on the international level, our patent system is one of the best formulated of the world, and there is no likelihood that the right of foreigners will not be protected adequately, preventing the introduction of foreign technology to Japan. In fact, the satisfactory introduction of new foreign technology is contributing greatly to the development of Japanese industries.

No chemical product or substance obtained by nuclear transformation is patentable in Japan. But this is true in many advanced countries of the world, and since the process by which such product or substance is obtained is patentable, we believe that the end result is approximately the same, unaffected by the lack of patentability for such product or substance.

The Japanese patent system was instituted with due consideration taken of the patent system of various countries and, furthermore, as it is supported by our Patent Law which incorporates the spirit of the Union of the Paris Convention, there is no ground whatsoever that one can state that, by the difference in the patent system, introduction of foreign technique is either unduly encouraged or discouraged.

There were certain countries recipient of technology to which not only export of technology from Japan but also of merchandise manufactured by new technique from Japan met difficulties, due to the lack of a patent system or a system to protect the inventions of foreigners. Regardless of whether the recipient country is an underdeveloped country or not, there were some instances where the Japanese inventors received damages as the recipient countries do not recognize the patentability of products or processes which not only Japan but most of the countries of the world recognize as such.

Korea (Republic of)

Foreign inventions and know-how are considered to be imported into this country through the existence of a national patent system. Though many foreign inventions and know-how might have been introduced to Korea under private or personal contract not through the patent system, the patent system has helped both parties to invest their properties in this country with confidence that their property could be protected from misuse by others.

Netherlands

Our country is obviously a recipient of foreign inventions. In our country the opinion prevails that due to the existence of a national patent system, foreign patentees are more prepared to have their patented inventions and the related know-how in this country practised by granting licences and thereby supplying that know-how to interested national industries, than in case a national patent system did not exist. The patents prevent abuse of the inventions and the related know-how by those other than the licences. The exclusion from patentability of chemical products as such methods of medical treatments and of methods of cultivation and breeding of plant and animal varieties, never did exercise a prejudicial influence of the access to relevant foreign inventions and know-how.

New Zealand

It is assumed that New Zealand is primarily a recipient of foreign inventions and know-how. There has been no recent study of the patent system in New Zealand and there is no means of finding out what its effect is upon the economy of the country. The criticism of the patent system in general as existing in this country has come to the knowledge of the authorities in recent years and it is appreciated that New Zealand should not expect to be a recipient of invention skill from abroad without making its contribution, by way of royalties, towards the cost of research and the rewarding of inventors.

United Kingdom of Great Britain and Northern Ireland

Rather more than half the applications for United Kingdom patents now come from abroad. A large number of United Kingdom inventors seek patents overseas. This country falls, therefore, in a sense, into both categories.

From very early days the British Law recognized the advantages to the economy in making known, and exploiting, new inventions in the country. It has encouraged foreigners as well as its own nationals to do so. The following is a quotation from the second interim report of the Committee on Patents and Designs (1944).

The Patent law of the United Kingdom originated in the Statute of Monopolies, enacted in 1624 (21 Jan i, c.3). The Statute had as its object the suppression of monopolies, which before that date were conferred by the Sovereign as a convenient means of raising revenue. These monopolies related for the most part to every day necessities, devoid of novelty or invention. The Statute in general terms declared monopolies, grants and letters patent for the sole buying, selling or using of anything within the realm to be contrary to law, but Section 6 excluded patents for inventions from that general prescription in the following terms:

"Provided also that any declaration before mentioned shall not extend to any letters patent and grants of privilege for the term of fourteen years or under, hereafter to be made, of the sole working or making of any manner of new manufactures within the realm to the true and first inventor and inventors of such manufactures, which others at the time of making such letters patent and grants shall not use, so as also they be not contrary to the law, nor mischievous to the State, by raising prices of commodities at home, or hurt of trade, orr generally inconvenient; the said fourteen years to be accounted from the date of the first letters patent or grants of such privilege hereafter to be made, but that the same shall be of such force as they should be if this Act had never been made, and of none other.

"The theory upon which the patent system is based is that the opportunity of acquiring exclusive rights in an invention stimulates technical progress, mainly in four ways; first, that it encourages research and invention; second, that it induces an inventor to disclose his discoveries, instead of keeping them as a trade secret; third, that it offers a reward for the expense of developing inventions to the stage which they are commercially practicable; and fourth, that it provides an inducement to invest capital in new lines of production which might not appear profitable if many competing producers embarked on them simultaneously. The history of industrial development seems on the whole to have justified theory."

It is almost certainly true that these advantages outweigh the disadvantages inherent in granting monopolies and they apply to a country which falls into category A as well as to one in category B.

United States of America

The United States is primarily a supplier of inventions and know-how to other countries . . . . . American enterprises have large numbers of licensing arrangements with foreign firms all over the world. Because of the extensiveness of United States supply of inventions and know-how to less developed countries and the fact the supply is effected essentially through private arrangements, the United States Government does not maintain data that would enable us to particularize in answering this question. Certain general statements, however, can be made. Private investment from industrially highly developed countries is a significant factor in accelerating industrialization in less developed countries. One element that is considered by a potential investor with respect to an investment involving a patent licensing agreement for production in a particular country, is the matter of effective patent protection in that country. Theoretically, a country could have free access to all of the technology embodied in patents without maintaining a patent system. Often the information disclosed in patents is not sufficient, however, to be of much utility to the potential user. He needs to have the related technology to "work" the patent. Since patent licences today usually involve commitments for the provision of technical assistance, the licensee obtains much more than naked patent rights. The local economy benefits by the acquisition through the agreement of valuable industrial techniques and know-how. In addition, dollar costs arising from royalty payments to United States firms are often more than offset by saving of foreign exchange from domestic sources of a product or service previously imported. This is not to say, however, that a foreign investment project involving licensing arrangement in a less developed country is always beneficial to the less developed country. On the one hand, it may mean that a particular less developed country may be giving up cheaper imports and may be diverting some of its economic resources from other activities in which it might be more efficiently engaged. On the other hand, the project may contribute in one way or another to general economic development and broadening of the industrial base in the less developed country. These are factors which the less developed country must weigh in arriving at decisions on an investment project involving a patent licensing arrangement.

Patent protection is also generally regarded as an important factor in fostering domestic in-

ventions, in that it increases incentive for inventing. It is particularly important to recognize the role of patents in encouraging investment in research programmes which are often very costly.

Further, patents assist agricultural countries to industrialize. Historically the patent systems of most of the highly industrialized countries date back to the early 19th century and before. For example, the United States enacted its first patent law in 1790. Thus these laws generally predated the great surge of industrialization that took place in the 19th century. Although no firm conclusions can be drawn that the highly industrialized countries have made rapid technical progress because they have had patent laws for a long time, or that their progress would have been slower without patent laws, the implication is that the protection of inventions has been a significant factor in their rapid and far-reaching industrial growth.

Country	*Official title & date of current patent law and regulations*	*Patentable subject matter*	*Examination by Patent Office*
Philippines	Republic Act No. 165 of 1947, as amended by Republic Act 637, 1951. Revised Rules of Practice before the Philippines Patent Office.	Any invention of a new and useful machine, manufactured product or substance, process, or improvement of the foregoing. *Not patentable:* inventions contrary to public order or morals, public health or welfare; mere ideas scientific principles or abstract theories or any process not directed to the making or improving of a commercial product.	Examination as to formal requirements only.
Union of Soviet Socialist Rep.	Statute on Discoveries, inventions and Rationalization Proposals (1959). Regulations on Compensation for Discoveries, Inventions and Rationalization Proposals (1959).	The solution of a technical problem distinguished by the essential novelty, in any field of national defence, which produces a positive result, is considered to be an invention. Such inventions are protected by granting either certificates of authorship or patents. Inventors may according to their choice request either: (1) a certificate of authorship, in which case the State acquires the exclusive right to use the invention, and the inventor is entitled to compensation and other rewards specified by law; (2) a patent, in which case the inventor acquires the exclusive right to the invention. *Not patentable or eligible for certificates of authorship:* substances chemically obtained (however, this does not apply to new processes). The following categories are eligible for certificates of authorship but not for patents: medical, flavouring and food substances obtained by non-chemical processes (though patents may be issued for the methods of preparation); new proven methods of treating diseases; new and improved species of agricultural animals, birds, etc.; varieties of agricultural crops obtained by selection.	Full examination as to substantial novelty and usefulness of invention. Examination for novelty is based on prior Soviet certificates of authorship and Soviet and foreign patents and publications.
United Kingdom of Great	Patents Act, 1949: Defence Contracts	Any manner of new manufacture and any new	Examination as to compliance with

SELECTED COUNTRIES

ation prepared by the
y; where appropriate,
naire circulated by the

countries.)

nter-nt	*Treatment of foreign nations*	*Requirments for working of patents; sanctions for non-working*	*Other cases in which patents are subject to public use*
on (7th uropean n For- ent Ap- (18th uropean Patent 1954 Agree- Interna- Institute , 1947 7).	National treatment. Foreign filing priority under Paris Convention and other reciprocal agreements.	Any patent not effectively utilized for three years may be the subject of an application for compulsory licence. The conditions under which the licence is granted are fixed by the court. Working must not be discontinued for three successive years, in which case it may be subject to compulsory licence.	Special licences may be granted if pharmaceuticals which are protected by special patents for medicaments, or to production processes for which are patented under the 1844 Act, are supplied in insufficient quantities or at exorbitant prices or are deficient in quality. Licences may be granted for the benefit of the State in respect of patents affecting national defence, which are also liable to expropriation against compensation.
an certain ar- th the m and ommon- s.	National treatment, twelve months foreign filing priority is provided on a reciprocal basis under arrangements referred to in column 5.	At any time after the expiration of three years from the date of the sealing of a patent any person interested may apply to the Controller for a licence under the patent upon the ground that the patented invention has not been commercially worked to the fullest extent that is reasonably practicable; or that the demand for the patented article in India is not being met to an adequate extent or on reasonable terms; or that by reason of refusal of the patentee to grant a licence on reasonable terms, the efficient working in India of any other patented invention is unfairly prejudiced or a market for export of the patented export of the patented article manufactured in the country is not being supplied.	The Central Government may make use of, or exploit, any invention for the service of the Government on terms to be agreed. Where the Central Government is satisfied that it is expedient or necessary in the public interest that a licence under a patent should be granted, it might place a notice to this effect in the Official Gazette and the Controller shall thereafter on application made to him order the grant to the applicant of a licence under the patent. The Central Government may revoke a patent where its grant is declared prejudicial to the public.
n (16th).	National treatment based on reciprocity. The applicant must elect domicile in Iran or appoint a representative resident in Iran. Foreign filing priority under Paris Con-	When the invention has not been worked within five years from the date of issue of the patent, the Court may, on the application of an interested person, declare the patent null and void.	

Britain and Northern Ireland	Act, 1958; Patents Rules, 1958; Atomic Energy Act, 1946.	method or process of testing applicable to the improvement and control of manufacture. *Not patentable:* well established natural laws; ingenious ideas or discoveries with no industrial applications contrary to law or morality; substances of food or medicine which are mixtures of known ingredients; plant and animal varieties.	patents acts and for novelty and patentability.
United States of America	Patent Act of 1952, amended to 1962; United States Code, Title 35, Patents. Rules of Practice of the United States Patent Office, 1949-1962. Atomic Energy Act of 1954.	Any new and useful process, machine manufacture, composition of matter or any new and useful improvements thereof. Inventions must not be publicly known or used in the United States, or patented or described in a printed publication in the United States or elsewhere, before the invention was made by the applicant, and, regardless of the date of invention, the invention must not be in public use or on sale or patented or described in a printed publication more than one year before the date of the application for patent in the United States. *Not patentable:* inventions contrary to public morals; business methods and scientific principles or discoveries not applied to a useful purpose; atomic weapons.	Examination as to formal requirements, novelty and inventiveness.

vention.			
on (15th	National treatment and foreign filing priority under Paris Convention. In other cases, national treatment and foreign filing priority is available only on the basis of reciprocity. Foreigners must submit a certificate of nationality to ascertain their status and appoint a representative resident in Japan.	If patented invention has not been properly worked within Japan for three consecutive years or more, any person may request a licence to work the patent subject to approval of the Director-General of the Patent Office. Failing agreement, applicant may ask the Director-General to order a licence.	The Minister of International Trade and Industry can order a licence for working in the public interest.
on (7th uropean Forma- nt Ap- 3 (9th uropean Classi- Patents, January ient on nal Pa- of The (6th	National treatment Foreign filing priority under Paris Convention.	Compulsory licences are granted, subject to reasonable compensation, three years after grant of patent if patent is not being worked on a sufficient scale in the Netherlands or if a licence is needed to work a subsequently patented invention (dependent patent)	A patent may be expropriated by a special law if in the interest of national defence or on grounds of public interest; or may be subject to compulsory licences upon reasonable compensation, if the Crown requires a licence for defence purposes, in the interest of industry or for other reasons of public interest.
nan re- gements d King- n Com- ntries.	National treatment. Foreign filing priority on basis of reciprocal arrangements.	Any person may petition the Central Government for a compulsory licence or the revocation of a patent if the demand for a patented article is not being met to an adequate extent or supplied on reasonable terms in Pakistan; or an existing trade or industry of the establishment of new trade or industry in Pakistan is unfairly prejudiced by default of the patentee to manufacture. The Central Government may also order revocation or grant a licence on ground that patented article or process is manufactured or carried on exclusively or mainly outside Pakistan. Compulsory licence or revocation may not be ordered before expiration of four years from date of patent application.	In certain cases the Government may make use of or exploit invention for the service of the Government on terms to be agreed. The Central Government may revoke a patent if it is found to be prejudical to the public.

APPENDIX D

SYNOPTIC TABLE OF MAJOR PROVISIONS OF PATENT LEGISLATION

This table is based on a survey of national patent leg
International Bureau for the Protection of Industrial Prope
information supplied by Governments in response to the Questi
Secretary-General has been inserted.

(The table covers patent legislation in the ECAFE

Country	*Official title & date of current patent law and regulations*	*Patentable subject matter*	*Examination by Patent Office*	*Duration of patent*	*Adherence to national & conventi*
France	Patents lot of 5 July 1844, as amended; articles L 603 and 604 of the Public Health Code, which, as amended by the order of 4 February 1959, institute "Special Patents for Medicaments". Various decrees.	Invention of new industrial products; invention of new methods, or new application of known methods, for obtaining an industrial result or product. Patents of addition are also granted. *Not patentable:* pharmaceuticals under the Act of 5 July 1844, which allows only the processes or means of production to be protected, but they may be the subject of "special patents for medicaments". Financial schemes and combinations, and inventions contrary to public order, morality or law, are likewise not patentable.	No examination as to novelty, except where special patents for medicaments are concerned.	Twenty years from filing date.	Paris Conven July 1884). Convention malities of P plications, 19 Jan. 1962). Convention Classification, (July 1955) ment on the tional Patent of the Hag (6th June 19
India	The Patents and Designs Act, 1911, as amended to 1956. Patents and Designs Rules, 1933, as amended to 1960. Secret Patent Rules 1933.	Any manner of new manufacture or improvement of alleged invention; an invention should result from inventive ingenuity and should be novel and useful and not contrary to law or morality. *Not patentable:* inventions relating to atomic energy.	Applications are examined as to form, novelty and general compliance with Patent Act and Rules.	Sixteen years from date of application.	None other tain recipr rangements United King some of the wealth countr
Iran	The Registration of Trade Marks and Patents Act, 1931. Regulations for the application of the Act, 1958.	Any discovery or new invention. *Not patentable:* credit or financial plans or combinations; inventions contrary to public policy, morals or public health; pharmaceutical formulae and compounds (how-	Examination as to form only.	Five, ten, fifteen or twenty years, at the request of the inventor, but not exceeding the term of a corresponding foreign patent.	Paris Convent December 19

Duration of patent	*Adherence to international patent conventions*	*Treatment of foreign nations*	*Requirements for working of patents; sanctions for non-working*	*Other cases in which patents are subject to public use*
Seventeen years from date of issue.	None, but certain reciprocal arrangements.	National treatment. Foreign filing priority is granted on the basis of reciprocity.	At any time after the expiration of three years from date of grant, any person may apply to the Director for a licence if the invention patented is not being worked commercially in the Philippines to fullest satisfactory extent; if the demand for patented article in the Philippines is not being met to an adequate extent and on reasonable terms; if by reason of the refusal of the patentee to grant a licences on reasonable terms, the establishment of any new trade or industry is unduly restrained.	The Government may use any patented invention, at any time, for Government purposes, subject to compensation to the patentee. After the expiration of three years from date of grant, any person may apply to the Director for a licence if the patented invention relates to food or medicine or is necessary for public health or safety.
Patents: fifteen years from date of filing; no extensions. Certificates of authorship: unlimited duration.		National treatment on a basis of reciprocity. Non-residents are required to use the All-Union Chamber of Commerce as their agent in connexion with granting the certificate of authorship or patent.		If an invention is of special importance to the State, the Council of Ministers of the USSR may, failing an agreement with the State on public organizations concerned, grant permission to use the invention to an interested governmental agency and establish the compensation to be paid to the patentee. The Government may ensure that certain discoveries, inventions or rationalization proposals concerning defence remain secret in the interest of the State.
Sixteen years from filing of complete	Paris Convention (7th July 1884). European	National treatment. Foreign filing pri-	At any time after the expiration of three years	Any Government department and any person au-

		ever, pharmaceutical processes may be patented).			
Japan	The Patent Law (No. 121, of 1959). The Law for the Enforcement of the Patent Law (No. 122, of 1959).	Any new invention capable of being used for industrial purposes is patentable. Utility models patents are granted for devices involving technical improvements. *Not patentable:* articles of food and drink; medicines; substances manufactured by chemical processes, or by a process of nuclear conversion; articles injurious to public order, good morals or public health.	Full examination as to general requirements of Patent Law and for novelty and patentability.	Fifteen years from date of publication; the terms of the patent may be extended but in no case is the term to exceed twenty years from date of application. Utility model patents are granted for ten years from date of publication of the application in the Utility Models Gazette or fifteen years from the date of filling, whichever is shorter.	Paris Convent July 1899).
Netherlands	Patent Act, 1910, as amended to 1956. Industrial Property Regulations, 1914, as amended to 1957. Patent Regulations, 1921, as amended to 1957. Patent Agents Regulation, 1936, as last amended in 1959.	Any new invention or inventive improvement resulting in a product or a process applicable to industry. *Not patentable:* inventions contrary to public order or morality; substances as such, chemical products; methods of cultivating and breeding plants and plant varieties (special law deals with this latter subject).	Examination as to compliance with Patent Act and for novelty and patentability.	Eighteen years from date of grant. No extension possible.	Paris Conven July 1884); Convention o lities of Pa plications 19 May 1956); Convention o fication of 1954 (12th 1956); Agree the Internati tent Institute Hague, 194 June 1947).
Pakistan	The Patents and Designs Act, 1911, as amended to 1960. The Patents and Designs Rules 1933, as amended to 1956. The Secret Patent Rules 1933, as amended to 1956.	Any manner of new manufacture of improvement of invention; an invention should result from inventive ingenuity and should be novel and useful and not contrary to law or morality. *Not patentable:* chemical products (not including their process of manufacture); admixtures of known ingredients; inventions contrary to law or morality.	Applications are examined as to form, novelty and general compliance with Patent Act and Rules.	Sixteen years from date of application. Patents of addition are granted for the unexpired term of the original patent.	None other ciprocal arra with the Uni dom and cert monwealth co

specification, with provision for extension by five years, or in exceptional cases ten, on the grounds of inadequate remuneration.	lities of Patent Applications, 1953 (5th May 1955). European Convention on Classification of Patents, 1954 (28th Oct. 1955).	Convention.	patent any person interested may apply to the Comptroller-General for a licence under the patent "licences of right"; if the invention is not being worked commercially in the United Kingdom to the fullest reasonable extent; if demand for patented article is not being met on reasonable terms or is being met to a substantial extent by importation; or if by reason of the patentee's licence conditions on export market for the patented article is not being supplied, or the working of some other patent is hindered, or the manufacture, use or sale of materials not protected by the patent or the development of commercial or industrial activities is unfairly prejudiced. The Comptroller shall consider nature of invention, time elapsed since grant, and efforts of patentee fully to work invention to public advantage and risks to be undertaken by him. The Comptroller's powers shall be exercised to secure maximum working of inventions, suitable remuneration to patentee and protection for any person working an invention under the protection of a patent. Patent may be revoked after the expiration of two years from an order for a compulsory licence if such licence or an endorsement "licences of right" would not be effective for the purposes set out above. An appeal lies from any orders of the Comptroller made under the above provision to a Judge of the High Court. No Order may be made which is at variance with the Industrial Property Convention.	patented invention for the services of the Crown (including the production or use of atomic energy). Applications for patents relating to defence may be withheld from publication. Applications relating to atomic energy uses may similarly be withheld from publication until certified by the Crown as not being required for defence purposes. Provision is made for the payment of compensation by the Crown. The Comptroller-General must grant compulsory licences in respect of patents relating to foods, medicines or surgical or curative devices unless it appears to him that there are good reasons for refusal. An application for such a licence may be made at any time after grant and an appeal lies to a Judge of the High Court.
Seventeen years from date of grant. No extensions except by Special Act of Congress.	Paris Convention (30th May 1887). Pan-American Convention of Buenos Aires of 1910 (21st March 1911).	National treatment. One year foreign filing priority under Paris Convention, Pan-American Convention of Buenos Aires (see 5) and under any other reciprocal arrangement.	No provisions in patent law. Atomic Energy Act of 1954 contains a temporary provision, expiring in 1964, for the grant of compulsory licences under a patent when there has been a declaration after hearing that invention is of primary importance in atomic energy field and that licensing of the invention is of primary importance in effectuating the policy and purpose of the Atomic Energy Act.	Where violation of the anti-trust laws by means of patents is found, the court may provide for the granting of licences on reasonable terms and in some cases, the grant of royalty free licences.

PART III. MARKETING

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SUMMARY

Marketing, as an industrial activity, has not always received due recognition, particularly among the developing countries of the world. The modern concepts of marketing have been slow to come to the countries of the East. Marketing methods, including market research, motivation research, sales propaganda and advertising, are considered by these countries to be wasteful. The great need today is to change the opportunist approach of depending largely on the law of supply and demand to a modern industrial marketing approach.

In developing good marketing practices, developing countries could draw inspiration from the countries of Europe and America and also Japan which have made a scientific approach to modern marketing. Mary of these techniques developed in the developed countries can with advantage be adopted or adapted to conditions obtaining in the developing countries of the East. Fortunately, there appears to be a growing understanding of the importance of marketing, and marketing as a profession is being developed on very scientific lines.

Products are the main pivot of the whole operation. The products have to be properly designed to give complete consumer satisfaction within their price range.

After production of the right type of product, it is the function of marketing to distribute it where the best prospects for it lie. This involves a systematic study of the market problems. Ultimately, however, it is the product that determines the nature of the distribution system that is most suitable. For perishable commodities, speed of distribution is more crucial. For non-perishable goods such as fountain pens, speed is not so important. The study of shelf-life will play an important role in selecting the method of distribution of the product. The condition of a country, its size, the nature of its communications system, and so on are also very significant.

Production of the right type of goods for the consumer and making them available at the proper centres is not enough. The buyer must be told what, where and when to buy. This is done through advertising. Advertisements must not only be attractive and genuine in their claims but must also create a desire in the mind of the buyer to purchase. Advertising today has become a very sophisticated technique. It requires expert handling and usually starts with the design of the product.

Several means of advertising are available. Written advertisements have a drawback, as their effectiveness is limited by the extent of literacy in the country and the total press coverage available. Modern techniques of mass communication such as the cinema, radio broadcasts, and television have added new tools in the armoury of the advertisers.

Organized display counters and emporia are assuming great importance as aids to marketing in which governments, trade organizations, co-operatives, and manufacturers unions take a very active part. Industrial, agricultural and other types of exhibitions and fairs are becoming common at the national and international levels. Vast organizations have been set up in many countries to hold periodically such exhibitions and fairs.

Governments of all countries have now accepted the role of accelerating the pace of industrial development as a means of raising the living standard of their peoples. Hence no government can be unconcerned with the development of proper marketing practices and will have to lend particular support to the promotion of marketing, particularly in the field of overseas trade.

The policies and measures which governments of developing countries should adopt to establish better marketing in the fields of domestic and international trade are discussed in detail in section II of this part of the report. The six-point programme set forth there may be considered as a recommendation which the developing countries should adopt.

Section IV gives the details (as far as is known) of the policies and measures adopted by some of the ECAFE countries for the promotion of marketing, particularly in the export field.

I. ADOPTION OF MODERN MARKETING PRACTICES IN THE DEVELOPING COUNTRIES

Marketing, as an industrial activity, has not always received due recognition, particularly among the developing countries including India. Although trading in India is a very ancient tradition which it has shared with countries in the East such as China, Persia, and Afghanistan, India is perhaps the only nation in the world where a particular hereditary trading caste has developed. However, the modern concept of marketing has been slow to come to India and to other countries of the East. Those countries have not been slow to accept innovations; the latest production technique have been unhesitatingly adopted and advanced methods of science have also been pursued; but possibly the very strength of their tradition in marketing has delayed the introduction of modern marketing technology. There are large and untapped markets in this part of the world; the growth of living standards will be very much accelerated by modern methods of marketing.

In India, there are a large number of firms both in the private and public sectors which employ the latest

plant and equipment but cannot boast of a modern marketing organization. Perhaps a contributory factor is the restrictive and protected nature of the economy, in which any extra effort spent on marketing is considered as a luxury. Marketing methods, including market research, motivation research, sales propaganda and advertising, are considered to be wasteful. The entire production can be sold without any trouble and therefore calls for no extra effort. The great need today is to change the traditional trading approach—the approach of an opportunist who depends more on the law of supply and demand and sells where shortages occur — to a modern industrial marketing approach.

Marketing may be defined as a chain of processes backed by creative thinking that spreads from the concept of production, through strengthening the desire for the product, to when it is consumed or used. As has been rightly said "marketing begins before anything and ends after everything." It begins with evolving the right concept of the product long before its manufacture and ends only when the product has been used by the consumer to his satisfaction. Therefore, modern marketing calls for undertaking proper research into the needs and wants of the people, evolving products which will meet the people's wants, distributing them to make them readily available, and advertising to make them known and create a desire for them among the consumers.

In many of the developing countries where there is restriction of imports, industry is today production-oriented so that production receives the sole emphasis and marketing often none. It seems pure logic to some people that, in a scarce economy, what is needed is to maximize production and that any effort spent on marketing is a luxury. What is not realized is that "marketing makes production meaningful and oriented to consumer needs, instead of producing for production's sake". The product may not be what the consumer needs; it may be either surplus stock which nobody wants, or it may be consumed most grudgingly by an unwilling consumer as there is no better substitute.

This exclusively production-oriented economy will in the long run lose that touch of efficiency and humanity inherent in a consumer market-oriented-economy, which is always more sensitive to the needs of its members and therefore more efficient. In the long term, a market system that gives the consumer the right of rejection must pass for better than one where the supplier is quite blind to consumer aspirations. A producer, let it be said, should not, even under conditions of shortage and limitations, slacken quality control, for it is this which ensures the consumer's satisfaction. He must also not fail to consult the consumer and thus run the risk of not satisfying him.

In developing good marketing practices, developing countries could look to the countries of Europe and America and also to Japan for inspiration regarding a scientific approach to modern marketing. Many of the techniques developed in the developed countries can with advantage be adopted or adapted to conditions prevailing in the developing countries of the East. The United Kingdom looks at marketing as the "creative management function which promotes trade and employment by assessing needs and initiating research and development to meet them. It co-ordinates the resources of finance, production and distribution of goods and services, and determines and directs the volume and scale of total effort required (including sales management, advertising, sales promotion, public relations and marketing research) to sell profitably the maximum production to the ultimate consumer and user."

"The emphasis is upon what the consumer wants; upon a social good of increasing employment, upon the freedom of the consumer to choose."

This definition in its breadth and width embodies everything; it means that:

(1) marketing is a creative function;
(2) marketing promotes trade and employment;
(3) marketing co-ordinates finance, production and distribution and determines and directs the scale and volume of the total effort;
(4) there is emphasis upon what the consumer wants;
(5) there is emphasis upon the social good of increasing employment, and upon giving the consumer the chance to decide.

In the context of conditions prevailing in India, which is today a sellers' market as a result of planned development and restrictions on import, there is not sufficient production to warrant a consumer choice. In many things, the consumer is forced to buy what is available and not according to his discretion. In a developing economy such as India, priorities have to be laid down; but, within that limitation, sound and scientific marketing will ensure that the consumer is given the best value for his money and often a choice. Unless there is good marketing practice, less than the maximum use may be made of the production capacities and resources. Idle capacity, which a developing economy with scarce resources can least afford, may be prevalent.

How, even in a sellers' market, proper marketing thinking can become useful is exemplified in the nationalized steel economy in the United Kingdom, which has undertaken market-research, demand forecasting, long and short term burgeting and research development. A study of the market pattern resulted in obtaining valuable information on the customer's demand (including consumer's consumer) which led to the rationalizing of steel sections, and reduced unnecessary variations and specifications to obtain longer production runs. (See also New Zealand, Study on Steel p. 35).

In a developing economy, it is a costly assumption to think that marketing and advertising are luxuries only to be afforded when the economy has developed

a large surplus. Production alone, without understanding the consumer and without rationalized production practice from properly conducted market research, can develop inefficiencies which cripple growth, and lead to higher prices.

Fortunately, there appears to be a growing understanding of the importance of marketing, and marketing as a profession is being developed on very scientific lines. It is worthwhile remembering that, even in Europe up to a short time ago, following the Second World War, there were conditions of acute shortage and a great deal of want. It is important to take note how marketing and advertising through all sorts of media including radio and television made an extraordinary contribution in raising the standards of living. Marketing is part of a discipline that is necessary for increasing production for both the home market and for export.

Scientific marketing calls for proper research into the needs and the wants of the people, evolving products which meet the people's wants, their distribution to make them readily available and propagation of knowledge about their availability (that is, advertising), so that there is a desire for them among the consumers.

Realizing the importance of marketing as a complete function, which begins before anything and ends after everything, one could analyse and put down the various facts of marketing as follows:

(1) *Product*

This is the main pivot of the whole operation. The products have to be properly designed to give complete consumer satisfaction within their price range. It must be remembered that the product cannot survive for long except when the consumer has no choice. The product must not only give the consumer satisfaction, but should also have a unique advantage either in the form of its intrinsic performance or in its aesthetic presentation. Products are not often designed with that extra unique virtue and in terms of consumers satisfaction. Yet, to achieve that result, very elaborate marketing research is rarely necessary. With greater industrialization (or removal of import restrictions) and cessation of sellers' market conditions, competition will force manufacturers to evolve products suited to consumer needs. It will be vital to their survival in business.

Three major difficulties that face any developing country seeking fast industrialization are as follows:

(a) lack of right type of material because of severe import restrictions and non-development of satisfactory indigenous substitutes;
(b) lack of quality packaging material;
(c) difficulty in obtaining the necessary technical know-how. While these can be imported from the advanced countries, they do not always suit the local conditions of climate, labour and raw material. Foreign collaboration is beneficial in many cases, but the maximum benefit has seldom been derived because sufficient attention has not been paid to local conditions. There is also a general lack of indigenous standardization activity, of which more has been said in the paper on 'standardization'.

(2) *Distribution*

After production of the right type of product, it is the function of marketing to distribute it where it has the best prospects. This needs a systematic study of the market. In a country such as India with its vast territory, the problem may be whether to distribute it heavily locally or cover thinly a wider field. Proper width and depth of distribution are essential.

In the countries of the East where literacy is not very high but growing, the means of conveying the manufacturer's message to the consumer is limited. 'Shop-keeper's recommendations' will still play a useful part. There must be constant dealer's stimulation; not only must he stock the product regularly, he must also take enough interest to recommend it to the consumers who are not pre-sold on a particular brand. Dealer's stimulation can be achieved by:

(a) regular contacts made by the sales force who are properly trained for the work;
(b) fair profit to the dealers, which can be ensured by offering attractive selling terms or by ensuring fast turnover, and by effective advertising.

(3) *Selling system*

There are many methods of organizing a selling system through wholesalers' selling agencies throughout the country, or appointment of wholesalers in big towns only. Ultimately however it is the product that determines the nature of distribution system that is most suitable. For commodities such as food articles and daily newspapers, speed of distribution is crucial, but not for fountain pens, shoes, cameras, and the like. The method of distribution will depend very much on the shelf-life of the product. If a consumer buys a product which has deteriorated because of long storage, he is bound to get a poor impression of an otherwise fine product. Therefore, shelf-life (including the question of obsolescence in the case of non-deteriorating articles) is an aspect which has to be borne in mind in devising the system of distribution.

(4) *Rural distribution*

In most countries of the ECAFE region, the vast majority of the population live in the villages far from the main centres of commerce. In India, only about 90 million out of a total population of about 400 million live in towns. Most of the villages are not easily accessible. Thus few organizations can reach them sufficiently often. The situation is changing; communications are better today, so that the aspirations and needs of the villagers for products of industry are changing. Progressive marketing organizations must

note this significant change; but, meanwhile, more must be done to reach the villages through various improvised means. One way would be to organize bigger retail firms in towns equipped with vans on a co-operative basis and thus able to reach the remote villages. Distribution can only make available the product at certain selected centres. The more widely spread and more numerous they are the better. Sales organizations can be pushed a little further by affording house services. But what must be done is to make the people aware that such centres and such services are available. This is achieved by advertising. Advertising creates and nourishes demand.

(5) *Advertising*

Advertising again begins from the very beginning of manufacture. The shape and form of the packaging are also the advertising points. To advertise one needs a product message and the media for communicating it. It must be attractive and persuasive so that it will be remembered. It must provide a motive for the purchase. Such motivation can be achieved by two means. First, the advertising message must offer a unique selling proposition, distinct from other products in the field; and secondly it must be presented in a manner appealing to the senses and it must also be wholly credible. Unsubstantiated claims will leave people unconvinced or at best they will be disillusioned.

An advertiser, particularly if he is inexperienced, should employ an advertising agency able to guide total marketing operation.

Press advertising — Many advertisers are prone to depend upon the press for their advertising, not realizing that much of such advertising is wasted on account of several conditions. The media for such communication are inadequate in India. Perhaps this is more or less the same in most of the ECAFE countries, barring of course Japan, New Zealand and Australia. The Press Registrar of India has in his register less than 10,000 publications. Out of these, less than 400 offer regular circulation and economic advertising rates, and have a circulation of about 8 million, which is less than the circulation of one single newspaper in the United Kingdom. In addition, they reach only a very small proportion of the Indian population, mainly urban. This puts a limit to the efficacy of the press advertising.

Cinema — Most of the advertising done in cinemas is through slides or films. Exhibitors are not well organized and are not able to give good service. Further they are careless and the advertiser has usually no control over the exhibition. There are less than 4,000 permanent cinemas in India and about 500 touring cinemas, mainly in South India. With the maximum facilities afforded, this type of advertising covers about 80 million people. This is very insignificant when we consider the huge mass of the Indian population.

Radio broadcasting — Today radio has become a very effective and important medium of advertisement as an aid to marketing. As with the cinema, such advertising reaches all listeners, literate or not. Its great advantage over the cinema is its much larger coverage reaching all corners of the land. Popularization of community listening to broadcasting programmes makes it available to even those who possess no private receiving set. Sophisticated techniques have been developed in planning these advertisements which are cleverly sandwiched between musical programmes. Advertisers run special programmes consisting of (recorded or personal appearance) music of popular star performers; they also run special musical competitions under their trade name such as the Binnaea Programme of the Ceylon Radio. Many of these commercial programmes today enjoy an ever increasing number of fans, especially among the younger generation. Radio advertising, however, suffers from the drawback of being only audible and not visible. This lacuna is removed in the television broadcasts.

Television — Television has added an extra dimension of vision to the radio broadcast and has become equal to the cinema features, but it approaches a very much larger mass of people within the range of television stations. Community watching, which is increasing in underdeveloped countries, will enlarge the circle of recipients who possess no television sets. As in ordinary radio broadcasting, the advertisements are distributed between programmes of other features of entertainment, education, sports and cinema shows; they need very judicious handling.

