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INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

ECONOMIC GROWTH OF COLOMBIA:

PROBLEMS AND PROSPECTS

(in XII volumes)

VOLUME IV

INDUSTRY: MANUFACTURING AND MINING

November 1, 1970

South America Department

CURRENCY EQUIVALENTS

(Certificate Market Selling Rate of Exchange)

End 1968

1 US\$ = 16.91 Pesos

1 Peso = US\$0.05913

End 1969

1 US\$ = 17.90 Pesos

1 Peso = US\$0.05586

End-March 1970

1 US\$ = 18.20 Pesos

1 Peso = US\$0.05494

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INTRODUCTION

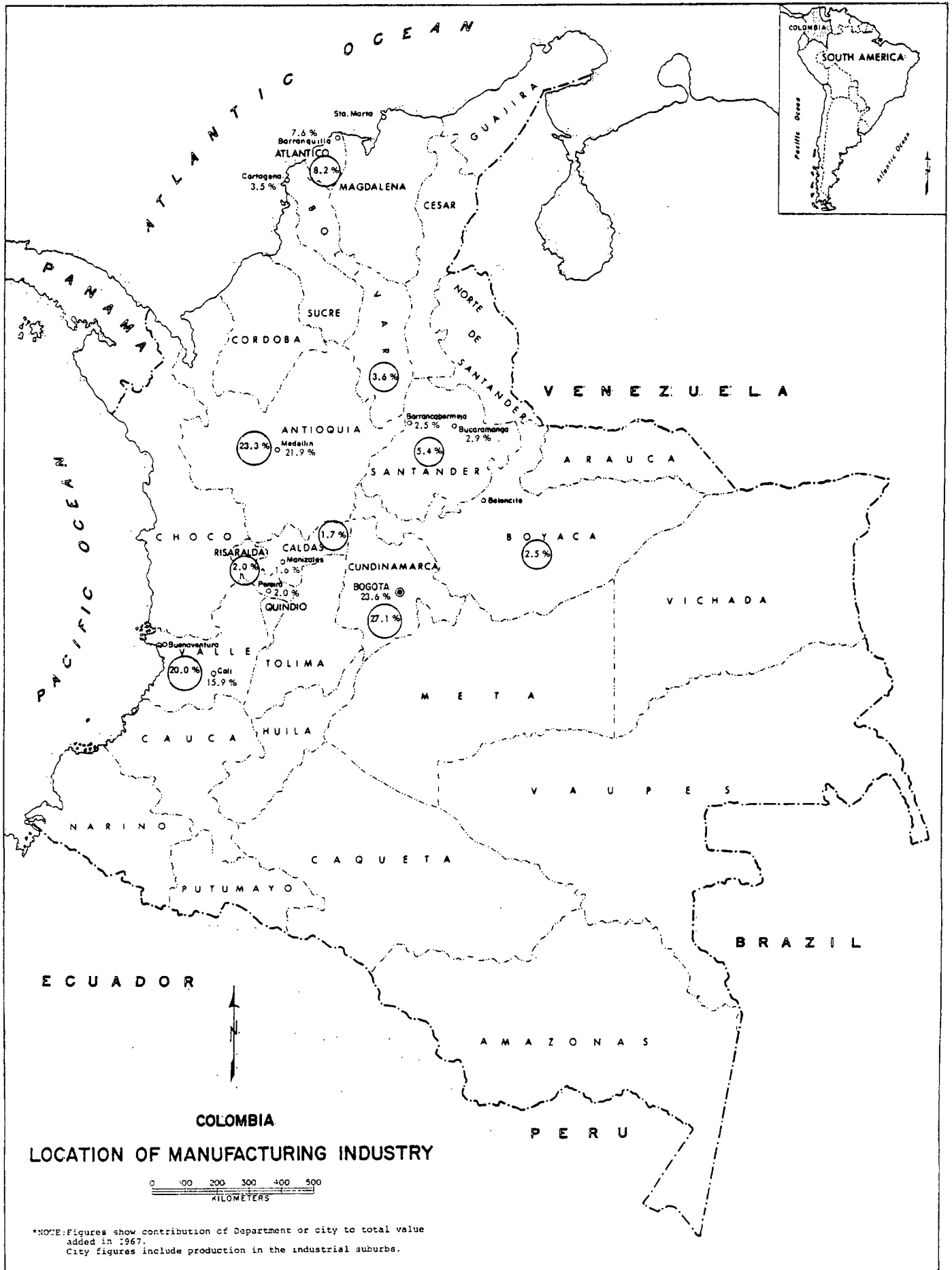
1. The scope of the discussion which follows relating to Colombian industry encompasses various objectives. The most important are to describe the growth and structure of the industrial sector, to discuss and evaluate government measures that have affected its development and to provide policy recommendations relating to its future growth. For purposes of this study industry is defined as including manufacturing and mining. Part I of this Report (Chapter I - IX) deals with the manufacturing sector. Part II (Chapter X and XI) discusses extractive industries -- metallic and non-metallic mineral mining and petroleum.
2. In Chapter I, manufacturing's share in gross domestic product, employment and fixed investment identify the sector's role in the Colombian economy. The contribution of the small "handicraft" industries to manufacturing output and employment is analyzed. The size of the Colombian market for various categories of manufactures is presented to indicate the role of foreign trade in manufactures.
3. Chapter II analyzes the growth of output and employment in manufacturing between 1953 and 1967 on the basis of available statistical information. Growth rates in manufacturing as a whole and in broad categories such as consumer goods, intermediate goods and capital goods are given for the first and second halves of this period to indicate the changes which have occurred in the pattern of growth.
4. Chapter III presents information on Colombian manufacturing such as the scale of enterprises, the importance of different legal forms of ownership, financing requirements and how they have been met. It also describes briefly labor and employer organizations.
5. Chapter IV discusses the measures taken by Government in the fields of taxation, monetary policy and social legislation as they affect the manufacturing sector.
6. Chapter V discusses commercial policy as it affects the manufacturing sector. It deals with tariffs, and non tariff import restrictions and export incentives. The discussion embraces the operational aspects of the foreign trade control mechanisms as well as their economic impact.
7. Chapter VI, the longest chapter, first presents a comparison of the manufacturing structure of Colombia with that of Brazil. A detailed analysis of the major Colombian industries follows. Each industry is discussed individually and those aspects which shed light on its international competitive position are analyzed - so far as the data permit. In a number of industries, specific suggestions are made which would improve their position; suggestions concerning export marketing possibilities, effects of changing the import regime, and multiple-shift working are made.

8. Chapter VII describes the regional distribution of manufacturing in Colombia, pointing especially to the concentrations of particular industries in specific cities or regions and to the implications of this locational pattern for future industrial growth.

9. Chapter VIII analyzes the implications for industrial production, foreign trade, employment and investment of probable changes in the size and character of the domestic market for manufactures. The prospects for expansion of manufactures exports are also discussed.

10. The final chapter of Part I, Chapter IX, summarizes the conclusions drawn from the discussions in the previous chapters.

11. Part II of the Report deals with the extractive industries. Chapter X considers mining other than petroleum while Chapter XI briefly analyzes the status and outlook of the petroleum industry.



PART ONE: MANUFACTURING

CHAPTER I

THE ROLE OF MANUFACTURING IN THE COLOMBIAN ECONOMY

12. Despite the significant growth of Colombian manufacturing industries during the recent decades, the Colombian economy remains rooted primarily in agriculture. Manufacturing industries, nevertheless, constitute an increasingly important part of the total economic picture. The manufacturing sector, which includes the factory and handicraft sectors, 1/ accounted for 15 percent of the gross domestic product in 1950 and rose to contribute about 19 percent of GDP in 1968, the last year for which national accounts data are available.

13. Total value-added in manufacturing as shown in the national accounts combines data for the factory sector as collected by the national statistical office (DANE) 2/ and estimates by the Bank of the Republic (Banco de la Republica) for the handicraft sector. The basis for these latter estimates is described in Appendix 1. Growth in the factory sector has been substantially more rapid than in handicraft, as shown by the declining share of handicraft in total manufacturing value added. 3/

Table I-1: VALUE ADDED AT MARKET PRICES

(million 1968 pesos)

| | <u>Factory Sector</u> | <u>Handicraft Sector</u> | <u>Total</u> | <u>Handicraft as a percent of Total</u> |
|------|-----------------------|--------------------------|--------------|---|
| 1950 | 4,542.9 | 1,472.1 | 6,015.0 | 24.5 |
| 1953 | 5,560.2 | 1,672.1 | 7,232.4 | 23.1 |
| 1960 | 9,284.3 | 2,096.8 | 11,381.1 | 18.4 |
| 1967 | 13,902.1 | 2,623.2 | 16,525.3 | 15.9 |
| 1968 | 14,828.1 | 2,721.9 | 17,550.0 | 15.5 |

Sources: Banco de la Republica, Cuentas Nacionales, 1950-1967, and unpublished Banco de la Republica data.