Display counters, emporia and exhibitions — Besides display of materials by the producer or his sales agent, organized display counters and emporia, with or without sales arrangements, are becoming very popular. These sophisticated display stalls, often designed with a great deal of ingenuity and appeal, are organized at various levels. Governments, federal or state, organize them, as well as manufacturers co-operatives, trade organizations, handicraft boards, and so on. All governments organize in-country industry exhibitions in which many manufacturing organizations and government departments participate. International exhibitions and fairs are organized by many countries, in which other countries participate in a fairly big way. National agricultural and mineral products, consumer goods, heavy engineering equipment and almost every product with potentiality in the international market are displayed. Organizing exhibitions has become so highly specialized as to need experts, and most governments have established exhibition offices to take care of exhibitions in their countries and overseas.

Point-of-sale — Paucity of means of communication forces marketing organizations to use various propaganda media, the best of which are vans, sometimes equipped with cinema projectors, to carry their product message to smaller towns and rural areas. These vans are costly and no marketing organization can afford more than a few. Perhaps co-operative ownership of such vans has some possibility.

Display of materials at the point of sale is another means of advertising. This serves as a last minute reminder to those who have been approached through other means of advertisement, and as a primary medium for the message to the less-educated. Effective means of display have a powerful potentiality as they arouse impulse purchasing.

Success achieved by marketing organizations can be short-lived unless backed by research programmes seeking the improvement of products, taking into consideration consumer likes and dislikes, technical progress in manufacturing, and so on, and use of new and better raw materials. The lack of competition means absence of a desire or compulsion to change for the better. Once competition develops, either by production units increasing in the country or by importation from abroad, this complacency is replaced by vigorous action. One has to offer the best value to the consumer and this necessitates constant research — market and technical.

Exports have become the very life-blood of industry in such countries as India today and this is likely to be so in all countries where development is being forced forward by planning. Most industries in such countries have to import essential raw materials or machinery, which can only be done by export of their products. Large numbers of manufacturers are unable to sell in the foreign market because of unfavourable quality and prices. Further, because of import restriction, they sell whatever they produce in the country and therefore take insufficient pains to improve the quantity of the products or lower the cost of production by improving productivity. Quality control during production is not well developed. The Indian Government through various incentives schemes is trying to induce manufacturers to export. In spite of small improvements in the recent years, most organizations are not export conscious. Economic development in most developing countries is very closely linked with its ability to market its products abroad. The Indian Government is, therefore, taking a few steps to induce more export of quality products and these will be covered under marketing for export.

The future progress of all developing countries lies in quicker industrial development, which in turn depends open better marketing efforts both within the country and abroad. They must adopt or adapt the various techniques used in developed countries; bacause, once competition warms up and the consumer has a clear choice to buy what he likes, only the fittest will be able to survive.

II. GOVERNMENT POLICIES AND MEASURES TO BE ADOPTED FOR PROMOTION OF MARKETING

Because of the need for rapid industrial growth, a government has vital stakes not only in what the country produces but also in what it sells. It should take very active interest in the task of marketing in all its aspects and as a total effort both in the domestic and in the international fields.

The government should be concerned with creating the atmosphere in the country for the healthy growth of marketing facilities in the modern sense. For this purpose, it must take the following steps at the national level to supplement the work done by individual producers and their associates in their own limited fields:

(1) Undertake market surveys and analysis particularly for new industries; they should include both national overseas studies;

(2) Help with design for marketing products so as to make them more acceptable. The government's responsibility should be particularly oriented to the development of overseas products;

(3) Take all such steps (including setting up organizations) which will help the rapid development of product distribution, in particular quick selling and perishable goods, and foodstuffs which are seasonable products and need proper handling and storing facilities. These steps include: easing road and rail movement procedures, providing for proper storage and warehousing (such as the formation of chains of state warehousing such as the formation of chains of state warehouses under an autonomous organization like the Warehousing Corporation of India);

(4) The establishment of an organized quality control and inspection system in respect of quality grading, marketing, etc., for all products, particularly those for export;

(5) Make available legal services for quick disposal of trade disputes between the producing country and overseas buyers;

(6) Undertake all the types of publicity (discussed in the above paragraphs) such as:
   (a) Publish special trade journals.
   (b) Compile and publish trade statistics.
   (c) Advertise in the overseas press.
   (d) Issue special brochures and pamphlets on special items.
   (e) Organize and run exhibitions of country products in the country as well as abroad and particularly in world fairs, international trade, industry and agriculture exhibitions.
   (f) Participate in other forms of advertising by preparation of film documentaries, radio and television interviews and discussions.
   (g) Establish trade commissioner's offices in overseas countries.
   (h) Open display counters and emporia in different parts of the country and in the

main commercial trade centres of the world.

(i) Generally take all action, organizational, legal and financial, which will help the marketing of country products.

In the larger countries such as Australia and India, state governments should be active in their own sphere, while the Central Government must take the initiative at the national and international levels.

In the following sections the action taken by some of the ECAFE countries in the region to improve marketing practices, particularly with reference to marketing abroad, are given based on the information so far available.

III. MEASURES TAKEN BY SOME ECAFE COUNTRIES FOR PROMOTION OF MARKETING

Afghanistan

No market analysis or survey has been carried out in this country for lack of personnel competent to undertake such study. The Government is, however, very conscious of the need to sell more of its products in foreign markets. The intrinsic qualiyt of Afghanistan goods is good but cleaning, grading and packaging need a great deal of attention.

Afghanistan has participated in many international fairs and exhibitions, such as the International Exhibition held at Cairo, the Commercial and Industrial Fair held at Milan in 1959, the Indian Agricultural Exhibition at New Delhi in 1959, and the Polish International Exhibitions 1960 and 1961. These exhibitions and fairs provided opportunities to Afghanistan to display products such as textiles, Karakul skin, precious stones, minerals, carpets and rugs, oilseeds and fruits and served to attract foreigners with the resources and opportunities for trade and investment in Afghanistan.

Australia

Extensive marketing analysis and surveys have not been undertaken by either the Commonwealth Government or the state governmnts.

The constitutional arrangement in Australia is such that the Commonwealth Government and state governments are all engaged in industrial promotion. Instead of co-ordinating their approach, state governments compete to add to their industrial structure. This gives strong impetus to industrialization in Australian states. Each government has a department which promotes the development of state enterprises. At the commonwealth level, the work of encouraging development is carried out by the Department of Trade and Industry whose functions include:

Assisting Australia to meet import competition by way of protective duties and bounties, formulating Australian international trade policy and representing the Australian Government at the international forums such as GATT and UNTACO, promoting overseas investment in Australian industry, and encouraging Australian manufacturers to establish joint ventures in South-east Asia, conducting surveys, reviews and studies of manufacturing industry and assisting Australian exporters and manufacturers to find markets abroad.

Institutional arrangements have been created to facilitate good working relations between government and business though such bodies as:

(1) The Export Devedopment Council composed of leaders of manufacturing industries, the economic sphere and government circles to advise the Government on developing exports;

(2) The Manufacturing Industry Advisor Council has a similar composition; it advises the Government on matters affecting the manufacturing industry.

As in the post-war years Australia turned to Asia to find export outlets for its primary products, so also it depends on Asia for the necessary increase in the export of manufactured goods. As a rule, the Commonwealth Government has been concerned mainly to provide general encouragement to all industries which are organized to export and are capable of doing so. Among the main forms this encouragement has taken are:

(1) Publicity campaigns in Australia, particularly designed to increase export consciousness on the part of Australian manufacturers;

(2) Trade promotion activities overseas such as participation in trade fairs, trade missions, trade ships, stock promotion, and the like.

Further steps are the establishment of the Export Payments Insurance Corporation (EPIC) and the provision of taxation export incentives, such as a payroll tax rebate for increasing export and an income tax market development allowance form of additional reductions from assessable income for money spent on overseas export promotion.

The Government also assists Australian industry by providing a favourable domestic economic climate within which it can flourish. Stable economic growth in the domestic market provides the conditions in which an industry can develop and enter or expand its activity in the export fields.

China (Taiwan)

In China, marketing analysis has been the responsibility of the Industrial Development and Investment Centre (IDIC) which has conducted a number of marketing analyses and survey as follows:

(a) Survey of Taiwan's market for radios, transistors and television sets.

(b) Analysis of foreign markets for Japanese-manufactured radio receivers, television sets and their principal parts.

(c) Market survey of Taiwan's refrigerants.

(d) Analysis of foreign markets for Hong Kong's industrial products.
(e) Market survey of ball bearings in Taiwan.
(f) Market survey of Taiwan's sports goods.
(g) Market survey of Taiwan's man-made-fibre processing industry.
(h) Analysis of Taiwan's imports of polyethylene.
(i) Market analysis of Taiwan's melamine.
(j) Market analysis of Taiwan's steel.
(k) Market analysis of Taiwan's dyestuffs.
(l) Foreign market analysis of Taiwan's exports of furniture.
(m) Market analysis of Taiwan's canned fruits.
(n) Market analysis of Taiwan's methanol.
(o) Market analysis of Taiwan's rugs.
(p) Market analysis of Taiwan's agricultural chemicals.
(q) Market analysis of Taiwan's preserved fruits.
(r) Analysis of Taiwan's imports of hand tools.
(s) Market analysis of Taiwan's toys.

The results obtained from this study have been published separately for the information of prospective investors or incorporated in feasibility studies in a number of cases.

Institutional arrangements for marketing promotion. In 1959 the China Productivity and Trade Centre was established as a successor of the China Productivity Centre with the object of helping to develop overseas outlets for local industrial products as well as new domestic markets.

Generally speaking, the activities of CPTC cover a wide variety of areas and are divided into ten fields as follows:

(1) Industrial engineering
(2) Technical consultation
(3) Industrial training
(4) Local appraisal
(5) Training information
(6) Market research
(7) Industrial design
(8) Industrial exhibition
(9) Technical information
(10) International organization, co-ordination and co-operation

CPTC has many problems to tackle, among which are:

(1) lack of appraisal of modern engineering techniques among a large number of small entrepreneurs, accounting for 80 per cent of industries in Taiwan, most of which are family concerns;
(2) lack of knowledge and appraisal of modern merchandizing and marketing, resulting in lack of interest among the top businessmen;
(3) inadequacy of marketing information and data.

Among methods adopted by CPTC to tackle these problems are:

(1) establishment of a system of collecting and exchanging trade and marketing information;
(2) sponsoring, in co-operation with other bodies, management and other training courses.

India

The organizational arrangements in India for taking care of and expanding export trade are as follows:

1. *Ministry of Commerce (formerly Ministry of International Trade)*—This Ministry is the primary government agency responsible for evolving export policies and directing export promotion efforts. It is divided into three divisions, namely:

(a) The Territorial Division which deals with problems of trade with different regions of the world. There are separated sections of this division for each region;
(b) The Commodities Division which has a number of sections to deal with different groups of commodities; they are charged with the task of keeping close watch over the export of different commodities and they take appropriate measures to stimulate and expand this effort;
(c) The Service Division which deals with questions of general policy such as credit facilities, commercial services, quality control, opening of foreign branches, export promotion aids, participation in exhibitions, commercial publicity.

In addition, a number of attached and subordinate offices in this Ministry are concerned with export promotion; namely, the office of the Chief Controller of Imports and Exports which looks after exports of raw materials and machinery and the offices of the Textile Commissioner, Jute Commissioner, and the Director General of Commercial Intelligence and Statistics. The last disseminates marketing information to Indian exporters, compiles trade statistics and assists in settling trade disputes.

To organize and effect exports, and to diversify and augment the country's export trade by supplementing the efforts of private enterprise in export promotion, the State Trading Corporation of India has been given a special role in dealing with foreign monopoly organizations. The Export Risks Insurance Corporation, an autonomous corporation, seeks to cover political and credit risks involved in export trade.

2. *Regional offices* — Export Promotion Offices provide prompt assistance to exporters in different parts of the country. Four such offices are at present functioning at Bombay, Calcutta, Madras and Ernakulam.

3. *Government and commercial representatives abroad* — Indian trade commissioners, commercial counsellors and commercial secretaries are posted in

countries with which India has substantial trade. They report periodically on the economic, financial and commercial conditions in those countries, undertake market surveys, attend to trade enquiries from India, acquaint the importers of those countries with goods available in India and assist businessmen with suitable introductions.

4. *Advisory bodies*—A number of advisory committees consisting of prominent representatives of trade and industry have been established to undertake close liaison between trade and the Government, to co-ordinate efforts and to advise the Government on measures to be taken to promote Indian exports.

To undertake countrywise and commoditywise reviews of export and to consider specific problems having a bearing on international trade, in 1962 the Government established the Board of Trade under the chairmanship of the Minister of Commerce; it consists of leading economists, prominent leaders of trade and industry and senior government officers in the economic ministries. A number of committees have been convened, such as: the Cost Reduction Committee to formulate cost reduction programmes in respect of export commodities; the Exports Sector Committee to study the possibilities of developing production in the selected fields for export; and the Port Export Promotion Advisory Committees established at important ports to advise on steps for stimulating export commodities from the areas served by each of those ports.

5. *Commodity bodies*—Fifteen export promotion councils, each dealing with a special commodity or group of commodities among the country's important export items, have been established to undertake intensive study of the export promotion possibilities for the commodities concerned and to advise the Government from time to time as to practical measures for assisting and expanding exports. The councils' programmes include surveys of foreign markets, market research, sending of delegations on study tours, participation in Indian and international exhibitions, carrying out schemes of publicity, preshipment inspection and quality control. In certain commodities such as handloom textiles, precious stones, jewellery, handicrafts and woollen manufactures, full-fledged export promotion councils have not been established, but advisory committees have been appointed. Statutory boards have been created for the development of certain industries such as tea, coffee and coir.

6. *The Indian Institute of Foreign Trade* — This is an autonomous body, registered under the Societies Registration Act, consisting of representatives of the government, trade and industry, universities, educational and research institutions. It undertakes and sponsors market surveys in foreign countries and commodity studies within the country; it also acts as an efficient centre for collecting and disseminating information on matters relating to foreign trade. It provides training in trade techniques to managerial personnel drawn from industries concerned and trading houses; it holds refresher and basic courses for the benefit of officers in trade missions and others; and it undertakes research studies on specific problems remitted to it by the Government or by industry and trade.

7. *Other agencies* — The Railway Freight Advisory Committee of the Ministry of Railways considers reductions in railway freight for export goods. The Freight Investigation Bureau in the Office of the Director General of Shipping looks into problems relating to ocean freight shipping space, shipping surveys and allied problems. The Drawback Committee in the Ministry of Finance deals with grants of rebate on excise and customs duties for exports of manufactured products. The Reserve Bank of India releases foreign exchange to businessmen for visits abroad and for opening branches in foreign countries.

8. *Trade and industrial organizations* — Chambers of commerce and industry and trade associations exist in almost all important commercial centres. Their work is voluntary and they serve as forums for their respective trading interests. The central organization is the Federation of Indian Chambers of Commerce and Industry which has twelve overseas members also and maintains contact with the International Commerce Commission through the Indian National Committee.

Assistance to exporters

1. *Import and supply of raw materials* — Certain schemes provide allocations of various indigenous raw materials such as steel and pig iron, against export of products manufactured from them. These schemes are operated by the respective Export Promotion Councils or by Port Export Promotion Offices where the commodity is not covered by any Council. The raw materials are obtained at international prices thus enabling the exporter to compete in the export market.

2. *Fiscal rebates* — Exporters are entitled to refund of central excise duty and refund from draw back of customs and excise duty paid on the materials used in the manufacture of such products. Sales in the course of export are not liable to sales tax. As an export incentive, rebate of a certain proportion of the amounts of income tax and supertax derived from export out of India is allowed in the case of all assesses, other than foreign companies which have not the prescribed arrangement for declaration of payment of dividends within India. A further rebate of tax calculated on an amount equal to two per cent of the export turnover is allowed to a manufacturer who either himself exports or whose products are exported.

3. *Credit facilities* — The bulk of the credit made available through the banking system is short-term credit. Provision is being made in the State Bank of India for furnishing export finances up to a period of seven years.

4. *Transport facilities and freight concessions* — Export cargo being moved over railways enjoys cer-

tain high priorities which are indicated by labels "priority for export" to ensure that no delay will take place at any stage. Freight rate concessions are given for a wide range of export commodities and for raw materials used for the production of finished export goods. Since India depends on carriage of export cargo in foreign bottoms, which makes the freight rates a matter for negotiation rather than for direct action, the Freight Investigation Bureau undertakes studies and negotiation in this regard.

5. *Industrial policy* — In the long-term interest of export it will be necessary to develop an export bias in the industrial complex. Preference is given under the Industries (Development and Regulations) Act 1951 to industries which have an export potential and which can undertake effective export of a given quantum. Foreign exchange is utilized preferentially for imports of machinery for industrial units which can undertake similar export obligations.

6. *Preshipment inspection and quality control* — A number of export commodities are already subject to preshipment inspection and quality control. (See the paper on Standardization for futher details.)

7. *Market survey* — Market surveys are from time to time undertaken in various foreign countries for different products with a view to assisting the potential demand for Indian products abroad. They are conducted by the commercial representatives, individual Export Promotion Councils and individual manufacturers.

8. *Commercial publicity* — The Government has embarked upon a programme of increased support to the export trade by following the undernoted objectives:

i) Maintenance of a regular and steady inflow of commercial intelligence from overseas markets and its dissemination to Indian industry and trade;
ii) Deepening of export-consciousness in the country; and
iii) Creation of an awareness in foreign markets about India's export potential as regards a wide range of manufactures and other goods.

To achieve these objectives, the following publicity is undertaken.

Publication of journals — The "Foreign Trade of India" started by the Directorate of Commercial Publicity in 1963 gives publicity to India's exportable products in the foreign markets. Each issue is devoted to a specific subject or group of industries/commodities. The "Journal of Industry and Trade" disseminates commercial and industrial information to Indian exporters, industrialists and businessmen. "Udyog Vyapar Patrika" is designed primarily to serve the requirements of small and cottage industries of India.

Economic and commercial reports — Economic and commercial reports are published, based on annual reports on economic and commercial conditions received from the Government's commercial representatives in the countries to which they are accredited.

Directories of importers of Indian products — These contain lists of importers of various products in the countries concerned.

Pamphlets and brochures — The programme for publicity through pamphlets and brochures has been considerably expanded and a large number of pamphlets, brochures and folders are issued. Efforts are also being made to issue them in two or three important foreign languages such as German, French and Arabic.

Publicity through films and radio — A number of documentary films have already been completed and a few more are likely to be completed soon. For this purpose, a documentary films cell is being set up in the Directorate of Commercial Publicity. The programme arranged with the External Services Division of All-India Radio for broadcasts on India's exportable products to be beamed to potential foreign markets was further stepped up during the year.

Exhibitions and trade fairs — Participation in international fairs and exhibitions and the organization of wholly Indian exhibitions in selected areas have contributed to the country's export promotion efforts, as they have had the effect of introducing India's exportable products, especially the non-traditional items, to world markets. In the case of fairs in East Europe, the State Trading Corporation of India deputed Trade Teams which negotiated business with the appropriate organizations concerned with foreign trade.

India's participation in the New York World's Fair was an outstanding event of the year 1964. Some of the highlights of the Indian Pavilion were:

(a) a sales centre where Indian handicrafts, handloom textiles and other articles were sold in retail, and
(b) a national restaurant where a large variety of Indian dishes were served.

Show rooms — The Government maintains 17 show rooms/trade centres in various countries. Various export commodities are displayed there by rotation; this has helped to stimulate interest in Indian goods and to introduce several items of export to foreign markets. The Government has decided to reserve 10,000 sq ft of space for the display of Indian products in the "Plaza of Nations" (at the World Trade Centre at New York) scheduled to be set up by the middle of 1968.

Indian Council of Trade Fairs and Exhibitions — In order that the existing showrooms and trade centres abroad could be managed and run on more commercial lines with the help of experts and people with actual experience in trade, this council was established in 1964.

9. *Trade agreements* — The Government of India, particularly through the agency of STC, has entered into trade agreements with a number of countries with a view to expanding and diversifying the

extent of India's export trade. Special rupee payment agreements entered into with the East European countries have provided a framework for increasing trade with them on a balanced basis. The Government has also approved individual barter transactions, again through STC.

10. *Marketing Development Fund* — Recently the Government started the Marketing Development Fund to advance the export promotion effort. Funds will be utilized for advancing schemes and projects for the development of foreign markets for Indian products and commodities.

Hong Kong

(1) The Government has established offices at London, Brussels, and Sydney whose operations are primarily concerned with the promotion of trade. In addition, the Hong Kong General Chamber of Commerce and the Federation of Hong Kong Industries jointly operate offices for the promotion of trade in New York and Brussels. Trade missions are from time to time sent to areas of interest or potential interest to Hong Kong trade and, in recent years, missions have been sent to the Middle East, the European Economic Community, Australia and East Africa.

(2) A display Centre of Hong Kong Products is maintained in Hong Kong and a centre is being set up in an extension to the Hong Kong Government Office in London.

(3) Hong Kong takes part in international trade exhibitions held in areas of interest or potential interest to Hong Kong trade, insofar as the Colony's resources of skilled personnel experienced in the mounting of such exhibitions and of resources available for such purposes permit. The Colony has exhibited over the last twelve months at international exhibitions held at San Francisco, Tokyo and Milan. Hong Kong also mounts smaller displays for the promotion of Hong Kong products in major cities in countries which represent the Colony's main markets. Such displays are planned for the United States. The policy regarding trade promotion generally is currently under review.

Japan

To achieve the aims of the Japanese development plans, one of the policy objectives was the expansion of foreign trade and modernization of industrial structure Japan has adopted several measures for expansion of its foreign trade.

It allows duty-free import of raw materials for industry which are in short supply in Japan. Three hundred and thirty-two items out of the total import of 2,530 items can be imported free of duty. The value of these items approximates 50 per cent of total import-value. For any production of exportable items, raw material import is permissible subject to reduced duty or free of refundable duty.

Institutional Arrangements for Industrial Promotion. They are:

A. (1) The Industrial Development Bank (national coverage)
Hokkaido Tohoku Development Corporation (regional)
(2) The Japan Productivity and Management Centre (regional)
(3) The Industrial Research Institute

B. Industrial Development Corporations
(1) Institutes in financial fields
The Japan Development Bank
The Small Business Finance Corporation
(2) Institutes in general economic fields
Several
(3) Institutes in industrial fields
The Electrical Power Development Company Limited
The Japanese Petroleum Exploration Company Limited, etc.
(About six in number)

Measures taken to improve technical standards and productivity in order to promote exports are as follows:

1. *Quality Control* — The methods adopted for quality control and inspection undertaken prior to shipment have been fully described in the paper on "Standardization".

2. *Action by the Japanese External Trade Recovery Organization (JETRO)* — This organization is entirely supported by governmental investment and looks after the expansion and diversification of Japan's export trade.

JETRO has 58 agencies in overseas countries and 32 agencies at home. These agencies have the following objectives:

- Investigation of foreign markets.
- Overseas advertisement of Japanese industries and products.
- Participation in trade fairs in foreign countries and opening international trade fairs.
- Despatch of students to foreign countries to study foreign designs.
- Exhibition of superiorily designed goods.
- Advertisement, introduction and transaction of Japanese superior goods through 14 trade centres abroad and their maintenance as permanent markets for the Japanese merchandise. To accomplish this object, researchers are permanently stationed at 43 places abroad.
- Rendering advice on trading methods and introduction of data on trade.
- Displaying and propagating Japanese merchandise and giving assistance to foreign enquiry.
- Marketing researches for sixty-four articles are entrusted to foreign special research

organizations. Further, in order to facilitate the conducting of special marketing research, the Organization bears part of the air fares for 37 business experts.

3. *The Japan Plant Consulting Institute* — This corporate body was organized in September 1955 as an organ to promote the export of Japanese plant. It has established fifteen overseas offices in various countries and has participated in various kinds of project such as the development of industry, exploitation of electric resources, industrialization and mechanization; and it has sent technical survey teams to these countries, given the necessary advice, and held technical consultations on designs and estimates.

4. *Japan Industry Floating Fair Association* — The Japan Industry Floating Fair Association, a corporate body, is the sponsor of the floating fair. The fair was held five times in the past, in south-east Asia in 1956, in Latin America in 1958, in Oceania and south-east Asia in 1960, in Africa and the Middle East in 1962, and in Europe in 1964. The Association has the SS "Sakura-maru", of 12,628 gross tons, for the exclusive use of the floating fair.

5. *Show centres*

(i) *At home*
- (a) The Japan Design House
- (b) The Japan Export General Merchandise Show Centre

(ii) *Abroad*
- (a) Those belonging to JETRO are located at New York, San Francisco, Los Angeles, Chicago, Toronto, London, Hamburg, Sydney, Bangkok, Hong Kong, Lima, Mexico City, and Bombay.
- (b) Those belonging to the Japan Machine Tool Trade Association are located at Chicago, Dusseldorf and Sao Paulo

6. *Trade fairs (held in 1964)*

(i) *At home*
- (a) The Osaka International Trade Fair
- (b) The Japan International Machine Trade Fair

(ii) *Abroad (only those in which JETRO participated)*

Japanese Industrial Fair (Nicaragua).
Japan Industrial Exhibition (Hong Kong).
Industrial Trade Fair (British Colombia).
International Trade Fair (Paris).
Japan Agricultural Machinery Exhibition (Iran).
The Twenty-ninth International Trade Fair (Salonika).
The Seventh World Trade Fair (United States).
International Trade Fair (Texas).
The Second Plastic Show (Canada).
The Third Annual Furniture Fashion Exposition (California).
The Sixth Biennial International Engineering and Industrial Exhibition (Sydney).
The Nineteenth Annual International Instrument - Automation Conference and Exhibition (New York).

7. *Examination of design of goods* — Imitations of design of foreign goods which infringe upon foreign ownership are not only violations of commercial morality but also prevent the sound development of international transactions. Special measures to prevent design imitation are taken, but voluntary action among industries is favoured.

8. The introduction of special traditional Japanese products to foreign countries is being improved to fall in line with foreign preferences, so that sales will improve.

9. *International commercial arbitration system* — Japan has concluded treaties with various countries concerning commercial arbitration to smoothen disputes in foreign trade.

10. Export Insurance has been introduced to insure against risks in overseas transactions which are not ordinarily insurable.

11. *Financial Taxation System* — In order to make up for the lack of capital accumulation and to smoothen export activities, various financing measures are taken such as discount of export bills by the Central Bank and financing exports with deferred payment by the Export-Import Bank. Special consideration is given to the taxation of reserve funds for opening overseas markets and for compensating for losses in overseas investments.

12. Training courses in business and foreign languages are given to those engaged in trading.

Nepal

The Nepal Industrial Development Corporation (NIDC) has undertaken several market surveys and made marketing analyses of existing and prospective projects:

- (a) Feasibility market surveys within the country have been carried out by its own staff on timber, jute, ghee, soap, processing industry and forest based industries.
- (b) Foreign consultant market investigation, especially in India, on pulp paper, wood and plywood, chipboard, woollen textiles, and so forth.

About 120 project studies for the increasing development of industrialization are to be undertaken. NIDC has set up a separate division which will offer consultancy and other services on market survey. A

new department, known as the Necessity Industrial Development Centre, is being started to advise industry about matters of production; major industries for the establishment of which market surveys are being conducted are sugar mills, sawmills, leather, soaps, paper pulp, woollen textiles, plywood and chipboard, and so on.

New Zealand

Domestic market surveys are conducted for individual manufactures or groups of manufactures by private market research organizations; results or methods are not published.

Two market researches were instigated by the Government.

(1) Most economic use of the Kapuni Natural gas reserves by Zinder International Limited of the United States which conducted market surveys in December 1964. A report is due shortly.

(2) The consultants to the New Zealand Steel Investigation Company Limited, made a thorough investigation of New Zealand market for steel. The study contained projections of product use in 1970, 1975 and 1980 and the geographical distribution of demand. Detailed information was also collected on 80 per cent of imports for 1962 and 1963 and permitted close analysis of quantities of each size used in New Zealand. Growth of demand was estimated as 4.3 per cent over the 17 years from 1963 to 1980.

In overseas markets, trade surveys are both part of the regular routine of the Trade Commissioner and an essential first step in trade promotion in a new area. An example of a major trade survey undertaken by a New Zealand team was the visit made to Panama, Peru, Uruguay, Chile, and Brazil in 1961.

The bulk of New Zealand's exports consists of primary agricultural products of the wool and dairy and meat industries. Recently there appears to be a slight trend of export development in the woollen textile and footwear industries.

The Philippines

In order to expand its commerce abroad, the Philippine Government launched in 1952 a programme to correct past deficiencies. Under it, great importance has been given to the export trade. It is envisaged that the programme will bring about an export earning of $3,700 million in five years. Firstly, it seeks to expand the production of traditional export items such as sugar, coconut products, fibre, tobacco and its products, lumber and embroideries, by 25 per cent in five years. It also plans to make possible the export of light manufactures.

Export procedures and requirements — In order to promote and establish an orderly efficient export programme, the Government has adopted some rules and regulations designed not only to protect its revenue but also to improve the quality of products and thereby increase the demand for them. Export transactions are negotiated through the Central Bank of the Philippines.

The Bureau of Customs is entrusted with the duty to enforce tariff and customs laws and has supervision and control over the entrance and clearance of vessels and aircraft engaged in foreign commerce. (The Collector of Customs "shall not permit products for which standard grades have been established by the Government to be laden aboard a vessel clearing for a foreign port, unless the shipment conform to the requirements of law relative to the shipment of such products.")

The Bureau of Standards, which is being organized, has the authority to inspect for quality of goods meant for export. The Bureau will form a vital link in the chain that is being forged in the Philippines for expansion of its export market.

The export of certain products is sometimes governed by special laws which are enforced by other government agencies.

Thus, shipments of coconut products, namely, copra, coconut oil and desiccated coconuts, must have the prior approval of the Philippine Coconut Administration. The Fisheries Commission gives authority to export marine products. In the case of lumber and logs, the Bureau of Forestry inspects the exportation before it approves the same. The Bureau of Animal Industry issues a health certificate to live animals before they are allowed to be exported. A Wildlife Special Permit is issued by the Director of Parks and Wildlife Office before birds and wild life are allowed to be sold, exchanged or exported.

The Bureau of Fiber Inspection Service is charged with the duty of inspecting the baling, grading and standardization of Philippine fibres for export. (The Philippine Coconut Administration inspects and grades copra for export. Logs and lumber for export are inspected by the Bureau of Forestry). The Bureau of Internal Revenue promulgates rules for the standardization, packing and inspection of leaf and manufactured, part manufactured or scrap tobacco in commercial quantities for export.

Other restrictions — There are restrictive measures enforced to regulate the export trade of the Philippines:

(1) Republic Act No. 427, which prohibits the export of silver and/or nickel coins.

(2) Circular No. 13, dated 3 March 1959, of the Central Bank, which requires a licence from the Central Bank for exporting gold in any form.

(3) Resolution No. 875 of the Monetary Board, which requires all exporters of copra and/

or coconut oil to appoint recognized surveyors and chemists who will make survey reports of the total amount of copra and/or coconut oil loaded or unloaded in port to and from a particular vessel.

Aside from the above measures, policies regulating the exportation and importation of some commodities have also been adopted.

Tariffs — The Philippines, like all other countries, is imposing tariffs not only for purposes of revenue but also to protect domestic industries. The Tariff and Customs Code of the Philippines provides for five kinds of import duty: *ad valorem*, specific, alternative, special, and countervailing duties.

Aside from the tariff is the levy of antidumping duties. This levy is designed to protect local producers against unfair competition offered by imported articles which are sold at prices lower than the home market price in their country of origin or lower than the cost of production.

Import quotas — Import quotas have been adopted by many countries as a means of regulating trade balances. The Philippines adopted this measure in 1949 to solve its difficulties in the balance of payments. This import quota was, however, lifted in 1962 when it failed to conserve the dwindling dollar reserves of this country.

Exchange controls — Exchange controls are used by many countries suffering from a shortage of foreign exchange to supplement their customs tariffs in reducing the volume of imports. Exchange control is primarily a monetary stabilization measure to protect domestic currency from further depreciation, but is also effectively employed to discourage importation of goods from abroad. The Philippines formerly imposed exchange control but lifted it partially in 1962.

Role of the Bureau of Commerce — For more effective foreign trade promotion, the Bureau of commerce has realigned its activities to meet the requirements of a systematic, vigorous and aggressive foreign trade development programme necessary to place the Philippines in a more advantageous position in its international trade relations, in view of the rapidly changing patterns of international commerce and especially the increasing complexities of competitive trading in the world markets. This Bureau seeks to strengthen and expand the country's trading position in existing foreign markets and to explore and develop new foreign markets for Philippine products. To accomplish this objective, the Bureau collaborates with other government agencies such as the Department of Commerce and Industry and the Department of Foreign Affairs in the vigorous implementation of foreign trade policies adopted by the Government. It provides the necessary information and advisory services to Philippine business, the general public and government agencies regarding economic and trade conditions in all parts of the world.

Establishing Offices — Trade Commission, etc.

The Department of Commerce and Industry, the government body which is in charge of the promotion of the country's commerce and industry, realizing the necessity for systematic and comprehensive foreign trade promotion activities, in view of the present stiff competition in the world markets and of the gradual loss of preferential tariff concessions for Philippine export products in the United States, took a concrete step in this direction when it decided to establish offices in various trade centres of the world as close-range observation posts and at the same time to have men on the spot to push through any trade activity not only of the government but also of the private sectors. At present, there are 27 commercial world and working for the promotion of Philippine attaches stationed in various trade centres of the foreign trade. These commercial attaches (called Foreign Trade Promotion Attaches) are stationed in New York City, San Francisco, Washington, D.C., Los Angeles, New Orleans, Chicago, and Seattle in the United States; Mexico City, Mexico; London, England; Hamburg and Bonn, West Germany; Paris, France; Berne, Switzerland; Rome, Italy; Madrid, Spain; Cairo, United Arabian Republic; Karachi, Pakistan; New Delhi, India; Brussels, Belgium; Tokyo and Kobe, Japan; Taipei, China (Taiwan); Djakarta, Indonesia.

These attaches' offices are located in the embassies and consulates for purposes of economy.

To promote the local markets, the Department of Commerce and Industry, through its Bureau of Commerce has adopted the following policies:

(1) to encourage the organization of merchant groups among Filipinos engaged in different lines of business;

(2) to enforce Republic Act 1180 otherwise known as the Retail Trade Nationalization Law and register bona fide Filipino retailers in implementation of R.A. 1292 with respect to providing assistance to Filipino retailers from a Retailer's Fund;

(3) to sponsor training seminars and practical demonstrations to help Filipino businessmen acquire and improve merchandizing skills and techniques;

(4) to extend business connexion work, marketing consultant services, and, whenever funds are available for the purpose, selling and buying assistance including storage and warehousing services to farmers, producers, merchants, and consumers;

(5) to regulate the operation of warehouses for the protection of depositors by issuing licences, as well as to supervise their operation;

(6) to encourage greater Filipino participation in trade and industry by fostering the organization of industrial association and trade groups, extending procurement aid for tools and equipment for small manufacturers, and procuring samples of Philippine products for promotional display.

In order to facilitate proper supervision and control of such policies and activities the Bureau of Commerce has branches in most of the capital cities as well as offices in almost all congressional districts each headed by a Commercial Agent. They are under the supervision of the Field Service Division of the Bureau which is located in Manila.

Display centres — Domestic

Several display centres have been established in various parts of the country, under the auspices of the Bureau of Commerce, an agency under the Department of Commerce and Industry. Located in branch offices of the Bureau, they depict various products from different regions of the country to let the people know what products are being produced not only in their areas, but also in almost all the country.

Display centres — Overseas

To promote the sale of Philippine export products in the world markets, the Department of Commerce and Industry has established display centres located in the premises of some of the Philippine embassies and consulates. At present there are display centres in Bonn and Hamburg, West Germany; San Francisco, California; Hong Kong; Saigon, South Viet-Nam; and Vancouver, Canada; and there is a plan to establish some in other places such as London, England; Los Angeles, California; and Seattle, Washington. These display centres are useful means of exhibiting various Philippine products, particularly handicrafts, to foreign buyers. However, unless the exhibits are changed frequently, such permanent display centres may degenerate into commercial museums.