1/ The handicraft sector is defined to include firms employing less than 5 workers.

2/ Departamento Administrativo Nacional de Estadística - DANE.

3/ Value added as used here and elsewhere in this report is gross, that is, the only deductions from gross output in arriving at gross value added are direct production materials. Neither depreciation nor indirect materials are deducted.

The factory sector alone, which represented about 9 percent of GDP in 1945 had risen to 11 percent in 1950, 14 percent in 1960 and about 16 percent by 1968. For handicraft, the admittedly crude estimate implies that its share of GDP has dropped from about 4 percent in 1950 to about 3 percent in 1968.

14. Another way of looking at the contribution of manufacturing to national output is to express its contribution in dollar equivalents as is done in the table below:

Table I-2: MANUFACTURING VALUE ADDED-TOTAL AND PER CAPITA-DOLLAR EQUIVALENTS

| | <u>1958 Prices & Exchange Rates</u> | | | <u>1968 Prices & Exchange Rates</u> | | |
|------|---|----------------------|-------------------|---|----------------------|-------------------|
| | | <u>\$ Equivalent</u> | | | <u>\$ Equivalent</u> | |
| | <u>Value added</u> | <u>Total</u> | <u>Per Capita</u> | <u>Value added</u> | <u>Total</u> | <u>Per Capita</u> |
| | (bill.pesos) | (mill.\$) | (\$) | (bill.pesos) | (mill.\$) | (\$) |
| 1950 | 2.2 | 290 | 25 | 6.1 | 360 | 31 |
| 1960 | 4.1 | 550 | 36 | 11.3 | 660 | 43 |
| 1968 | 6.4 | 840 | 43 | 17.5 | 1,030 | 52 |

Note: Pesos converted to US\$ at the following rates:
 1958 at 7.6 pesos per dollar (capital exchange rate)
 1968 at 17 pesos per dollar

Source: Table I-1

15. Thus, depending on the exchange rate use for conversion to dollar equivalents, 1/ the contribution of manufacturing to gross domestic product per capita rose by US\$18 and US\$21 per capita in the 18 year period from 1950 to 1968. In either event, the increase amounts to a real increase of about US\$1 per capita per year.

16. The above data are based on value-added in manufacturing (eliminating multiple counting of new materials and intermediate products used at various stages of production). They should not be confused with gross value of output data used appropriately for other comparisons elsewhere in the report. In Colombia gross value of output is about two and one half times gross value-added. 2/

1/ Two comparisons are shown, 1958 because this is the base period used in national account statistics, and 1968 because this is the latest year for which data are available.

2/ Inter-country comparisons, while desirable in principle, cannot be made meaningfully without taking account of differences in treatment of indirect taxes, the differing structure of industry and wage policies. Time did not permit such comparisons.

17. In 1967, total employment in the factory sector was 293,825 or about 5 percent of the economically active population in Colombia. ^{1/} This figure represents an increase of about 47 percent since 1953. For the entire post-war period, the increase was almost 159,000 or 118 percent above the June, 1945 level.

18. Employment in the handicraft category is not known and cannot be estimated with any degree of accuracy. Sources in Colombia place it at approximately equal to the recorded employment in the factory sector, or about 300,000. This number appears to be highly exaggerated. According to Banco de la Republica estimates, value-added in handicraft in 1967 was approximately 20 percent of that in the factory sector. This estimate would imply that value-added per person employed was only one-fifth that for all factory employment, where it averaged 52,000 pesos per person per year in 1967 prices. DANE data indicate that small firms employing 1 to 4 workers had an average value-added per paid worker of 28,000 pesos. On the basis of the foregoing estimates, it appears more reasonable to assume that the equivalent full-time employment in handicrafts in 1967 was more of the order of 150 to 200 thousand persons, implying a value-added per person engaged of between 15 and 20 thousand pesos per year.

19. New fixed investment in manufacturing is a significant portion of total national fixed investment. In 1967, total new fixed investment in manufacturing industry was 2,364 million pesos ^{2/} (equivalent to about US\$150 million) or 16 percent of total fixed investment in Colombia. In that year Government investment (both national and local) in fixed assets was about 29 percent of the total; manufacturing investment therefore represented about 23 percent of private fixed investment. Fixed investment in manufacturing has been highly cyclical, representing approximately 7 percent of total fixed investment in 1953, rising to 19 percent in 1957 spurred by the earlier coffee boom and falling to 10-11 percent in the next four years. It reached 15 percent in 1962, fell to 11 percent in 1963 and has remained at 16-17 percent in the years 1965-1967. (See Table I-3 below.) With few exceptions, notably 1957, manufacturing's share in total fixed investment has been less than its share of GDP since 1950, indicating that the main role of manufacturing investment since the late 1950s has been to keep pace with the development of the economy rather than acting as a pacemaker.

^{1/} Included in the figures shown above, there were in 1967 about 11,000 persons occupied in manufacturing who were not paid employees--probably represented by the owners of the establishments and their immediate families.

^{2/} The total includes net land purchases by the manufacturing which should be excluded in any precise comparison. Absence of data precludes such exclusion, but it is not believed to have affected significantly the year to year fluctuations although it somewhat overstates the level for the whole period.

Table I-3: INVESTMENT IN FIXED ASSETS IN COLOMBIA
1957 - 1967

| | <u>Total investment in fixed assets in the whole economy</u> | <u>Investment in fixed assets in manufactur- ing industry</u> | <u>Share of investment in manufacturing industry in total investment in the whole economy</u> |
|------|--|---|---|
| | (million current pesos) | | (percent) |
| 1957 | 2,643 | 500 | 18.9 |
| 1958 | 3,339 | 373 | 11.2 |
| 1959 | 3,908 | 403 | 10.3 |
| 1960 | 4,845 | 499 | 10.3 |
| 1961 | 5,580 | 623 | 11.2 |
| 1962 | 6,137 | 920 | 15.0 |
| 1963 | 7,168 | 774 | 10.8 |
| 1964 | 8,654 | 1,247 | 14.4 |
| 1965 | 9,504 | 1,633 | 17.2 |
| 1966 | 12,304 | 2,096 | 17.0 |
| 1967 | 14,729 | 2,365 | 16.1 |

Source: Banco de la Republica, Cuentas Nacionales, 1950-1967.

The market for manufactured goods is estimated at about US\$2,751 million in 1967, the latest year for which detailed data are available. This figure is arrived at by adding to the gross value of production in factory industries (DANE figures), 1/ the value of net imports (imports minus exports), as shown in Table I-4 below.

20. The table shows the market by major categories of goods and also indicates the share of imports in the market and the percentage of production exported. Appendix Table 9 contains a more detailed breakdown of these data, not only for 1967 but also for selected earlier years.

1/ The output of handicraft industry is not included for lack of detail.

Table I-4: MARKET FOR MANUFACTURES IN COLOMBIA-1967

(mill. USS equivalent)

| | <u>Production</u> | <u>Imports</u> | <u>Exports</u> | <u>Total Market</u> | <u>Imports as percent of Market</u> | <u>Exports as percent of Production</u> |
|----------------------------|-------------------|----------------|----------------|---------------------|-------------------------------------|---|
| Non-durable consumer goods | 1,336.5 | 25.0 | 3.0 | 1,358.5 | 1.8 | 0.2 |
| Durable consumer goods | 144.9 | 26.3 | 2.7 | 168.5 | 15.6 | 1.9 |
| Intermediate goods | 764.6 | 165.0 | 45.9 | 883.7 | 18.7 | 6.0 |
| Capital goods | 78.4 | 205.2 | 3.4 | 280.2 | 73.2 | 4.3 |
| Other manufactures | 48.8 | 11.8 | 0.6 | 60.0 | 19.7 | 1.2 |
| Total manufactures | 2,373.2 | 433.3 | 55.6 | 2,750.9 | 15.8 | 2.3 |

Source: Appendix Table 9.

21. The salient features of the Colombian market for manufactures are:

- a. Neither imports nor exports are significant for non-durable consumer goods, pointing to a high degree of self-sufficiency which partly reflect stringent import controls (including complete import prohibitions).
- b. At the other extreme, capital goods imports account for over 70 percent of the market.
- c. On durable consumer goods and intermediate goods, imports account for less than 20 percent of the market.
- d. Overall imports account for over 15 percent of the market. As will be discussed in more detail in Chapter VIII, this proportion has been reduced from over 30 percent in 1953.
- e. Exports account for a very small part of Colombian manufacturing output, slightly over 2 percent in 1967. The absolute volume, though still small, has been rising rapidly, especially in intermediate goods, as will be developed in more detail in Chapter VIII.

22. Except where there is specific indication to the contrary, the discussion of manufacturing in the rest of this report is confined to the factory sector and excludes handicraft enterprises, primarily because there are no adequate data. Where information is available on the handicraft sector of a particular industrial branch, it will be specifically identified as such.

CHAPTER II

THE GROWTH OF MANUFACTURING SINCE 1953: OUTPUT,
VALUE ADDED AND EMPLOYMENT

General Trends

23. The growth of Colombian manufacturing industries 1/ during the fourteen years from 1953 to 1967 - as measured by trends in output, value added and employment - will be discussed in this section. The detailed analysis on growth will extend only through 1967 because this is the last year for which comparable statistics are available. In the discussion all value figures have been inflated to real 1968 prices and all growth rates calculated on the basis of these constant value figures.

24. In the fourteen-year period under discussion, manufacturing has been characterized by a moderate overall growth, with a much faster growth in the 1950s than in the 1960s. Output, moreover, has expanded considerably faster than employment, reflecting marked increases in productivity.

25. The value of output of Colombia's manufacturing industries increased from about 17 billion pesos in 1953 to some 40 billion pesos in 1967. This increase represents a rise of about 138 percent and an average annual growth rate of 6.4 percent for the 1953 to 1967 period. 2/ Growth was not evenly distributed throughout the period. The average annual growth of output declined from 7.0 percent from 1953 to 1960, to 5.8 percent from 1960 to 1967.

26. In 1967, firms employing 100 or more workers produced about 63 percent of output value. The rate of growth of output was markedly higher in the larger firms as can be seen from the table below. While growth in firms employing between 5 to 15 workers was 3.2 percent from 1960 to 1967, the output of firms employing between 100 and 200 workers grew at the rate of 6.7 percent and firms employing 200 and more workers grew at the rate of 7 percent.

1/ Manufacturing refers to firms employing five or more workers or the factory sector.

2/ While data are not available beyond 1967, preliminary information supplied by the Bank of the Republic indicate that manufacturing output rose about 6.6 percent in 1968 and 8.5 percent in 1969. On this basis, the gross value of production of the factory sector in 1969 is estimated at 47 billion pesos in constant 1968 prices.

Table II-1

Average Annual Growth Rates in Output, Value-Added and Employment

| | <u>O U T P U T</u> | | |
|----------------------------|----------------------------|----------------|----------------|
| | <u>1953-67</u> | <u>1953-60</u> | <u>1960-67</u> |
| Non-durable consumer goods | 4.4 | 4.3 | 4.6 |
| Durable consumer goods | 9.9 | 10.5 | 9.4 |
| Intermediate goods | 9.8 | 12.8 | 6.9 |
| Capital goods | 13.0 | 15.6 | 10.5 |
| Other | 14.3 | 16.5 | 12.0 |
| <u>Total</u> | <u>6.4</u> | <u>7.0</u> | <u>5.8</u> |
| | <u>V A L U E A D D E D</u> | | |
| Non-durable consumer goods | 5.3 | 5.1 | 5.5 |
| Durable consumer goods | 8.0 | 7.9 | 8.1 |
| Intermediate goods | 8.7 | 9.3 | 8.0 |
| Capital goods | 11.5 | 11.7 | 11.4 |
| Other | 13.3 | 12.7 | 13.8 |
| <u>Total</u> | <u>6.7</u> | <u>6.7</u> | <u>6.8</u> |
| | <u>E M P L O Y M E N T</u> | | |
| Non-durable consumer goods | 1.5 | 2.1 | 0.9 |
| Durable consumer goods | 5.8 | 9.8 | 1.9 |
| Intermediate goods | 4.3 | 5.4 | 3.2 |
| Capital goods | 11.2 | 17.0 | 5.7 |
| Other | 9.4 | 12.7 | 6.2 |
| <u>Total</u> | <u>3.3</u> | <u>4.3</u> | <u>2.1</u> |

Sources: Appendix Tables 2, 4 and 6.

Table II-2: GROWTH RATES IN OUTPUT BY SIZE OF FIRMS

| <u>Firm Size</u> | <u>Output</u> | | <u>Growth</u> |
|---------------------|----------------------|-----------------|---------------|
| | (million 1968 pesos) | | % |
| | 1960 | 1967 | 1960-1967 |
| 5 to 15 workers | 2,912.0 | 3,636.4 | 3.2 |
| 15 to 19 workers | 8,425.0 | 11,629.3 | 4.7 |
| 100 to 199 workers | 4,299.1 | 6,749.9 | 6.7 |
| 200 to more workers | 11,401.9 | 18,210.2 | 7.0 |
| Total | <u>27,038.0</u> | <u>40,225.8</u> | <u>5.8</u> |

Source: 1960; DANE Boletín Mensual de Estadística No. 1967: Appendix Table

27. In 1967, value added in manufacturing amounted to about 17 billion pesos (1968 prices). This represents an absolute increase of about 150 percent and an average annual growth rate of about 6.7 percent between 1953 and 1967. For the fourteen-year period under discussion, therefore, value added grew at only a slightly higher pace than output.

28. Conceptually, value added data is a better measure of growth than gross value of production because it eliminates double-counting in intermediate goods. Colombian value added data, however, must be used with great care in analysis of the development of the manufacturing sector. The quantitative import restrictions and exchange rate fluctuations that have prevailed in Colombia for the last fifteen years have brought with them sharp inventory movements of raw materials in the manufacturing sector. Value added data reflect the inventory accumulations and depletions as well as the valuation of such inventories because value added is derived by deducting material inputs from the total value of production. It is possible that the value added figures are underestimated in years of inventory buildup if the purchase of raw materials for inventory purposes is counted as an input for production. The reverse would happen in years of inventory depletion. A second difficulty in using value added data relates to the choice of deflators. Indices that apply to gross output (wholesale price indices) can be more readily tested than those applicable to value added. ^{1/} Because of the problems of measuring growth in value added, the discussion on output growth will concentrate on the growth of gross value of production.

29. In 1967, paid employment in the manufacturing industries was about 283,000, an absolute rise of about 56 percent from 1953 when the work force in the manufacturing industries was about 181,000. This represents an average annual growth rate of about 3.3 percent and points

^{1/} See notes on Colombian Manufacturing Statistics.

to the inability of the manufacturing sector to absorb much of the rapidly increasing labor force. The slow growth of employment in manufacturing compared to the growth of output and value added reflects the increases in labor productivity that were evidenced during the period. As with output, the growth of employment declines over the fourteen years between 1953 and 1967. While manufacturing employment rose at the rate of 4.3 percent in the first half of the period, it only increased at the rate of 2.1 percent in the second half.

Characteristics of Industrial Growth

30. The increases in manufacturing output and employment described above were not evenly distributed among several industrial branches. These have been classified for purposes of analysis into the four major sub-groupings of non-durable consumer goods (such as food, clothing, textiles ^{1/} and pharmaceuticals), durable consumer goods (such as furniture, appliances, and automobiles), intermediate goods (such as basic chemicals, petroleum products and metal manufactures), and capital goods (heavy machinery and transport equipment). The role of each sub-group in the growth of output and employment can be measured in terms of the percent contribution of each group to expanded output and employment and in terms of the relative rate of growth of each sub-group and industrial branch.

Production

31. As indicated in Table II-3 below, of the 23 billion pesos increase in output between 1953 and 1967, some 44 percent was accounted for by the non-durable consumer goods industries; of the remaining 56 percent, some 40 percent was accounted for by the intermediate goods industries, some 8 percent by the non-durable consumer goods industries and only about 5 percent by the capital goods industries. The figures point to the important contribution of the non-durable consumer goods and intermediate goods industries in total industrial output.