Holding of exhibitions — National and international

In the Philippines, unlike in some other countries, the holding of exhibitions depends on the Government's financial assistance, especially in the case of international exhibitions. No sum of money can be expended out of the national treasury without authority from the Congress of the Philippines. In other words, it is only by legislation that funds can be set aside for such a purpose. This procedure makes it difficult to hold exhibitions, either national or international, because it is not easy to persuade the lawmakers to appropriate the required amounts.

Financing from the private sector can never be relied upon, because the method used in this country is invariably on a voluntary basis; it is impossible to impose obligatory assessment on any individual or firm belonging to the private sector. In spite of such difficulties, it is the policy of the Government to participate and assist in holding exhibitions, both national or international.

Thailand

In order to assist small industries in marketing their products, a marketing organization is considered very important by the Thai Government. The Department of Industrial Production, with the assistance of an ILO Expert on handicraft design and marketing, is actively studying how best to convert the departments handicraft retail shop "Narayana Phand" into a full-scale marketing organization.

An Industrial Design Centre was set up in the Narayana Phand by the Department of Industrial Promotion in 1963. It serves as a centre of traditional and contemporary handicrafts and industrial products. The centre is developing new designs of products in ceramics, wood, lacquer, silver, bronze, glass and plaster ware. Its services are available to local manufacturers without charge. In September 1964, the first industrial design exhibition was organized as a part of its activities. Seven industrial establishments participated with 70 new designs. In Bangkok, the Government has also opened various display centres.

Republic of Viet-Nam

Market analysis — The Government has not yet undertaken any market analysis and surveys. Some private organizations have, however, carried out market analysis to determine the potential markets before going into business. The best known private organization active in the field is the Viet-Nam Centre. The surveys are kept secret.

Export of manufactured and semi-manufactured products — In order to stimulate the export sector, an Export Development Centre was set up in November 1964. Several measures have been taken such as:

Simplification of formalities
Provision of export subsidies
Exemption from some duties and taxes
Establishment of industrial standards bureau.

In the preparation of this paper, extensive help has been obtained from the following, for which grateful acknowledgement is made:

(1) The National Productivity Council — Technical Reports No. TR.8 and 39.
(2) Several publications on marketing by Shri P. L. Tandon, Chairman, Hindustan Lever of India.
(3) Annual Report of the Ministry of Commerce, Government of India, 1964-1965.

A STUDY ON INDUSTRIAL RESEARCH AND DESIGN

Prepared by a Group of Experts*

FOREWORD

This report has been prepared mainly on the basis of discussion between the members of the Group. The working paper prepared by the consultant, the country reports and other papers presented during the "Inter-regional Seminar on Industrial Research and Development Institutes in Developing Countries", Beirut, in December 1964, were also made use of.

The report stresses the importance and role of industrial research and development in the industrialization of a country. Concepts, objectives, functions, etc., of institutes for industrial research and development in general have been stated. As far as institutes in the ECAFE region are concerned, the present status of industrial research activities and problems in these countries has been described. In addition, the report contains the recommendations of the Group to promote industrial research and development and to develop co-operation among the countries of the ECAFE region on these activities.

* The Group consisted of the following:

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PART I. INDUSTRIAL RESEARCH AND DEVELOPMENT

I. INDUSTRIAL RESEARCH AND DEVELOPMENT AS A MEANS OF PROMOTING INDUSTRIALIZATION

It is apparently quite easy nowadays to set up a manufacturing industry, provided that capital is available. A whole factory including technicians and technologists can be obtained from abroad. But to industrialize a country effectively many interrelated activities are required. These activities encompass such elements as industrial planning and policies, the creation of a favourable industrial environment, techno-economic studies of industrial projects, the implementation of decisions, finance, training, management, and so forth. And this is where industrial research and development play their part, not only at the planning stage but through all stages of industrial development. Before starting an industry, marketing, availability of raw materials and technological and socio-economic feasibility studies must be made. Next come the choice of technology, a study of the scale of operation and the industrial location and site. When the industry is at its operational stage, improvement in productivity and in the quality of the product becomes necessary if progress is to be made in the industry.

Numerous illustrations of the functions of industrial research and development in promoting industrialization could be given. Some are given below.

(1) *Marketing studies and development*[1]

There are many marketing functions which can be investigated, studied and developed through research for the industrial sector in general, for a group of manufacturers, or for a given factory. Assistance can thus be given in determining the potential market. Who the potential consumer is, what and when he will buy and how much he is expected to buy are questions which can lead to the right selection of products for manufacture if they are answered scientifically.

One of the functions of research is to advise on problems of merchandizing. Assistance can be given to a factory, for example, to investigate and solve the

[1] For more details see the paper on Standardization, Patents and Marketing (I&NR/Ind. Conf./S.6).

problems of packaging, labelling branding and standardizing products.

(2) *Use of local materials*

Many industries use imported raw materials because the availability and suitability of such materials in the country are not known. It is one of the functions of research and development to make quantitative and qualitative surveys so that the local materials may be substituted for the imported ones. This would allow the full exploitation of mineral resources and agricultural materials. This may also lead to the development of new industries which may not have been thought of. Very often, it happens that the local materials are not directly suitable for the industry in question. They may need some processing. Here again, industrial research and development would be required.

(3) *Efficient use of equipment*

Research may provide knowledge to make possible the more efficient use of equipment. Investigation and study on the spot may be needed to ensure that waste is reduced, the life of equipment prolonged, and a high rate of production obtained, which in turn would raise productivity in the factory.

(4) *Utilization of waste and waste disposal*

Disposal of waste products and effluents is a major consideration in planning an industry. In many cases the problems remain unsolved, and consequently these substances may become a serious public muisance. In this situation, industrial research would be indispensable. Through research, the waste could possibly be also utilized, which in turn would improve the economy of the industry. Alternatively, a cheap method of disposal could be devised, but only through caerful studies and investigations.

(5) *Adaptation of foreign technology to local conditions*

For rapid industrialization the introduction of foreign technology is essential. Most of the technology needed has already been developed in advanced countries and does not have to be re-created locally, but using tchnology developed elsewhere might require careful study. The form of technology used in an industrially developed country may not necessarily be appropriate in another where scientific and technical manpower and capital are in short supply and operative conditions are at a much lower level. In most cases, the adaptation and modification of imported technology will be necessary. This adaptation may require applied research into the quality of local raw materials and the effects of different operating, climatic and other conditions. It happens repeatedly that research may be required for urgent trouble-shooting problems to enable a so-called 'package factory' or 'ready-made factory' to run properly.

(6) *Development of indigenous know-how and technology*

Although at the initial stages there would be the introduction of imported technology, in due course the developing countries would have to develop the infrastructure of scientific and industrial research to sustain their industrial development and ensure its future growth and improvement. This will be the stage when increasing dependence on their own know-how and technology will give them the status of a developed economy.

The illustrations above indicate the usefulness and necessity of industrial research and development for industrialization. Any proposed industrial project, whether undertaken in the public or private sector, should be studied and developed in a way that will ensure its success. Full advantage should be taken of the research facilities available in the country in planning and operating such an industry.

The importance of research to industrial development may also be shown by comparing research expenditure in various countries at different stages of development. Table 1 shows that countries which are advanced industrially are spending large sums of money on research.

TABLE 1. PER CAPITA EXPENDITURE ON RESEARCH AND PER CAPITA NATIONAL INCOME IN VARIOUS COUNTRIES

Country	*Year*	*Expenditure on scientific research (million US$)*	*Population (million)*	*Per capita research expenditure (US$)*	*Per capita national income (US$)*	*Research expenditure as per cent of national income*
Australia	1958/59	80	9.9	8	1,176	0.70
China (mainland)	1960	400	669	0.60	—	—
India	1961/62	94	440	0.21	67	0.32
Japan	1962/63	781	93.2	8.4	467	1.78
Norway	1958	25	3.5	7	908	0.70
Pakistan	1964	10	100	0.1	72	0.14
Sweden	1961/61	218	7.4	29	1,730	1.7
United Kindom	1961/62	1,693	52	32	1,202	2.7
United States	1961/62	12,516	174	82	2,838	2.9
Soviet Union	1958/59	4,140	209	20	660	3.00
Yugoslavia	1958	15	18	0.84	362	0.22

Source: Journal of Scientific and Industrial Research (India) 22 (1963), p.479-86. Figures for Japan and Pakistan compiled and introduced.

The magnitude of per capita research expenditure of the United States, the United Kingdom, Sweden, Australia, Norway and the Soviet Union is a clear indication that there is a close relationship between research and the industrialization of a country.

It may thus be said that because a country is well-developed industrially it can afford to spend more for research. It is equally correct that since a country pays more for research it is therefore well-developed.

II. CONCEPT, OBJECTIVES AND FUNCTIONS OF INSTITUTES FOR INDUSTRIAL RESEARCH AND DEVELOPMENT IN THE COUNTRIES OF THE ECAFE REGION

It has been reported elsewhere that the industrial level of the countries in the ECAFE region is extremely uneven. Whatever the stage of development, the role of industrial research would be to take the country to a higher industrial and economic level. The concept of industrial research would, to a certain extent, depend on the present initial stage and the programme intended.

At the initial stage, a backward country might have a primitive agricultural economy, practically without any industry but with unexplored raw material, minerals and other natural resources. It would need extensive and intensive efforts at surveys to discover, prove, and assess the raw materials on which to base its future industry. To ensure rapid development, it might resort to the large-scale introduction of foreign know-how, technology, capital equipment and financial resources. Its industrial research and development effort would consist of obtaining qualitative and quantitative data and development research on the processing, beneficiation and utilization of resources and adaptation studies on imported know-how to suit the nature, quality and characteristics of the local materials.

At a later stage, simultaneous efforts to develop indigenous know-how, further development and improvement of imported processes, and duplication of machinery, equipment and instruments would have been started. Scientists would be called upon to plan, develop and execute projects related to basic industries such as steel, coal, petroleum, heavy engineering, electronics, nuclear energy, and metallurgical industries. The inflow of imported technology would still be quite high but there would be a matching build-up of indigenous know-how, scientific skill, design and engineering. Side by side with industries set up with foreign assistance and know-how, would rise industries based on adapted or copied designs and completely indigenous effort.

At the third stage, the country would have developed enough scientific, technological and engineering knowledge and potential to go ahead on its own steam. It would stop introducing know-how and technology from abroad except in selected areas. The high level of inflow would become more of an interflow and exchange at almost equal levels. In order to accelerate its rate of growth and development further, the country would purchase know-how and designs of proven superiority and sell to others where it had gained a lead. It would then be at the stage of a self-generating developed economy.

Probably those stages would telescope into each other or be at various levels in different spheres of activity and industry.

At the first stage, it would be an advantage to have research and development institutes with efficient analytical facilities to deal with a wide variety of raw materials and minerals; processing units to study the behaviour and characteristics of indigenous resources and technical and economic data for industrialization. This would have to be a multi-purpose or multi-functional organization staffed by scientists of different skills, disciplines and specializations.

At the same time, efforts to build up a supply of scientific and technical personnel of the requisite standards would have to be planned. Science education, training and research in universities and the establishment of institutes of technology would have to be undertaken.

At the second stage, institutes specializing in major raw materials or proposed heavy and basic industries might have to be established. The scale of operations required and the intensification of efforts and expenditure for the development of raw materials of basic importance to the economy of the country would necessitate a scale of industrial research and development possible only in a specialized institute. Such an institute might grow out of a division or a section of the multipurpose institute, or may be established as a new project but with suitable co-ordination with the multipurpose institute. There may be institutes based on a commodity, such as petroleum, coal, atomic minerals, rubber, jute, tea or cotton. Alternatively, they might be related to major basic industries such as iron and steel, non-ferrous metallurgy, automobiles, marine engineering and aeronautical engineering.

At this stage there would be a massive requirement for scientists, technicians, mechanics, engineers and designers of all types and descriptions. The universities and institutes would have to diversify their training courses and multiply in number in order to cater for the growing needs of different types of industrial research institutes and industries and to the requirements of technical departments, railways, workshops and defence.

At the third stage the individual industries would build their research facilities to sustain their development and growth. The specialized institutes would also give attention to long-range problems and basic research to keep up the tone of research and supply the needs of industrial research for higher standards and new goals. Industrial research and industrial development would then become interrelated and in-

terdependent, as would the industrial and basic research.

The problem of training more and better scientists and technologists will always exist and will be met by the universities and teaching institutions training ever larger numbers of students.

The comparatively advanced countries such as Australia, Japan, and even India, Pakistan and the Philippines have already taken steps to set up institutes in accordance with their national needs. The real problem is faced by the other countries who are still entering the first industrial stage. It is to the problems of those countries that the present discussion and suggestions are mostly directed.

1. *Types of research*

Scientific research may be classified into four main groups:

(1) Pure, fundamental research, with the objective of extending the frontiers of human knowledge and the study of natural phenomena.

(2) Oriented or objective basic research, which is a systematic investigation of fundamental aspects of applied work.

(3) Applied research, which has as its objective the application of knowledge to the needs of a man or a country. For example, the utilization of the natural resources of a country or finding substitutes for imported materials. Applied research can be 'time targeted' and may be carried out generally through team work.

(4) Development research, which deals with the development of products or processes to the stage at which industry can accept them for industrial exploitation. Team work is mostly necessary at this stage. This type of research does not necessarily involve any discovery or innovation, but a systematic review of the results of applied research and the development of new techniques for the production and use of materials, devices, systems and methods in industry, including the development of pilot and prototype plants.

As has been mentioned before, the adaptation of known technologies to local conditions and development work is the prime need of countries in the ECAFE region. However, before adaptative research is undertaken, studies of the project with respect to special conditions in a country, such as climate, raw materials, manpower, scale of operations and so forth have to be considered. Such studies may lead to improvements in process economy or the development of new techniques.

2. *Objectives*

For developing countries of the ECAFE region, industrial research should start with modest objectives, such as the survey of natural resources, training of scientific and technical manpower, and so on. Priority may go to the study and utilization of existing and already discovered resources.

The following are some of the suggested problems in order of importance:

1. industrial utilization of local raw materials;
2. utilization of agricultural waste products;
3. evaluation of natural resources.

It may be interesting to mention the priority areas of industrial research in one of the ECAFE region countries, the Philippines. The priority areas of industrial research in the formulation of the Philippines five-year research and development programme from 1962-1967 are:

(1) research directed at the increasing utilization of natural resources to produce substitutes for imports;

(2) research directed at up-grading and expanding the national export products;

(3) utilization of the waste products of industry;

(4) the development of scientific and technical manpower and of the 'science-consciousness' of the public.

Many developing countries, with the help of international aid agencies, are investing large sums of money in institutes of one kind or another. The objective of all these institutes is to accelerate the industrialization of the country.

All developing countries, in spite of various differences in their social and cultural structure, political situation, climatic conditions, or type of natural resources, are essentially in need of speedy industrialization. For industrialization, developing countries need different types of services: assistance in technical and market feasibility studies, examination of industrial investment prospects, and their re-design, pre-project planning and pro-forma costing, applying of scientific research (for new or improved products, by-products, reduction of costs, use and adaptation of local raw materials), plant location, efficient factory layout, handling of materials, standardization, testing and quality control, technical trouble-shooting, emergency production aids, production costing systems, technical information and library services, and the full modern spectrum of production engineering and technical management.

All these services and facilities such as equipment, apparatus, instruments and library may be made available through an "Industrial Research and Development Institute". Such an institute not only offers all these services, but undertakes work for all kinds of industries and in all the pertinent branches of science and technology. It therefore maintains a wide range of physical facilities and a highly diversified staff, which enable it to make the most of the interdisciplinary teamwork principle in solving problems and also make a more comprehensive array of equipment economically available to each individual problem. These are tremendous advantages, both in

finding solutions rapidly and in doing so at the lowest cost; and this in turn produces the secondary advantages of inducing the voluntary use of the needed technical services by industries not previously accustomed to this form of expenditure as a normal business cost.

A factor that has contributed to the growth of this type of institute is that an industry's problem seldom lies wholly within one field. It is seldom that even a purely scientific problem lies entirely within a single field of science, in fact even if it does, we cannot be sure that the specialist in that field will always be the one to have the first idea for its solution. But in a developing country, especially, it has been found in practice that the greatest number of industrial problems involve a composite of several of the listed services, the contributions of which are interdependent and often indistinguishable from each other. Often the industry is not even aware of several of the contributing aspects and if the institute's knowledge or interest is confined to one field it is likely to miss them too. The importance of a composite technical service for investors is apparent. To be of any practical service to an industrial development bank, an institute examining a proposed loan project must obviously be equally competent to deal with the scientific as well as the cost and production management aspects.

During a discussion on the role of industrial research and development institutes at the Inter-Regional Seminar on Industrial Research and Development Institutes in Developing Countries, at Beirut in December 1964, it was suggested that the following guide-lines should be kept in view when industrial research institutes are being established:

1. The industrial environment must first be assessed with reference to its technological needs.
2. Initially the institute will be a technical information supply plant, making use of the results of research performed elsewhere. This function should be more than a question-and-answer system; the institute should engage technical people to visit industrial operations and to supply information on up-to-date processes, equipment and products associated with those operations.
3. Laboratory facilities should be provided to fit industrial needs. Initially these will be limited probably to testing, quality control and trouble-shooting.
4. When areas of applied research related to the industrial development of country have been assessed and decided upon, research programmes in these areas should be established. Programmes having early industrial value should be given priority.
5. In selecting personnel, it is mandatory to have technical people with broad interests and with backgrounds in industrial research to fill the senior positions in the early stages. Although men with intermediate levels of training are suitable for testing and quality control work, later positions in research will require senior men with more specialized training, backed up by skilled technicians.
6. During the formation of the institute, care should be exercised to avoid over-organization. To ensure a good team spirit, all positions in the institute should have a real function and purpose.
7. The director of the institute and his senior technical men should carry the full responsibility for the technical and administrative operation of the institute. It is particularly essential that the long-term research planning be done by that group of men.
8. The need eventually to establish areas of research competence associated with the main industries of the country should not be overlooked in the daily handling of service and test work.
9. The institute should be free from political interference.
10. The financing of the institute will need to be carried entirely by the government at the start; private industry should be required to pay for work done to meet its particular needs. Even after the industrial income has become substantial, however, government support should be maintained to finance applied research into new areas of industrial development in the country.

3. *Functions of an institute for industrial research and development*

Industrial research offers a wide variety of functions to serve national goals of industrial development. Some of the important functions of industrial research and development in support of industrialization are:

(1) The initiation and carrying out of research for the promotion of industries in general, and primary and secondary industries in particular.
(2) The survey, study and development of local raw materials.
(3) The development of new processes and the improvement of existing ones.
(4) The development of new products or new uses for existing products.
(5) The improvement of industrial productivity.
(6) The study of the technological and socio-economic feasibility of industrial products.
(7) The testing and standardization of products, processes, scientific instruments and equipment.
(8) Scientific investigations connected with standardization.

(9) The choice of technology and study of the scale of operation.
(10) The study of industrial location and site.
(11) The carrying out of marketing research and development.
(12) The collection and dissemination of scientific and technical information.
(13) Liaison with other countries in scientific research.
(14) The training of research workers; on-the-spot training of technicians for industry, making grants-in-aid for scientific research, the establishment of studentships and fellowships.
(15) The establishment of industrial research associations.
(16) The provision of technical services to industries, prospectors, the universities, government departments, boards and corporations, by carrying out sponsored research projects, analyses, tests, repairs to instruments and consultation.
(17) Development work up to the pilot plant stage.
(18) Industrial production counselling, including such subjects as factory layout, the selection of machinery, production costing; technical consultation to manufacturers, publicizing technical journals for the information of technical people and also for the general public and maintaining an up-to-date technical reference library.
(19) Extension services for clientele development.

Many of those functions can cover a type of important research work that should immediately be taken up on a short-term basis by an industrial research and development institute. For example, work on the adaptation of foreign technology can be taken up immediately to suit it to local conditions. The work on the development and utilization of local raw materials can also be taken up at the very beginning. The institute can help industry by doing work on the formulation, application and dissemination of identity and quality for industrial products, manufacturing and engineering standards, process specifications and the use of standard marks. The institute can also take up testing work for industry.

The institute may have to undertake marketing studies and development. It may also have to advise on the suitable location and site of the plant. It may have to help the industry by instituting pilot plant studies of suitable techniques of production.

In carrying out these functions, industrial research and development establishments serve mainly in a consultancy and operating capacity.

Industrial research institutes in developing countries should, in the first place, try to adapt foreign technologies for use in the country. For this purpose, machinery may have to be designed and constructed and models of prototypes, and graduation of laboratory techniques may have to be prepared. An industrial research institute should carry out advisory functions for the government and private enterprises. It should also import specialized training of a high order for its research staff. The industrial research institute should also undertake the publication of scientific journals for the dissemination of scientific news to the general public, industry and the government. Industry is one of the most complex and advanced economic activities when compared with agriculture, commerce and transportation. In the manufacturing industry, the major functions are purchase, sale, planning, production, transportation and control, and the elements used are men, materials, and machinery. Industrial research involves all these activities. Market research, raw materials research, product research, waste utilization research, process research and operational research are types of applied and development research to be carried out in industry. They are described briefly in the following paragraphs.

Market research: Customer requirements on the quality, quantity and styling of a product are investigated by market research. The need and the market and future demand for improved products and for new products, and the testing of consumer reaction to the new products are part of market research. A modern plant with a product of very good quality but without customers to buy the product or with only a limited number of customers has a real problem.

A market demand estimate based on per capita consumption in developed countries without consideration of the buying power of the people, the customs of the people and the lack of adequate transportation and communication in the country may create sales difficulties. Statistical and other background facts and publications available in developed countries for market research may not be available in developing countries; an extensive field study and interviews may be very helpful. Even the method of market research for developing countries should be different from that employed in developed countries.

Raw material research: The objective of raw material research is in general to improve the quality, reduce the cost and increase the sources of supply of the raw material used in an industry. The result of the research may be a substitute or a new, better and cheaper source of the material.

In a developing country the cotton or wool textile industry may exist. All the cotton or wool may be locally available or partly imported. Continuous research on producing better and cheaper cotton or wool will be needed. This may lead to the possibility of growing better cotton and also bringing a special breed of sheep to the country as is done in Turkey. Mixing the cotton and wool or other synthetic fibres in textiles, may also be the subject of raw material research. Raw material research on clay to be used for bricks, tiles and ceramics requires local

geological surveys and various kinds of chemical and physical analysis. Improving the quality and continuation of the production of canned food for local or export markets requires continuous raw material research in the country. Local research on proper sand for the glass industry has been responsible for the establishment and success of a new window glass plant in Turkey.

Product research: The is usually involved with process research and the aim is to improve the quality of the existing products or to develop new products. Product research is usually based on market research, which indicates the consumers' demand on quality of product.

It is not the best quality, but the customer quality which has the largest market. A product research geared to the market demand on quality and quantity will be the main function of engineers in the plant. The aim of the product research is not only quality and demand but also the reduction of the cost of manufacturing. The competition of local or imported products is the main incentive for product research.

Waste utilization research: The object is to find uses for the waste products of a process or to reduce the percentage of waste as much as possible. In some cases the disposal of waste may be costly or it may even involve health and social problems in the community. The most effective waste utilization research would be one which transforms the nuisance into a source of profit.

Usually owing to the lack of experience and training of the workers, the percentages of waste in industries set up recently in developing countries are higher than those in similar industries in developed countries. The possible uses of the waste products are usually geared with other industries which may not be available in developing countries. Waste utilization research in developing countries therefore faces different problems and its effects and contribution will be greater than in developed countries. One of the examples of transforming nuisance into a source of profit is the use of cinder from coal power plants in making cinder-blocks for the construction of buildings.

Process research: This may involve either a specific step in a process or it may involve the complete manufacturing processes. This type of research involves a great deal of scientific and engineering work and requires top research workers. The result of process research is always a great saving either in material or in labour or in the improvement of quality.

Operational research: Its objective is to analyse the many factors that affect the income of the company and find out what combinations of these factors will give the maximum profit. Operational research requires the team work of scientists, engineers, mathematicians and social, economic and financial experts.

Research on personnel and labour relations in the plants, on relations with government competitors and customers, and research on changes of import and customs regulations are part of the operations research of a company. Customs regulations, the political situation in a country, the financial means and sources of a country will have a great influence on the methods and types of operational groups:

Industrial research laboratories *in industry* may be classified in three groups:

Testing and control laboratories: They are used for analytical, chemical, metallurgical and physical testing and control over materials, processes, and products. Practically all manufacturing companies, depending on the type and amount of their product, should have a testing and control laboratory.

Development laboratories: They are used to reduce the cost of production and develop new products or improve existing products, by process and product research. The procedure in development laboratories is to collect ideas from all sources and carry out research to find the methods and processes which can be applied at the manufacturing stage. This means a new idea together with applied research, trial-and-error and scientific investigation may bring a new technical method of production or a new product. After this step models and a pilot plant may be built and a small-scale use of the method in the plant or of the product in the market is tried out. The manufacturing scale can be adapted to the product and/or process if the result is successful. Practically all companies of moderate and large size in developed countries have such development laboratories attached to their research department.

Scientific research laboratories: Their aim is usually to find applications for scientific discoveries and also to carry out some background research work on a specific discovery which may have possibilities for the development of new industries. This type of research may not produce a discovery which can be applied by the industry for a long time. Only the big and specialized companies in developed countries have scientific research laboratories.

4. *Development and use of local materials*

One of the functions of industrial research and development is to survey local raw materials in order to find substitutes for expensive imported materials as well as to allow for the full exploitation of natural resources and agricultural materials. For example, through a study on the spot in Ceylon it was possible to ascertain the possibility of producing citric acid from local molasses. The catalytic oxidation of alcohol from fermented molasses yielded the needed citric acid at a lower cost than that of the imported product.

Although the technique of making artificial fibres is generally known, on-the-spot industrial research was needed, for example, in the United Arab Republic in order to utilize bagasse properly in the manufacture of viscose rayon. The local bagasse was investigated and was found to include 25 per cent pith, which is lower in cellulose and higher in ash content than the fibrous

part. Early investigations indicated that about 40 to 50 per cent of the pith had to be removed to produce pulp suitable for viscose rayon. As research continued in the National Research Centre it was discovered that it was only necessary to remove 3 per cent of the pre-hydrolyzed material in order to reduce the ash content to a suitable level. This research also resulted in the production of suitable viscose pulps prepared under atmospheric pressures and without requiring more additional chemicals or time than in the conventional pre-hydrolysis method, which is the alkali method under high pressure. The final result was a superior quality and less costly product derived through the proper utilization of a local material.

5. *Efficient use of equipment*

Through research, industrialists can obtain knowledge which may lead to more efficient use of equipment. For example, investigation and study on the spot may be needed to ensure that waste is reduced, the life of equipment prolonged, and a high rate of production maintained, which in turn raises productivity in the factory. An example from India illustrates how on-the-spot study in a water pump plant increased productivity and trebled the capacity of the cupola used for melting raw materials. The rejected castings were being scraped and re-melted as a procedure which the management considered a necessary part of the process because they were unaware of the relative frequency of the defects. However, through careful investigation and study it was discovered that although the layout of the factory as well as the product were satisfactory, a significant number of castings were rejected owing to the presence of air pockets in the castings which could not be discovered until the castings were machined. This defect occurred because the air intake in the cupola was not sufficient to produce a consistent, suitable temperature, thus causing blowholes in the casting. It was discovered that the temperature control was malfunctioning, that the cupola was improperly designed and that the air intake had been allowed to clog. The required corrections were made and the capacity of the cupola was trebled.

Much information is available about the efficiency of equipment manufactured abroad for use under known conditions. However, using the same equipment under different environmental conditions may result in frequent breakdown, lower productivity, shorter span of life or higher cost of production. For instance, working conditions in local factories, the level of education of the personnel, or the prevalence of sand or dust in the area may have an adverse effect on the wear of machinery. Through research and development in developing countries, solutions may be obtained to adapt equipment to the local environment or vice versa.

6. *Laboratory testing and standards*

Industrial standardization accelerates industrial development in many ways. For example, it helps conserve labour and materials: it improves the output quantitatively and qualitatively; provides a basis for comparison, inspection and settling industrial disputes; and simplifies the training of personnel.

Through industrial research, advice and assistance can be given to the Ministry of Industry, chamber of commerce, trade associations, or individual establishments in the formulation, application, review, and dissemination of standards of identity and quality for industrial products, manufacturing and engineering standards, purchase specifications and the use of standard marks.

Also through the laboratory testing facilities of some of the research organizations, assistance can be given to local industry or government departments to satisfy some of their needs. For instance, it may be necessary in some areas to analyze the clay deposit in order to know its properties and to determine what extra elements are needed to obtain good quality ceramic products.

7. *Marketing studies and development*

There are many marketing functions which can be investigated, studied and developed through research for the industrial sector in general, a group of manufacturers, or a given factory. Thus assistance can be given to determine the potential market. Who the potential consumer is, what and when he will buy and how much he is expected to buy are questions which can result in the right selection of products for manufacture if they are answered scientifically.

One of the functions of research is to advise on problems of merchandizing. Assistance can be given to a factory, for example, to investigate and solve the problems of packaging, labelling, branding and standardizing of products.

Assistance can also be rendered in collecting, analyzing, evaluating and disseminating pertinent data on the competitive position and market trends related to given products.

It is important to create the confidence and interest of consumers in national products. Buying habits can be changed through an effective consumers' education programme. The government, the chamber of commerce or a trade association may seek the advice and consultancy services of one of the industrial research organizations for this task.

8. *Location and site of plants*

Through research, advice and assistance can be given to individual industrialists to choose the most suitable location and site of the industrial plant. The importance of proper plant location can be illustrated by an example where the choice of a chemical plant locality alone showed a variation in operation cost of $400,000 every year. After the general location of an industrial plant is decided upon, the choice of the site can also affect the cost of building, equipment and operation; for example, the general grading and soil conditions affect the decision on the foundation

needed for the building which in turn influences the cost of construction. Thus industrial research can be of assistance even before a factory is built.

9. *Suitable technique of production and pilot plant studies*

A new or improved process may result in a better quality product, more efficient use of by-products or better waste recovery. A suitable quality control programme will ensure uniform quality, increased output and lower cost products. Good production methods will simplify work and result in the efficient flow of material.

One important function of research and development is to assist the country or individual establishments in improving or developing efficient production techniques and methods as well as in engineering development. An example from Nigeria shows that the Federal Institute of Industrial Research was successful in achieving mechanized gari production in the country for the first time. One of the first major projects of the institute was the conversion of the traditional gari cottage industry to production on an industrial scale. After carrying out some basic research to understand the scientific process involved in gari manufacture from cassava roots, enough information was obtained for the construction of a pilot plant capable of producing one ton daily. The new process, which involves the use of special techniques and locally designed equipment, resulted in a uniform quality gari product prepared under hygienic conditions and having a long storage life.

10. *Raising industrial productivity*

In introducing local industrial products, the developing countries compete with foreign goods. If protective measures are taken to help developing local industries, they can be effective in the long run but only to a certain extent. The quality and price of locally produced goods should be reasonable in order to attract the consumer and at the same time to protect his interests. If local industrial products are to be exported they must face a competitive market where protection is not given. For instance, according to one study, based on data for 1959/60, the total cost of producing one yard of cotton sheeting in the Philippines was 131 per cent of that in the United States. This comparison is especially significant in view of the fact that the labour cost per hour in this industry in the Philippines was 20 per cent of that in the United States.

It can be seen that high productivity rates play an important role in a successful industrial development programme. Higher productivity not only provides consumers with more products at lower costs but also results in improved working conditions, higher wages and increased return on invested capital. Thus the benefits of higher productivity are shared between the employers, workers and consumers.

There are many related factors which influence the general level of productivity in a given country, including.

(a) Environmental factors such as social tradition, human relations and attitudes, natural resources, climatic conditions, education, level of nutrition, sanitary conditions, and so on.

(b) Technological factors such as the factory location, layout, size; equipment used (design, handling and application, maintenance); product (technique of production design, by-products); power (type, source, raw materials used), and so on.

(c) Management factors such as production (planning, scheduling, quality control); cost accounting and control; personnel practices (recruitment, placement, training, turnover and absenteeism control); marketing (research, planning, merchandizing); industrial relations; purchasing (timing, steadiness and reliability, soundness and selection), and so on.

(d) Labour adaptability, attitude to job, stability on the job, attitude toward co-workers, aptitude for work, ambition and willingness for improvement, wages, effectiveness of labour organization.

(e) Availability of capital.

The various elements of increased productivity involve the collection and analysis of data, research, factory surveys, training, legislation and the proper execution of a programme designed to raise productivity. Research and development functions can play a key role in strengthening the working of policy and decision-making organizations which are concerned with raising industrial productivity, whether on a national, local or factory level, since institutional research can approach the problem in its entirety and in a comprehensive manner.

For instance, in addition to the functions of research in material or process development discussed in this paper, one of the functions of research can be the establishment of procedures, techniques and standards to measure industrial productivity. Through this measurement all parties concerned are in a position to effect improvements. Thus, a tendency to blame labour for inefficient industry may stand in the way of diagnosing the real interrelated factors which hinder progress, and may also place labour in an unfair situation which might lead to unnecessary conflicts. Various measures for raising industrial productivity can be studied and kept under constant review.

Measurement of productivity is impossible without an adequate system of industrial accounting. The absence of good cost accounting, for instance, might lead the management to economize on labour and thus create a social and economic problem in the community when the real reason for the high cost of

production is probably inefficient utilization of raw materials or the adoption of inefficient processes by the management. Research can play an important role in devising a system of industrial accounting which would be suitable for a given industry under local conditions and disseminating this information throughout the industrial sector.

Another possible function of research is to survey, investigate, study and analyze industrial workers' adaptability and attitude to their jobs. It may be discovered that such items as absenteeism, labour turnover and lack of interest which contribute to low productivity are caused, for instance, by low morale due to poor managerial practices, or by the method and technique of production used in the factory, or by the workers' general attitude towards employment. Programmes for improvement can be established when systematic studies reveal the nature and causes of the workers' varying attitudes towards industrial work.

11. *Pre-investment studies*

Industrial research may assist the planning authorities or industry itself in conducting specific pre-investment studies to determine the most suitable programme of industrialization as well as the technological and socio-economic feasibility of industrial projects. It can also verify studies undertaken by foreign establishments, thereby giving assurance and confidence to local industrialists.

One of the functions of research and development may also be to render assistance to both the public and private sectors in the preparation of designs, technical specifications and schedules for industrial plants and in the subsequent technical and commercial evaluation of tenders.

12. *Other supporting functions*

Organized research can play an important role in strengthening the comprehensive and institutional approach to industrial development. The mere fact that a factory is established does not necessarily mean that it will succeed or encourage the business community to accelerate the rate of factory establishment.

There are numerous functions which require study and planning and which in the long run affect the attitude of industrialists towards investments. For instance, investors in developing countries need incentives to invest in manufacturing industries rather than in the sure, successful and relatively easy business of real estate.

The national authorities may undertake measures to promote industrial development through government purchase and procurement, industrial zoning and sites, facilities for hire or hire-purchase of buildings and equipment, regulation of patents and industrial property, industrial extension service, and so on. In this connexion, guidance can be given through research to the national authorities.

13. *Organizational structure of a model industrial research and development institute*

A summary of the organizational structure of a model institute is given below:

(1) Industrial Economic Division
   (a) Feasibility studies or evaluation of projects.
   (b) Industrial accounting of cost studies.
   (c) Market studies.
   (d) Studies on rationalization, methods of procedure.

(2) Industrial Services Division: studies products, process technology, equipment, labour requirements, production costs, investment, scale of operation, location in relation to markets, raw materials, etc.; transportation and other local conditions. It prepares lay-out plans of the production unit, its construction or extension. It maintains contacts with dealers of machinery and other equipment and with technological advances in other countries, also with possible fields of research and development on a laboratory and a pilot-plant scale. It also helps trouble-shooting in plant operation, technical management and quality control etc.

(3) Scientific Instrumentation Division: makes repairs and calibrates scientific instruments and laboratory equipment, principally in the areas of glass blowing, optics, fine mechanics and electronics.

(4) Scientific and Technological Division: its main function is to find new products and discover new processes and adaptations of known technological methods. Its services cover a wide range of topics from analyses of raw materials and products to investigation of the utilization or benefits of natural resources. Its personnel keeps abreast of technological research in other countries.

(5) Standards Division; for determining standards.

(6) Engineering and Technical Services Division: for the design and construction of pilot plants, maintenance of buildings and equipment.

(7) Documentation and Library Division.

(8) Budget Division: makes a study of the funds that will be needed for the operation and maintenance of each division and of the entire institute.

(9) Accounts Division: deals with costs of different projects, etc.

(10) Administration Division.

III. INDUSTRIAL RESEARCH ACTIVITIES AND PROBLEMS IN THE COUNTRIES OF THE ECAFE REGION

As stated in the preceding chapter, a scientific assessment of the status of industrial research activities

in different countries can hardly be made in the absence of reliable data on the number and type of research institutes, the magnitude of their activities, the number and quality of scientific, technical and engineering personnel engaged in research, resources by way of financial support provided for expenditure on research and auxiliary services such as workshops and instrumentation, documentation facilities and technical literature etc., available to scientists. To get an idea of the impact made by industrial research on industrial growth, economic development studies on the utilization of the results of research and the economic returns from research would be necessary. Here, only a general description of the position of industrial research activities has been attempted.

1. *Different levels of research and development*

The level of industrial research activity bears a direct relationship to the industrial growth and development of the country itself. The more developed the country, the higher is its investment by way of per capita expenditure and proportion of national income in industrial research, and the more effective its utilization of the results of its research. The less developed countries have the double disadvantage of meagre investment and the inefficient use of the limited research activity they are able to afford.

Of twenty-three ECAFE member countries, only fifteen have industrial research and development activity of any significance. These countries vary greatly in the stages of their growth and development. At one end are countries such as Japan and Australia which are sufficiently advanced to have a self-generating economy supported by a well-developed technological base. At the other end are Outer Mongolia, Western Samoa and Afghanistan which have yet to set up institutes for industrial research. In the middle are countries such as India, Pakistan and the Philippines whose governments have taken the initiative of building up research and development organizations to support their plans and programmes for industrialization. They have set up well-organized industrial research institutes which are making their contribution to the economy to enable the countries to achieve the "take-off stage", where the country may produce enough for export to pay for its imports, give its people a reasonable standard of living and turn out a sufficient number of scientists and technologists to sustain its research, teaching institutions and industries. These differences in level of industrial development are reflected in the status of the industrial research activities in the countries.

2. *Growing research consciousness*

There is, however, in the government and the people of all the countries of the region, a growing consciousness of the part that industrial research will have to play in their future growth and development, and in the improvement of their standard of living. Almost every country has taken some step or other in setting up a research council or committee, mostly through government sponsorship, to plan for surveys of resources and in the establishment of agricultural, medical and technological research institutes, and has made efforts at the education and training of scientific and technical personnel. It is significant that most of the countries have thought in terms of four-, five- or seven-year plans for industrial and economic development and have recognized the need to set up research institutes to aid in their fulfilment.

3. *Governments and industrial research*

As may be expected, in most of the countries of the ECAFE region scientific research effort is based on government support. Even in advanced countries, the role of the government in co-ordinating and directing scientific research is assuming greater prominence. This is in recognition of the importance of science and scientific research in the economy of the country and its defence. While in Japan and Australia, industrial firms contribute significantly to research expenditure and effort in India, Pakistan, the Philippines, Indonesia, China (Taiwan) and others, it is the government that has taken the major responsibility for initiative in the establishment and sustenance of the research institutes. For various reasons, it will not be practical in most of these countries for a number of years to expect industrial firms to carry out their own research or give it financial support in any significant measure. Since industrial research in a broad sense will have to play an initiating and supporting role even in the early stages of the countries' growth, the responsibility for it will have to rest with the governments concerned.

4. *National policy on science*

In the countries of the ECAFE region there is a widespread realization of the fact that future progress and prosperity are linked with the use of science and technology; and there is an intense desire for a speedy growth into an industrial economy, to enable them to catch up with the advanced countries. This, however, has not yet crystallized into national science policies and specific measures for their promotion. The Indian Parliament adopted a Science Policy resolution in 1958 declaring that it would give every encouragement to science and technology, promising better status and emoluments for the scientists, and recognizing the role of scientific and industrial research as the major instrument for national progress. The Scientific Advisory Committee to the Cabinet under the chairmanship of the Prime Minister keeps the scientific situation under review and co-ordinates and directs the science policy. In Pakistan, the National Research Council under the chairmanship of the President of the Republic co-ordinates the working of the major scientific research organizations. Similar bodies exist in some of the other countries and have the advantages of the association of the highest State authority with their functions and decisions.

In most of the countries, however, the machinery for the collection, collation and presentation of scientific and technical information and data to assist in policy-making has not been set up. Recently some steps have been taken in India by the Council of Scientific and Industrial Research with the setting up of a Survey and Planning unit, which has gathered data on the expenditure on research in different sectors, the availability of scientific and technical personnel, and the research effort by the State-sponsored research institutes and those of private industry. These data are essential for planning industrial research and making possible the concentration of limited resources on areas of maximum economic returns.

5. *Financial responsibility and control of research organizations*

While in Japan 64 per cent of the research effort is financed by industrial firms, in most of the ECAFE countries, in the absence of research consciousness in the community at large and the reluctance of the private industrial firms to provide funds, the main responsibility for supporting research would fall to the State. In Japan more than one per cent of the total sale proceeds go to research. In India the total expenditure on research is 0.32 per cent of the national income: of this approximately 20 per cent is on industrial research. In Pakistan the figure is approximately 0.14 per cent. Most of the developed countries spend 1 per cent or more on research, a considerable portion being shared by private industry. In most of the developing countries in the ECAFE region, however, the expenditure on research is too meagre for it to have any significant impact on the economy. Since the main strategy of industrial research in these countries is to be of the adaptive or development type making use of the known knowledge and experience of the advanced countries, the returns are likely be higher on per unit expenditure. There is however a need for a definite policy for a minimum quantum of investment in industrial research by the developing countries.

Whatever the source of funds, it is essential that scientific research should not be subject to the usual administrative rules and procedures of government departments. The science organizations in India and Pakistan, although deriving their funds from the government budget, are autonomous under their own governing bodies and follow their own methods of working.

Research organizations in Burma function under the Ministry of Industry and in Thailand industrial research is carried out by the private sector as well as by the Government Department of Science and a government-sponsored research corporation. In Japan, there are 7,500 firms which undertake research, some of them having set up large central research institutes. In India, there is a growing trend in industry to take up its own research, sometimes with government support. While for the quicker utilization of its results, research must be carried out in close association with the user department or industrial firms for creative research of a good standard, it must be carried out away from the direct influence of the user. It is for this reason that most of the industrial firms which undertake and control their own research, insulate their research institutes from their day-to-day industrial operations.

6. *Relationship between industrial research and planning departments*

In countries such as India, Pakistan, Burma, the Republic of China, and the Philippines, which have taken to state planning of their economy in the form of five or seven year plans, it would be a great advantage to relate industrial research to the planned industrial goals and programmes. In most of the countries however there is at present no existing or proposed machinery to develop this relationship. The danger of meagre resources and research effort running into wasteful channels is inherent in such a situation. In countries such as Thailand, where scientific research is partly under the Ministry of Industry there may be a better liaison, but where research is performed independently special efforts would be necessary to orient industrial research to serve the needs of planned industrial development.

7. *Types of institutions*

There are institutes set up by private industries essentially to meet their own immediate or long-term needs. Research is carried out on a large scale by the Iranian Oil Company, Hitachi Company of Japan and others in fields related to their own interests. The governments of a number of countries have set up institutes dealing either with their major raw material resources or with specialized national requirements. The Wool Research Laboratory, Afghanistan; the Taiwan Sugar Experimentation Station; the Rubber and Tin Research Institutes in Malaysia; the Aeronautical and Metallurgical Laboratories in Japan and in India; and the Philippines Sugar Institute deal with special subjects. In India there are a number of specialized research institutes for fuel, petroleum, metallurgy, glass, leather and food technology, in addition to laboratories dealing with the whole range of industries in the field of chemicals and physics and engineering. These are combined with regional laboratories essentially multi-purpose in character and with emphasis on research into the raw materials present in the area of their location. In Pakistan the main emphasis has been on regional laboratories with multi-discipline and multi-purpose facilities to serve a large number of industries.

In most of the other countries a start has been made by the setting up of multi-purpose institutes such as the Ceylon Institute of Scientific and Applied Research, the National Institute of Science and Technology in the Philippines, the Applied Scientific Research Corporation in Thailand, the Union of Burma Applied

Research Institute (UBARI), which cater for a number of industries.

Another type of institute established with a view to helping various regions of the world in their efforts to develop their resources is the Japan Consulting Institute, organized in 1955, with the object of conducting business, on a non-profit basis, as a technical consultant primarily for heavy industries, so that help can be given to developing nations in their industrial construction and expansion. Its membership includes almost all the big industrial firms in Japan.

In India, Japan, Ceylon, the Philippines, Pakistan and Thailand, there are service institutes catering specially for the needs of small-scale industries.

In Australia and India, the pattern of co-operative research institutes for industry has been tried with success where the government supports a large section of industry in setting up industrial research, quality control and standardization facilities by giving financial and organizational assistance.

There are many advantages in co-operative research performed by an association of small-scale industries which pool their resources. It can bring the benefits of research and development to all the members of the association at a comparatively small cost. It is an efficient way of utilizing scarce scientific resources. It provides training for the staff of the member companies to meet the special technical needs of their industries. The participating firms in a co-operative research scheme become more technically minded and by pooling ideas they can plan their programmes more efficiently. For developing countries co-operative research may perhaps be a method of strengthening and developing existing industries.

It is clear, therefore, that no single pattern of organization for scientific and industrial research institutions can immediately be recommended for all countries of the ECAFE region. The practice of copying the patterns followed by the advanced countries or neighbouring countries might not always be successful in a particular country of the ECAFE region because of various factors related to local tradition, the educational system and background, the stage of economic development of the country and its socio-political arrangement. Countries of the ECAFE region should therefore take into account the influence of their own traditions and should mainly be guided by the dynamic changes that are taking place around them.

8. *Research institutes and universities*

Universities are the suppliers of scientific and technical personnel for research, industry and technical services. It is they who set the high standards of research and training so essential for creative work. In turn, the universities can benefit by closer contacts with research institutes by sharing facilities, such as costly equipment, instruments and apparatus and the services of highly qualified specialized personnel in research and teaching. In Thailand graduate students of Chulalongkorn University are permitted to do their course work on instrumentation and microchemical techniques at the Department of Science of the Ministry of Industry. In India, Pakistan and the Philippines the research organizations award fellowships and scholarships to the younger scientists in the universities. In Burma close co-operation exists between the research departments of the Universities of Rangoon and Mandalay and the technical staff of UBARI. In Australia some sections of the Commonwealth Scientific and Industrial Research Organization (CSIRO) work in close co-operation with local universities.

9. *Scientific and technical personnel*

The most important problem facing the research institutes, apart from the need for instruments and equipment, is an acute shortage of competent scientific and technical personnel. Firstly, such personnel are turned out by the universities and institutes of technology in inadequate numbers and are not always of the standard required for research. The higher emoluments offered by industrial concerns and the better career prospects in administrative services make industrial research a less attractive proposition. Secondly, a number of scientists who go to more advanced countries prefer to stay on there, causing a further depletion in the limited talent available. This is partly due to the better standards of living and higher emoluments in the advanced countries — and also to the better research and instrumentation facilities and atmosphere to which these scientists become accustomed. The difficulties of finding suitable employment in line with their training abroad and the insufficient opportunities for absorption soon after their return are additional impediments in the way of scientists trained abroad.

Even Japan is faced with the difficulty of finding adequate numbers to man its expanding industries and growing industrial research. In Burma UBARI takes fresh graduates on to its staff, and they are then sent abroad for specialized research after an initial period of training. On their return they are given a promotion and facilities for research. In India, the National Register Unit of CSIR maintains data on scientific and technical personnel and makes projections of future requirements. The CSIR also operates a "scientists' pool" which provides immediate *ad hoc* employment to any scientist returning after specialized training or research from advanced countries. The scientist can then look around and find suitable employment in keeping with his specialized interest. Indonesia is still facing an acute shortage of scientific personnel. In Malaysia, the policy of rapid Malayanization has resulted in dislocation owing to the departure of expatriate scientific personnel and the difficulty of finding suitable local substitutes. In the Philippines the National Science Development Board has wisely allocated 40 per cent of its fund to the training of scientific manpower and the Research Administration. Scientists are also given liberal travel grants and sub-

sidies for higher education and training abroad. Thailand is also facing some difficulties in staffing the laboratories of its newly established Technological Research Institute.

Considering the vital importance of competent scientific personnel for research of a worthwhile quality and standard, the ECAFE countries would be well advised to initiate a bold and imaginative policy in science teaching and the training of scientific personnel.

(i) *Science education in schools*

Since education must be planned for in the early stages of primary school, early education in science is indispensable to give children a scientific outlook. Practical work and experimentation should be adopted at an early age and the children encouraged to prepare their own devices.

(ii) *Science teaching and training in the universities*

Students in the university should acquire a broadly-based education in science and technology in the early stages of their career and go in for specialization at the end. Research on some fundamental problem should be introduced into their curriculum at the next phase of their studies.

For proper standards of training, the universities should have well-qualified, experienced and contented staff and modern teaching facilities. The lack of scientific equipment, apparatus and competent staff makes it very difficult to be sure of a future supply of scientists.

(iii) *Training abroad*

There is a great scarcity of trained manpower in countries of the ECAFE region. To overcome this, it may be useful to send scientific and technical personnel abroad for higher training and education. To prevent their remaining permanently in the advanced countries, the foreign-trained scientists must be assured of adequate salaries, social status and appropriate working conditions and opportunities.

(iv) *On-the-job training*

To fit scientific and technical personnel for industrial research, it is an advantage if during their educational and training career, they spend a period in on-the-job and in-service training. This would help to develop an appreciation of the problems and outlook of the industry.

10. *Documentation, library, publication and information services*

These services have multiple functions including the following:

(i) To help the scientist to keep abreast of the research and development in his own and related fields of interest by means of technical literature, reprints, abstracts and translation services.

(ii) To communicate to the scientific world information on research progress and development achieved by the scientists.

(iii) To keep the public at large and the legislative organs in particular informed of scientific development and elicit their sympathy and support for the provision of resources and finance for research.

(iv) To convey the results of research which is specifically of interest to the user in a form that is easily understandable to him.

(v) To publish bulletins, brochures and extension literature to help industry to approach appropriate institutes for technical assistance and to sponsor industrial research.

World technical literature is growing at a tremendous pace and the number of scientific journals published exceeds 60,000. Modern scientific research would not be able to maintain its rate of progress in the absence of efficient documentation and library facilities. With the high prices of technical literature, the role of abstract and translation services has become still more important. All scientific institutes should be equipped with some technical books and journals but extensive library facilities are an expensive proposition. Countries such as Japan, Australia, India, Pakistan and the Philippines among the ECAFE countries probably have adequate technical literature facilities for their research institutes. There is however not much information about the facilities available in other countries.

With respect to documentation UNESCO has assisted India, Pakistan, the Philippines, Thailand, Indonesia, the Republic of Korea and Malaysia to set up documentation organizations. Japan has its own documentation organization but services in other countries are not at present at the level required for modern industrial research.

Australia publishes eight scientific journals together with a series of technical and semi-technical reports, supplemented by trade circulars and newsletters. The Republic of China's Union Industrial Research Institute (UIRI) publishes a technical digest available to its users. In India, CSIR publishes eight scientific journals besides 'Research and Industry', especially directed to industries, in addition to an 'Information Newsletter' and 'Research Utilization Data' for industry. In New Zealand, all research publications are handled by the Information Bureau which also provides library and documentation series. In Pakistan, the results of research are disseminated through the scientific Journal of the Pakistan Council of Scientific and Industrial Research (PCSIR) and 'Science and Industry', which is of special interest to industries. The Philippines also publishes its journal covering scientific research and information data. Popular science journals have recently made their appearance in some of the ECAFE countries but the total effort in this field remains inadequate.

11. *Utilization of the results of research*

In Japan, since most of the research is carried out by industry itself, its utilization does not offer any serious problem. The results of government-sponsored research are utilized under the aegis of the Agency of Industrial Science and Technology. In Australia, the CSIRO industrial liaison section aims at bringing research to the notice of industry and granting licences. In Burma, the UBARI makes the results available through the Directorate of Industries. In India, each research institute has its own liaison section responsible for maintaining contact with its sector of industry. Their efforts are co-ordinated and supplemented by the CSIR headquarters liaison unit. The processes are licensed to industry through the National Research Development Corporation of India. Industry is also encouraged to participate in the pilot plant and prototype development stage of the research and preferential terms are offered to the sponsors. In Pakistan, the Research Utilization Committee of PCSIR performs a similar function. All processes are carried to the pilot plant production stage and products are sold on a 'cost plus' basis to make available technical and market data and to generate confidence in industry.

It has been observed that local entrepreneurs in the developing countries of the ECAFE region do not show much interest in the processes developed in the research laboratories of their own countries. Some of the reasons responsible for this attitude are:

(1) An indiscriminate import of technical know-how from advanced countries with technical and economic guarantees and sometimes financial participation by foreign firms.

(2) Owing to lack of design and engineering facilities in the research laboratories, it might not be possible to furnish all the details for the local process that are necessary for it to be set up in an economically workable unit.

(3) Sometimes, owing to lack of publicity on the part of the local research laboratory, entrepreneurs are not aware whether or not a successful process has been worked out locally.

Since the sponsorship of industrial research and development institutes in most of the ECAFE countries would be connected with a government, special efforts are necessary to see that the results of research are brought to the attention of the potential users and are made an instrument of industrial advancement. Various aspects of this problem are considered below.

(i) *Choice of research projects*

For the speedy utilization of its results, a research problem undertaken should relate to the immediate or long-term interests of the user. Surveys of industry, visits to industrial concerns and factories and evaluation of processes and products can help in the 'identification' of problems for investigation. While the ultimate decision on a research programme would rest with the institution, the continued association of the user with the choice of research projects and their progress would ensure his future interest.

(ii) *Design, engineering and equipment*

In developed countries, consultant engineering firms or project design institutes are available and may take up a process from a laboratory or from the pilot plant stage for application in industrial level design and engineering. Such facilities are not available in most of the developing countries and this creates a major gap between research results as emanating from the laboratories and their actual industrial utilization. The few consultant engineering firms that there are prefer to take up well tried processes.

To remedy the position, firstly, data should be available on the basis of continuous pilot plant experimentation to ensure the technical and economic feasibility of the process or the product. Market studies and consumer acceptability trials should be carried out at this stage.

For engineering design, it will be useful if the country sets up its own design and engineering organization. Most entrepreneurs prefer to deal with organizations which give performance and economic guarantees. The Indian CSIR has set up its own design and engineering unit which undertakes the design for factories and the commissioning and initial operation of industrial units if required. It is able to take up turnkey jobs for industrial firms with suitable technical and economic guarantees if required.

(iii) *User participation*

Since pilot plant and prototype experimentation and studies involves a greater concentration of resources with respect to time and effort of technical personnel, and expenditure on materials and equipment, the financial participation of the potential user at this stage is important to ensure the successful utilization of the results of research. In India, pilot plants have been set up at the site of the user, investment on capital equipment being made by the research institute while running expenses and services are paid for by the user.

After the successful operation of the pilot plant, the user purchases it for the training of staff and for market studies. In return he is given exclusive or preferential terms on the process for a limited period.

(iv) *Extension services*

Some research institutes maintain extension centres for direct contact with the industries and for demonstrations of processes and new products. Contacts are developed between the staff of the extension centres and the technical personnel and managers of the industrial firms. Literature in the form of brochures, newsletters, and science digests giving non-technical data on subjects such as economics is made available to the industrial firms.

(v) *Consultancy services*

The effective use of consultants involves the diagnosis of the problem and of the type of technical assistance required; creating a favourable atmosphere for adapting foreign experience and know-how to local conditions; establishing a channel of communication between the client and the consultant; and providing for the effective transfer of information and know-how for the implementation of the project.

The advanced countries of the world have private consulting firms which offer advice when approached by private industrialists with regard to the establishment of an industry, its practical feasibility with respect to locality, raw materials, finished products and their consumption within the country or outside, and the probable cost of production and so on. In addition to these private consulting firms which work on a payment basis, the governments of advanced countries have such consulting services attached to different departments or to different research institutions. The duties of these consulting services include the tendering of suitable advice and giving full information, even from literature, about the project concerned.

Except perhaps for Japan, Australia and India, no country of the ECAFE region possesses private consulting services. In order to remedy this situation, consultancy services as well as other services should be offered by the industrial research and development institutes in countries of the ECAFE region. Competent scientists and technologists in these institutes may provide expert consultant service and may visit industrial establishments to study specific problems on the spot. The consultancy services of the institute should cover different aspects of industry, such as plant layout, machinery and equipment, production control, cost accounting, quality control, marketing, better utilization of raw materials and by-products, improving products and yields, and so forth. The consultancy service of the institute may include bringing the local entrepreneurs into contact with foreign consultants for more suitable advice.

12. *Incentives for industrial research*

Various governments give encouragement in the form of special concessions to industries utilizing indigenous research or carrying out research on their own.

In India, money spent by industry on research counts as expenditure for tax exemption. Recently a scheme has been introduced by which the Government through the CSIR may give matching grants for research performed by a private firm on approved projects. Similarly in the Philippines all funds contributed to the support and maintenance of scientific foundations are tax-free. In the Republic of Korea, research expenditure within certain limits is regarded as a loss for taxation purposes. Contributions or donations for the development of science and technology are similarly counted for tax exemption.

The industry should also be provided with 'risk insurance' and 'benefits' on investment on processes based on indigenous research.

IV. REGIONAL CO-OPERATION

1. *Advantages*

The idea of the ECAFE region countries developing avenues of co-operation in the field of industrial research has several attractive features. Regional co-operation could be approached in various ways, for example by the setting up of regional industrial research institutes, regional information, documentation and co-ordination units, and the like. Most of the countries cannot afford even the minimum expenditure and resources required for the setting up of a modern industrial research institute. A pooling of resources would enable them to set up institutes of viable size and would lead to an over-all economy through the optimum utilization of limited resources. This would also make for the easy movement of scientific personnel and would eliminate avoidable duplication of research by different countries.

2. *Difficulties*

These obvious advantages notwithstanding, there are serious difficulties in the way of setting up industrial institutes on a regional basis. Most of the developing countries have only recently gained independence, often by revolution. Any idea of a supra-national authority or even a supra-national co-ordinating agency may be looked upon unfavourably and evoke opposition. Some regional arrangements like OECD, ECM and EURATOM have functioned with a certain degree of success. There is also the example of the Central American Institute for Industry which works as a regional research institute for five Latin American countries in their plans for industrialization. Unless there is a certain degree of economic and political loyalties may adversely affect the esprit de corps and the research atmosphere of an institute.

3. *Suggestions*

While establishing regional institutes may not be a practical proposition for the time being, it should be possible to think of other ways and means of achieving co-operation among the countries of the ECAFE region. The following are some suggestions offered for consideration as means of promoting regional co-operation for industrial research and development.

(i) *Regional information and co-ordination centre*

It would be useful to have, at the regional headquarters of ECAFE, classified information about the research organizations and institutes especially in the field of science and technology, their major areas of research, their scientific and technical personnel and the titles and subjects of research. This would enable the centre to make available to scientists in one country, information on industrial research and program-

mes on the same subject elsewhere and also to arrange for the exchange of experience. It would be helpful in arranging discussions or seminars on subjects of common interest to countries in the region.

(ii) *Documentation service*

Some of the countries in the region (India, Pakistan, the Philippines and Thailand) have well-developed documentation institutions, mostly set up with aid from UNESCO. Japan has its Information Centre sponsored by the Government. These institutions can readily procure and make available abstracts, reprints, photocopies, microfilms and translations from scientific literature all over the world. Establishing documentation and abstraction centres for each country with all the essential facilities would be a costly proposition. These should be no difficulty in servicing a group of countries from the nearest centre. A scientist in the country could send his requisition to the regional documentation centre and could be supplied with his requirement on the same terms as scientists of the host country. ECAFE could make co-ordinating arrangements and help in the smooth working of the system.

(iii) *Commodity-based co-operative research institutes*

It may be possible for institutes for commodity research to be set up on a co-operative basis by countries which have a common interest in some materials of major economic significance, such as rubber, tea, or petroleum. Since the participating countries would have a community of interest, it might be possible to organize joint efforts in conducting research, the results of which could be available to all of them. This would not preclude the establishment of their own institutions by the countries concerned but would ensure co-operation and the pooling of information and technical research at an advanced level.

(iv) *Technical training*

(a) Some of the countries in the region such as Japan, Australia, India and the Philippines are comparatively at a more advanced level than the rest. The ECAFE secretariat could promote bilateral arrangements whereby scientists from one country could be associated with research and take training in specialized topics in another. Travel expenditure for the trainees could be borne by the sponsoring countries while hospitality and expenditure during training could be borne by the host country.

(b) It would also promote healthy co-operation if scientists from different countries could meet for common training courses such as those arranged in food processing and technology for south and south-east Asian countries at the Central Technological Research Institute, Mysore, India.

(v) *Research administration*

(a) *Autonomy.* The subject of the autonomous functioning of research institutes under government sponsorship received the attention of the Expert Working Group. It was felt that for creative research, research institutes and organizations would benefit by having autonomous status. It would be useful if a study on the status and functioning of research institutes could be undertaken on behalf of ECAFE for different countries of the region.

(b) *Science administration.* The question of science administration and the fact that a considerable amount of the scientists' time is necessarily devoted to administrative routine was also discussed by the Group. A non-scientific administrator may not able to appreciate the problems and requirements of industrial research while a scientist may lack the training to be a successful administrator. In the United States, the management of scientific and industrial research has become a specialized field. Persons with a good scientific background are given training in administrative methods and placed in charge of the administrative aspects of research institutes. It would be worthwhile to investigate a similar approach in the countries of the ECAFE region.

4. *ECAFE Regional Council for Industrial Research and Technology*

In order to enable these functions to be undertaken, the ECAFE secretariat should have under its aegis a Regional Council for Industrial Research and Technology, staffed by the appropriate scientific personnel.

V. INTERNATIONAL ASSISTANCE AND CO-OPERATION

1. *Present status*

Most of the countries in the ECAFE region have been beneficiaries of international aid from the United Nations and agencies such as UNESCO, UNTAB, United Nations Special Fund, FAO, WHO and UNICEF. Regional and bilateral arrangements such as the Colombo Plan, the Ford and Rockefeller Foundations, United States AID and others have also been of great help. This assistance has been utilized for the purchase of research equipment, machinery, apparatus and instruments, and to build up libraries, documentation facilities, technical literature and reference books. Under the aid programmes, experts in different fields of specialization have been made available, to give a start to the research institutes and train counterpart local scientific and technical personnel. Fellowships and scholarships have been awarded to scientists for specialized training and studies in the advanced countries.

Bilateral agreements have also provided for the visits of scientists to research institutes and industrial establishments.

UBARI in Burma has received scientific equipment; Ceylon was helped by the World Bank and by UNTAB with experts, engineering specialists, and an engineering unit and workshop; UNESCO has helped India, Pakistan and the Philippines to set up Documentation Centres. The Philippines received a

research reactor from the United States Government through a bilateral agreement. The United Nations Special Fund is assisting Thailand to equip and obtain experts for its Technological Research Institute.

2. *Advantages and shortcomings*

Only general information is available on the subject of international assistance and its impact on research and development. Exact figures of assistance received through various agencies and the manner in which it has benefited the recipient countries would be a useful study and would be helpful in evolving the most suitable pattern.

Most of the developing countries have limited financial and foreign exchange resources. In providing badly needed equipment, instruments etc. and equipping their research institutes, international aid has played a helpful part. In the absence of trained scientific personnel, experts from the advanced countries have helped to improve the standards of teaching and training of the local scientists and thus the level of industrial research. The training of scientists from the developing countries in the research institutes and establishments of the advanced countries has helped to broaden their outlook, brought them into personal contact with scientists in other lands and enriched their knowledge, thinking and experience. It has helped to increase their potential for industrial research and development in their own countries.

There are some drawbacks, however. It has been difficult to get high-calibre scientists to go out as experts to the less developed countries and as a result the best experts have not been available. Some experts have not been able to see in the proper perspective the local raw materials, conditions and level of industrial research required. Some experts find it difficult to adjust to the social, economic, political and climatic conditions, to the language, to the food and to social amenities in the developing countries. By the time the expert is somewhat acclimatized, his term is often over. From the financial angle, an expert costs much more than would the training of a much large number of local scientists abroad.

The linking of aid for equipment with experts has sometimes obliged the developing countries to accept experts who could be better employed elsewhere.

The training of local scientists abroad has been useful except for the fact that a number are lost to their own country by their preference of staying in advanced countries.

3. *International co-operation*

International co-operation in the scientific field, apart from the fact that it generates a feeling of goodwill between nations, is important for the following three reasons:

(1) Science and technology are expanding so rapidly and in so many directions that every country, even those that are developed, can learn from the others.

(2) There are certain disciplines of science where mutual co-operation is necessary because observations and scientific data have to be collected from many countries. Such fields are meteorology, geophysics, oceanography and the geography of diseases etc.

(3) Certain branches of science and technology are so expensive that few nations can afford to undertake them independently. Take, for instance, the work in the field of peaceful uses of atomic energy and satellites.

In many of these fields, there is already co-operation between the advanced countries of the world. For example, there is an exchange of data regarding space experiments, atomic energy, and medical research.

Co-operation exists in a limited way in the planning of scientific and technological policies and there is further scope for international co-operation in their planning and formulation. There are many other scientific fields in which there is already co-operation which can be further extended. Apart from oceanography, subjects such as volcanology, seismology, and astronomy are being handled on a co-operative basis through the efforts of UNESCO which also has a pilot plant project for teaching chemistry in the developing countries of Asia. It is understood that UNESCO has plans for promoting regular partnership relations between scientific institutions in advanced and developing countries.

Frequent exchange visits of scientists and technologists who are eminent in their respective fields, and their participation in regional and international conferences, symposia and seminars, would bring about better understanding. Technical programmes sponsored by various international agencies and the United Nations Special Fund have, no doubt, greatly assisted in accelerating the pace of progress in countries of the ECAFE region, which are faced, on the one hand, with the problem of building their economies through multilateral developments in the fields of science and technology, industry and agriculture, and on the other, with a paucity of scientific and technical personnel and an acute shortage of funds for the purchase of badly needed scientific equipment.

VI. A SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT IN COUNTRIES OF THE ECAFE REGION

1. Introduction

Considering the role of industrial research in giving support to and promoting industrial development, a survey of its status in countries of the ECAFE region may provide a measure of the research potential available as an aid to industrialization. The economic and industrial backwardness of a country is equally reflected in the lack of essential data concern-

ing expenditure on research, numbers of scientists and technologists and the relating of the research to plans for the survey and utilization of raw materials and resources. The absence of these data is a serious handicap and it is felt that perhaps the ECAFE secretariat should itself take the initiative in organizing the appropriate studies.

In the absence of reliable data, the survey has leaned heavily on the country reports presented during the Inter-regional Seminar on Industrial Research and Development Institutes in Developing Countries, organized by the Centre for Industrial Development at Beirut in December 1964, and on some published literature. While these reports contain valuable information, they are at times not sufficiently explicit with respect to such vital questions as national science policies, financial support and responsibility for industrial research, control and direction of industrial research establishments, quantum of the research effort and its economic turnover by means of the utilization of its results, etc. An effort has been made to arrange the available material as far as possible in the sequence given in the sentence above.

The survey thus provides a general idea of the industrial research situation and points to the need for a greater effort to collect extensive and reliable data to enable ECAFE's assistance to be more effective in this region.

2. Afghanistan

1. *Industrial plans and expenditure*

The second five-year plan of Afghanistan (March 1962 to March 1967) accords a high priority to industry and mining, which are allotted more than one-third of the total planned investment. It envisages a tenfold increase in electric power, a threefold increase in coal mining and a considerable increase in cement production. Basic industries, including gas, petroleum and chemical fertilizers, are to be developed, as well as a number of light industries such as silk-spinning, shoe-making, glass and cigarette manufacturing, particular attention being given to those industries which process agricultural products and raw materials for export. The second five-year plan provides for an outlay of $114.5 million for industry and $225 million for mining.

2. *Industrial research activities*

There is no direct mention in the plan of industrial research activities, although research work closely related to industry and directed towards such products as wool, silk, honey, and karakul sheep-skin is being undertaken under the auspices of the Ministry of Agriculture. For example, the training centre in the Kataghan region for improving the quality of karakul pelts and for introducing modern methods of breeding is charged, among other duties, with the task of undertaking research. The Central Wool Research Laboratory undertakes activities for the better technical management of sheep flocks, research in wool production, standardization of wool exports and training of personnel for the Kabul Wool Laboratory.

In addition to the six sericulture stations already established during the first plan period, the second five-year plan provided for the establishment of new stations for the multiplication and distribution of silkworm eggs and improved varieties of grafted mulberry plants. A honey bee station has been set up in Nangabar for the training of farmers in modern methods of bee-keeping.

3. Australia

In Australia, the organization pattern of industrial research is similar to those of the highly developed countries. Industrial research and development activities are widely carried out both by governmental and non-government organizations, while fundamental research is primarily looked after by the universities where there has been considerable strengthening of research facilities in the recent past.

1. *The Commonwealth Scientific and Industrial Research Organization*

The government-sponsored Commonwealth Scientific and Industrial Research Organization (CSIRO) was established in 1949 in accordance with the Science and Industry Research Acts. The powers and functions of the CSIRO include the initiation and carrying out of research in connexion with, or for the promotion of, primary and secondary industries in the Commonwealth; the training of research workers and the making of grants-in-aid for pure scientific research; the testing and standardization of scientific apparatus and instruments and the carrying out of scientific investigations connected with standardization; the collection and dissemination of information relating to scientific and technical matters; liaison with other countries in scientific research; the establishment of industrial research studentships and fellowships; and the establishment of industrial research associations.

Undesirable centralization has been avoided, chiefly in two ways. First, a policy has been followed of establishing laboratories in different places in the Commonwealth where the necessary facilities, contacts and other suitable conditions could best be found. Second, state advisory committees widely representative of scientific and industrial interests have been established in each of the six states of the Australian Commonwealth. These committees, appointed for a term of three years, advise the executive on general matters and on particular questions of investigation and research. CSIRO is governed by an executive of five members who are appointed by the Commonwealth Government; the executive is assisted by an advisory council comprising, in addition to members of the executive, the chairmen of the six state advisory committees and other persons co-opted on account of their scientific knowledge.

2. *Financial support*

The funds of the CSIRO are provided from Commonwealth revenue by parliamentary appropriation from the Wool Research Trust Account, the Wool Industry Fund, and from industry, directly and indirectly, by means of special grants and contributions. The latter are received from several agencies, associations or institutes for the undertaking of specific research projects and are recorded in a special account entitled the "Specific Research Trust Fund". In addition, a supplementary income is obtained by various means, such as by the sale of publications, the sale of produce by field stations and laboratories, royalties from patents, testing fees and the sale of property obtained by gift from philanthropic Australians. Also, for a number of years, CSIRO has received grants from overseas establishments for specific research projects of interest both to them and to Australia. The majority of these awards have come from agencies of the United Nations or the United States of America.

3. *Organization*

CSIRO is organized in four major group laboratories and a number of divisions and sections. The four group laboratories are the Animal Research Laboratories with three divisions, the Chemical Research Laboratories with six divisions, the National Standards Laboratories with two divisions, and the Wool Research Laboratories with three divisions. There are seven independent divisions in other research fields which carry out research and development activities directly under the aegis of CSIRO. In addition, there are about fourteen independent sections which have not reached a stage of development which, with regard to the scope and magnitude of their operations, would justify their designation as divisions.

As CSIRO's investigations extend throughout the Commonwealth and as many of the investigations conducted, especially those concerned with problems affecting the agricultural and pastoral industries, necessitate experimental work in the field, a number of branch laboratories and field stations have been established in various parts of Australia. The head office of CSIRO is in Melbourne and associated with it are the organization's central library, agricultural research liaison section and central experimental workshops.