^{1/} Data for the textile industry do not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles in Colombia are for consumer use and have been classified under non-durable consumer goods and half are for industrial uses and have been classified as intermediate goods.

Table II-3: INCREASES IN OUTPUT, 1953-1967

| | <u>Contributions to Increased Output</u> | | | | |
|----------------------------|--|--|-----------------|-----------------|--|
| | <u>Output</u> <u>1953</u> | <u>1953-60</u> | <u>1960-67</u> | <u>1953-67</u> | <u>Output</u> <u>1967</u> |
| | ----- (million 1968 pesos) ----- | | | | |
| Non-durable consumer goods | 12,321.1 | 4,218.9 | 6,114.0 | 10,332.9 | 22,654.1 |
| Durable consumer goods | 653.8 | 658.2 | 1,143.3 | 1,801.5 | 2,455.3 |
| Intermediate goods | 3,507.9 | 4,641.4 | 4,810.5 | 9,451.9 | 12,959.7 |
| Capital goods | 239.8 | 421.5 | 667.5 | 1,089.0 | 1,328.8 |
| Other | 128.3 | 247.1 | 452.5 | 699.6 | 827.9 |
| <u>Total</u> | <u>16,850.9</u> | <u>10,187.1</u> | <u>13,187.8</u> | <u>23,374.9</u> | <u>40,225.8</u> |
| | <u>Output dis-</u> <u>tribution</u> <u>(%)</u> | <u>Percent Distribution</u> <u>of Increases</u> | | | <u>Output dis-</u> <u>tribution</u> <u>(%)</u> |
| Non-durable consumer | 73.1 | 41.1 | 46.3 | 46.2 | 56.2 |
| Durable consumer goods | 3.9 | 6.5 | 8.7 | 7.7 | 6.2 |
| Intermediate goods | 20.8 | 45.6 | 36.5 | 40.4 | 32.1 |
| Capital goods | 1.4 | 4.1 | 5.1 | 4.7 | 3.3 |
| Other | 0.8 | 2.4 | 3.4 | 3.0 | 2.1 |
| <u>Total</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Source: Appendix Table 2.

32. The contributions to increased output described immediately above are not indicative of the average annual growth rates for these groups because of the disparate output bases from which each group started. While the non-durable consumer goods industries and some intermediate goods were relatively well-developed by 1953, the other industrial branches were only beginning to be established in Colombia. Hence the pattern of development of the non-durable consumer goods industries, which in 1953 accounted for 73 percent of industrial output, and of intermediate goods industries, which accounted for 21 percent of industrial output, are of greater importance than the pattern of development of capital and durable consumer goods industries, which together accounted for about 5 percent of industrial output. The growth trends, however, point to the development of new industrial sub-sectors and are indicators of the process of diversification of Colombian manufacturing output.

33. For the entire 1953 to 1967 period, the non-durable consumer goods industries grew moderately, 4.4 percent per year from 1953 to 1967. The intermediate and durable consumer goods industries grew rapidly, each

reaching growth rates of about 10 percent for the entire period. The capital goods industries grew the most relatively, with an average annual rate of growth of 13 percent.

34. As mentioned above, industrial production grew faster in the first half than in the second half of the fourteen year period under discussion; most industrial sub-groups followed this pattern of development. Table II-4 below shows the growth of production in selected sub-sectors. The growth of manufacturing between 1953 and 1960 can be attributed to the development of non-traditional branches. The rapid growth of the capital goods industries in this period is, in part, explained by the low output base from which these industries started -- in 1953 they accounted for only 1 percent of output.

Table II-4: AVERAGE ANNUAL GROWTH OF OUTPUT

| | <u>1953-67</u> | <u>1953-60</u> | <u>1960-67</u> |
|-----------------------------------|----------------|----------------|----------------|
| <u>Non-durable consumer goods</u> | <u>4.4</u> | <u>4.3</u> | <u>4.6</u> |
| Food | 3.5 | 1.7 | 5.2 |
| Textiles | 5.9 | 8.4 | 3.5 |
| Pharmaceuticals | 12.0 | 13.5 | 10.5 |
| <u>Durable consumer goods</u> | <u>9.9</u> | <u>10.5</u> | <u>9.4</u> |
| Rubber products | 10.2 | 11.2 | 9.1 |
| Electrical appliances | 15.1 | 18.8 | 12.5 |
| Motor vehicles | 9.7 | 6.9 | 12.6 |
| <u>Intermediate goods</u> | <u>9.8</u> | <u>12.8</u> | <u>6.9</u> |
| Paper and products | 16.2 | 18.1 | 14.3 |
| Chemicals, other | 19.2 | 17.6 | 21.0 |
| Petroleum | 10.1 | 17.5 | 2.8 |
| Non-metallic min. products | 6.9 | 6.9 | 6.8 |
| Basic metals | 22.5 | 41.8 | 3.2 |
| Metal products | 10.7 | 13.3 | 8.1 |
| <u>Capital goods</u> | <u>13.0</u> | <u>15.6</u> | <u>10.4</u> |
| Mechanical machinery | 9.3 | 10.8 | 7.8 |
| Electrical machinery | 24.2 | 34.7 | 13.8 |

Source: Appendix Table 2.

35. More significant was the dynamic development of industries producing industrial inputs - the intermediate goods industries. These industries had already attained considerable development by 1953 and grew

at an average annual rate of about 13 percent in the seven-year period from 1953 to 1960. The development of the intermediate industries was partly spurred by government investments in this group. Hence, the establishment of Paz del Rio, the steel plant, stimulated the development of the basic metal industries which grew at a rate of 42 percent per year. The chemical industries grew at the rate of about 18 percent. A few large investments such as the government-financed soda plant near Bogota were instrumental in their expansion.

36. The start of production of the ESSO petroleum refinery in Cartagena contributed to the accelerated growth of another important industrial input — refined petroleum products — which grew at an average annual rate of 18 percent between 1953 and 1960. Partly as a by-product of the development of the steel industry, but also as a result of import restrictions, the metal industries grew rapidly at an average annual rate of about 13 percent.

37. The paper industry received its first stimulus in the 1950s — expanding at the rate of 18 percent per year. Large investments throughout the period by Carton de Colombia, one of the two large producers of paper products in Colombia contributed to this development.

38. The durable consumer goods industries grew at an average annual rate of about 11 percent in the 1950s. The rapid development of the tire industry and the establishment of several electrical appliance manufacturers contributed to the expansion of this category.

39. As mentioned above, unlike the capital and durable consumer goods industries, the non-durable consumer goods industries had already attained a degree of development in the early 1950s, in part explaining the slow growth of this sub-group during that period. Within the sub-group, however, the textile industry experienced significant growth — 8.4 percent per year, resulting partly from the expansion and modernization of capacity but also the introduction of new products, such as synthetic fabrics and wool yarn.

40. In the period between 1960 and 1967, there was a slowdown in the growth of three out of the four major industrial sub-groups, non-durable consumer goods being the exception. The rate of growth of capital goods declined from about 16 percent from 1953 to 1960 to about 11 percent from 1960 to 1967; the growth of the intermediate goods declined from about 13 percent in the first period to about 7 percent in the second. The rate of growth of consumer durable goods declined least: from 10.5 percent from 1953 to 1960 to 9.4 percent from 1960 to 1967.

41. The decline in the growth of intermediate goods production in the 1960s reflects the marked decrease in the expansion rate of the basic metals and petroleum industries, which had greatly contributed to the growth of the group in the 1950s. Intermediate textiles as well as some of the less important branches, such as the wood and leather industries also exhibited sluggish growth rates.

42. Some important intermediate branches, however, continued to expand in the 1960s. The chemical and paper industries grew rapidly pointing to continued import substitution in these branches. The growth of chemicals in this period resulted from the start of production of new plants such as the soda plant in Cartagena, the fertilizer plants, as well as the introduction of new products such as polyester fibers. The growth of the paper industry reflects the further increases in capacity of Carton de Colombia and the start of production of the other large paper company in the country, Promotora de Papeles (PROPAL). The continued growth of the metal industries was stimulated by a few large investments, such as Forjas de Colombia, the steel forging plant, located in Bucaramanga.

43. Capital goods grew the most relatively in the 1960s. The growth of the capital goods industries was spurred by the expansion in production of electrical machinery which increased at the rate of about 14 percent per year.

44. As mentioned above, the durable consumer goods industries continued to increase in the 1960s, reflecting some development in the automotive industry and the continued expansion of the electrical industries. The non-durable consumer goods industries exhibited a slightly faster growth in the 1960s than in the 1950s, caused primarily by the more rapid growth of the food industries. Compared to their sluggish growth in the earlier period, there was a new revival of the food industries, partly reflecting the expansion of the sugar industry, but also the increased supply of processed foodstuffs for the domestic market.

Employment and Productivity

45. As with output, increases in employment varied among the several industrial branches. Of the 102,000 additional workers employed in manufacturing between 1953 and 1967, about 41 percent were employed in intermediate goods industries and about 24 percent in the non-durable consumer goods industries. Only slightly more than one fourth of the additional workers employed were involved in the production of capital goods and consumer durables.

Table II-5: INCREASES IN EMPLOYMENT, 1953-1967

| | <u>Employment</u> <u>1953</u> | <u>Contributions to Increased</u> <u>Employment</u> | | | <u>Employment</u> <u>1967</u> |
|----------------------------|----------------------------------|--|----------------|----------------|----------------------------------|
| | | <u>1953-60</u> | <u>1960-67</u> | <u>1953-67</u> | |
| Non-durable consumer goods | 109,523 | 16,669 | 8,207 | 24,867 | 134,399 |
| Durable consumer goods | 12,469 | 11,562 | 3,395 | 14,957 | 27,426 |
| Intermediate goods | 52,846 | 23,420 | 18,473 | 41,893 | 94,739 |
| Capital goods | 3,857 | 7,717 | 5,519 | 13,236 | 17,093 |
| Other | 2,645 | 3,469 | 3,212 | 6,681 | 9,326 |
| <u>Total</u> | <u>181,340</u> | <u>62,837</u> | <u>38,806</u> | <u>101,643</u> | <u>282,983</u> |

| | Employment distribution % | Percent Distribution of Increase | | | Employment distribution % |
|-------------------------------|------------------------------|-------------------------------------|--------------|--------------|------------------------------|
| | | | | | |
| Non-durable consumer goods | 60.4 | 26.5 | 21.2 | 24.5 | 47.5 |
| Durable consumer goods | 6.9 | 18.4 | 8.7 | 14.7 | 9.7 |
| Intermediate goods | 29.1 | 37.3 | 47.6 | 41.2 | 33.5 |
| Capital goods | 2.1 | 12.3 | 14.2 | 13.0 | 6.0 |
| Other | 1.5 | 5.5 | 8.3 | 6.6 | 3.3 |
| <u>Total</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Source: Appendix Table 6.

46. By comparing rates of growth in production and employment, one can derive implicit figures of production per worker. It should be noted, however, that the production figures are for gross output and consequently the derived figures are for gross output per employee. The significance of such derived figures is limited, particularly as regards any specific industry. There are likely to be offsetting errors or biases in the data for the entire manufacturing sector, but it is not feasible to allow adequately for these in each specific industry. With these limitations in mind, the data in Table II-6 indicate that for manufacturing as a whole, gross value of output per paid worker grew by 3.1 percent per year between 1953 and 1967. If employment is related to value-added, the rate is 3.4 percent per year.

47. By broad categories of manufactures, the rates fluctuate between 1.6 and 5.3 percent; figures derived from value-added, however, show differences for the growth rate of each category. Any interpretation as to productivity in specific industries should, therefore, be based on material presented in Chapter VI below rather than what may be inferred from the data in Table II-6.

Table II-6: GROSS OUTPUT PER PAID WORKER

| | 1953 | 1960 | 1967 | Average |
|----------------------------|-------------|--------------|--------------|---|
| | | | | annual growth (percent) 1953-1967 |
| | (thou. 1968 | pesos) | | |
| Non-durable consumer goods | 112.5 | 131.1 | 168.6 | 2.9 |
| Durable consumer goods | 52.4 | 54.6 | 89.5 | 3.9 |
| Intermediate goods | 66.4 | 106.9 | 136.8 | 5.3 |
| Capital goods | 62.2 | 57.1 | 77.7 | 1.6 |
| Other | 48.5 | 61.5 | 88.8 | 4.4 |
| <u>Total</u> | <u>92.9</u> | <u>110.7</u> | <u>142.2</u> | <u>3.1</u> |

Source: Appendix Tables 2 and 6.

CHAPTER III

GENERAL CHARACTERISTICS OF COLOMBIAN MANUFACTURING

48. The manufacturing industries in Colombia have developed in an unusual geographic frame. Three mountain ranges traverse the country, offering formidable obstacles to speedy and low-cost transportation. Sea access from northeastern Colombia to western Colombia, furthermore, requires crossing the Panama Canal. This has led to the development of several large urban centers and the fragmentation of the market for manufactures. Manufacturing production has been located near the market and therefore developed, to a large extent, along regional lines, a unique phenomenon in Latin America. Moreover, manufacturing has been in the past, predominantly inward-oriented, reflecting in part the distance to the ports of most of the manufacturing centers. This has had the unintended effect of hampering exports of goods which have a high transport cost content. It implies also that in cases of low value bulk products export-oriented industries will need to be located at or close to coastal points. No doubt, if such geographical barriers had not existed, and there had been a unified market for the country, the characteristics of the manufacturing sector, which will be described in this and the chapters that follow, would have been considerably different.

49. In this chapter, some of the general characteristics of the manufacturing sector are analyzed. The chapter includes a discussion of scale of operations, type of ownership and industrial financing. The competitive structure of individual industrial branches is discussed in Chapter VI, while the regional structure of manufacturing is discussed in Chapter VII.

Size of Plants

50. Most establishments engaged in manufacturing activities are small, employing less than 20 workers. The data indicate that in 1967 there were only slightly over 1,000 factory establishments in Colombia employing 50 or more persons and about 1,300 more employing from 20-49 persons. In addition there were over 8,000 establishments employing less than 20 persons each as indicated in the following table:

Table III-1: AVERAGE SIZE OF ESTABLISHMENTS - 1967

| <u>Establishment Size</u> | <u>Number of Establishments</u> | <u>%</u> | <u>Paid Employees (thousands)</u> | <u>%</u> |
|---------------------------|---------------------------------|------------|-----------------------------------|------------|
| Under 20 | 8,413 | 78 | 45.3 | 16 |
| 20-49 | 1,338 | 12 | 39.8 | 14 |
| 50-99 | 525 | 5 | 36.3 | 13 |
| Over 100 | 527 | 5 | 161.6 | 57 |
| | <u>10,803</u> | <u>100</u> | <u>283.0</u> | <u>100</u> |

Source: Appendix Table 10.

51. As can be seen from Table II-2 in Chapter II the growth rate of output was greater in the larger size firms. The 527 establishments employing over 100 persons, while representing less than 5 percent of the number of establishments, accounted for 57 percent of the employment, 72 percent of the wages and social benefits, 1/ 62 percent of the gross output, 71 percent of the value added, 82 percent of the net investment, 66 percent of the increase in inventories, 63 percent of the horsepower installed in the total manufacturing sector.

52. It is interesting to note that of these 500 odd large establishments, 55 percent were in traditional consumer goods, 2/ and slightly over one-fourth were engaged in production of intermediate goods. Less than 100 establishments in durable goods (capital or consumer durables) employed 100 or more persons.

53. In Brazil, by comparison there were 3,456 establishments employing 100 or more persons which accounted for 69 percent of the employment, 76 percent of the wages and 75 percent of the value added, indicating a slightly greater concentration of large establishments than in Colombia.

54. Certain branches of industry are highly concentrated in large establishments in both Colombia and Brazil (e.g., textiles, tobacco, rubber, beverages and chemicals). Brazil has a heavy concentration of employment in larger plants in metals and metal products, paper and machinery (of all types), while the percentage of such concentration in Colombia is markedly lower. Certain industries like furniture, food, clothing and wood products have more small plants reducing the concentration in larger establishments. A comparison of the percentage of branch employment in plants employing over 100 persons in Colombia and Brazil is given in Table III-2 below.

1/ 70 percent of the wages proper and 81 percent of the social benefits.

2/ The Colombian data have been adapted to the Brazilian classification.