4. *Co-operative research association of industry*

CSIRO is empowered to recognize "associations of persons engaged in any industry for the purpose of carrying out industrial scientific research", and such an association may be given a grant through the organization of up to £1 for every £1 raised by the industry itself. It is the policy of CSIRO to foster the development of strong independent research associations, of which two have so far been sponsored — the Bread Research Institute of Australia and the Australian Leather Research Association. Where the research work involved is much too limited to require the formation of a research association, the organization makes research facilities available to industries by entering into agreements to undertake clearly defined research projects.

5. *CSIRO and the universities*

Many CSIRO divisions and sections work in close collaboration with Australian universities on particular research programmes and officers of the organization assist in university lecturing, demonstrating and supervising in specialized fields. Moreover, grants have been made to support a number of university research programmes of particular interest to CSIRO. It is the general policy of CSIRO to work with an industry or public authority in seeking solutions to problems which are of concern to a number of companies or interests; and, from time to time, it undertakes work for individual companies if other help is not available.

6. *Patenting policy*

CSIRO regards it as important that inventions arising from research in its laboratories should be applied as widely as possible in industry. Experience has shown that, in many cases, industrial innovations based on these inventions are more readily taken up by industry when the inventions have been protected by patents. The patenting of CSIRO inventions achieves several purposes, such as protecting the public interest by ensuring that the inventions are not patented by others and permitting supervision to be exercised over industrial users to ensure that new products and processes do not become discredited owing to the inventions being incompetently applied. Patenting thus provides a means by which a firm that is prepared to invest a substantial amount in developing an invention from laboratory operation to factory production may be given a measure of priority in its use, and thus permitted to recoup its development expenditure.

7. *Industrial liaison*

An important part of CSIRO's industrial research liaison section relates to patents and their licensing to industries. The industrial research liaison section also publishes the bi-monthly CSIRO Industrial Research News, which contains information about development from CSIRO research programmes likely to be of interest to Australian manufacturers. The section also prepares other publications aimed at bringing CSIRO research to the attention of industry and the general public.

8. *Publication and dissemination of information*

The results of CSIRO's research work are made available through various channels. Eight scientific periodicals are published, together with various series of technical reports and semi-technical publications. Formal scientific publication is supplemented by the

preparation of films, by continuous and close contact with industry by officers of the divisions and sections, by the provision of facilities for guest workers in laboratories, the publication of trade circulars, newsletters and articles for trade journals, as well as lectures, short courses of special training and the organization of conferences of a specialized nature.

9. *Research by industrial firms*

In addition to the widespread research and development activities conducted by CSIRO, there are forty non-governmental organizations supported by various private industrial companies which carry out industrial research and development work. These private organizations are financed, administered and staffed on much the same lines as the industrial research laboratories existing in advanced countries. Their major research activities consist of investigations into efficiency production processes with the aim of cost reduction, increase of output per man-hour and development of new products and processes to satisfy expanding markets.

10. *Scientific personnel*

Neither the governmental nor the non-governmental research and development organizations in Australia appear to face any serious problem in acquiring the necessary technical staff, because the Australian universities and specialized training institutes turn out adequate numbers of scientific graduates who enter the field of research.

4. Burma

In Burma, fundamental research is primarily carried on at the universities of Rangoon and Mandalay; but the Union of Burma Applied Research Institute (UBARI) is at present the sole organization which carries out applied research in science and engineering, and experimentation for the economic development of the country.

1. *Union of Burma Research Institute (UBARI)*

UBARI was established by the Union of Burma Research Institute Act passed by the Union Parliament in 1954.

UBARI is a public establishment, administered by the Burma Research Board which is a policy-making body under the Ministry of Industry, charged with responsibility to stimulate, co-ordinate and support scientific and engineering research. The University of Rangoon is represented on the Board through the nomination of some of its professors. The executive responsibility for UBARI is vested with the Director-General assisted by the heads of the various research departments. The departments of UBARI are the metallurgy and geology research department, the physics and engineering research department, the applied chemistry department, the cellulose, pulp and paper research department, the ceramics research department, the instruments department, the analysis department, and the standards and specifications department.

The Union of Burma Atomic Energy Centre, established in 1955 in UBARI, has six departments, namely the radioactive minerals department, the nuclear reactor studies department, the health physics department, the nuclear instrumentation department, the radiochemical analysis department, and the agricultural and biological applications department.

2. *Industrial liaison*

Co-ordination with the fields of basic and applied research is maintained by close liaison between the university professors and the technical staff of the Applied Research Institute. Industrial research consciousness among industrialists and government departments is promoted by the holding of annual science exhibitions in which the universities and UBARI actively participate in order to disseminate scientific knowledge and demonstrate the results of research. UBARI provides technical services to industries, prospectors, the universities, government departments, boards and corporations, and the Army, Navy and Air Force by carrying out sponsored research projects, analyses, tests, repairs to instruments and consultation. On-the-job training has also been provided in some departments to technicians from industry. UBARI has initiated a number of research projects of great economic significance to the country and followed them up to the pilot plant stage; the results have been made available to industrialists through the Technical Service Division of the Directorate of Industries. There have been many instances in which private industrialists have requested the Institute to set up small manufacturing units on a cost plus fee basis after having been convinced by the operation of the pilot plants. The Institute continues to expand its facilities for branching out on more lines of research activity, increasing pilot plant experiments and providing technical services to the country.

3. *Financial support*

In the Government's annual budget, the necessary appropriations are made for the organization; the flow of funds may be regarded as regular and smooth.

4. *Scientific personnel*

In order to staff the Institute with the necessary technical personnel, the graduate and post-graduate resources of the universities are drawn upon. Fresh graduates of the universities are taken on to the staff of UBARI and after a few years of practical work at the Institute where they obtain a fundamental knowledge of scientific research, they are sent abroad for their training in their specialized fields. On return they generally receive a promotion and these facilities provide a sufficient incentive to local personnel to work in industrial research.

Expatriate staff are engaged in those departments for which sufficiently qualified local staff are not available. The latter understudy the expatriate staff, who are replaced soon after the local personnel have been adequately trained.

5. *International assistance*

Technical assistance received by UBARI was in the form of equipment obtained through the various sources of foreign aid, such as United Nations Technical Assistance, UNESCO, ICA, the Colombo Plan and the Fund for Peaceful Atomic Development.

5. Ceylon

1. *Industrial plans and research*

The Donoughmore Constitution relating to the constitutional reforms in Ceylon provided in 1930, among other reforms, a Board of Ministers. As a result, the Ministry of Labour, Industries and Commerce came into being. The new Ministry took over the responsibility for making a survey of the country's available resources and carrying out research on the utilization of these resources to a stage where they could be economically exploited. The Ministry also arranged for the training of technical personnel to carry out research. The Ministry created a Department of Industries and within this Department set up an industrial laboratory to:

(a) ascertain the properties of raw materials found in Ceylon;
(b) investigate the industrial uses to which they can be put;
(c) lay down standards for local raw materials and production;
(d) assist government factories in their problems; and
(e) assist local private industries.

The Department also recruited science graduates from the University and after an initial period of training at the Research Laboratory, sent them for advanced technological work in particular fields overseas. Simultaneously a separate department of geology was established to investigate the mineral wealth. It revealed the presence of the following natural resources: limestone, graphite, mica, ilmenite, monazite, salt, kaolin, glass-sand and more recently iron ore deposits. A quantitative estimation of these resources was made by the Department of Geology and economic exploitation was initiated experimentally by the Department of Industries.

During the Second World War, to meet the urgent needs of the country which had formerly been met by imports, a number of factories were set up as projects. The factories were:

(a) Plywood and saw mill
(b) Steel rolling mill
(c) Leather factory and tannery
(d) Quinine and drugs factory
(e) Coir yarn factory
(f) Ceramic factory
(g) Acetic acid factory
(h) Glass factory
(i) Semi-mechanized paper factory

After the war, the factories, being uneconomic, could not survive in peace-time conditions. The Government therefore asked for the help of a large number of foreign experts in various fields. The United Nations and other international organizations came to the assistance of the country and sent a number of experts among whom was a team from the World Bank. These experts recommended the immediate creation of an autonomous applied research institute as the first and most essential step for industrial development.

2. *Ceylon Institute of Scientific and Applied Research*

The Ceylon Institute of Scientific and Applied Research came into existence as an autonomous institute in 1955, with headquarters in Colombo, with its own office buildings and a well-equipped laboratory, workshop and library. Its objectives are:

(a) Technological research with special emphasis on the utilization of local resources.
(b) Standards testing.
(c) Promotional activities.
(d) Training of research workers
(e) Dissemination of scientific and technical information.

The Institute is under the charge of the Ministry of Industries.

Government control over the Institute is limited to the conditions that it should not perform any work which, in the opinion of the Minister, is contrary to the public interest. The Institute has no control over other research institutes or over the research being carried out in other government departments or corporations.

(i) *Management:* The management of the Institute is vested in a Board which, in its original concept, was to consist of (a) three members elected by successive boards (the first three members were to be appointed by the Minister in charge of Industries); (b) one member appointed by the Minister of Finance; (c) two *ex-officio* members, the Permanent Secretary to the Ministry of Industries and the Director of the Institute.

(ii) *Staff:* The Director is appointed by the Minister and is a paid employee whose terms and conditions of employment are fixed by the Minister of Industries in consultation with the Minister of Finance. The Director is *ex-officio* Vice-Chairman of the Board. The Board is responsible for all appointments to the Institute, but delegates the power of appointing all officers except the Accountant to the Director.

The first personnel of the Institute were the research officers and research assistants of the Industries Department; these numbered 21. The Board subsequently recruited two research officers and three

research assistants in addition to an accountant and secretarial staff.

(iii) *International assistance:* The World Bank and UNTAA donated the services of Dr. Godwin as the first Director of the Institute for five years and Dr. Liefelund as Chief Engineer of the Institute for three years.

The Institute also arranged an agreement with the International Co-operation Administration for six specialists in management, industrial engineering, tools and die-making. These specialists were provided with local counterparts, who were offered facilities for further training overseas.

The Institute was given a grant of one million rupees a year for the first five years by the Government. In addition, the Government transferred to the Institute the machinery and equipment of the two industrial laboratories and the entire technical library of the Industries Department, comprising 4,000 volumes, valued at Rs. 0.5 million.

The Institute also received from Colombo Plan aid a fully equipped engineering unit consisting of a laboratory and workshop estimated at Rs. 1.12 million. The International Co-operation Administration donated a 115 kVA generator and books valued at Rs. 284,000.

(iv) *Research programmes and service to industry:* The research programme of the Institute comprises:

(a) projects which have been transferred from Industrial Development;
(b) projects which were suggested to the Institute by various government agencies and approved by the Ministry;
(c) projects which were initiated by the Institute on its own;
(d) projects which were suggested by the corporations and government departments on their own;
(e) projects which were suggested by the private sector industries.

The Institute has also undertaken a large number of testing services for the private sector industries. The Institute has made special efforts in promotional activities. It is mainly responsible for the sponsoring of the Standards Bureau, the Productivity Association of Ceylon, and the Small Industries Service Institute. A project report was also submitted for the formation of the Industrial Corporation of Ceylon. The Institute in addition undertakes technical and economic feasibility studies of various industrial projects suggested by the private sector. The Government utilizes its services for technical advice and information.

(v) *Patenting policy and financial incentives research:* Various incentives for the promotion of industrial research have been announced by the Government; for example, the Institute can patent its discoveries and inventions which could be utilized on a royalty payment basis. The Institute is also exempt from income tax and stamp duty. Contributions and donations or payments for services rendered by the Institute are also exempt from income tax.

(vi) *Financial support:* It was stipulated that the Government would donate 1.0 million Rupees a year for the first five years. It was expected that after this period the Institute would be self-financing, but this goal was not realized. The Minister of Industry therefore obtained cabinet approval for an annual grant of 1.0 million Rupees to the Institute which would enable it to work satisfactorily, regardless of the income it received. This move has ensured continued financial support so that the Institute can pursue its research programme unhampered.

At the request of the Government a national programme of research, based on a survey of indigenous resources and manpower, has been prepared after discussion with scientists and economists from the University, the National Planning Department, the Central Bank and other research institutes and departments. A committee has been appointed to assign priority to different items to work under this programme.

3. *Commodity-based and other research institutes*

In addition to this Institute, research is also being carried out by the Tea Research Institute, theh Coconut Research Institute and the Rubber Research Institute on specific problems related to their trades. Similarly, there is a Medical Research Institute doing research on health problems and drugs and pharmaceuticals. There is an Ayurvedic Research Institute doing work on an indigenous system of medicine. Departments such as the Irrigation, Fisheries, and Public Works have their own research units.

There is also a small industries institute started in 1962 in Velona, with a fully equipped office and workshop. Seven United Nations experts have been on loan to this Institute. The main functions of the Institute are:

(a) to conduct techno-economic surveys and studies of particular industrial trades and of the industrialization possibilities of particular geographical areas;
(b) to conduct market surveys of products manufactured, or considered suitable for manufacture;
(c) to initiate research through the CISIR on improved designs of products, alternative materials, improved processes of production and the development and introduction of tools and equipment particularly suitable for use in small undertakings;
(d) to organize training courses for government extension personnel;
(e) to organize an information centre; and
(f) to operate common production facilities services.

4. *National science policy and co-ordination*

With a view to co-ordinating the work of all these units, a National Research Council is proposed, with the Prime Minister as Chairman. This Council would be an advisory body to advise the Government in framing its scientific and economic policy. It would also advise on and co-ordinate all research activities and provide special funds for research fellowships.

5. *University research*

Fundamental research which is the domain of the University, is unfortunately not being performed in Ceylon's only university because of limited resources both in men and material.

6. *Scientific and technical personnel*

A major problem that Ceylon faces in starting industrial research in the country is inadequate numbers of scientific personnel. There is a great scarcity of trained people to man the few industries, to undertake training schemes and even to teach in teaching institutions. That is the reason industrial research has not yet made much progress in the economic development of Ceylon's resources.

6. China (Taiwan)

1. *State policy on research*

The Government of the Republic of China, with limited skilled manpower and limited funds available for research and development, has laid emphasis not upon trying to discover new fundamental ideas, important as they are, but upon applying what other nations have already discovered as quickly as possible to the betterment of the living standard of its people and the improvement of its economy. Applied research is mainly directed at reducing the cost of prdoucts and at improving their quality so as to find ready export markets. Nevertheless, there are in China (Taiwan) some agencies such as Academia Sinica, the Atomic Energy Committee, the College of Science and the National Taiwan University which undertake work on fundamental research.

Among the organizations conducting industrial research and development work may be mentioned the following:

(a) the Union Industrial Research Institute at Hsinchu;
(b) the Taiwan Provincial Forest Research Institute at Taipei;
(c) the Taiwan Provincial Sea Products Research Institute at Tainan;
(d) the Taiwan Sugar Experimentation Station owned by the Taiwan Sugar Corporation and located at Tainan;
(e) the Taiwan Aluminium Company Laboratory owned by the Chinese Petroleum Corporation and located at Kaoshiung;
(f) the Kaoshing Research Laboratory owned by the Chinese Petroleum Corporation and located at Kaoshiung;
(g) the Chia Yi Solvent Works Research Laboratory owned by the Chinese Petroleum Corporation and located at Chia-i;
(h) the Wei Chuan Food Corporation Research Laboratory at Taipei;
(i) the China Fermentation Industries Limited Laboratory at Taipei;
(j) the Taiwan Glass Research Institute owned by the Taiwan Glass Association and located at Chu Tung.

All but the last three of the above research organizations are government-sponsored. The non-government research laboratories are organized on the same pattern as those in developed countries; they are sponsored and financed by private sources.

2. *Union Industrial Research Institute at Hsinchu*

Description of the organization pattern will be restricted to the Union Industrial Research Institute (UIRI) which is the nerve centre of industrial research and development work in Taiwan. This public insttiute, which is the outgrowth of the Hsinchu Research Station of the Chinese Petroleum Corporation, was established by the Ministry of Economic Affair on 1 November 1954. Located near the city of Hsinchu, the Institute aims to intensify industrial technological research, to help industry in Taiwan and to co-ordinate the implementation of the four-year economic development plans. The policy-framing authority of UIRI is an advisory committee of 21 members, chosen from among noted scientists, engineers and authorities on related subjects, who plan research projects, study results and formulate future plans for the Institute. The Director of UIRI has the sole executive responsibility for the establishment.

Scope and organization

The scope of research of the Institute extends to every field of industry, with special interest in manufacturing processes and the uses of by-products. The Institute does not undertake the work of formulating standards for products and raw materials, this field being looked after by the National Bureau of Standards established under the Ministry of Economic Affairs. The work of UIRI has been defined in more detail as follows:

(a) to undertake research on industrial products and the utilization of by-products, to determine new industrial developments;
(b) to co-ordinate its work with that of all other research and experimental organizations and utilize their equipment fully to reduce unnecessary duplication to the minimum;
(c) to design and do research work and tests on special problems submitted by public or pri-

vate industries for the sake of improving their techniques;

(d) to furnish technical advice, co-operate with and give technical assistance to public or private enterprises upon request;

(e) to collect industrial data, make, repair and check instruments for the enterprises.

There are now under the Institute ten laboratories dealing separately with organic chemistry, inorganic chemistry, agricultural chemistry, fuel chemistry, industrial instruments, electrical engineering, engineering materials, metallurgy, ceramics and atomic energy.

Financial support

UIRI is partly supported by financial contributions from such government corporations as the Chinese Petroleum Corporation, Taiwan Sugar Corporation, Taiwan Power Company, Taiwan Fertilizer Corporation, Taiwan Alkali Corporation, Taiwan Aluminium Works and Taiwan Cement Corporation; these contributions cover about 60 per cent of its expenditure. The remaining 40 per cent is met by fees obtained from contracts with public and private clients regarding specific research projects as well as from technical services rendered by its Industrial Services Department. The flow of funds from government sources is constant and regular, and there is no difficulty in obtaining the remainder of the funds from the Institute's own efforts and services.

Personnel

The staff of the Institute consists of university and college graduates who, following recruitment, are put through a training programme to make them competent as research workers. Research personnel have still to be recruited from abroad for certain senior posts, but they are replaced soon after local staff have learnt to take on their work efficiently. In 1961, the number of scientists and technical staff in the Institute was around 160.

Information and research utilization

Through its industrial services department, the results of UIRI's industrial research are made available to the ultimate users, both public and private. In addition, UIRI publishes a technical digest and maintains a large technical reference library which is available to interested persons outside the Institute.

International aid

UIRI does not receive any technical assistance through international or bilateral aid.

7. India

1. *Research situation*

In India, an extensive network of institutions engaged in scientific research has come into existence and pure research, applied research and research in specialized fields are being undertaken at a large number of centres. Some of these research institutions are sponsored directly by the Government through grants, while others are supported by contributions from private industrial undertakings, such contributions being subject to certain tax exemptions. It may be said, however, that the contribution of private industries to industrial research does not appear to have reached a level commensurate with the progress of the economy. The major organizations conducting research in India are the Council of Scientific and Industrial Research, the Indian Council of Agricultural Research, the Indian Council of Medical Research, the Atomic Energy Commission, the Sequence Research and Development Organization, and the Railway Research Design and Standards Organization, which are mainly supported by the Central Government. All these organizations have a number of research laboratories and institutes set up by the Co-operative Research Association of Industry: three in textiles and one each in the wool, silk and artificial silk, cement, rubber, plywood, paints and tea manufacturing industries. In all, there are 46 research institutes and units under the CSIR (including co-operative research), 91 scientific and technological institutes belonging to the Ministries of Defence, Railways, Post and Telegraph and the state governments. There are 47 medical research institutes and 114 agricultural research institutes and centres in the various states. Some 41 industries have set up and completely financed industrial research institutes. The Shri Ram Institute for Industrial Research, Ciba Research Centre, Metal Box Research, Rubber Research Institute, Hindustan Lever and Tata Institutes are some examples.

India has 56 universities in different parts of the country, of which 40 have science teaching and research departments. Their activities are co-ordinated and financially supported by the University Grants Commission.

2. *National policy on scientific research*

The Government of India is the major sponsor of scientific and industrial research in the country and has pursued an enlightened science policy. The Indian Parliament adopted a Science Policy Resolution in 1958 declaring that the Government and the country would give every encouragement to science and technology as an instrument of national economic and industrial development. The over-all science policies are guided and co-ordinated by the Scientific Advisory Committee to the Cabinet, consisting of eminent scientists of the country and presided over by the Prime Minister. Scientific research and development are carried out by scientific institutions under the direction or control of the Executive Councils and Scientific Advisory Committees which are autonomous bodies.

3. *The Council of Scientific and Industrial Research*

(i) *Industrial research*

The major effort in industrial research and the co-ordination of research activities is carried out by the Council of Scientific and Industrial Research.

The Council of Scientific and Industrial Research was set up in 1942 as an autonomous body, registered under the Registration of Societies Act (Act XXI of 1860). The functions assigned to the Council are:

a. The promotion, guidance and co-ordination of scientific and industrial research in India including the institution and the financing of specific research projects.
b. The establishment and development of and rendering assistance to special institutions or departments of existing institutions for the scientific study of problems affecting industries and trade.
c. The establishment and awarding of research studentships and fellowships.
d. The utilization of the results of the research conducted under the auspices of the Council for the development of industries in the country.
e. The establishment, maintenance and management of laboratories, workshops and organizations to further scientific and industrial research and to utilize and exploit for purposes of experiment or otherwise any discovery or invention likely to be of use to Indian industries.
f. The collection and dissemination of information related not only to research but also to industrial matters generally.
g. The publication of scientific papers and a journal of industrial research and development.
h. Any other activities which generally promote the objects of the resolution.

The growth of research activity under the Council has been rapid in recent years and a comparative table showing the position in 1947, 1954 and 1963 is given below:

Year	*Total number of laboratories and institutes*	*Budget (million rupees)*	*Number of scientists and technologists*	*Total number of employees*
1947/1948	2	5.26	70	...
1954/1955	12	21.7	524	2,993
1963/1964	29	117.5	2,435	11,319

(ii) *Administration*

The CSIR is administered by a governing body of which the Prime Minister is the President, the Minister for Education the Vice-President and the Director-General of CSIR the Principal Executive Officer. The Ministry of Education provides the administrative link between the Government of India and the Council.

The governing body consists of 35 members composed of eleven Ministers of the central and state governments, eleven scientists, nine industrialists and four officials of the Central Government. A Board of Scientific and Industrial Research consisting of 43 members (six ministers of the central and state governments, 28 scientists and nine industrialists) advises the governing body on proposals for instituting specific research, the study of problems affecting particular trades and industries, the establishment of research institutes and the award of fellowships.

The Board and the governing body are further assisted in their work by a joint sub-committee of the governing body and Board and a finance sub-committee which scrutinize the technical and financial aspects of the proposals. The Board is also assisted by a number of research committees dealing with physical research, radio research, chemical research, geological and mineralogical research, pharmaceutical and drugs research, metals research, biological research, electrical and mechanical engineering research, civil engineering and hydraulic research, aeronautical research and oilseeds research.

(iii) *Headquarters, research co-ordination and planning*

Administrative co-ordination and planning is done at the headquarters of CSIR at New Delhi. The various scientific and technical units located at the headquarters and working under the Director-General of CSIR consist of Survey and Planning, Research Co-ordination, Industrial Liaison and Extension, Defence Co-ordination, National Register, Publications and Information Directorate, Central Design and Engineering and Patents.

Much of the detailed administration is left in the hands of various units. The head office acts only in a co-ordinating and guiding capacity. It maintains close relations with other departments of the State such as the Departments of Education, Health, Works, Agriculture and Food and other scientific and technical organizations. It is also responsible for ensuring that research under the CSIR fits into the pattern of the country's planning, and for the formulation of policies for research with a view to its better utilization.

The Survey and Planning of Scientific Research Unit collects data regarding the entire field of scientific research in India and after interpretation uses these data for the further planning of industrial research. Its work is co-ordinated with the corresponding units in the Planning Commission, Central and Statistical Organisation and so on. The Research Co-ordination, Industrial Liaison, and Extension Services Units maintain suitable documented information on research in progress at the various laboratories and are helpful for internal co-ordination between the CSIR laboratories and external co-ordination with other organizations such as the Railways, the Indian Council of Agricultural Research and the Indian Council of Medical Research and others. It maintains contact with the Director-General of Technical Development, Ministry of Industry and other organizations responsible for planning and industrial development. It is also a means of contact between the various laboratories and the National Research Development Corporation for the utilization of research.

The CSIR set up a separate unit known as the Defence Co-ordination Unit in 1962. The functions of the Unit are to select and identify problems concerned with defence, assign them to various laboratories and convey the results the Defence Organisation. It also helps in conveying those results of research from the defence laboratories which can be exploited and utilized by industry.

The Council collaborates closely with the national councils for agricultural and medical research. It also co-operates with the India Standards Institution in the work of establishing standards for raw materials, manufacturing equipment and accessories, finished products, methods of testing, and so on.

(iv) *Design and engineering*

The Council established a Central Design and Engineering Unit in 1963. The duties of the Unit are to undertake detailed engineering design, economic studies and project evaluation, in addition to procurement, erection and commissioning of industrial plants on processes developed by the national laboratories.

(v) *National laboratories*

The twenty-nine laboratories and institutes under the control of CSIR, some of which have research stations or extension centres attached, are distributed all over the country. Of these laboratories, the National Physical Laboratory and the National Chemical Laboratory stand on a special footing and are engaged on problems of research basic to industrial advancement as a whole. Some of the other laboratories, as their names imply, are engaged in problems of interest to particular industries such as fuel, food, drugs, glass and ceramics, leather, buildings and roads; while a few deal with engineering research and yet others are concerned with problems of industrial development in various regions. These laboratories are engaged on work which does not come within the purview of universities or industries. They furnish facilities for team work in research projects and for pilot plant investigations. Other activities of these laboratories consist of surveys of raw material sources and work relating to research on standards and specifications. Moreover, they render technical assistance to industry through the provision of testing facilities and through liaison and extension work. Some of them conduct short-term training courses in special subjects for the benefit of technical personnel employed in industry. Each national laboratory has an autonomous executive council responsible for its control and general direction within the framework of the rules, regulations, and directions emanating from the governing body from time to time. Each laboratory is under the executive control of a director.

(iv) *Technical manpower and "scientists' pool"*

The Council set up a National Register Unit in 1948. It maintains a roster in card index form on the availability, qualifications and experience of scientists, engineers and mechanical personnel in the country and makes projections of future requirements. The Unit has a section for qualified Indian scientists abroad. It helps well-qualified personnel, both within the country and outside it, in securing suitable employment. CSIR also operates a "scientists' pool" which offers *ad hoc* employment to scientists returning with higher qualifications and specialized training from abroad. The scientist can then look around until he can find suitable employment.

(vii) *Documentation and scientific publication*

The Publications and Informations Directorate set up in 1942 is responsible for the publication of the following journals:

1. Journal of Scientific and Industrial Research.
2. Indian Journal of Pure and Applied Physics.
3. Indian Journal of Chemistry.
4. Indian Journal of Technology.
5. Indian Journal of Experimental Biology.
6. Indian Journal of Biochemistry.

It also publishes a journal dealing with research pertaining to industry entitled "Research and Industry", a fortnightly bulletin named "CSIR News", and a standard encyclopaedia, the Dictionary of India, Raw Materials and Industrial Products, under the popular title "Wealth of India". In Hindi, it publishes Vigyan Pragati to provide technical information to small-scale industries. Recently the CSIR has started the publication of a science journal entitled "Science Reporter" for the dissemination of scientific information.

The Indian National Scientific Documentation Centre supplies, to individual scientists and organizations, translations of foreign language articles and research papers, microfilms and photo-copies of articles and it prepares bibliographies on selected topics. The Centre also brings out three journals:

1. INSDOC
2. Annals of Literary Science.
3. Bibliography of Scientific Publications of South and South-East Asia.

(viii) *Patent policy*

The Patent Unit receives applications for patents from the laboratories and, after the necessary screening, processes the applications with the Controller of Patents in India and with patent authorities abroad.

(ix) *Utilization of the results of research and liaison*

The Council pays particular attention to the need for utilizing the results of research and proving their commercial feasibility. Separate industrial liaison units are established for each laboratory. The liaison officers maintain contacts with chambers of commerce and industry, industrial and trade associations, government departments and other users of research. Problems of industry are analysed and identified and brought to the notice of the appropriate laboratories for advice and, where necessary, for investigation. At

its headquarters, the Council Maintains an Industrial Liaison and Extension Service unit to co-ordinate liaison activities at the central level and to maintain contact with central government departments for industrial development and planning.

(x) *User participation and co-operative research associations*

The Council also promotes user-participation in research by financially supporting co-operative research associations of industry. Capital and recurring expenditure up to 50 per cent is borne by the CSIR, the rest being subscribed by industry. There are three research institutes existing in the textile industry and one each in the silk and artificial silk, tea and plywood, paint, rubber and cement industries. During 1963/64, financial support of 1.92 million rupees was provided to these research organizations.

(xi) *Co-operation with university research*

The Council also provides grants-in-aid for research in universities and scientific and technical institutes and laboratories outside the CSIR. These are in the form of research schemes providing for senior and junior fellowships of 400 rupees and 250 rupees per month respectively (500 rupees and 300 rupees for engineering subjects), equipment and other expenses. During 1963/64, the Council supported 580 research schemes at an expenditure of 514 million rupees, as compared to 110 in 1954 at an expenditure of 0.8 million rupees. The Council also sponsors a large number of senior and junior fellowships to promising research workers in the universities and other institutes. It also gives financial support for the setting up of research centres in different parts of the country, for example, a centre for dye-stuff technology at Bombay University and a centre for earthquake engineering at the Roorkee University. Promising research workers are also recruited for training and research in special fields in the institutes of scientifically advanced countries.

(xii) *International science co-operation*

The Council participates in international research projects such as those connected with the collection of ionospheric data and the international Geophysical Year. The Council is a member of the International Council of Scientific Unions. The Radio Research Committee functions as the National Committee in India for the International Union of Radio Science. Problems of theoretical and applied mechanics are referred to the Council by the International Union of Theoretical and Applied Mechanics. The INSDOC represents India on the International Federation of Documentation.

The Council is the executing agency on behalf of the Government of India for science exchange programmes or agreements with other governments and academies of sciences such as the Soviet Union Academy of Sciences, Hungarian Academy of Sciences, Poland, the Federal Republic of Germany, the German Democratic Republic, the United Arab Republic, and others.

4. *International aid*

Schemes financed by the United Nations Special Fund, the Colombo Plan, T.C.M., UNTAB, the Ford Foundation, and the like are in operation in some of the laboratories.

8. Indonesia

1. *National planning and science policy and co-ordination*

In Indonesia, under the eight-year National Overall Development Plan (1961-1969), a definite policy has been laid down, namely that extensive research activity should be undertaken as a prerequisite for large-scale development, and that all research activities by the government departments and higher educational institutes and universities must be expanded. In 1959, Indonesia had about 65 separate scientific institutions, two-thirds of which had been founded by the former Dutch Government, while the remaining one-third had been founded by the Indonesians.

The great majority of research institutions in 1959 were operated or supervised directly by the various government ministries. A number of large foreign industrial companies had laboratories, but all except one were busy almost entirely with routine testing on manufacturing processes or quality control. The only private laboratory operated by a single company performing some original research was that owned by the Standard Vacuum Petroleum Company at Sungeo Gerong in South Sumatra.

A Council of Science in Indonesia (MIPI) was established at Djakarta in 1956. The task of the Council is:

(a) to advance and to promote efforts and activities in the field of science serving the interest of the nation in particular and the interests of peace and mankind in general; and
(b) on its own initiative or upon request, to advise the Government on problems, projects and activities relating to science.

MIPI is an autonomous legal entity established by statute, under the Minister of Education. The Executive Board of MIPI, which consists of nine members, is the policy-making body. It is assisted by an advisory committee of 40 members representing the natural sciences, the cultural, social and political sciences and scientific institutes or government offices operating in scientific fields. The officer with executive responsibility for MIPI is the Executive Director.

MIPI, in principle, does not itself administer scientific projects which involve performing research, managing institutes and so on; however, if a research institute is not in a position to take any action that is necessary for conducing research, MIPI steps in. It is thus a body to regulate co-operation on a voluntary basis and to activate projects in the field of science in

Indonesia. Furthermore, MIPI does not interfere in the internal affairs of scientific and research institutions; and, in turn, the universities and these institutions recognize MIPI as the highest agency in the country in matters of scientific co-operation. MIPI also assists scientific organizations in obtaining needed equipment and publications and serves as a centre for scientific documentation and information. Being a body favoured in budgetary matters, it assists research projects, giving priority to applied research. During the first half of the Eight-Year Plan, MIPI is to establish seven research institutes in the fields of chemistry, physics, geology and mining, metallurgy, electronics, biology and social economics. Their work is to be oriented in practice to problems of industrial development.

2. *Industrial research institutes*

The following are some of the existing institutes which undertake industrial research and development:

1. The Department of Research and Training Institute was established in 1956 at Djakarta under the Ministry of Industrial Affairs. Its tasks consists of investigations on industrial goods, with particular reference to ways of using the raw materials available in Indonesia, the development of semi-processed and finished goods; testing and quality control of industrial products; patents and standards; scientific information, consultations and industrial training.
2. The Industrial Research and Development Institute, Djakarta, conducts research in industrial goods not within the jurisdiction of other institutes, such as wallboard, resins, tools.
3. The Chemical Research Institute was founded in 1909 at Bogor. It has seven sections, namely those for testing, phytochemistry, essential oils, agriculture, physiochemistry, cellulose and training of research personnel. Its task is to help promote industry by providing advice concerning processing, by setting standards for products to help industries concerned to make improvements.
4. The Materials Research Institute was established in 1912 at Bandung. The functions of this institute are to undertake research and to test imported materials for industrial utilization and Indonesian materials for use in local industry and export; to provide advice on the production and utilization of materials for various industries; and to carry out research on the quality, utilization and development of materials, especially those of indigenous origin.
5. The Textile Research Institute founded in 1922 at Bandung, has under its wings various sections such as spinning, weaving, knitting, ready-made clothes, dyeing and finishing, a technical laboratory, a chemical laboratory, textile printing and a textile college. Its tasks are to provide information and advice to small industries, especially to cottage weavers; to test and inspect textiles, textile fibres and weaving requirements; to develop and promote improvements in the manner of working and in equipment; and to train textile experts and workers.
6. The Ceramics Research Institute, established in 1961 at Bandung, has four sections relating to ceramics research; glass research; training; technical assistance and extension. Its functions are to undertake research in the production of various ceramic and glass products; to provide information and advice to new or small industries; and to train ceramic technicians.
7. The Leather Research Institute founded in 1913 at Jogjakarta has six sections, namely a research laboratory; an analysis laboratory; a pilot plant and technical information and training sections. Its functions are to undertake research in the various processes of tanning; to perform chemical and physical analysis of leather goods; to conduct courses on leather tanning and handicraft, and to provide information and advice to leather companies.
8. The Batik Research Institute (Printed Textiles Research Institute), established in 1949 at Jogjakarta, has a technical section and a laboratory. Its main tasks are to seek ways of perfecting the batik process; to train prospective batik businessmen; and to provide information and advice to batik industries.
9. The Institute for Rubber Research and Development, founded in 1941 at Bogor, has six sections, that is a research department doing general research, basic research, latex research, preparation of rubber and processing of rubber; a development department relating to general development and technical development; and departments of information and propaganda, economic analysis and documentation. It is assigned the tasks of developing through research natural rubber into a competitive industrial raw material conforming to specifications and containing no contaminations; promoting world consumption of rubber by expanding the range of new uses thereof; providing information and advice to manufacturers of rubber products; and conducting a course in rubber technology.
10. The Standard-Vacuum Petroleum Maatschappij Process Laboratory at Sungei

Gerong, south Sumatra has a quality control section and a research section including pilot plant. Its tasks are to test samples of crude and refinery products in order to ensure that standards are met; to seek new petroleum products, to make improvements in existing products and methods of producing products from the varieties of crude available.

All but the last of these research institutions are government-sponsored. The executive responsibility of each organization is held by a director, chief or head of the institute.

3. *Financial support*

The urgency of national development and the slenderness of the resources available have so far limited Indonesian research activities to areas of direct concern to the Government. Owing to the very fact that the existing research institutions are government-owned, a regular flow of funds has to be ensured by the Government in order that their work may proceed smoothly.

4. *Technical personnel*

Since the educational system of Indonesia until very recently has not been designed to produce professional or scientific personnel and in view of the relatively great length of time required to train competent research personnel, scientific manpower to staff the research institutions is still very limited in relation to the basic needs of the country. Many of the research institutions are barely able to cope with current programmes of research, let alone to undertake new research projects. Most of such institutes have an adequate number of trained intermediate and skilled personnel, but they lack the vitally important senior university-trained staff members with experience of the work. However, the situation is gradually improving as new graduates are turned out by the universities, and it has again become possible for some institutions to work on research projects.

5. *International aid*

Mainly because of the shortage of foreign exchange, the research institutions have found it difficult in recent years to import new equipment, chemicals, other laboratory materials and supplies, and reference books; and they have had to look to foreign agencies and international organizations for technical assistance. For this purpose, donations have been received from individual United States universities, the Asia Foundation, the British Council, the Governments of the Colombo Plan countries, the United States Economic Co-operation Administration-International Co-operation Administration (ECA-ICA) line of agencies, the Ford Foundation, the Rockefeller Foundation, the United States Information Service and several foreign diplomatic and consular posts in Indonesia. Among international agencies, technical assistance has been provided by FAO, UNESCO, UNICEF and WHO.

9. Iran

1. *Policy on industrial research*

The responsibility for industrial development including mines and trade in Iran rests with the Ministry of Economy. It has recently set up a Research Centre for the development of industry and trade, to undertake research, survey and feasibility studies for the formulation of industrial programmes and policies within the framework of the third plan law of 1962. The Centre proposes to impart training to provide competent personnel to carry out its own aims and for other organizations. The Centre has Research Planning and Policy, Project Evaluation and Trade Development Divisions besides those concerned with statistics, co-ordination and international affairs, and documentation and publication.

2. *Research projects*

With the assistance of the United States in 1956, a project was devised to establish a centre for industrial research, consisting of six laboratories: ceramics, chemistry, textiles, leather, foundry and repair shops. The project was completed in 1960 at a cost of $900,000, one third being subscribed by the United States Government.

The industrial research laboratories function under the Institute of Standards attached to the Ministry of Economy. The industrial research centre of Iran attempts to:

(a) obtain, classify and publish information and statistics concerning all the different aspects of industry and mining in the country;
(b) carry out research concerning all the industrial products and mineral resources of the country, either directly or by contracts with the institutes of technology and engineering colleges;
(c) determine the standards of industrial products and provide laboratory and testing services;
(d) carry out socio-economic research serving industry;
(e) provide consultancy services;
(f) provide training courses for skilled workers and technicians in industry and arrange seminars to discuss economic and industrial problems;
(g) exchange information with industrial research centres in other countries.

3. *Scientific personnel*

There is a great scarcity of qualified scientists, engineers and technical personnel for research. Steps are being taken by the Centre to offer financial incentives to persons taking up research.

10. Japan

In Japan, since technical research was limited in scope during the Second World War, there was at the end of hostilities a wide gap between the research

activities of Japan and those of the advanced countries. To bridge this gap in the early post-war years, industrial development was accelerated by utilizing the scientific and technological resources of the highly industrialized countries through the "induction of foreign technology into Japan" which involved contracts for technological assistance. This was done by the purchase of plans, designs and drawings; the employment of foreign engineers; and the procurement of technical know-how. It contributed substantially toward the technological development of the country. Such technological co-operation opened up new spheres in production techniques leading to economy in raw materials, increases in yield rates, simplified processes and lower costs as also improvement in the quality of products and the development of new ones. Gradually, as the enterprises grew in size, increasing importance was attached to the promotion of research. Existing research facilities have been rapidly improved and adjusted in order to raise the nation's over-all standards, with the result that a new creative research system has been established, permitting the previous practice of introducing foreign technology to be abandoned, stage by stage.

1. *Policy on industrial research*

For the economic, social and cultural advancement of a country, the phenomenal progress of science and technology is inevitable and its contribution to the welfare of the population and to industry is more than evident. In Japan there has been a rising demand for a 'consistent and integrated policy' for science and technology.

Owing to lack of space, it is impossible to describe in detail the organizational pattern of all the research organizations in Japan. But, to give a general picture, the research organizations are grouped into three categories: 1) private companies, 2) government research institutes including local government and special corporations, 3) universities and colleges.

According to the survey of the Statistics Bureau of the Prime Minister's Office, the research expenditure of Japan was US$781 million in 1962, registering a remarkable seven-fold increase over the 1953 figures; 64 per cent of the research expenditure was incurred by private companies; the number of researchers was 117 thousand, 50 per cent of them belonging to private companies.

The development of industrial research activities by the private companies notwithstanding, the role of the Government in research has become still more important. The Government has annually augmented its budgetary efforts toward the promotion of science and technology. stimulating research activities, training scientific and technical personnel, and improving documentation services, and so on.

The Government plays an important role not only in the promotion of basic science, but also the promotion of such research as private enterprises may not be able to undertake, such as large-scale research and that closely related to human life, as for example the prevention of air and water pollution, and research aimed at levelling the production structure of business, geographical research etc.

2. *Administration of research*

A group of advisory organizations has been constituted to ensure the incorporation of the views and opinions of broader areas in the making of national administrative policies.

The Science Council of Japan was established in 1949, under the Prime Minister, for the purpose of promoting the development of science and its permeation into administration, industry and scientific organizations representing the scientists of Japan.

The Council for Science and Technology was established in the Prime Minister's Office as an advisory organ to the Prime Minister in 1959. The purpose of the council is to promote a 'consistent and integrated policy' for science and technology in the Administration.

The Atomic Energy Commission, established in the Prime Minister's Office in 1956, administers policies on research into and the development of nuclear energy and ensures the democratic administration of nuclear energy.

The Space Activities Council, attached to the Prime Minister's Office, was established in 1960 for the purpose of establishing national policies to meet the challenge of the phenomenal accomplishment and advancement in the area of space exploration.

The Science and Technology Agency, established in the Prime Minister's Office in 1956, administers a consistent and integrated policy for science and technology, and encourages research activities in the field of the use of nuclear energy and space exploration.

The Agency of Industrial Science and Technology, whose main duties are the co-ordination, propagation and practical application of the results of research conducted by the attached laboratories and institutes; the encouragement of research activities; and other services in the scientific and technological promotion and improvement of manufacturing and mining industries, was established in 1948 as an independent agency directly under the Ministry of International Trade and Industry.

3. *Government research institutes*

In addition to the large number of research laboratories maintained by private enterprises, Japan possesses many government research organizations, which are as follows:

(1) The Science and Technology Agency has three research institutes attached to it. Two of them are closely related to industry, one being the National Aerospace Laboratory and the other the National Research Institute for Metals.

(i) The National Aerospace Laboratory is engaged in research on aerodynamics, air-

frames, jet engines and rockets, research on automatic control and instrumentation for aircraft and space vehicles; and the study of flight testing.

(ii) The National Research Institute for Metals conducts research on heat resistant materials, pure metals, materials for the electronics industry, ferrous and non-ferrous metals, atomic reactor materials, and the like; research on judging the defects of steel and preventive measures; and research on the industrial development of metals and casting.

(2) The Agency of Industrial Science and Technology has thirteen research institutes and laboratories relating to the manufacturing and mining industries.

(i) The Governmental Mechanical Laboratory has as its chief function research on the technology of machining and forming; research on improvement of the durability of machinery, on automation techniques and on optical instruments.

(ii) The Government Chemical Industrial Research Institute, Tokyo, is mainly engaged in research on analytical methods, catalysts, pure substances and chemical physics; research on air and water polution; research on the utilization of sea water; and on chemical engineering.

(iii) The Osaka Industrial Research Institute conducts research in organic chemistry, including polymer science, and inorganic chemistry, including carbon products and pigments; research on applied physics concerning optical instruments, industrial instrumentation and so on; on ceramics such as glass, porcelain, enamel and new ceramic products; on the paper industry and on the utilization of sea water.

(iv) The Government Industrial Research Institute, Nagoya, deals with research work on the promotion of productivity in mechanical engineering; on the utilization of radiation for the chemical and physical field; on ceramic materials, pottery and porcelain; on foundry technology; on control technology for industrial wastes; and on the utilization of solar energy.

(v) The Fermentation Research Institute is engaged in research on the micro-biological treatment of industrial wastes; on enzymes; on new useful micro-organisms and the breeding of micro-organisms; on the prevention of mould growth; and on continuous fermentation and automatic process control.

(vi) The Textile Research Institute conducts research on the manufacture of synthetic fibres; on spinning, weaving, dyeing and finishing; and on the physical properties of textiles.

(vii) The Electro-technical Laboratory is the largest institute in the Agency of Industrial Science and Technology; it is engaged in research on electronics; research in relation to power engineering; research on atomic power; and on the establishment and maintenance of electric standards.

(viii) The Industrial Arts Institute is mainly engaged in research on industrial design; basic research on industrial art techniques; research on packaging techniques and on merchandise analysis.

(ix) The National Research Laboratory of Metrology, Tokyo, carries out research on the establishment and maintenance of standards excluding electric standards, for example length, mass, temperature, pressure, viscosity, humidity, time, force, angle, density, speed, volume, etc.

(x) The Resources Research Institute is located in Saitama, and its main functions are research on mining, safety in mines and mining equipment; research on new processes of coal preparation and treatment of waste from coal preparation plants; research on the structure of coal, the production of cokes and new material from coal; research on synthetic high polymers and hydrocarbon; research on the combustion of fuels and the like.

(xi) The Government Industry Development Laboratory, Hokkaido, is engaged in research on the utilization of coal and tar; research on chemical and instrumental analysis; research on material testing, research on chemical apparatus.

(xii) The Geological Survey of Japan, Tokyo, deals mainly with geological survey and investigation and the preparation of geological maps; survey and research on natural resources including water, hot springs and geothermy; geophysical prospecting; geophysical general survey and research and geochemical research; strength property and age determination of rocks.

(xiii) The Government Industrial Research Institute, Kyushu, is engaged in research on chemical and instrumental analysis; research on the chemical industry; research on measuring techniques; research on industrial materials; research on machining and plastic working of metal.

(3) The Ministry of Transportation, the duties of which are the administration of sea, land and air transportation, has two research institutes. One is the Ship Technical Research Institute which has a close relationship with the ship-building industry.

The Ship Research Institute deals with research work on propulsion dynamics and the structure of ships; on marine engines equipment and related facilities of ships; on the welding and fabrication of ships; on the testing of model and real ships; on the testing of electronic navigation.

(4) Japan has research institutes of the special corporation type. Typical institutes of this type are the Japan Atomic Energy Research Institute and the Institute of Physical and Chemical Research which are sponsored by the Government. Their research activities are so important that we must mention their role in the promotion of Japanese industry.

4. *Research by private industry*

In present-day Japan, industrial research carried out by the private companies plays a most important role for developing industries. With the growing economy and strengthened industrial foundation, Japanese industrial circles are becoming very anxious to further improve the nation's technology, for it is on her newly developing technology that Japan's hope for a higher rate of economic growth depends. During the past few years, many enterprises have been attempting to establish central research laboratories, to increase their number of research workers and to seek materials for future use.

Among the private companies, about 7,500 are conducting research, and the number of central research laboratories in private companies is over sixty. The total expenditure for research activities in industry amounted to $500 million in 1962, and covered 64 per cent of total research expenditure of Japan. In the same year private companies employed about 55,000 researchers, which was 50 per cent of the total number. Some of the central research laboratories are the largest in scale and possess the most modernized equipment and facilities in the world. But the expenditure on research is still one to two per cent of the total sale, though many enterprises hope to bring this rate up to two to five per cent in the near future.

For the first time in the history of Japanese industry, the Hitachi Company Limited established in 1941 a central research institute under private sponsorship; today almost every large manufacturers has a research organization of its own. In these organizations, engineers, scientists and technicians are engaged not only in research work to improve the quality, performance and design of products as well as the technology and manufacturing processes, but also in basic industrial research so as to establish a consistent research system in each enterprise. The expansion of the research and development activities of these research institutions is aimed not only at improving the quality as well as the quantity of manufactured products, so as to place Japanese products on a competitive footing in the world's export markets, but also at producing a new technology and new products. The research laboratories of Japanese industrial undertakings are very similar in pattern to those of the United States. It may be said that Japan has caught up with other advanced countries in the field of research for technical development and that the country is now ready to engage its scientific and technological talents in cultivating and developing even unknown fields.

5. *Scientific personnel*

The university aims at teaching and studying professional learning and technical arts. In Japan, there are about 340 universities including technical colleges. They will turn out about 32,000 scientists and engineers for industries and research institutes in 1965; but because of rapid growth of industry and the accelerated expansion of research activities, the demand for scientists and engineers is increasing so fast that their shortage has posed a serious problem.

6. *Research in universities*

The universities, including the research institutes attached to national universities which have been established to overcome limitations in carrying out research imposed by the shortage of personnel or funds, are engaged in academic research as well as in basic research which cannot be dealt with by private enterprises and outer research bodies. The role of the universities is very important as it forms the basis of the research activities carried out by industry.

11. Republic of Korea

1. *Industrial development plans*

In the Republic of Korea, the first five-year economic plan (1962-1966) definitely states that the ultimate course of the Korean economy lies in industrialization. During the plan period, the period of preparation for industrialization, emphasis will be placed, inter-alia on technological advancement. To achieve this, a unique first five-year plan for technical development (1962-1966) has been drawn up which is designed as a complement to the economic development plan, the successful implementation of which will depend upon the creation of a sound technological basis. The basic objectives of the technical development plan are:

(a) to develop the technical manpower resources necessary for the implementation of the first five-year economic development plan;

(b) to improve the level of existing technology in an endeavour to increase productivity and accelerate industrial development.

Among the policies of the plan, the following deserve mention:

(i) In the area of technological improvement, the practical aspects of scientific and technical training will be actively promoted and technical research will be encouraged;

(ii) Advanced foreign technical knowledge will be introduced into the Republic of Korea where appropriate;

(iii) Public understanding of modern technology will be promoted through a positive programme for the dissemination of technological information;

(iv) To ensure the successful implementation of the plan, the pertinent existing laws will be amended, or new laws enacted, or both, and technical development institutions and agencies will be either reorganized or created, as required.

2. *Research organizations*

Korea at the present time is concentrating mainly on accepting and utilizing the advanced know-how of industrialized nations. Consequently, there are few organizations doing work on technical research and development, but several engaged in extension work.

Korea has established a Technical Development Bureau with three division, namely Technical Administration, Technical Promotion and Technical Research. The existing governmental research organizations in the field of industry and mining are:

(1) The National Industrial Research Institute, Seoul, whose task is to develop industrial techniques under the supervision of the Ministry of Commerce and Industry. This Institute has under it an inorganic chemistry section, an organic chemistry section, a ceramics section, a textile section, a mechanical engineering section and a food industry section.

(2) The Institute of Mining and Metallurgy, established in 1962, devoted itself to the solution of such mining and metallurgical problems as the study of coal washing. A study for the utilization of brown coal and anthracite; the processing of low grade wolframite; the treatment of finely ground ores of iron, copper, gold and silver; the study of floatation and steel-making from low grade iron ores.

(3) The Atomic Energy Research Institute possesses two atomic reactors which Korea set up with financial aid from the United States.

(4) The Geological Survey of Korea.

3. *Financial support*

Private investment in research is virtually non-existent in South Korea; research activities in private industries are extremely limited in scope, being largely confined to the testing or inspection of finished products. In 1961, the Government allocated a sum of about $2 million for the operation of national and public scientific and technological research agencies. However, only a small portion of these funds was allotted to fields directly linked with industrial activities.

It is owing to this absence of industrial research facilities that investment in research has been made a pronounced investment feature of the five-year plan for economic development; during the plan period, the over-all scale of research activities will be gradually expanded to promote rapid technical progress. It is also planned that specific responsibilities will be assigned to the various research agencies of colleges and universities, state research organizations, special corporations and private industries, and that special attention will be paid to the need for the modernization of research facilities and equipment to keep pace with the rapid scientific and technological progress of the world.

Since research investment by private industry has been negligible and is expected to remain so for some time to come, the following targets for investment in research by the Government have been set:

Year	*Research investment*	*Per cent of GNP*
1962	$ 4.9 million	0.30
1963	$ 5.5 million	0.32
1964	$ 6.7 million	0.37
1965	$ 8.3 million	0.43
1966	$10.4 million	0.5

4. *Incentives for industrial research*

To encourage private technical research activities and provide incentives for research, the following tax measures will be put into effect under the plan:

(1) As the outlay of research funds by private industry can fluctuate greatly with the business situation, research expenditures within certain limitations will be regarded as losses for taxation purposes.

(2) Contributions and donations for the development of science and technology will be considered as losses.

5. *Dissemination of technical information*

The encouragement of exchanges of information for the dissemination of scientific technology will be actively promoted under the plan, through a systematic reorganization of information agencies, the training of information specialists and the acquisition of advanced information and data processing techniques. For this purpose, a centralized technical information centre will be established to gather and consolidate technical information both domestically and abroad and distribute valuable or required information and data to appropriate individuals and organizations so as to promote the improvement of technical standards and the development of local industries.

12. Malaysia

1. *Resources and raw materials for industrial development and industry*

By virtue of the fact that Malaysia's wealth is derived primarily from the plantation and mining

economy of the former Federation of Malaya and from the forest resources of North Borneo, research activities are mainly channelled to the development of such products as rubber, tin and timber. Rubber is of particular importance to Malaysia's economy, employing the largest number of workers, producing the largest proportion of the national income and yielding the largest profits, with tin running a close second. Manufacturing industries are of some significance and are focussed on the processing of rubber, tin and foodstuffs; on the manufacture of consumer goods such as dry cell batteries, aluminium products, industrial gases, paints and varnishes, rubber and leather footwear, cigarettes, cigars, biscuits, metal cans, soap, confectionery, bricks, soya bean sauce, sago flour and sago pearl; on coconut oil milling and refining, pottery, glass and bottle making, motor vehicle assembling, cotton spinning, textile weaving, brewing and soft drinks bottling, pineapple canning, rattan furniture making and shipbuilding. The majority of these industries are conducted on a small or medium scale and can ill afford to invest in research and development work, so they depend chiefly on imported techniques already developed in advanced countries.

2. *Government research*

Government organization for scientific research is still rudimentary, because few funds are available to support an elaborate structure for scientific research; Malaysia has still to depend on research facilities provided by research organizations in other countries of the British Commonwealth. However, compared to the 1939 level, research facilities in Malaysia had expanded perhaps by 80 per cent by 1959.

3. *Research institutes*

To describe in more detail the existing research organizations related to industry, the Rubber Research Institute of Malaya, founded in 1925 and situated at Kuala Lumpur, may first be mentioned. The only private research body in the country, it is run under a director with funds obtained by an export cess on all rubber produced by rubber plantations, and maintains liaison with the British Rubber Development Board of London. The Institute includes soils, botanical, pathological and chemical divisions, an experiment station, a statistics section and smallholder's advisory services. It keeps in close touch with the larger estate companies such as Dunlop, Socfin and United States Rubber which have laboratories of their own for route quality control and fundamental research. It is engaged in such tasks as research on production, including that of the physical environment of the rubber treet, on the rubber plant and of its pests; research on products, including the latex and dry crude rubber, testing and modifying natural rubber to meet the consumer's needs: and technical advice to rubber estates and smallholders. The Institute is an autonomous organization established by government enactment.

The Forest Research Institute of Kepong, Selangor, was established in 1926 with the chief research officer as the executive head. It has several research branches, namely botany, ecology, silviculture, mensuration, entomology, chemistry, wood technology, timber research, timber mechanics, wood working, wood preservation, composite wood and seasoning. Its functions are to solve the basic problems of: (a) how to produce the greatest possible amount of economic timber in the shortest possible time under a sustained yield system, and (b) how to use the timber produced to the best possible advantage.

In the field of mining development, there exists a research laboratory established in 1955 and maintained by the Geological Survey Department at Ipoh, headed by a director within the Ministry of Natural Resources. It is financed by the Colonial Development and Welfare Fund and performs such tasks as preparing a geological survey of Malaya and assaying ores. The excellent physical plant consists of a new building and laboratories with valuable equipment from various countries.

4. *Scientific personnel*

Owing to the Government's policy of making Malaysia Malaysian, the expatriate personnel which staffed the research institution were sent away, with the result that, in 1959, every institute faced the problem of under-staffing, especially with regards to senior staff personnel. Though few qualified Malaysian are yet available, the situation is expected to improve as the universities and technical institutes pro duce more qualified Malaysians who chose scientific careers. But at present some of the institutes are finding it difficult to recruit Malaysians. A solution to the problem of under-staffing was partially found by recruiting a few nationals other than British through international organizations such as the FAO and the Colombo Plan.

5. *International aid*

Assistance from outside was sought by the research institutions by means of obtaining foreign scientific periodicals through an exchange of publications and by subscriptions. Prior to independence, important capital grants had been provided by the Colonial Development Fund operated by the British; while since the attainment of independence, increasing assistance has been obtained through the Colombo Plan. Aid to technical libraries, including the contribution of scientific works, has been provided by the Asia Foundation and the United States Information Service.

6. *Small industries research*

The State of Singapore has established a Technical Services Division, the object of which is to help

industry to achieve the maximum productive efficiency. The services are provided through the following sections:

1. Industrial Research Unit
2. Standards Unit
3. Light Industries Services
4. Management Development and Consulting Unit
5. Industrial Design
6. Technical Information Service.

The Industrial Research Unit was started in 1960 with a generous contribution of $370,000 from the New Zealand Government for the purpose of essential research and testing apparatus. The New Zealand Government also provided the services of two engineers to act as Director and Deputy Director.

The Unit is intended to render a wide variety of services as shown below:

1. It will help in the introduction, development and adaptation to local conditions of new processes and methods.
2. It will undertake research into locally available materials with a view to discovering new applications as well as improving current applications.
3. It will help in the transfer of laboratory processes to industrial purposes by undertaking pilot plant operations or otherwise.
4. It will undertake for local factories the testing of their raw materials and finished products to ensure that the right quality is being achieved.
5. It will help in the maintenance of accurate standards.
6. It will undertake to service a wide range of complicated optical, mechanical, electrical and electronic instruments for more sophisticated industries.
7. It will act as a repository of knowledge of the most recent development in science and technology in various parts of the world.

The main sections are (a) electrical and electronics engineering (b) mechanical engineering, (c) chemical engineering, (d) experimental workshop, (e) instrument repair and adjustment, (f) administration and cost accounting.

The present senior staff includes a Director, Mr. D. I. Woods (a civil engineer), a Deputy Director, Mr. F. D. Poper (an electrical engineer), two mechanical engineers, one electric/electronic engineer, one chemical engineer, three chemists, one physicist and an instrument technician.

The Unit has been strongly biased towards engineering. With increasing demands for chemical testing and for developmental research especially from the Economic Development Board, the Chemistry Section has been strengthened. An industrial chemist from Taiwan, Mr. Huang Tat Ho, has been seconded to the Unit to help and co-ordinate research work in the chemical sections.

Since its establishment, the Unit has already undertaken a large number of jobs for industry government departments and statutory bodies.

The Unit carries out testing, repairing and calibration of instruments, consulting and surveying in the electrical field. It also undertakes testing and servicing in the mechanical field. In the chemical field the analysis of various raw materials and products and their manufacture is undertaken. The Industrial Research Unit also helps the Standards Unit in the formulation of standards and specifications.

The Light Industries Services Unit has been set up and is being financed jointly by the Economic Development Board and the United Nations Special Fund. It has a comprehensive service programme to cater for the special needs of the large number of small manufacturers. The United Nations Special Fund will provide experts, purchase equipment for the laboratories, workshop and machine shop and train local personnel.

The Unit will have a full testing laboratory which will be closely associated with the proposed Food Technology and Research Institute to be established in Malaysia with the help of the United Nations Special Fund.

The Management Development and Consulting Unit has been set up to help industry to raise productivity and to train managerial personnel. An Institute of Management is being set up in Singapore.

It is proposed to establish an Industrial Design Centre for the promotion of a high standard of product design, packaging and marketing techniques, etc.

The Technical Information and Document Centre has also been formed and is being expanded.

13. New Zealand

1. *National organization for industrial research*

The central organization for the conduct of scientific and technological research is the Council of Scientific and Industrial Research under the Minister-in-Charge of the Department of Scientific and Industrial Research. The Council consists of a chairman and not more than eight members, two of whom are government officials, while the secretary of the council bears the executive responsibility.

Under the Council are twelve divisions dealing with animal ecology, the Antarctic, botany, crop research, entomology, fruits research, geophysics, grasslands, geological survey, plant diseases, plant chemistry and plant physiology. Laboratories, research stations and institutes relating to industrial research and development have also been established under the aegis of the Council, and include an applied mathematics laboratory, the Auckland Industrial Development Laboratories, the Dominion Laboratory, the Dominion Physical Laboratory, a fats research laboratory, a hops research station, a tobacco research station, an in-

stitute of nuclear sciences and a wheat research institute.

2. *Universities and research associations*

In addition to the research work carried out in the above institutions, the Council recommends annual grants for research workers in the universities and the eight incorporated research associations, so as to encourage research, frequently in subjects ancilllary to the main programme of the Department of Scientific and Industrial Research (DSIR). The grants, although met from the vote of DSIR, are outside the DSIR's regular programme of research and scientific services.

3. *Financial support*

The rate of expansion of research in New Zealand has been slow and it is significant that in 1961 the Government spent only half as much as Australia on research and development, representing 0.163 per cent of GNP. However, a policy for intensifying the industrial research programme has been adopted recently, and is accompanied by the provision of additional funds and facilities for research.

The expenditure arising from the activities of the Council is met by annual budgetary appropriations to DSIR. Moreover, the Council receives contributions by industry for specific projects undertaken on a contract basis, such funds being credited to a special deposit account.

4. *Scientific personnel*

In recent years there has been a steady improvement in the educational qualifications of the scientific officers. The proportion with doctoral degree increased from 8.8 per cent in 1950 to 25.3 per cent in 1963, and over 40 per cent of scientific research personnel now have a doctoral degree or a first-class honours degree.

5. *Documentation, information and liaison*

The results of research conducted by the research institutions are published by the Information Bureau, which is responsible for the editing and publishing of all the scientific publications of the Council and its subsidiaries. In addition, the Bureau provides a central library service which includes reference facilities, an index of scientific translations, cataloguing, interlibrary lending, book ordering and assistance to branch libraries. The Bureau also maintains a technical information section and a photographic section. Moreover, a scientific liaison service is maintained under the senior scientific liaison officer, who keeps in close touch with national and international scientific research organizations both at home and abroad.

14. Pakistan

1. *Plan for industrial development and research*

In Pakistan, the production activity of industries, both private and public, was greatly hampered by the lack of facilities for research relating to industrial materials and processes at the time Pakistan launched its first five-year plan (1955-1960). The plan therefore provided for the further development of the laboratories of the Pakistan Council of Scientific and Industrial Research (PCSIR), with emphasis on applied research, in order that, for the most part, the work of these laboratories should consist of obtaining the results of the latest and best investigations of research centres in other developed countries and adapting those results to local conditions. The laboratories engaged on industrial research are to be regarded as productive, functional parts of the country's industrial development facilities; and their results are to be measured by their direct effect in improving efficiency and increasing industrial output. However, investment in industrial research is not to be considered as solely the Government's responsibility; associations of manufacturers, co-operative societies and individual industrial firms are urged to make a beginning in conducting research in matters of special concern to them.

The second five-year plan (1960-1965) also stressed the need for industrial research on the nature and use of raw material resources, and for the development of new products, processes and improved techniques for the most economic use of these resources. In a review of the work of PCSIR, it was reported that a number of new processes had been developed to a stage where they were ready for commercial exploitation and that private enterprise would be engaged to develop commercially the processes evolved. The plan envisages the expansion of existing activities in industrial research, where possible in concert with private industries which are expected to finance research of special interest to them. While a number of research institutions related to the industrial field have been established in Pakistan, the question of industrial research does not appear to occupy the place it deserves. It is intended that, during the second plan period, an Industrial Research and Development Centre will be established in East Pakistan, to supplement research and advisory services by collecting and disseminating information on the latest technical discoveries and industrial development occuring in other countries.

2. *National policy and organization of industrial research*

A study of the industrial research organizations in Pakistan reveals that, as in most countries of Asia and the Far East, industrial research activities have been sponsored more by the Government than by private industry, in spite of the fact that industrial development has taken place to a very considerable extent as a result of the successive five-year plans. Thus, with the exception of the Fazl-i-Omar Research Institute, which was founded in 1926 with the object of promoting the study of science and development of industries in the country, the existing research institutes are all organized as governmental institutions.

PCSIR, founded in 1953 and located at Karachi, is the nerve centre of industrial research in Pakistan. It promotes the progress of science and its applications to the development of the national industries as well as the utilization of the natural resources of the country. The executive responsibility is borne by its chairman.

The main responsibility for scientific research in Pakistan is at present concentrated in five autonomous research councils:

1. The Agricultural Research Council.
2. The Medical Research Council.
3. The Council of Scientific and Industrial Research.
4. The Atomic Energy Research Council.
5. The Council for Engineering and Works.

Most recently, the Government has approved the establishment of a National Science Council, with advisory and co-ordinative functions, to avoid unnecessary duplication of scientific work under the various research councils. Its functions also include the rendering of advice to the Central Government on all matters connected with the development of scientific activities and on any particular issue referred to by the Government. In order to ensure a smooth inter-organizational relationship, the research plans submitted by the various councils to the relevant ministries, for budgetary sanction will also be referred to the National Science Council for scrutiny and advice. Once their budgets have been sanctioned, the responsibility for the implementation of the projects and policies would rest with the research councils without reference to the ministries. The ministries, which will be ultimately responsible for developments arising out of the results of research, will be closely associated with the various councils and their governing bodies through their high-level representatives on these bodies. The success of this scheme will ultimately depend on mutual understanding and adjustment, and a spirit of co-operation between the constituent sectors of the organization.

3. *Research institute under PCSIR*

The research policies of the PCSIR, which represents the major research potential of the country, have weighed quite heavily in the direction of applied research. This is reflected in the over-all pattern of the various multi-functional laboratories of the Council and their research divisions.

I. *Central laboratories*

1. Physical Research and Testing Division.
2. Chemical Research Division, including paints and plastics.
3. Biochemical Research Division.
4. Drugs and Pharmaceuticals Research Division.
5. Building Materials Research Division.
6. Fuel Research Division.
7. Engineering Division with workshop and pilot plant section.

II. *East regional laboratories*

1. Natural Products Research Division (covering work on minor forest products and biological, agricultural and industrial wastes).
2. Fuel Research Division.
3. Food and Fruit Technology Division.
4. Leather Research Division (principally providing facilities for investigations into the tanning material resources of the region).

III. *West regional laboratories*

1. Metallurgical Research Division (including ore dressing and testing of minerals).
2. Industrial Fermentation Research Division.
3. Oils, Fats and Waxes Research Division.
4. Glass and Ceramics Research Division.
5. Food Technology Research Division.

IV. *North regional laboratories*

1. Indigenous Drugs Research Division.
2. Fruit Technology Research Division.
3. Mineralogical Research Division.
4. Wool Research Division.

In drawing up this plan, emphasis has been laid on regional development in respect of the raw material resources of the two wings of the country. Because of the widely different character of the raw materials and the problems associated with their industrial utilization, it was considered necessary to duplicate some of the research divisions in the laboratories located in East and West Pakistan.

The laboratories of the PCSIR do not normally undertake work on standardization, but they co-operate with the Pakistan Standards Institution to promote standardization and quality control in industry.

4. *Utilization of the results of research*

The PCSIR has evolved a practical procedure for converting its laboratory processes into industrially feasible propositions. According to this procedure, a process worked out in the laboratory is subjected to pilot plant investigations to study and establish the economics and optimum working conditions of the process. In most cases, this necessitates the designing and fabrication of equipment to suit the operational requirements of the process for commercial production.

In the course of pilot plant investigations, the various resulting products are sold on a 'cost plus' basis, to assess the reactions of the consumers in respect of their price and quality, and to make necessary improvements in the light of that assessment. Such a procedure, though somewhat protracted, ensures the acceptability of the research products in the market and attracts prospective industrialists for their commercial exploitation.

In order to expedite the utilization of its processes by industry, the Council has considered it appropriate to set up its own Research Utilization Committee, which deals exclusively with processes evolved by the Council. The offers received from industrialists, in response to public advertisement through the press, are

scrutinized by the Research Utilization Committee, and the processes are leased out to suitable parties on the basis of their trade and industrial experience, against the payment of a nominal premium and royalty. Following the allocation of a process, the Council gives every possible assistance in setting up the factory, and operating it in the initial stages of production, with the help of its own technical personnel, who were associated with the development of the processes.

Through this procedure, it has been possible to convert many laboratory processes into successful industrial enterprises. Reference may be made in this connexion to processes for the production of Vitamin 'A' concentrates from shark liver oil; a whole range of low-cost building materials; tack-free paints from semi-drying oils; hardboards and insulation boards from agricultural wastes; and low-cost petrol gas plants for schools and colleges. All these and other processes, which have reached the commercial utilization stage, are based on indigenous raw material resources and are covered by patents.

5. *Scientific personnel and training*

As to the present situation in Pakistan in regard to the availability of scientific personnel, it may be mentioned that a sizable middle layer of such personnel has been provided through a scheme of overseas training launched shortly before independence. Subsequently, an increasingly large number of overseas training facilities has been offered under the Colombo Plan and other international assistance programmes. In addition to this, the ASIR has instituted a liberal scheme of study leave for its scientific staff after a period of satisfactory service, to enable them to improve their qualifications in the various fields of science and technology. In a number of cases, Pakistani students who run short of funds while studying overseas on their own, are provided with financial assistance by the Council against an undertaking to serve under it during a period of three to five years after the completion of their studies.

With regard to the training of personnel to meet the growing demand of research, teaching institutions and industry, the Government of Pakistan is considering a proposal based on the recommendations of the Scientific Commission, to send out annually 100 graduates in science, engineering and medicine for overseas training during the next five years. The total period of training of these graduates will be three to four years, and their fields of training are to be determined by the requirements of the various research councils they will serve after the completion of their studies. In addition to this measure, increasingly greater emphasis is being laid on raising the standards of teaching and research in the scientific departments of the universities. With improved facilities in scientific equipment, staff, and budgetary allocations, they will be in a position to offer opportunities for training at the doctoral level, which is at present quite rare. Furthermore, a plan for the training of laboratory technicians for glass blowing, precision tool making, high vacuum maintenance, and for carrying out routine laboratory operations is under consideration.

6. *Co-operation with university research*

The national research organization charged with the co-ordination of scientific activities of the country should do everything possible to assist the universities in their teaching and research programmes. This can be done, for instance, by seconding their own staff for lecturing in their specialized fields to university classes, making their research facilities available to university students for their doctoral level work, and financing specific research schemes, initiated by active scientists of the universities or allocated to them on a contract basis. It was with these possibilities in mind that the various laboratories of the CSIR in Pakistan were located in the close vicinity of university campuses, and every effort is being made by the CSIR to extend its assistance and co-operation to the universities, without in any way encroaching on their freedom. The National Science Council is putting particular stress on such co-operation between autonomous research organizations and the universities, and the Atomic Energy and other research councils are striving to follow this directive.

7. *Financial support*

The annual expenditure on research at present, in Pakistan, is only 50 million rupees. The gross national product is 15,000 million rupees per year. This expenditure on research, when compared with other countries both developed and developing, is very low. It is hoped, however, that with the re-organization of universities and the research councils, expenditure on research and development may be increased to one per cent of the national gross product in the course of the next ten years.

8. *Commodity research institutes*

Among the research institutes dealing with research in specific products may be mentioned the Institute of Cotton Research and Technology at Karachi and the Pakistan Central Jute Research Committee, each institute being headed by a director. The former carries out research work on cotton production, fibres, textiles and marketing, while the latter undertakes agricultural, technological and economic research on jute.

9. *Dissemination of information and publication*

The results of research are disseminated to the interested public through such publication as the Pakistan Journal of Scientific and Industrial Research, Science and Industry, the Science Chronicle, Annual Reports of PCIR, Quarterly Journal of the East Regional Laboratories and the Annual Report of the Pakistan Central Jute Committee.

PCSIR has under its supervision the Pakistan National Scientific and Technical Documentation Cen-

tre (PANSDOC) established as a documentation centre for all branches of science and technology.