Table III-2: EMPLOYMENT IN ESTABLISHMENTS EMPLOYING 100 OR MORE PERSONS AS A PERCENTAGE OF TOTAL EMPLOYMENT, BY INDUSTRY BRANCH

| <u>Concentration of Employment (ranking by Colombian portion)</u> | <u>Industry Branch</u> | <u>Colombia</u> | <u>Brazil</u> |
|---|-------------------------------|-------------------------|---------------|
| | | 1967 (percent) | 1966 |
| Over 80 percent | Textiles | 85 | 85 |
| | Tobacco | 85 | 84 |
| | Rubber | 81 | 75 |
| 65 to 79 percent | Beverages | 78 | 63 |
| | Chemicals | 67 | 74 |
| 50 to 64 percent | Paper | 58 | 73 |
| | Non-metallic Mineral Products | 57 | 58 |
| | Leather | 56 | 44 |
| | Electrical Machinery | 56 | 81 |
| | Transport Machinery | 52 | 90 |
| | Metals and Metal Products | 50 | 79 |
| | Under 50 percent | Printing and Publishing | 48 |
| | Wood Products | 46 | 21 |
| | Mechanical Machinery | 46 | 68 |
| | Food | 41 | 61 |
| | Clothing and Footwear | 37 | 53 |
| | Miscellaneous | 37 | 60 |
| | Furniture and Fixtures | 24 | 27 |

Sources: IBRD: Current Economic Position and Prospects of Brazil, Vol. III Report No. WH195a, December 1969 and Appendix Table 11.

Factory Ownership

55. In 1966, the latest year for which published data are available 65 percent of the establishments were owned by individuals, 23 percent by limited partnerships and only 5 percent were corporations. The rest had miscellaneous forms of ownership, such as official or semi-official firms, general partnerships, cooperatives, etc. As might be expected, the larger firms were generally corporations, the medium-sized firms limited partnerships and the small establishments were owned by individuals.

56. Table III-3 shows that while corporations represented only 5 percent of the establishments, they accounted for over 40 percent of the employment and over 50 percent of the gross output, 59 percent of the

TABLE III-3

STATISTICAL SUMMARY OF MANUFACTURING ACCORDING
TO JURIDICAL FORM OF OWNERSHIP - 1966

| | <u>Establish- ments</u> | <u>Employment</u> | | <u>Gross Output</u> (m i l l i o n) | <u>Value Added</u> (m i l l i o n) | <u>Wages & Salaries</u> (m i l l i o n) | <u>Social Benefits</u> c u r r e n t | <u>New Fixed Investment</u> p e s o s | <u>Inventory Change</u> p e s o s | <u>Horsepower Installed</u> (thousands) |
|----------------------------|-----------------------------|-------------------------------|------------------------------|--|---|--|---|--|--------------------------------------|--|
| | | <u>Total</u> (thousands) | <u>Paid</u> (thousands) | | | | | | | |
| Corporations | 585 | 120.5 | 120.4 | 17,612.3 | 8,162.6 | 1,894.6 | 774.4 | 1,079.7 | 1,579.4 | 659.9 |
| Limited Partnership | 2,698 | 94.4 | 92.6 | 9,226.9 | 3,086.6 | 956.0 | 217.3 | 315.4 | 375.1 | 243.1 |
| Individual Owners | 7,631 | 56.4 | 47.9 | 2,428.7 | 805.2 | 255.2 | 36.2 | 57.5 | 66.1 | 73.9 |
| General Partnership | 152 | 12.2 | 12.1 | 1,826.4 | 594.7 | 150.3 | 41.8 | 57.6 | 27.4 | 26.1 |
| Official and Semi-Official | | | | | | | | | | |
| Societies | 79 | 8.0 | 8.0 | 2,250.3 | 994.0 | 120.6 | 31.3 | 569.1 | 61.3 | 45.6 |
| Others | 652 | 8.0 | 7.0 | 501.5 | 180.7 | 50.9 | 8.6 | 16.9 | -4.8 | 14.2 |
| Total | <u>11,797</u> | <u>299.5</u> | <u>288.0</u> | <u>33,846.1</u> | <u>13,823.8</u> | <u>3,427.6</u> | <u>1,109.6</u> | <u>2,096.2</u> | <u>2,104.5</u> | <u>1,062.8</u> |

Percent Distribution

| | | | | | | | | | | |
|----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Corporations | 4.9 | 40.2 | 41.8 | 52.0 | 59.1 | 55.3 | 69.8 | 51.5 | 75.1 | 62.1 |
| Limited Partnership | 22.9 | 31.5 | 32.2 | 27.3 | 22.3 | 27.9 | 19.5 | 15.0 | 17.8 | 22.9 |
| Individual Owners | 64.7 | 18.8 | 16.6 | 7.2 | 5.8 | 7.4 | 3.3 | 2.7 | 3.1 | 6.9 |
| General Partnership | 1.3 | 4.1 | 4.2 | 5.4 | 4.3 | 4.4 | 3.8 | 2.8 | 1.3 | 2.5 |
| Official and Semi-Official | | | | | | | | | | |
| Societies | 0.7 | 2.7 | 2.8 | 6.6 | 7.2 | 3.5 | 2.8 | 27.2 | 2.9 | 4.3 |
| Others | 5.5 | 2.7 | 2.4 | 1.5 | 1.3 | 1.5 | 0.8 | 0.8 | 0.2 | 1.3 |
| Total | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Source: DANE, Boletín Mensual de Estadística, Number 209

value added and almost the same proportion (58 percent) of wages and social benefits paid. They also accounted for over half the new investment and three-fourths of the increase in inventories. The few large government firms (including Ecopetrol and Planta de Soda) accounted for less than 3 percent of the employment but 7 percent of the value added and 27 percent of the new fixed investment. These striking differences point to the capital intensive nature of the petroleum and chemical industries.

57. The limited partnerships, which enjoy a preferential tax position, are a significant factor in industry (and probably also in trade), as is indicated in Chapter IV.

Labor and Employer Organizations

58. Trade union organizations have an important function in the manufacturing sector. The existing legislation tends to favor a single union within a company as it allows only one union to act as collective bargaining agent. These enterprise unions are frequently affiliated with a national union but bargaining is customarily with a single firm, rather than with an entire industry.

59. There are two large national trade union federations in Colombia: the CTC (Confederacion de Trabajadores de Colombia) and the UTC (Union de Trabajadores de Colombia). Union ties with the political parties are not close and it is the impression of the mission that trade union influence was more evident in industrial bargaining and on other matters of direct labor interest, such as minimum wage laws, than on broader issues such as taxation and industrial or foreign trade strategy.

60. There is no evidence that labor organization has been instrumental in initiating major cost changes in manufacturing industries. The limited data available point more in the direction of wage changes following increases in the cost of living, although obviously the repercussions of such wage adjustments in a particular industrial branch have affected industrial costs and prices in that and related branches.

61. Social benefits include "ordinary" benefits paid as a matter of legal obligation and "special" benefits usually paid by specific large employers. 1/

62. ANDI (Asociacion Nacional de Industriales) is the largest employer organization and engages in economic studies, employment services for foreign technicians and other activities. There are also numerous specialized trade associations.

1/ Labor in Colombia, U.S. Department of Labor, March 1962, pp. 27-37, gives a detailed description, in English, of benefits at that time.

Industrial Financing

63. As was indicated earlier in Chapter I, new investment in fixed assets in Colombian manufacturing in 1967 was 2,364 million pesos, or about US\$150 million equivalent. Investment probably rose slightly in real terms in the following two years. In 1966, the last year for which detailed data are available, private corporations (excluding official societies) accounted for about 51 percent of total manufacturing fixed investment; if official societies are added, the percentage increases to 78 percent. What is most significant for present purposes is that in that year, privately-owned corporations accounted for about 70 percent of the private fixed investment in manufacturing.

64. The data issued by the Superintendency of Corporations (Superintendencia de Sociedades Anonimas) cover only private corporations. At the end of 1968, a sample of the larger corporations 1/ had net assets of approximately 23.3 billion pesos. 2/ It is likely that all corporations in the manufacturing sector had net assets of approximately 30 billion pesos and that total net assets in manufacturing (corporate, non-corporate and official societies) were about 55-60 billion pesos.

65. An approximate condensed balance sheet for 298 large manufacturing corporations is reproduced below:

Table III-4: COMPOSITE BALANCE SHEET FOR LARGE MANUFACTURING CORPORATIONS AS OF DECEMBER 31, 1968

| <u>Assets</u> | <u>Billion pesos</u> |
|---|----------------------|
| Fixed Assets (net of depreciation reserves) | 4.7 |
| Cash and Securities | 2.8 |
| Accounts receivable | 6.3 |
| Inventories | 5.1 |
| Other assets | <u>4.4</u> |
| | 23.3 |
| <u>Liabilities</u> | |
| Payable to Banks | 1.6 |
| Payable to Government | 1.0 |
| Payable to External Creditors | 1.2 |
| Labor obligations | 0.7 |
| Other accounts payable | 4.7 |
| Capital | 4.0 |
| Surplus and reserves | <u>10.1</u> |
| | 23.3 |

Source: Unpublished data, Superintendencia de Sociedades Anonimas.