15. The Philippines

1. *National policy and programme of industrial research*

The rapid development of post-war science and technology in the advanced countries of the world also affected the national economic policies of developing countries. It was realized that high standards of living were invariably connected with those countries where science and technology had been supported and developed. The Philippines was affected in a similar way. It recognized that it was only through industrialization that the natural resources of the country could be developed and that this could be done only through self-help, by improving and up-dating the country's own scientific research resources and through adaptive acquisition from industrially advanced nations.

The Philippines Congress, in 1954, therefore created the Committee on Science and Technology in the House of Representatives and the Committee on Scientific Advancement in the Senate. This brought about direct contact between the scientists and the policy-makers. In July 1958, the Science Act was enacted to integrate, co-ordinate and intensify scientific and technological research and development and to foster invention; and to provide funds for this and other purposes.

This Act created the National Science Development Board (NSDB), whose function was to co-ordinate, integrate, and support the scientific and technological research activities of the Government and private enterprise in the country. The eleven-member Government Board, under a chairman with cabinet rank, acts as the policy-making body on scientific matters. It prepares the national programme for the science and technology sector, and submits it to the Philippine National Economic Council for inclusion in the overall social economic development programme of the Government.

The Act also created the Philippine Atomic Energy Commission (PAEC) and reorganized and expanded the old Bureau of Science into the present National Institute of Science and Technology (NIST). These two research agencies are the main functionaries of the NSDB, the former for nuclear science and the latter for conventional sciences. Thus the NSDB hopes to eliminate wasteful duplication of research, to provide financial assistance and direction of research efforts, to promote 'science consciousness' and improve science education, and to provide more efficient technical services to private industries — all aimed at solving the basic problems of the country concerning food, clothing, shelter and medicines.

The development and scope of scientific research in the Philippines have been characterized by considerable shifts in orientation and direction. During the pre-war period, it was oriented more toward survey and fundamental research, while during the post-war period it has become interested more and more in applied research. Industrial research and development programmes of NSDB and its agencies. Great emphasis is laid on applied research and pilot plant work leading to the commercial utilization of the results of research. However, pure research (and especially in dustry oriented fundamental research) have not been altogether neglectd. Fundamental research has remained the major activity of the universities and the National Research Council of the Philippines.

In the light of this policy, the NSDB has adopted the following guideline for the priority areas of industrial research in the formulation of the country's five-year research and development programme planned for 1962-1967:

Area I.: Research directed at increasing the utilization of natural resources to produce substitutes for imports.

Area II.: Research directed at upgrading and expanding the nation's export products.

Area III.: Research dirceted at processing the waste products of agriculture and industry to develop consumer goods and export commodities.

Area IV.: Measures directed to develop scientific and technological manpower, and to promote social science research and 'science consciousness'.

2. *Financial support*

Likewise, in the system of priorities for the allocation and distribution of research and development funds provided by the Government, the NSDB adopted in July 1963 the following guidelines:

Funds for applied research and development work in

Agriculture and natural resources	20%
Industry and engineering	20%
Medical and allied science	10%
Food and nutrition	10%
Pure and fundamental research	5%
Training of scientific manpower and research administrators	40%
Promotion, publication, survey, conferences and other services	5%

(i) Financial support for the NIST comes primarily from government appropriations which have averaged three million pesos, about US$770,000 at the present rate of exchange, during the last three fiscal years.

(ii) A survey conducted by the NSDB in 1960 on the research expenditures of private industry showed that private industrial firms spent 7.7 million pesos for research and development activities, 6.9 million pesos of which was for applied research and development and

750,000 pesos for basic research. Research and development expenditures in the government sector on the other hand totalled 29.5 million pesos, of which the University of the Philippines, the Department of Agriculture and Natural Resources, the NSDB and the Department of Health were allocated the greater portion.

3. *Measures to promote industrial research*

In order to create industrial research consciousness among the private industry and governmental sectors, the following policies and responsibilities of the NSDB and its agencies were established:

to encourage and facilitate the active participation of the domestic and foreign sectors in furnishing financial, technical and other forms of assistance for scientific and technological activities;

to initiate and bring about the establishment of standards, quality control measures and documentation facilities;

to co-ordinate and promote co-operation in the scientific research and development activities of government agencies and private enterprises;

to establish a system of priorities for scientific and technological projects;

to initiate and facilitate arrangements for scientific and technological aid from domestic private sectors and foreign sources and for the exchange of information among local and foreign institutions and scientific investigators.

to offer to, and accept from, the public and private sectors specific project proposals of scientific and/or technological research and development, and to provide the appropriate financial, technical and other support thereto;

to establish and provide incentives, including financial and technological support, for the establishment of scientific and technological centres;

to disseminate the results of scientific and technological research and to encourage their practical application;

to grant scholarships in mathematics, science, technology, and science teaching to deserving citizens;

to grant financial or other awards, bonuses or prizes to deserving scientific, engineering and technological researchers and inventors;

to pay additional compensation to scientific, engineering and technological researchers and inventors employed in the Government or its subdivisions under such terms and conditions as may be most conducive towards the attainment of the maximum efficiency in scientific research and studies;

to extend travel grants for scientific and/or technological purposes; to send delegates and/or observers to scientific and technological conferences or conventions; and to promote and assist scientific and technological conference and conventions in the Philippines;

with the approval of the President of the Philippines, to appoint not more than five science attaches with the proper scientific background and, whenever necessary, to send scientific and technological missions abroad;

to approve and facilitate the procurement of radioactive materials and instruments for use in nuclear laboratories, and to issue licences for the use of radio-active materials.

4. *Incentives to industrial research*

Various incentives are given by the Government for the promotion of industrial research in the country. Grants, bequests and donations given to NSDB and its agencies as well as to the universities of the Philippines for the purpose of aiding scientific and technological investigations are exempt from taxes. Similarly, all funds contributed to the support and maintenance of various scientific foundations are tax-free. The Government has also waived import duties and other taxes on scientific apparatus, equipment and other facilities.

Other scientific policies adopted by the NSDB are: the giving of awards, bonuses and prizes to deserving inventors and researchers; the giving of financial grants for the printing of scientific and technical publications; the giving of travel grants to Philippine scientists for attendance at international science conferences; and the giving of financial assistance to educational institutions for the undertaking of basic research.

5. *Testing and standards*

The NSDB and its agencies, especially the NIST, provide close collaboration with private industries and manufacturing plants by giving them testing and standardization services and technical enquiry and field consultation services. The NIST has its own testing and standards laboratories for quality control. These laboratories also support the Philippine Standards Association in the formulation and establishment of standards for locally manufactured products.

6. *Scientific personnel*

To meet the scientific manpower requirements of the country, a five-year programme has been outlined covering the following areas:

a) Regional summer science institutes for selected elementary teachers from both private and public schools.

b) Regional summer science institutes for selected secondary science and mathematics teachers, also from both public and private schools.

c) Graduate study and training scholarship programme.
d) Undergraduate study and training scholarship programme (science talent search).
e) In-service training programmes of personnel of the NSDB, NIST and PAEC.
f) Establishment of the Philippine Science High School (free scholarship basis) for selected boys and girls.

7. *Government research organizations*

The principal agencies of the Government undertaking industrial research and development projects are the following: (a) National Institute of Science and Technology. This Institute is under the supervision of the NSDB. Its predecessor was the former Bureau of Science established on 1 July 1901 and reorganized in July 1958 into the present NIST. Its buildings and the nature of its functions and research activities may be gleaned from its organizational structure composed of the following eight technical operating units: (1) Agricultural Research Centre; (2) Biological Research Centre; (3) Food and Nutrition Research Centre; (4) Industrial Research Centre (biggest unit consisting of the Chemical Research and the Engineering Research Laboratories (5) Medical Research Centre; (6) Tests and Standards Laboratories; (7) Scientific Instruments and Technical Services Division and (8) Science Decumentation and Library Division. It has also an Administrative Division and a Legal Division.

The NIST undertakes mostly industry-oriented research projects dealing with problems involving the discovery or improvement of industrial processes, consumer products, or equipment designs, or the like making maximum use of indigenous raw materials. It gives a technical consultation service to private industrial establishments and other government agencies.

Its research activities can be approximately distributed thus: basic research — 5 per cent; applied research — 70 per cent; and development — 25 per cent. Through the NSDB, it undertakes contractual research and technical consultation services for interested private enterprises, and collaborates with universities and private industries in giving on-the-job or preservice technical laboratory training to selected graduates or graduating students in the science and engineering. It assists other government agencies such as the Bureau of Commerce in the establishment of local product standards.

8. *Nuclear research*

The Philippine Atomic Energy Commission was created by the Philippine Science Act of 1958 as the implementing agency of the National Science Development Board on atomic matters. In the formulation and development policies for atomic energy, surveys and studies are made concerning the undertaking of research designed to contribute to the solution of pressing agricultural, medical and industrial problems, and with promotion and co-ordination of atomic energy use and application in the country. Surveys and studies are also made on the availability of the needed manpower and the specialized facilities and equipment.

The most important applications of radio-isotopes in research, outside the PAEC, are being carried out by the University of the Philippines (U.P.), the Philippine General Hospital Radioisotope Laboratory, the U.O. College of Agriculture, the Bureau of Plant Industry and the National Institute of Science and Technology.

9. *University research*

The University of the Philippines (U.P.) is the biggest government-supported university. It established in 1959 its Office of Research Co-ordination. This office implements research and development projects through its Natural Science Research Council and Social Science Research Council, both policy-making bodies for research activities whose members (representatives of the various U.P. colleges) are appointed by the U.P. Board of Regents. Most of the industrial research is undertaken by the Colleges of Agriculture and Forestry (at Los Banos, Laguna province), Pharmacy, Engineering, and Fisheries. The executive responsibility of the U.P. is exercised by its President, a presidential appointee. Other colleges undertake mostly basic research. Its wide campus is located in Diliman, Quezon City. This Institute also undertakes industrial research in the fields of agriculture, pharmacy, engineering and fisheries.

10. *Commodity-research institute*

Apart from the research organizations under NSDB, there exist the following governmental institutions devoted to research work on specific lines:

(a) The Philippine Coconut Administration (Philcoa) at Manila, which is engaged in copra improvement research, so that copra can command higher prices for producers and strengthen its competitive position in the world market.
(b) The National Development Company, Manila, carries out industrial research on rice oil extraction, fertilizer deposits, pulp and paper, food canning, leather board, cassava flour projects, and so on.
(c) The Philippine Sugar Institute (Philsugin) at Manila is financed by taxes received from sugar producers. It serves the sugar industry by undertaking research work on the agricultural and industrial phases of sugar cane and its products. It also co-ordinates research work with the University of Florida, United States, on the utilization of sugar cane bagasse for paper and paper board manufacture.
(d) The Forest Products Laboratory at Manila, under the Bureau of Forestry, devotes its

research activities to forest products research to help industrialists obtain lumber, stimulates the manufacture of exportable wood products, and determines the suitability of forest species as raw materials for pulp.

(e) The Division of Fisheries Technology at Manila carries out research work on the utilization of marine products as well as on the preservation, canning and processing of fresh fish and other aquatic products.

11. *Research by industry*

(i) The San Miguel Brewery, Manila, conducts research on the glass and brewery industries;
(ii) Elizalde and Company, Manila, conducts research on the hemp rope making industry;
(iii) A. T. Sauco and Company, Manila, conducts research on the pharmaceutical industry;
(iv) Cia. de Celulosa de Filipinas, Manila, conducts research on the paper industry;
(v) The Philippine Manufacturing Company, Manila, conducts research on the fuel industry.

12. *Scientific personnel*

The recruitment of highly qualified and well-trained scientists and technologists has remained one of the problems of science advancement in the country. Hence the need for a more intensified programme of developing the necessary high talent manpower for the sustained industrialization of the Philippines.

There is a dearth of well-trained scientists and technologists of the graduate levels who can pursue independent research work or can serve effectively as team or project leaders. This problem is partly due to the higher salary scales offered to talented young researchers by private industry and more so to the very high salary rates offered to foreign scientists mostly hired by contract through bilateral agreements. A concomitant problem is the emigration of young Filipino scientists, mostly trained abroad, to other countries where they can get better salaries and opportunities.

To help solve these technical personnel problems, the NSDB has launched its five-year technical manpower training programme on four levels of education and training improvement and up-grading of science teaching in the elementary and secondary schools, and scholarship grants at the undergraduate level and graduate studies level (M.Sc. and Ph.D.) in local and foreign universities.

Another incentive given to attract better men to work in the research laboratories was the raising of the pay scale (now ranging from 3,600 to 15,000 pesos per annum for scientist/technologist levels) of technical personnel of the NSDB and its agencies to twice those given in 1959. The University of the Philippines has also raised the salary scale of its faculty.

A recent amendment of the Science Act of 1959 exempts researchers from compulsory retirement at the age of sixty-five (they can continue in the government service if physically fit) and from the rules and regulations of nepotism.

The yearly observance of Science and Technology Week, started in 1961, is another science incentive activity. Outstanding Filipino scientists are given plaques of merit. The truly productive scientists are awarded the "Presidential Distinguished Science Service Medals.". In 1963, cash awards were also extended.

13. *Training programmes*

The NSDB and its agencies have intensified their in-service and pre-service training programmes to attract talented young men to work in research and to provide skilled technicians for private industry in such fields as chemical, biological, food, and engineering research, analytical chemistry, and in the uses of radioisotopes in industry, medicine and agriculture. Foreign-sponsored fellowships are being made use of to enable technical personnel already in the service to study or train abroad. Vocational courses in glass blowing, fine mechanics, optics and electronics are being offered by the NIST in its Scientific Instruments Repair Centre, a UNESCO-assisted project.

14. *Utilization of the results of research*

The main objective of the principal industrial research establishments of the Government is to pass on the results of their applied and development research projects to the ultimate users in the country, most particularly to the private industry sectors. It has been a standing governmental policy that research agencies supported with public funds shall only undertake the first three main aspects of research: (a) fundamental (b) applied, and (c) development (pilot plant scale). The Government refrains from competing with private entrepreneurs.

Thus, after the pilot plant stage, the NSDB and its agencies, for instance, apprise interested private investors or manufacturers of the techno-economic feasibility of commercializing the results of its development projects. This is usually done through personnel liaison, through writing or through technical information bulletins, these extension activities being performed by a co-ordinating team in the agency, or by the public relations and field extension unit of each research agency. If results are patented, (such patents, as in the case of the NIST, are in the name of the actual discoverers but assigned to the agency, the interested private parties who express a desire to exploit the patent and are capable of commercializing the patents or results, will be given the right to license the patents under contract and to pay the agency not less than one per cent of the gross sales of products per year for a certain period of time. One example of this government-private industry joint venture is the integrated processing of the coconut pilot project of the NIST. The inventors are given a share of the royalty.

Technical consultation services are part of the activities of Philippine research agencies. Each office also maintains publication and information units. The NIST publishes the well-known Philippine Journal of Science and other science information publications.

The NSDB organized early last year nine regional science promotion offices in the entire country, manned by field extension personnel who disseminate the results of research, give demonstrations, and promote science consciousness in the rural areas. In the international scene, it had established foreign stations and detailed science attaches in Washington, D.C., United States; Bonn, West Germany; and in Tokyo, Japan.

15. *International aid*

The Philippines, as a member of the United Nations and its specialized agencies, has received foreign technical assistance mostly in the form of equipment, expert services and study or training fellowship grants in the various disciplines of science from agencies such as the Colombo Plan, United States AID, UNESCO, FAO, WHO, UNICEF, IATA and from the governments of friendly countries such as West Germany, India, Israel and others. The Philippines research reactor was given to the Government through a bilateral agreement with the United States Government.

16. Thailand

1. *National science policy*

Thailand is in the process of evolving a definite national policy concerning plans for industrial research and development. Meanwhile, it is left entirely to the various government departments engaging in scientific research to formulate their own policies. Industrial research and development are not included as a separate item in the first five-year plan (1961-1966) of national economic development nor in the national industrialization policy, though the second five-year plan (1967-1971) may contribute something towards this direction.

2. *The National Research Council*

Thailand established the National Research Council in 1956. In 1959, the scope of the Council's activities was broadened. The present National Research Council has the Prime Minister as its President. According to the National Research Council Act B.E. 2502 (1959) the Council has the following functions:

1. to make recommendations to the Council of Ministers on national policies and programmes relating to research;
2. to establish and support research groups and institutes in accordance with instructions from the Council of Ministers;
3. to co-ordinate research activities in various branches of science;
4. to promote and support public and private research;
5. to register investigators and scholars who are engaged in various branches of science;
6. to establish an additional division of the Council;
7. to assign investigators to work on research projects;
8. to suggest ways and means of financing research;
9. to make grants and awards in support of research;
10. to co-operate with other countries in research;
11. to submit an annual report to the Council of Ministers.

The National Research Council may obtain the following income for grants and awards in support of research.

1. Government allocation.
2. Fees charged by the Council.
3. Interest on investment and other income from property under the control of the Council.
4. Gifts from various sources.

Since its establishment, the National Research Council has taken some initial steps in starting several primary projects including a survey of research work in Thailand, the compilation of a register of scientific and technical personnel and a survey of the scientific equipment available in the country. The Council has given research grants to university professors as well as several graduate fellowships to individual graduate students.

It was recommended by an expert of the United Nations Bureau of Technical Assistance Operations (BTAO), who made a survey on scientific research in Thailand from June 1960 to June 1961, that the National Research Council constitute a body which could undertake scientific research and investigation by itself. The major research activities of the Council were to be carried out through three research institutes, still to be established an Agricultural Research Institute, a Medical Research Institute and a Scientific and Industrial Research Institute. Facilities for these three institutes were to be transferred from various governmental departments and laboratories. These recommendations met with opposition, and were replaced by new proposals.

Following new recommendations made by the same expert, an Applied Scientific Research Corporation of Thailand was established in May 1963 instead of a change being made in the structure of the National Research Council. As planned, the activities of the Corporation will be grouped into:

1. a Technological Research Institute,
2. an Agriculture Research Institute,
3. a Medical Research Institute,
4. other auxiliary groups including a Documentation Centre, a National Standards Laboratory, and an Instruments Repair and Calibration Centre.

The scope of the Research Corporation is very broad. It covers all phases of the country's activities, including industry, agriculture and health. The Research Corporation will make available scientific knowledge based on local experimentation, which would be helpful for the development of Thailand's economy. The Research Corporation will establish close links with the universities and other agencies of the Government and will foster co-operative research arrangements and projects designed to strengthen science in existing institutions. It will help the university staff to engage in research and to provide training to post-graduate students. At present the Corporation is concerned mainly with the building up of research facilities and staff for the Technological Research Institute. An agreement has been signed between the Thai Government and the United Nations Special Fund to organize this Institute in Bangkok. Under this agreement, the Thai Government will contribute $2,167,000 towards the expenses of the Institute during the first five years while the United Nations Special Fund's contribution will amount to $846,300. This latter contribution will consist of the provision of eight experts to advise on the setting up of the Institute, and the provision of equipment for the various laboratories. The experts will have senior Thai personnel as counterparts. In addition, eight United Nations fellowships, each of one year's duration, will be awarded to Thai nationals. The Thai Government will contribute the land and buildings and will pay the salaries of local personnel and the operating expenses of the Institute.

3. *Industrial research establishments*

The establishment of the Research Corporation does not interfere with the scientific research activities of governmental departments and laboratories. On the contrary, these activities are further reinforced and the movement towards an over-all policy for industrial research and development is thereby facilitated and accelerated. For example, a new laboratory for pulp and paper has recently been established in the Department of Science, Ministry of Industry. Similarly, the Textile Development Centre of the Department of Industrial Promotion of the same Ministry has broadened its scope and activities.

It can be said that most of the scientific research performed at present is still carried out in the governmental departments and laboratories.

At present there are no institutions solely responsible for industrial research. The newly established Technological Research Institute of the Applied Scientific Research Corporation of Thailand and the Department of Science of the Ministry of Industry are supposed to deal with industrial research more than any other institution.

(a) *Department of Science*

Although the Department of Science does not devote itself entirely to industrial research, it has successfully carried out a number of industrial research projects. It is one of four departments of the Ministry of Industry, and was started in 1891 as a small laboratory of the Department of Mines and Geology. It was transferred to the Royal Mint in 1903. Over the years, the laboratory widened its functions and finally became the Department of Science in 1934.

(i) *Organizational structure*

At present the Department is under the control of a Director-General and consists of six divisions further subdivided into sections:

1. Secretary's Office
2. Division of Chemistry
3. Division of Biological Science
4. Division of Physics and Engineering
5. Division of Analytical Chemistry Training
6. Division of Research

(ii) *Functions*

The functions of the Department of Science are:

1. to serve as the Government central laboratory and a scientific centre which will satisfy all government requirements in technical matters;
2. to assist general public and private industries in technical matters including analysis, technical information and consulting services;
3. to certify locally-manufactured products so as to promote their popularity.
4. to control the quality of foods and beverages for taxation purposes and for the public welfare;
5. to train scientific personnel in analytical chemistry to meet the Department's own needs and those of government and private agencies.

(iii) *Industrial research projects*

Since its establishment, the Department has completed several industrial research projects, for example:

1. development of alum production;
2. quick processes for the manufacture of fish sauce and vinegar;
3. fruit-juice concentrates and preservation of food;
4. oils and fats including rice-bran and kapok-seed oils;
5. preparation of special glue and starch paste;
6. drying oils;
7. raw materials for ceramic wares;
8. paper pulp from various sources including rice straw and bagasse;
9. water repellent used in shaving board production;
10. improvement in the quality of solar salt.

In the past few years, the Department has increased its capability to serve the public and industries. Several necessary instruments such as an infra-

red spectrophotometer, a gas chromatograph and a polarograph have been acquired. The Material Section of the Division of Physics and Engineering which has been testing Portland cement for some time is now in the process of installing several material-testing instruments. The installation of food processing equipment is also in progress in the Division of Biological Science and will be used for research in food processing on a pilot-plant scale.

With these increased facilities and capability, it is felt that the Department of Science should be able to serve industry better than it can now. A plan is therefore under study as a result of the National Economic Development Board's suggestions. The Board has made three recommendations concerning the Department of Science:

1. New and expanded activities of the Department of Science should be related to industrial development and assistance to industrial enterprises.
2. The Department of Science should prepare a programme to expand its service functions, such as testing and certification, to industrial establishments.
3. Specific projects of an applied research nature should be continued in the Department of Science and related to industrial requirements to the extent feasible.

(iv) *Financial support*

All research expenses of the Department of Science are included in the annual budget appropriation of the Department by the Government (US$407,000 for 1964, $355,000 for 1965 and $457,000 for 1966). The Department charges some fees from private bodies for services. All the earnings are credited to the Ministry of Finance. Occasionally, the Department's research workers receive small sums of money as an award from the industry that makes use of their research work.

(v) *Staffing*

Staffing is a serious problem that the Department of Science and other scientific institutions have to face. Relatively few of those who graduate in science have the ability to carry out satisfactory research work. Those who have research qualifications are usually foreign-trained graduates with higher degrees. The Department of Science has a number of such scientists. Unfortunately, most of them are engaged in administrative work.

(vi) *The application of results of industrial research*

The results of the industrial research of the Department of Science are made available to interested parties. The Department sometimes also provides training to personnel of private industry who wish to utilize the Department's facilities. In many cases the extension service is made through the Department of Industrial Promotion or other appropriate government departments.

(vii) *Documentation, publication and information services*

Industry may acquire general technical information from the library of the Department of Science, which is the largest technical library in Thailand. The services of this library have proved invaluable for industries as well as other government and private organizations. Compilation of bibliographies, a search for the answer to a particular technical question, and the procurement of publications are normal services of the library. Occasionally, the library gets assistance from research scientists of the Department in giving such services.

For the publication of the Department's own work, there are two reports: one issued annually and the other quarterly. In these reports brief discussions of the Department's work are presented.

(b) *Technological Research Institute*

The Technological Research Institute is the first institute of the Applied Research Corporation of Thailand. At present the Institute is under the control of a Director-General and is supported financially by the Government and the United Nations Special Fund.

There are four groups in the Institute:

1. Industrial Chemistry Group:
   carrying out research primarily on agricultural and plant products.
2. Mineral and Metallurgy Group:
   to work on extraction metallurgy, mineral chemistry and foundry technology.
3. Textile and Fibre Group:
   responsible for research on the production, extraction and improvement of local fibrous plants.
4. Construction Material Group:
   studying indigenous materials and industrial waste for use as building material, new construction methods and formulating a code of practice.

(c) *Research by industry*

Research in industry is not known in Thailand. Even large undertakings, such as cement manufacturers, starch factories, paper mills, sugar factories, breweries and chemical plants, do not engage in scientific research. Their laboratories are mainly for process and quality control.

4. *Incentives for industrial research*

Incentives to research such as tax exemptions, subsidies or grants, have not yet been offered by the Government. Scientific equipment and supplies are, however, exempted from import duty. A number of research grants and fellowships are given to professors and students, but these are not enough to promote the proper incentive needed in research.

VII. SUMMARY OF INDUSTRIAL RESEARCH IN THE COUNTRIES OF THE ECAFE REGION

The role of industrial research as an instrument for industrial development and economic progress is widely recognized. There is, however, an urgent need to collect data on research, such as expenditure on research in different sectors, the number and type of research organizations and institutes and their programmes, the availability of scientific and technical personnel, the utilization of the results of research and their impact on development. Surveys of research and training methods and library, information and documentation services are also necessary. In the absence of these data, it is difficult to assess the status of industrial research in these countries. ECAFE could initiate action to collect such data as would be useful in the exchange of research experience and information, in making arrangements for seminars and in the utilization of experts and fellowships to optimum advantage.

While there is a general appreciation by the governments of the ECAFE countries of the need for the promotion of science and technology, this has yet to crystallize into national policies on science and its utilization. Active measures to assure the social and economic status of scientists, the establishment of training and research institutes, the survey of raw materitals and resources and the offering of incentives to industries for the application and undertaking of industrial research, have yet to be taken in most cases.

The concept and requirements of industrial research for a country bear a close relation to its stage of development and economic growth. In the ECAFE region, the level of development is uneven. Japan and Australia are well advanced, while India, Pakistan and the Philippines are midway and Outer Mongolia, Western Samoa and Afghanistan are almost at the starting level. The immediate requirement of industrial research for these countries is for adaptive research, to enable them to utilize already developed technology in relation to their raw materials, minerals, agricultural and natural resources. The particular type of institute (unifunctional or commodity-based specialized research, multi-functional dealing with a number of fields, or discipline and field-oriented) will depend on the stage of development and specific requirements of the country concerned. Some of the countries already have one or more of the different types. For the developing countries a multi-functional institute, dealing with a variety of subjects and providing a wide spectrum of services, may have a definite advantage. It should provide facilities for surveys, industrial research and process development related to major raw materials and proposed industries, pilot plant studies and economic and technical feasibility data. It should also make available analytical, quality control and standardization facilities, and have operational research and consultancy expertise. This would enable it to service a broad spectrum of industries and their multifarious requirements.

The most important problem facing developing countries in the ECAFE region is the shortage of scientific and technical personnel. Arrangements for the teaching of science and for training facilities for personnel who are to perform advanced scientific and technological research must receive a high priority. The paucity of resources, finance and foreign exchange have stood in the way of proper equipment, instruments, technical literature and library facilities being provided to the institutes. For their mutual interest, the research institutes should develop close working relations with the universities and institutes of technology. This would ensure the best use of equipment, instruments, etc. and of the services of competent scientific personnel.

While the major responsibility for industrial research will rest with the governments for a number of years, efforts should be made to associate the user departments and industrial firms closely with the framing of research programmes. Financial participation on suitable terms by firms interested in pilot plant development usually ensures the speedy utilization of the results of research. Industrial firms may be encouraged to make use of research in government-sponsored institutes or to undertake research by themselves, by liberal tax exemptions, provision for risk capital and subsidies for approved projects. The setting up of co-operative research associations by industries or by the government giving financial support with a matching grant and organizational help should be encouraged.

It would be a great advantage if the limited available resources of men and materials could be used to the greatest possible extent by co-operation among the countries of the region. There are real and serious difficulties, in practice, in the way of setting up regional industrial research and development institutes. ECAFE could, however, take the initiative in promoting the wider utilization of documentation services set up in some countries with UNESCO assistance, by extending their use to the neighbouring countries in the region. ECAFE could also consider encouraging the setting up of commodity-based research institutes on a co-operative basis, by a number of interested countries in the region coming together for joint use of the results of research. Joint training courses, seminars and symposia and the exchange of visits and training on a bilateral basis could be initiated and assisted by ECAFE. Studies on data on research, research management and the pattern of research organization if undertaken by ECAFE, will further enhance its usefulness to the countries of the region.

International aid by United Nations agencies, regional agreements and bilateral arrangements have been of undisputed benefit to the developing countries. It has enabled them to obtain equipment, instruments

and technical literature to equip their research institutes; provided experts to train their scientists; and given opportunity to local scientists to avail themselves of fellowships and scholarships in advanced countries. This help is valuable, and should be stepped up in a generous measure. Simultaneously studies should be undertaken to evaluate the impact of international aid on the industrial research and development of the recipient countries. This would provide data on the ways in which the aid could be most useful.

The recommendation of the Group would necessitate the organization of machinery for collecting data and information and initiating action to promote regional co-operation. The setting up of a 'Regional Council for Industrial Research and Technology under the aegis of ECAFE would be helpful in the discharge of these functions.

VIII. RECOMMENDATIONS

On the basis of its studies and discussions, the Expert Working Group on Industrial Research offers the following recommendations. Some others are interspersed in the text of this report. Some of these are meant for particular consideration by the governments of the countries concerned, while others are for the attention of ECAFE.

1. Recommendations for the attention of the governments

National science policy: Considering the role of science and scientific and industrial research in the industrial and economic development of the countries, it is recommended that promotion, encouragement and utilization of science be declared as subjects of national policy and that measures be taken to strengthen the scientific base.

Scientific and technical personnel: For industrial research and development, the most important requirement is competent scientific and technical personnel.

It is recommended that measures be taken to extend science teaching and experimentation in schools, and to improve standards of training and research in the universities and institutes of technology. To have adequate numbers of scientists available, facilities for training should be suitably expanded. Projections of the needs for scientific and technical personnel should be made to determine the future requirements for industrial research, teaching institutes and for industries.

Status of the scientist: To enable scientists to make their maximum contribution to research and development, they must be assured a high social status, adequate emoluments and promotion opportunities and a congenial atmosphere and conditions for work.

It is recommended that suitable measures to assure the status, emoluments and service conditions of scientists be taken. They should also be given encouragement by way of merit promotions, improved financial prospects and awards for good work.

Data on research: In most of the countries of the region, data on the number of scientific and technical personnel in different fields of specialization, expenditure on research and allocation of resources to different sectors of research and development, the quantum of international funds spent on fundamental research and industrial research, and the impact on the economy of results of industrial research, are not available. These data would be required for the planning of industrial research, and would also be useful in policy-making.

It is recommended that survey, planning and statistics groups be attached to the science departments and organizations concerned to compile data systematically on scientific research.

State responsibility for industrial research and development: In the absence of the willingness of industrial firms to undertake and support industrial research, the major responsibility for initiating and supporting it devolves on the governments.

It is recommended that the responsibility for the organization and financing, on a long-range basis, of industrial research organizations and institutes should be shouldered by the State.

Autonomy of research institutes: Financial support to institutes for scientific and industrial research in the developing countries will have to be provided by the governments for a number of years. In the interest of creative research, it is essential that the functioning be not subjected to the administrative rules and procedures usually applicable to government departments.

It is recommended that scientific and industrial research institutes should function as autonomous organizations under the direction and control of their Scientific Advisory Committees and Executive or Governing Councils.

Research programmes of institutes for industrial research and development: Since most of the countries have meagre resources of technical personnel and finance, it is essential that the research effort be productive of results capable of industrial application. For this there should be the closest possible assocation of the user in research programmes; the research projects should be directly related to the programmes and plans of industrial development in the country.

It is recommended that the closest possible association and participation by user departments, industries and planning authorities should be assured with the programmes of industrial research programmes of industrial research and development in institutes.

Utilization of the results of research: The results of research should be available at a level at which they can be utilized by industrial firms. They should include pilot plant data, design and engineering data and market assessment and economic feasibility studies. Arrangements should also be made on suit-

able terms to encourage financial participation by industrial firms in pilot plant studies.

It is recommended for speedy utilization of the results of industrial research, the institutes should have arrangements to provide design and engineering, market studies and economic data. Financial participation by the potential user should be attempted where possible.

Incentives to industry to use indigenous research: In most developing countries, industrial firms prefer to import foreign know-how and technology, particularly since it has the advantage of assured performance and often includes the supply of equipment, training of personnel and financial participation. Special incentives will have to be offered to industrial firms to compensate for possible loss in the utilization of the results of indigenous research, or in undertaking their own research and development.

It is recommended that the governments should give special incentives by means of liberal tax exemptions, risk capital and subsidies to industrial firms who may utilize indigenous know-how or take steps to develop their own industrial research efforts.

Co-operative research associations for industry: Co-operative research associations for industry have proved a particularly useful tool in developing industrial research by small- and medium-scale industrial firms. They receive financial and organizational support from the government and undertake research for use by the entire industry.

It is recommended that particular encouragement be provided to firms willing to form co-operative research associations and to undertake research.

Consultancy services: In most of the developing countries, there are no consulting engineering firms for design and engineering, market feasibility studies, and so on. Industry also lacks competent technical personnel to give advice on process development and "trouble-shooting" within the factories. The association as consultants of research institutes and research scientists with factories would also give them a better appreciation of the problems of industry.

It is recommended that to further industrial development, institutes for industrial research and development and scientists should provide consultancy services to industrial firms.

Research institutes and universities: Universities are the producers of scientific and technical personnel. To ensure high standards of science teaching, training and research it will be useful if the universities are manned by highly qualified and competent personnel. Co-operation between the research institutes and the universities would ensure the best use of costly equipment and of the limited number of scientific personnel available. Research institutes could also offer fellowships to deserving students in the universities to encourage research training.

It is recommended that the closest possible association in teaching and research and the use of equipment be encouraged by the research institutes and the universities.

Documentation and information services: For the efficient discharge of their duties, it is essential that scientists should be provided with scientific documentation in the form of journals, abstracts and facilities for getting microfilm, reprints, translations, and the like.

It is recommended that industrial research institutes should have arrangement for efficient documentation and library services for their scientific personnel.

2. Recommendations for ECAFE

Collection of data on scientific research: In order to plan its scientific activities better and make its assistance more effective, ECAFE should have information on the industrial research institutes, research programmes and projects, scientific and technical personnel, and resources and facilities available.

It is recommended that ECAFE organize the collection and maintenance of data on research in the countries of the region. If necessary a special section for the purpose may be created within ECAFE.

Documentation services: Some countries in the ECAFE region have documentation institutes set up with UNESCO assistance. Since modern documentation facilities are a costly proposition, it is recommended that ECAFE may approach the countries concerned so that documentation facilities from these organizations could be made available to scientists and institutes in neighbouring countries. ECAFE could help in organizing and co-ordinating such arrangements.

Commodity-based co-operative research institutes: There are a number of countries in the ECAFE region which have common raw materials of importance to their economy, such as rubber, tea, and petroleum.

It is recommended that ECAFE take the initiative in organizing commodity-based co-operative research institutes for the countries having common interest in research on particular materials.

Science administration: It is felt that in the interest of creative research a scientific institute should be free from the administrative rules and procedures of government departments and should function as an autonomous organization.

It is recommended that ECAFE organize a study of the functioning of industrial research and development institutes in the countries of the region to make possible a choice of the optimum pattern of administration.

Research Council for Industrial Research and Technology: In order to enable ECAFE to help the countries of the region with respect to industrial research and technology and to enable it to take up the recommendations listed above, it is essential that it should have a regional council devoted to the subject of industrial research. Such a council will be able to co-ordinate research programmes by providing informa-

tion on research being carried on in the developing countries. The council could also help by arranging visits by scientists from one country to another and encouraging bilateral arrangements for technical training and mutual assistance.

It is recommended that urgent steps be taken by ECAFE to set up a "Regional Council for Industrial Research and Technology" to be under its aegis.

International aid: International assistance has been of great benefit to the region. Several agencies of the United Nations have helped developing countries with library and documentation facilities, technical literature, machinery, equipment and instruments, and by providing the services of experts and fellowships to scientists for specialized training and higher education in the advanced countries. Assistance has also been provided through regional plans and bilateral agreements between the advanced countries and the developing countries.