1/ The sample covers 298 of the 586 corporations, but these 298 accounted for about 80 percent of gross sales and wages and salaries of all corporations.

2/ After deducting 3 billion in depreciation reserves.

The data do not permit a breakdown as between current and long-term obligations.

66. The means by which larger firms handled their financing requirements from 1964 to 1968 is indicated in Table III-5 below.

Table III-5: SOURCES AND USES OF FUNDS
FOR LARGE MANUFACTURING CORPORATIONS

| <u>Sources</u> | <u>1964</u> | <u>1965</u> | <u>1966</u> | <u>1967</u> | <u>1968</u> |
|--|--------------|--------------|--------------|--------------|--------------|
| Internal Sources | 829 | 980 | 1,494 | 1,016 | 1,035 |
| Depreciation | 271 | 295 | 311 | 274 | 358 |
| Contingency reserves | 19 | 27 | -13 | 11 | 21 |
| Undistributed profits | 539 | 658 | 1,196 | 731 | 656 |
| Borrowings | 638 | 610 | 1,846 | 301 | 1,217 |
| Banks | 187 | 31 | 173 | 98 | 520 |
| Government | -26 | 73 | 198 | 29 | 119 |
| Foreign sources | -96 | 267 | 519 | 69 | -97 |
| Labor obligations | 47 | 34 | 64 | 52 | 136 |
| Other credits | 526 | 205 | 892 | 54 | 538 |
| Capital | 214 | 404 | 688 | 109 | 177 |
| Share issues | 149 | 284 | 470 | 164 | 119 |
| Borrowings from shareholders and affiliates | 65 | 120 | 218 | -55 | 58 |
| Total Sources | <u>1,680</u> | <u>1,995</u> | <u>4,028</u> | <u>1,426</u> | <u>2,429</u> |
| <u>Uses</u> | | | | | |
| New fixed capital | 472 | 610 | 721 | 804 | 943 |
| Inventory increases | 355 | 306 | 1,456 | 63 | 323 |
| Cash and securities | 112 | 286 | 274 | 442 | 314 |
| Accounts receivable | 709 | 618 | 1,598 | 28 | 796 |
| Other assets | 32 | 175 | -21 | 87 | 53 |
| Total Uses | <u>1,680</u> | <u>1,995</u> | <u>4,028</u> | <u>1,426</u> | <u>2,429</u> |

Source: Unpublished data, Superintendencia de Sociadades Anonimas.

67. For the larger industrial firms, there has been a tendency for marked swings in borrowings in past years, particularly in periods of larger price increases, presumably because of fears that import liberalization policies would not be long sustained. For example, borrowings tripled between 1965 and 1966 and then fell by over 80 percent in 1967. It is significant to note that borrowings in 1966 were primarily from Government, foreign sources and other credits (accounts payable or borrowings from domestic non-bank lenders). Increases in bank loans were small, reflecting

the tight credit policy of the government. In 1967, after devaluation, borrowings shrank sharply, presumably because increases in inventories and accounts receivable were nominal as compared to a combined increase of 3 billion pesos in 1966.

68. The pattern of the large corporations was not duplicated by the smaller corporations. There are some indications that for the smaller firms the rise in borrowings between 1965 and 1966 was less marked and that the issue of new shares also rose less. While the rise in inventories appears equally steep, the increases in accounts receivable were smaller. Presumably in Colombia, as elsewhere, the smaller firms have less success in borrowing in periods of tight money and high interest rates, except from shareholders or affiliates. These inferences on smaller corporations are drawn from a comparison of sources and uses of funds data for all reporting corporations, and similar data for the 315 large corporations, both reported by the same source. Unfortunately, data for all manufacturing corporations were not available for years after 1966. The following table shows the proportions of the sources of funds in the three years 1964-66 for which comparable data are available for (1) all corporations, (2) 315 identical large manufacturing corporations, and (3) the other manufacturing firms:

Table III-6: SOURCES OF FUNDS BY SIZE OF CORPORATION
(percent)

| <u>Sources of Funds</u> | <u>1964</u> | | | <u>1965</u> | | | <u>1966</u> | | |
|-------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | <u>Total</u> | <u>Large</u> | <u>Small</u> | <u>Total</u> | <u>Large</u> | <u>Small</u> | <u>Total</u> | <u>Large</u> | <u>Small</u> |
| Internal Generation | 38 | 49 | 14 | 37 | 49 | 15 | 31 | 37 | 12 |
| Borrowings | 47 | 42 | 57 | 45 | 37 | 60 | 54 | 51 | 61 |
| Capital | <u>15</u> | <u>19</u> | <u>29</u> | <u>18</u> | <u>14</u> | <u>25</u> | <u>15</u> | <u>12</u> | <u>21</u> |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Superintendencia de Sociedades Anónimas, La Industria Manufacturera and Revista, 1966.

69. The larger corporations financed between 37 and 49 percent of their needs from internal cash generation (undistributed profits and non-cash reserves, e.g. depreciation) as compared with 12 to 15 percent for the smaller corporations. The smaller firms raised 25 to 29 percent of their needs by new equity as against 12 to 19 percent for the larger corporations. Borrowings by the smaller firms constituted a larger portion of their financing, 57 to 61 percent as against 37 to 51 percent for the larger firms. In that connection, it should be noted that such borrowings include borrowings from shareholders or affiliates. Unfortunately, no breakdown of borrowings is available to test the hypothesis that a significant part of the borrowings by smaller corporations probably came from such sources. If this is so, the larger proportion of borrowings may be more nominal than real and may merely reflect tax or other advantages of infusing capital in debt rather than in equity form.

Major Financial Institutions

70. The role of the various institutions involved in industrial financing was described in WH-188a, December, 1968, Annex I, Industry, pp. 17-20. Moreover, the Bank through its present close relations with five leading finance companies (financieras) and contacts with the others is already very familiar with the nature and profitability of the financieras' operations. Consequently, the following comments serve only to point up selected problems.

71. Private development finance companies have played an important role in industrial financing in Colombia. There are eleven such in operation but the five leading ones in the four major cities and Manizales have been operating from five to ten years and their combined activity may be considered to represent approximately 90 percent of the entire group. ^{1/} However, as of mid-1969, these finance companies accounted for only about 20 percent of the 12.5 billion pesos of assets held by development banks (which cover all sectors of the economy). Governmental development institutions like IFI (Instituto de Fomento Industrial - Institute for Industrial Development) are more important sources of capital for industry than any individual financiera. In fact, governmental bodies like IFI and the Central Mortgage Bank (Banco Central Hipotecario) offer stiff competition for savings, partly because of the tax-exempt nature of their obligations.

72. As long as IFI and other government owned finance companies have greater access to funds and/or more favorable terms, private finance companies will find it difficult to reconcile the twin goals of lending on competitive terms with an adequate financial return to attract additional local capital. The proliferation of effort and costs inherent in eleven separate entities, each with its own staff, management and board of directors, while understandable, is not conducive to improving the private companies' competitive position (see Chapter IV regarding fiscal and monetary policy).

^{1/} From a private report to a leading financiera made late in 1969.

CHAPTER IV

GOVERNMENT MEASURES AFFECTING INDUSTRIALIZATION:
FISCAL, MONETARY AND SOCIAL LEGISLATION

73. In internal economic policy as it affects manufacturing, Colombia long emphasized fiscal and monetary measures and limited direct government intervention to exceptional cases like investment in the Paz del Rio steel plant and special measures in exchange crisis situations. The major emphasis was on tax policy, the incidence of which was more progressive than in most South American countries. This is reflected in the fact that direct taxes constitute a larger percentage of tax revenues in that country than in other South American countries. Business taxation policies (with measures ranging from an excess profits tax to tax exemptions to industries for specific performance on use of indigenous materials) reflected twin desires (a) to furnish incentives for industrialization as a means of increasing employment opportunities, and (b) to level down by taxation high, visible income disparities. Monetary policies seemed to fluctuate from period to period.

74. In the last few years, measures intended to spur economic growth and to improve income distribution and resource allocation have tended to become somewhat more direct, e.g. agricultural incentives, export incentives for non-traditional products, greater governmental direction of bank loans and investments toward favored sectors, and a variety of other measures, which are discussed below.