However, the linking up of assistance in the form of equipment with the compulsory posting of experts has caused some difficulties. The question of the usefulness of the expert arrangement with the recipient countries also requires careful study. The problem of the scientists sent for higher training staying in the advanced countries and their consequent loss to the developing countries also deserves attention.

It is recommended that a study be undertaken by ECAFE on the impact of assistance under international and bilateral agreements to the countries of the region.

PART II. INDUSTRIAL DESIGN IN COUNTRIES OF THE ECAFE REGION

INTRODUCTION

As far as can be ascertained this is the first time that industrial design has been included in such a conference. In view of the many misconceptions with regard to the function of industrial design, it is not possible to present a set of condensed recommendations without some details of what it is, what it sets out to achieve, and the social patterns which may reject or accept it as a worthwhile function which can assist in economic development.

These social patterns are strongly influenced by one of man's most powerful driving forces — his need for individualism or self-expression, irrespective of his social level or nationality.

Industrial design reflects this expression in a mass form but it is often considered to be too controversial for objective discussion and analysis. The opportunity to present a case for its inclusion as a necessary function of industrialization is therefore appreciated.

I. GENERAL ECONOMIC BACKGROUND

Throughout the countries of the ECAFE region[1], the superimposition of industrialization on communities which are essentially agrarian or, in the case of Singapore for instance, largely devoted to commercial activities, raises problems of design and consumer acceptance for which there is no real counterpart in western countries.

Industrialization in Western countries has developed apace with social evolution, thus allowing changes to take place over many hundreds of years. Consequently existing industrial thinking is the product of many generations, which has allowed for gradual specialization.

This means in effect that in the case of product development, when a designer undertakes a project, all the background information of economics, distribution, manufacturing capacity and so on is available or has been worked out. The designer becomes a specialist and can therefore concentrate with well defined and specified limits. In addition, consumer habits and preferences have matured over many generations and social patterns are distinct and definable. This facilitates the development of products which can match the consumer preferences of the various social levels.

Again, the evolutionary pressures, culminating in the free enterprise system of production and commerce which is characteristic of most Western countries, by the very stimulus of freedom of choice has produced an intensely competitive market for the products of industry.

A classic example of this is the extraordinary number and variety of motor vehicles available to the buying public. In this competitive battle amongst rival manufacturers, every selling factor has been examined and exploited. Factors such as these have given rise to comparatively new studies and new functions, probably stimulated by three factors:

Mass sales of identical articles
Intense competition
Freedom of choice

The interpretation of what people really wanted became the function of specially trained people, and so industrial design was born as an essential unit of industry. Throughout its evolution, it has always been nourished by a vast stream of inventiveness and independence of thinking.

It is probable that this independence has been assisted by the ever-growing tendency in the family units to grant equality and free expression of personality to children at an increasingly early age.

Finally it must be remembered that the Western countries have a general homogeneity of religion, social behaviour, dress, and appearance, and indeed, similar climate conditions. This means that product development can be undertaken for consumers who have similar expectations and buying habits.

When these factors are measured against tropical countries, and those of Asia and south-east Asia, marked differences are apparent.

There is virtually no background of industrial thinking, the majority of people have been brought up in a village structure, the family pattern is one of rigid

[1] Japan, Australia and New Zealand are industrially well-developed, and capable of developing their own designers. Therefore, throughout this discussion the ECAFE region refers more particularly to the tropical areas and those where industrialization is in the early stages of development.

integration, religious teaching is more passive — more philosophical — less active climate conditions generally tend to reduce physical activity and there are no great seasonal fluctuations, and so on.

Superimposed upon this structure is the tremendously important conditioning factor of colonization by the French, the British, the Dutch, and others. These influences have, in their more active periods, imposed an obedience upon local people which is still apparent in the schools and government institutions.

These influences have combined to produce a pattern which conditions the product development techniques to be adopted.

The complicating issue is that the people of developing countries almost invariably copy the products of the more industrially advanced countries whether they are suitable or not.

Motor cars with plastic trims and styling designed for temperate regions feel like mobile furnaces in tropical areas, and owing to the construction and choice of materials, deteriorate rapidly. Metal refrigerators with egg and butter compartments and gadgetry deliberately designed for rapid obsolescence, are prized by people who don't use butter or cheese and indeed do not store foodstuffs to anywhere near the same extent as Western people. Yet it is certain that if refrigerators were specially designed for tropical conditions with due regard to the eating habits of the local people and in the materials best calculated to withstand deterioration, they would be initially rejected on the principle that it is not what people need but what they want that they buy.

Examples are legion of goods and sructures and even wearing apparel which are in no way suitable for the people of these developing countries, but which are not only desired, but demanded.

In countries such as the United States, whose economy is geared to rapid change and almost unlimited choice, giving the people what they want, irrespective of cost, is perhaps forgivable. In countries which are trying to raise the living standards of the people, the manufacture of unserviceable products is economically quite unsound.

It is interesting to note that in the Economic Bulletin for Asia and the Far East published December 1964, the following comment was made:

> "Backwardness in institutional patterns has, for example, been an inhibiting factor in the transplantation of modern economic organizations or techniques. Rudimentary infrastructure, inadequate in the extreme for encouraging industrialization, has made economic ventures both costly and risky. High illiteracy and low educational standards have limited the capacity of the economy to absorb these new ideas and techniques particularly on account of the scarcity of skilled labour or managerial skills."

Nevertheless there has been some activity in many ECAFE countries to promote industrial design techniques. However, this activity, in relation to the over-all assistance that has been mounted, has been infinitesimal. It is significant that these efforts have taken root and, given further encouragement and direction, could become a highly profitable investment.

This then is the background against which the function of industrial design must be assessed and developed.

II. WHAT IS INDUSTRIAL DESIGN?

Before specifically defining the function of industrial design, it is necessary to appreciate the fact that economic development is dependent not only on the available material resources, but also on the creative talents that can be organized. These talents which in their final manifestation give tangible expression to ideas, are revealed in the arts, and in the more practical activities of architecture, applied graphics such as advertising art, textile designing, packing and so on, in the design of capital equipment and consumer commodities or products, in interior designing and product display, and so on.

Industrial design is generally accepted as that applied to three dimensional consumer goods, as distinct from textile designing, packaging, and interior designing. It involves the utilization of the elements of line, shape, colour and texture through an intimate knowledge of form, function and materials for the purpose of producing salable goods. A qualified designer must therefore combine a training in graphic arts with a working knowledge of materials, production methods and marketing, and must be capable of expressing his ideas in colour renderings, models and engineering specifications. He should also have a general knowledge of consumer psychology, and be able to apply his creative talents to the planning of feasible and salable products for any given environment.

Although packaging design has generally been considered a graphic art, the trend is towards including this as a subsidiary to industrial design.

Textile designing is a special field of graphic arts, and is generally separated from industrial design.

However, in view of the special requirements of ECAFE countries and for the sake of clarity, it is included in this report together with packaging design.

In addition and for the same reasons no distinction is made between handicraft and mass-produced articles.

Therefore, industrial design is involved in such industries as the manufacturing of household appliances, lighting, furniture, ceramics, tableware, metal and glass ware, general packaging and food processing, textiles, gift ware and handicrafts, and also in the manufacture of tools and equipment and so on.

One of the comparatively new branches of industrial design is 'ergomatics' or human engineering. Ergomatics is applied to seating, handling of appliances, tools and equipment to facilitate ease of usage and reduction in fatigue. This is an increasingly

important factor in the development of consumer products and equipment.

III. IS INDUSTRIAL DESIGN NEEDED?

Whether industrial design is an essential factor in the industrialization of developing countries poses an important question. If industrialization is needed in these areas, and a great deal of expert thinking has combined to say unanimously that it is, then all the functions that go to make industrial enterprises successful must obviously be necessary.

Since industrial design, as an integral part of manufacture, is one of these functions, it must therefore be important to the production of commodities irrespective of where the enterprises are situated or whether they produce handicraft or mass-produced articles. (See appendix 1)

The real question is not whether it is important but how important it is, and when it should be introduced.

Products which are considered necessary and for the production of which manufacturers are sponsored and developed, must compete with important products right at the outset. Areas like Bangkok, Singapore, Malaya, Manila and Hong Kong, for instance, have access to the most up-to-date commodities from all parts of the world. Their people are intensely 'overseas brand conscious', and will therefore not accept products just because they are locally made. Such products will therefore need a high salability rating if they are to survive.

This has been repeatedly demonstrated, as many local manufacturers can testify.

On the question of products for export, the natural growth of industries inevitably brings them into the export field. Inferior or cheaper products may be exported on the basis of cheap labour but this is a diminishing expectation. Certainly it is difficult to export products which have been copied from developed countries, where, because of experience and capacity, they can be made much more efficiently.

Again, in contrast to countries like the United States, New Zealand, or Australia, for instance, where the exploitable wealth allow them to support high cost products from local industries, many ECAFE countries just cannot afford these luxuries. This means that at the outset, if the cost of living is to be kept within reasonable limits, the products of industry must be kept within the purchasing capacity of the people.

On the question of local talent, ECAFE countries, even more particularly than Western countries, must be careful in balancing industrialization against the human resources.

It may be just as important to develop the reservoir of local knowledge inherent in the indigenous people, as it is to put up steel mills, automobile factories and satellite cities, and so on. This knowledge, combined with inventiveness and a sense of pride, develops that confidence which is essential to a country's well-being.

Industrial design, by stimulating such attitudes, can indicate the industrial development which appeals to the traditional social and economic make-up of the people, and assist in establishing correct priorities in industry. These priorities must prevent the invitation of foreign imported patterns, which inhibit indigenous and appropriate lines of development.

Therefore industrial designers should be brought in at the very inception of programming and, as part of the pioneer productive force, they must be classified as one of the implementers of the development process, deserving at least as much priority as the managers, administrators, and similar personnel.

A pertinent comment made on behalf of one of the leading United States corporations stated:

> "Good design expands markets by providing new and better products. It adds value. It awakens the public. It changes the character of the market, moulds it, expands it. Without the designer, we are stopped cold in our progress."

In the post-war expansion of Japanese and Australian consumer goods, it is significant that the rapid increase, both in the home market and the export market, was preceded by intense activity at the government level in promoting better product design, packaging and presentation. This activity, which resulted in the establishment of design and product centres, academic and professional institutions, has steadily increased because it is regarded as essential for the maintenance of industrial growth.

It is not the purpose of this exercise really to determine the degree of importance of industrial design. It is sufficient to prove that it is important, not at some future time but now.

IV. FACTORS INHIBITING THE GROWTH OF INDUSTRIAL DESIGN

(1) In reviewing the factors which affect the growth of industrial design in the ECAFE countries, it is essential to explain in clear terms what is meant by industrial design.

In highly industrialized countries there is a general acceptance of the term among industrialists. In Asian countries such as Malaysia, Thailand, India, Indonesia and the Philippines, the function is not really understood.

The common definition among the more enlightened people in these areas is that it deals with drawing designs of products, packaging and posters, and so on. Seldom is it related to manufacture, social behaviour, marketing, economy of materials, or usage. This leads to the curious assumption that it is only necessary to draw a picture of a product and someone will make it. In other words the only requirement is a general art training. Nothing could be further from the truth.

It cannot be stressed too strongly that if there is any confusion in the scope and position of any industry or function of industry, there is no basis for

assessing or estimating its value. This means that it has little chance of acceptance in the industrial sector.

This confusion concerning industrial design does exist in many ECAFE countries and unless it is eliminated by organized education and promotion, little progress can be made.

(2) Another factor is the general attitude with regard to the type of assistance required to develop local industries.

The sole objective of industry is to manufacture products and to sell them; in other words, to produce salable items. This certainly does not mean products or goods which are produced without any considerations of quality, serviceability or cost. This is generally accepted among all concerned, yet there seems to be a curious reluctance to give more than fleeting attention to the technical factors of skill and product know-how. On the other hand, there is a common and very understandable tendency to place very great importance on general management principles, business economics, and productivity.

While effective management is a very essential requirement of business ventures, it is nevertheless interesting to observe that the history of almost 90 per cent of established industrial enterprises clearly reveals that they were not started by trained managers, but by technicians: people who worked with their hands, and who were more interested in making a product than in sitting behind desks. Management councils came later when the industry had expanded sufficiently to need them. Therefore, in areas which are still struggling with the elementary principles of making something, too much initial concentration on the more romantic fields of management tends to draw interest away from the basic essentials of making tools and dyes, designing and developing products, keeping the machines running and so on. Of all the papers, seminars, conferences, lectures and demonstrations that have poured into developing countries, by far the greater effort has been devoted to the theoretical fields of management and general feasibility studies.

For people who may not yet have passed through the handicraft stage of industrial development, this concentration to the exclusion of product development and production techniques produces the impression that once the factory shell is erected and a theoretical feasibility study is compiled, products will produce themselves, provided there is a management structure operating strictly in accordance with line control.

In this climate, the technical functions of research, product development, toolmaking, production engineering and creative product thinking are looked upon as secondary aspects of industralization. The great industrial enterprises of the more advanced countries were built on creativity, imagination and technical skill. These are the ingredients for successful enterprises anywhere, and they appear in well-thought-out products that serve and enrich the community.

It is in this area that industrial design belongs, not as a function that devotes itself to pretty pictures, but as one that tries to express technical skills in a highly salable and useful commodity. It is therefore important to develop these principles with at least the same energy as that given to any other section of the industrial complex.

Mr Lee Kuan Yew, Prime Minister of Singapore, made a very pertinent observation during the opening of the 1965 Festival of Sport when he pointed out that there is an inclination to have too many managers and not enough performers. This is equally true in industry.

(3) In considering the aspects of natural creativity and imagination, it is axiomatic that progress stems from dissatisfaction with existing methods and a sense of adventure. If these attributes are not cultivated, progress in any sector will be difficult. They must therefore be fostered at all levels.

In the industrial sector of the more tropical countries which basically has its roots in existing handicraft and cottage industry enterprises, there is a noticeable reluctance to venture into new areas of activity. Traditional methods handed down from generation to generation, are strictly adhered to, and diminishing salability is accepted with resignation and inaction.

In addition, and for reasons which have been previously discussed, this prevailing hesitation retards initiative, creativity and enterprise.

To break down these barriers, schooling and training systems must be made more flexible and due recognition granted for expressions of inventiveness and originality, otherwise the climate will not be suitable for developing the type of thinking necessary for the growth of the creative functions of research and product design.

(4) On the question of the impact and progress that can be made by experts who are recruited for particular assignments, it is proposed to illustrate the problem by citing a true case history.

The terms of reference stated that the duties of the expert covered a training programme for producing counterparts to a senior industrial design level, and for instructing local industries in the functions of product design, packaging and presentation. Therefore, in simple terms the industrial design problem would appear to resolve itself by firstly getting manufacturers interested in raising their product standards and by training efficient counterparts to carry on the programme.

The first problem of locating suitable staff was extremely difficult for the following reasons.

With functions such as management, general engineering, industrial research, cost accounting, economics, production control, etc., the recruitment of personnel is very much simpler because Colombo Plan and other training schemes including local academic

courses have managed to supply at least a workable number of trained operatives.

When it came to industrial design, local training facilities did not exist. Indeed, apart from a very small number of enlightened people, the function had never been heard of, or at best only in very vague terms.

This introduces the question of status, which is very important to many people in ECAFE countries. A sure way of gaining status is to concentrate on obtaining diplomas and degrees, which carry with them an excessive weight of authority.

In some public services, for instance, it is almost impossible to gain promotion without academic training, because it is considered that a certificate is more important than ability.

Therefore, in selecting a profession, it is obvious that the choice will fall on those categories which can give the maximum status and therefore the greater financial return. Industrial design obviously has no rating in these conditions, being largely a combination of art and industrial and social experience, built on a foundation of natural talent for inventiveness, sensitivity to form, texture and colour, and for which until very recently there were few overseas training facilities except in established design studies, architectural schools, and in factory drawing offices.

This means that when the expert attempts to find suitable trainees, he faces not only a natural local resistance to taking on a profession which does not automatically offer a diploma, but also the equally formidable task (in twenty-one months) of creating competent senior design technicians from people who have only natural talent to offer.

When this is added to the problem of getting industry to think in terms of product and packaging improvement, the expert may be justified in feeling that he is living on borrowed time.

In undertaking the assignment, the expert does not know whether he will be allowed to continue beyond the contract period. He therefore tries to push through some sort of a crash programme which he hopes will act as a foundation for future development. These programmes usually end up in frustration. It is like commissioning a painting, when the artist knows that he may achieve little more than to prepare the canvas and block in some of the background.

In short, it is impossible with technical functions like industrial design, which cannot be effectively promoted by reports and recommendations — only by visual demonstration because it is a visual activity — to make the required impact under at least four or five years. Anything less is a palliative which inhibits successful achievement.

(5) In many western countries, the acceptance of industrial design as an essential function has only been achieved after very severe setbacks, the most serious being the inability of the available designers to improve the products of industry. In Australia, and this applies to other countries, the status of industrial design for ten years following the Second World War was at a very low ebb. The reason for this was the fact that all sorts of unqualified people calling themselves industrial designers were taking on assignments which they were unable to solve, with the result that industry temporarily rejected industrial design as being too vague, too costly, and a waste of time.

Industrial design is a specialized study, and to inflict untrained or semi-trained people on industry is suicidal. Experience in South-East Asia countries strongly indicates that this is not understood. After the most rudimentary training, local people are expected to turn out new salable products, which is just not possible.

It cannot be overstressed, therefore, that this attitude represents the greatest single threat to the successful integration of industrial design into the industrial complex.

What has been discussed so far concerns general attitudes of local behaviour and thinking, as a prelude to the task of specifically indicating the type of assistance programmes required in addition to those which are already in existence. However, it is important to understand the existing social patterns, in order to develop programmes which can take root and flourish.

V. GENERAL RECOMMENDATIONS

In evaluating suitable design formulae, it must be assumed that administration machinery for assisting local industries to sell their products on the local and export markets will be made available if assistance should be necessary. On this basis the following recommendations are put forward.

1. *Public relations facilities*

Trained lectures and propagandists should be made available through the regional centres to present an effective story to government departments, existing training institutions, manufacturers and to the public, explaining the purpose of industrial design, its value to the economy and the way in which it should be used and fostered.

The media for presenting an effective case are available to every country no matter how underdeveloped: the radio, the local press, seminars, and so on.

Interest in this function of industry must be generated in order to raise its status to the correct level and to produce the most suitable climate for its growth, otherwise subsequent effort will struggle in an atmosphere of local indifference.

2. *Supporting institutions*

Two types of institutions which can play an important role in assisting the development of industry are building centres and product and design centres.

These centres are primarily developed to act as shop windows for available commodities, so necessary for the stimulation of local and export trade, and as information centres for the industrial and building complex. In particular, building centres, which reflect the activities of perhaps the largest single industry in any country and most certainly the one which continues to expand, embrace a very high percentage of the consumer products. For this reason they are more active even than product centres.

However, both are an integral part of all industrialized countries and are usually sponsored both by government and private enterprises.

Apart from the more direct economic and industrial considerations, they fulfil an important secondary role, as pivots around which design and presentations standards are evaluated and developed.

In this capacity they are indispensable institutions for design and product training.

It is not proposed to elaborate on the techniques for their establishment and maintenance, as an enormous amount of reference material is available, but it is strongly recommended that they be considered as a necessary facility for trade and industry and the upgrading of design standards.

It may be interesting at this juncture to make some reference to the very successful Product and Design Centre of Singapore. This project is a pilot scheme which will develop into an extended operation in the future. At the moment it is subsidized by the Economic Development Board and about 50-60 per cent of its running costs are paid back in the form of rentals for space. It is further proposed in the near future to commence a building centre to support the building trade and building supplies from either local or overseas sources.

In view of the work already undertaken and the reactions of the manufacturing and business interests, there could be considerable merit in establishing an enlarged unit in Singapore which could become one of the ECAFE regional centres for the purpose of developing trade and industry throughout the south-east Asia sector, for the training of local designers, and for the dissemination of design assistance.

Singapore has decided geographical and economic advantages which could make it an ideal locality for a permanent regional exhibition and design institute. It is a multiple cultural area which has successfully integrated four languages and four societies. It is one of the world's great commercial crossroads, and a flourishing international trading centre.

Thus the establishment of a centre in Singapore could cater for the needs for Malaysia, Thailand, Viet-Nam, Cambodia, and Burma.

A second regional centre could be located in the eastern sector by expanding an existing organization in either the Philippines, Hong Kong, China (Taiwan), or the Republic of Korea.

In a similar manner the western sector covering India, Pakistan and Ceylon could be organized by expanding existing facilities.

It is proposed, however, that Singapore be regarded as the priority pilot project, and that the other centres be developed as the need arises.

These centres would not interfere with established local institutions which would be assisted in every way possible by the regional centres.

Existing institutions such as primary and secondary schools, universities, architectural institutes, departments of trade and industry, and the like, local newspapers and government communication channels can be organized to spark off interest in the development of local products and better standards of product design and presentation.

Another effective medium is exhibitions of the best products of the more developed countries. Design centres and departments of trade throughout the world have the machinery for undertaking these exhibitions and they should be fully exploited.

3. *Training of local designers*

It is hardly likely that local industries or those which are establishing themselves will have all the technical or financial resources to train their own designers. This must therefore be undertaken on a government level, and a sufficient number of overseas experts recruited to cover all aspects of training, both theoretical and practical.

Specifically it is suggested that, in order to conserve the available resources and to avoid duplication, the three regional centres be equipped to train local designers, who would be sent to these centres on the recommendations of resident industrial design experts.

After a minimum period, selected candidates would undergo the complete three-year course of training, including a specified period either in overseas or local factories. (Candidates who after the minimum period show no further aptitude would be sent back to their own countries).

By the above method, resident experts could be relieved of the task of fully training local counterparts, and could thus devote their full attention to assisting industries. Qualified returning local designers, after an initial settling in period, could then take over from the resident experts.

This plan in no way alters present arrangements, to the extent that local institutions and centres could continue to serve the best interests of the community, but it does provide a system of co-ordinated activity which is lacking at present. It also suggests that where necessary industrial design experts be recruited to act as local advisors.

It is most important that if industrial designers are to operate effectively, they must be fully and properly equipped. Any suggestion that all that is needed is to recruit some graduates, give them a few months' instruction and then expect them to serve industry efficiently must be avoided at all costs.

Industrial design ability presupposes understanding of aesthetic values, inventiveness and ability to draw, and an understanding of social patterns. Unless the trainee demonstrates these characteristics, his further training is a waste of time.

4. *Recognition of ECAFE trained designers*

As mentioned previously, it is important to establish a professional qualification for designers who have attained an approved level of efficiency.

This will enable competent designers to enjoy the status which their efforts warrant and to compete on equal terms with those in other professions.

This standard can be recognized by establishing ECAFE chapters of an approved overseas design institute which would have the right to confer membership on approved applicants trained through the regional centres.

5. *Regional co-operation*

To obtain the maximum return for the financial and human effort required to establish industrial design, and to pool the available talent, it is recommended that design seminars be organized on a yearly basis, so that selected designers and experts can bring their problems together and exchange techniques and viewpoints.

These seminars are important, and it should be remembered that almost every developed country sends delegates to the International Council of Societies of Industrial Design which holds a regular biannual congress. The ECAFE yearly conferences could link with this international body.

It is suggested also that, coinciding with a seminar period, an annual exhibition of selected products developed in ECAFE countries be arranged and if necessary displayed in other centres throughout the world.

It is essential to build up a pool of available infomration and to overcome any feeling of isolation, which is a definite retarding factor.

To implement these recommendations and to develop a permanent identity with regard to industrial design activities it is desirable that an officer be delegated to co-ordinate all design activities throughout the ECAFE area, including the regional centres proposed in recommendation 2.

6. *Improving export standards of locally manufactured products*

The foregoing remarks and recommendations have been put forward for the purpose of establishing and upgrading product design to a profitable level. It is therefore obvious that these should also influence export standards. Furthermore, correct promotional techniques distributed through the regional and local centres will do much to bring the views of the buyers directly to the manufacturers.

There are, however, additional aspects which are directly related to the export problem.

On the subject of presentation, for instance, packaging and labelling specifically designed for overseas conditions, effective brochures and price lists are noticeably absent. There is a definite reluctance to invest in these necessary sales aids which stems from lack of finance on the one hand, and absolute ignorance on the other. This makes it difficult to mount an effective export drive.

It may be necessary, therefore, to offer export incentives in the form of taxation rebates, both in the volume of exports and the cost of promotion.

Another factor which is not directly related to product design is freightage which is sometimes heavily loaded against developing countries. To overcome this inequality, a government subsidy is indicated.

Although the following remarks are not directly related to export standards, their inclusion here is considered to be justified.

It is apparent that the tendency to copy overseas designs will limit the areas in which local products can be marketed. Furthermore, a study of the products available at competitive prices will indicate that the most successful products will be those which have local individuality in design, in materials and in presentation. For example, there is a world demand for teak which is an indigenous product. Therefore, it is probable that instead of shipping the raw material, suitably designed products could be made locally and freighted in a "knock down" condition. Rattan is another material for which there is a continuous world demand and which grows exclusively in tropical areas. Curing, processing and conversion into finished products is highly intensive.

It is recommended that materials which are indigenous to ECAFE areas should be re-examined and design and production techniques formulated to develop products which have the appeal of exclusiveness and originality.

7. *Summary of recommendations*

To sum up the foregoing general recommendations, the practical solution is to establish a regional centre in Singapore as a pilot project under the direction of a project manager, to be followed by other centres at a later date.

This centre will display the selected products of the central ECAFE countries, and will include building materials and equipment both from the above countries and from importing countries where these items are not available from local sources, and also a design training unit and information service.

It will, like the other regional centres, act as the pivotal point for the central area for the implementation of the recommendations already referred to, and which are specifically listed here.

1. Regional promotion.
2. Extension of local centres to include workshop facilities and the services of resident design experts.

3. Establishment of regional training facilities with a right to issue approved diplomas.
4. Development of copyright protection.
5. Establishment of regional seminars and product displays.
6. Establishment of "good design" awards and correct export standards.
7. Distribution of trade enquiries and technical information.
8. Improvement of export standards.

Note: A regional centre developed as a self-supporting, self financing operation is outlined in appendix 2

Appendix 1

Digest of Information Pertaining to Industrial Design in the ECAFE Region

From the available correspondence there seems to be some confusion in defining handicraft and mass-production industries, and the type of design assistance required for the one or the other sector.

In theory a line can be drawn by establishing the degree of handiwork involved, but in practice it is very difficult to determine where one leaves off and the other commences. However from the point of design assistance this does not matter.

Both enterprises attempt to produce salable products which must compete in the market place, irrespective of whether they are handsome or mass-produced. They must express the fundamentals of sales appeal, workmanship and fitness for the purpose. These qualities are the special concern of the industrial designer. The only difference is in the techniques to be adopted.

On the subject of handicraft or cottage type industries, there is an almost nostalgic desire to perpetuate them in some developing countries owing to the mistaken idea that they will provide continuous employment and revenue. This has never been supported by economic fact because invariably commodities which are produced more simply will eliminate those which have no other advantage but the expression of tedious and time-consuming hand labour.

Handicraft commodities should be encouraged only where they cannot be made by any other method. Custom-built articles for which there will always be a limited market are dependent on individual supply and demand.

It is therefore suggested that indigenous handicraft industries be assisted, not in perpetuating archaic methods, but in simplifying their methods, in eliminating wasted labour, and in increasing salability.

Official requests have been received for local centres of industrial design in the cottage industries from Malaysia, China (Taiwan), Burma, Thailand, and the Philippines.

An extract from the report of the Working Party on Small-Scale Industries to the Committee on Industry and Natural Resource[1] is given below:

Problems and measures connectd with design and techniques of production

The Working Party observed that good design involves the harmonious blending of the aesthetic and the functional and that, while to a certain extent this is conditioned by the tastes of the consuming public, the level of sophistication of the market to be served and the limitations of skills and equipment available for production, it is always important to pay attention to this aspect of small industry development. Generally speaking, most countries of the region have had little experience in overcoming problems of design and techniques of production. At the present moment, due to the existence of a seller's market, the importance of this matter is not perhaps fully recognized; moreover, the fact that proper design and proper techniques of production will not only make fabrication simple but result in economies of raw materials and lowering of costs thus leading to the expansion of markets is generally ignored. The Working Party observed that, as the development of small industries progresses, the character of the markets will change and the buyers will be able to exercise a choice, so it will become very important to ensure satisfactory design and techniques of production. It is recommended, therefore, that the institutes established in the countries of the region to assist the development of small-scale industries pay particular attention to both of them.

The Working Party endorsed the suggestions of the Philippine delegate that the secretariat arrange to make available to the countries of the region experts in designing products composed of locally available raw materials; and that, as many suitable raw materials are often available in more than one of these countries, the possibility be explored of making joint efforts in developing and exploiting designs. The Working Party also endorsed the suggestion that the secretariat explore the possibility of establishing a Regional Design Institute for Cottage and Small-Scale Industrieis.

It was observed that there is in some cases a tendency to adopt highly specialized and sophisticated techniques of production which are perhaps not justified by the nature of the product or which are unnecessary and, in the long run, wasteful because they lack the flexibility of older and simpler methods. Hence, it is false economy to adopt particular production techniques merely because they are new or complicated; generally speaking, simple techniques allowing flexibility of

[1] (E./N.11/I & NR/46, 11 June 1963 paragraphs 55-58).

production appear to have greater chances of success in this region.

The Working Party noted the possibility of using with advantage for small industries' development such machinery and equipment as may have become redundant in large industries owing to new development, for example, automation. However, it pointed out that, before accepting such equipment, the recipient industry should ensure that it is in sound working condition and that sufficient repair facilities exist to maintain it in efficient working order. It is also necessary for it to be accompanied by adequate quantities of spares and components. In other words, care must always be taken to ensure that any surplus machinery taken over will really be to the economic and social benefit of the recipient industry from all points of view.

Appendix 2

Cost of Regional Product and Design Centre in Singapore

The centre will include a design studio, a prototype shop and facilities for selected international displays, seminars and conferences, and the like.

Area required	*(sq ft)*	*(sq ft)*	*(US$)*
Display area:			
consumer products	17,000		
building materials	13,000	30,000	
Office area		2,000	
Studio area		2,000	
Modelling area		1,000	
Seminar area		2,000	
International display		3,000	
Total areas ...		40,000	

Installation cost

Probable cost of building ..... (The building is very simple and developed on the open style, for which there are a number of examples in existence)	400,000
Equipment (furniture, lighting, etc.) ..	100,000
General operating equipment	20,000
	520,000

Running costs per annum:

Personnel:

- Project manager
- Director
- Receptionist (2)
- Typist (4)
- Research officers (2)
- Design advisers (3)
- Promotion officer
- Clerks (2)

Servicing costs, promotional material etc.	150,000

Probable returns:

	(US$)
Contributing countries on pro rata basis	100,000
Rental of building displays (500 displays)	200,000
	300,000

Note: It is suggested that the land be donated by the host country.

Financing arrangements:

It is proposed that the project be underwritten by the United Nations Special Fund and any surplus be returnable to this Fund, to pay off fixed capital charges and so on.

The success of product and design centres, which are a feature of all industrialized countries, depends almost entirely on the personnel and the degree of independence allowed them in conducting operations. Therefore great care must be taken in selecting highly trained people, otherwise the operation could degenerate into a musum.

Appendix 3

Summary of Services Available in the ECAFE Region

(The following summaries have been taken from the available ECAFE records)

Japan

In addition to the government-sponsored Japan Design House established as the central information centre, each local government has its own permanent design display. In addition many large department stores conduct periodic displays of selected products to promote improved product design.

Local and travelling design exhibitions are an established part of industry sponsored both by government and private agencies.

In 1955/56 four additional design centres were established to register and protect new designs against imitation, and to stimulate originality in local designing. These activities were supported by legislation under the Import-Export Transaction law, and the export commodities design law.

Japan has about 24 well-established industrial design training facilities and a great number of active design associations.

The promotion of industrial design and improved product development is very active and rapidly increasing; and facilities for training overseas students are readily available.

Australia

Australia has several design and building centres sponsored both by the Government and by private agencies, for the display of its industrial, building, and consumer products. In addition the various branches of the Department of Trade and Industry are extremely active in promoting trade exhibitions both for local and overseas presentation. There are also a number of professional associations specifically related to industrial design and commercial art and a very well organized Chamber of Manufacturers which represents the bulk of industry. Training facilities for designers are quite adequate and industrial design activities are increasing steadily.

Malaysia

Two handicraft centres sponsored by government agencies are in existence. These centres are mainly distribution centres for local handicrafts. There are no specific training facilities yet available for industrial designers, and no permanent display for industrial or consumer products other than the handicraft centres. It is believed that the Government has indicated the need for an industrial design expert specializing in the handicraft and mass production industries, and a permanent product display area has recently been proposed.

Singapore

A permanent display centre for local products was established recently by the Economic Development Board. This centre, which is a pilot project, has training facilities for industrial design and four local designers are undergoing training.

There are no established handicraft centres in existence although the Tourist Promotion Board is considering this problem in relation to tourist activities.

At present a United Nations industrial design consultant is attached to the Economic Development Board. One of the new proposals under consideration is a building centre to service the rapidly expanding building industry.

Thailand

Four well-established handicraft centres are located in Bangkok to display and merchandize handicraft products. There are no general-product centres, but periodic product displays are sponsored by the Ministry of Industry which has also established an industrial design unit under its direction. This unit, staffed by a number of locally trained designers, was originally organized by an overseas design expert as a Special Fund programme. There are no overseas design experts at present in Thailand, but it is understood that recommendations for increased assistance are being considered.

Republic of Viet-Nam

An extremely well-organized handicraft display and merchandizing centre is located in Saigon which sets out to market the local handicrafts and to assist in improving design and production. This centre is part of the government-sponsored industrial centre, specifically created to foster industrial expansion.

Design training facilities are very few and information on industrial design activities is at this moment not available. It is understood however that there is very little organized activity except through the handicraft centre.

China (Taiwan)

Some definite increase in design activities has been made in recent years with the creation of the China Productivity and Trade Centre (CPTC) which houses locally-made products and undertakings some industrial design activity in conjunction with industry; there are other centres such as the handicraft centre and the small industries centre, which are specifically centres for handicrafts. With regard to teaching facilities, a full course is available in industrial design at the Provincial University of Taipei. It is understood that three additional universities have either instituted or will soon commence similar courses.

There are no assistance programme design experts at present in Taiwan but in 1962/63 a US AID expert was attached to the CPTC.

Hong Kong

Hong Kong has very few facilities for industrial design development or servicing, but two trade centres have recently been established for housing and promoting locally manufactured products. It is not known whether additional services exist.

The Philippines

While there does not appear to be any specific training programme for industrial design, the National Cottage Industries Development Authority (NACIDA) is extremely active in promoting small industries. Display centre are established all over the country in addition to ten regional institutes. NACIDA also conducts research in design and marketing trends, and sponsors periodic exhibitions of handicraft products. Handicraft artisan training is undertaken on a national scale, and some design instruction is included.

Burma

No facilities exist for training designers nor for displaying the products of industry. It is understood that the Burmese Government has indicated its desire for a regional institute and display centre.

India

While it is not known whether India has any specific training courses for industrial design, nevertheless Government has established a very active organization to assist the smaller industries. The industries service provides local specialists on industrial design who undertake specific product assignments for private industry. In addition there are twenty-one

regional centres which are extensions of the central organization.

Pakistan

It is understood that an institute for industrial design in handicrafts and small industries is being established in West Pakistan in addition to the design centres in Lahore and East Pakistan.

In addition light training centres for carpet weaving and design are operating throughout the country.

It is regretted that at this time, there is no available information on the following countries: Nepal, Cambodia, South Korea, Ceylon, New Zealand, Indonesia.

The table shows the numbers of industrial experts (overseas assistance programmes) working in ECAFE countries.

Country	*Total industrial experts*	*Industrial design experts*
Japan	3	0
Australia	–	–
Malaysia (including Singapore)	30	1
Thailand	37	0
South Viet-Nam	2	0
China (Taiwan)	12	0
Philippines	18	0
Burma	7	0
India	35	0
Pakistan	13	0
Nepal	2	0
Cambodia	13	0
South Korea	15	0
Ceylon	19	0
New Zealand	0	0
Total	206	1