Tax Policy

75. The discussion in this section relies extensively on the Report of the Musgrave Commission, ^{1/} a committee appointed in 1968 by the President of Colombia, to evaluate the tax structure of the country. In general, the mission is in agreement with the findings and proposals of the Musgrave Commission on the issue of business taxation.

76. Fiscal measures affecting Colombian manufacturing industries fall under three general headings: direct business taxes, indirect taxes, and tax incentives. Colombian business taxes, as presently constituted, encompass a multiplicity of complicated and uncoordinated measures. In essence, the incidence of taxation varies markedly according to the legal form of business organization; for example, corporations are effectively discriminated against in favor of non-corporate entities.

^{1/} Commission on Tax Reform, Richard A. Musgrave, President, Tax Reform for Colombia - Report by the Commission on Tax Reform (hereinafter referred to as the Musgrave Report).

77. Tax incentives in some cases have not achieved the objectives for which they were designed. Tax incentives have been in existence since 1960 for the purpose of fostering certain "basic" and "complementary" industries, but have been largely ineffective in securing the desired result.

Business Tax Structure

78. Business taxation can affect manufacturing activity in a variety of ways. The inclusion or exclusion of various forms of income in taxable income, cost deductions, asset depreciation, and tax rates imposed on different legal forms of business, obviously affect the profitability of the enterprises and thus the incentive to invest in them.

79. There are presently three types of taxes levied on business enterprises: (a) income taxes levied on all forms of business enterprise, (b) excess profits taxes levied on corporations only, and (c) special profits taxes applied to corporations and limited liability companies. Indirect business taxes are of little importance in Colombia, although the municipal industry tax is poorly structured and has a nuisance value.

80. The incidence of the business income tax in Colombia depends on the legal form of ownership of the business. The Musgrave Report succinctly summarizes the structure of the business income tax:

"Under the present system, corporations, limited liability companies and partnerships are subject to different treatment as follows:

- corporations now are subject to a three-rate schedule of 12 percent on taxable income up to P 100,000, 24 percent on P 100,000 to P 1,000,000 and 36 percent on the excess over P 1,000,000;
- limited liability companies have a three-rate schedule of only 4 percent on the first P 100,000 of taxable income, 8 percent on P 100,000 to P 300,000, and 12 percent on the excess over P 300,000;
- partnerships are subject to a two-rate schedule of 3 percent on the first P 100,000 and 6 percent on the excess over P 100,000.

All of the after-tax income of limited liability companies and partnerships is inputted to the owners for tax purposes at the individual level, while corporate stockholders are taxable currently only on dividends. The retained earnings of corporations are not taxable to the shareholders. Nevertheless, this difference in integration does not adequately equalize the burden differential at the entity level." ^{1/}

^{1/} Musgrave Report, paras. 6.4 and 6.5.

81. In addition to the business income tax, corporations are subject to an "excess profits" tax which is:

".... levied at graduated rates (20 to 56 percent depending on the rate of return on net worth) on earnings (after deduction of income tax) in excess of 12 percent of net worth when net worth is over P 200,000."

82. The Musgrave Commission gives several reasons for the original establishment of the excess profits tax: First, the government has granted numerous benefits to the manufacturing sector, and the business sector has derived benefits from the protection vis-a-vis foreign competition granted to its products, as well as from monopolistic pricing. It is felt that the government is, in fact, recovering some of its implicit "subsidies to the business sector". Second, "to encourage employers with high earnings to lower prices or raise wages since this could be done largely at the expense of their tax liability".

83. Whatever the rationale for the establishment of the excess profits tax, its impact has been to further discriminate against the corporate form of ownership. The Musgrave Commission feels that the high and erratic marginal rate of taxation resulting from the incidence of the excess profits tax applies mainly to corporations.

84. The third form of business taxation is the group of special taxes. There are two taxes in this group: First, the development and special social security tax - 3 percent of taxable income applies to corporations, individuals, and limited liability companies, but not to partnerships; and second, the housing tax - 6 percent of taxable income - applies to all legal forms of business but not to individuals.

85. The corporate form of ownership is, therefore, penalized under the Colombian business tax structure.

"This discrimination ... is unfortunate both from equity and economic standpoints. The corporate form is an important means of mobilizing capital and organizational talent for the tasks of economic development. In many instances, corporations and limited liability companies are of equal size and resources, and tax differential created by the present structure is unwarranted by their respective economic powers and resources". 1/

86. Another important aspect of the tax problem is the definition of taxable income and includes questions regarding depreciation allowances, loss carry-over and carry-forward, salary allowances and other items such as entertainment expenses, expenses abroad and head-office expense. Pre-

1/ Musgrave Report, para. 6.8.

sently, the Colombian business tax structure does not permit the revaluation of assets — a measure frequently adopted in inflationary economies — and does not have carry-over and carry-forward provisions for losses.

87. On the question of depreciation allowances, the Commission rejects the proposal that asset revaluation be permitted to improve the ability of the taxpayer to maintain his real (as opposed to nominal) capital. It believes that by liberalizing depreciation allowances based on historical cost the same end can be achieved as effectively and with greater administrative simplicity and will be more effective in "rendering assistance to the growing as against the established but static firm". A first step is to eliminate the 10 percent salvage estimate which would increase the total amount of allowable depreciation. It suggests the optional use of double declining balance rates instead of straight line rates on new machinery and equipment (not buildings). It further suggests consideration of increased depreciation rates for plants engaged in multiple shift operations but recognizes probable difficulties of administration.

88. The Bank has supported, indeed urged, asset revaluation in public utilities, because in its absence price regulation based on a rate of return on original cost in local currency would result in inability to finance needed growth in part from internal cash generation and a distortion of resource allocation. In the case of private industry, where pricing is largely unregulated and where varying degrees of competition, both internal and external, are present, the case for asset revaluation is less strong. This is particularly true when price changes are moderate, as in Colombia in the past few years, and where fixed assets are usually less long lived than in hydro-electric plants, water supply projects etc. For these reasons, permissible asset revaluation for manufacturing does not, under present circumstances, appear indispensable for profitable industrial investment.

89. On loss carry-forward and carry-over, the Commission urges adoption of such provisions, which are not presently permitted, to improve incentives for investment in new risky businesses by new firms. Salary limitations for tax purposes of 15,000 pesos per month (US\$833) generally, and 20,000 pesos per month (US\$1,111) for the top manager in a firm "pose efficiency and equity problems for a relatively small group of business firms and their highest paid employees". The Commission proposes raising these limits and the appointment of a "salary board" to hear appeals from firms which seek to justify greater deductions.

90. The Commission recommends repeal of the housing, development, and social security taxes on business, and of the corporate excess profits tax; it suggests raising the equivalent revenue by raising the corporate tax to a level of 44 - 46 percent.

91. It should be noted that the Commission estimated business income tax (including excess profits tax) at over 12 percent of national revenues and individual income tax revenues at just under 15 percent making a total of 27 percent which compares with 23 percent for Chile, 20 percent for Peru, 12 percent for Brazil and 6 percent for Argentina. These figures refer to 1963-65.

92. In general, the mission agrees with the Musgrave Commission on the impact of the business tax structure on the manufacturing sector and with many of its recommendations for reform of the business tax structure. It would be difficult to disagree with the Commission's attitude that:

"At the core of the reform stands substitution of a uniform tax for the multiplicity of the present structure and the resulting realignment of rates". 1/

Indirect Taxes

93. Indirect taxes are generally low and of less importance in Colombia than they are in other Latin American countries. The Commission estimates indirect taxes in Colombia at 6-7 percent of GNP as compared to 8 percent in Chile, 11 percent in Peru and 13-14 percent in Brazil and Argentina. The mission estimates that manufacturers pay about 4 percent of sales in indirect taxes. There are two types of indirect taxes that affect the manufacturing sector: the national sales tax and the municipal industry tax.

94. The industry tax is levied at the municipal level and industry tax. Rates are relatively low, the nuisance value to manufacturers is unjustified. The mission agrees with the Musgrave Commission that the:

"... Municipal Industry and Commerce tax should be abolished. This tax is an inequitable and unworkable anachronism for a country at Colombia's stage of development. Tax liability is determined on the basis of a curious mixture of gross sales, installed horsepower, value of monthly rent, and even square feet of plant space in some municipios. The tax attempts to bring virtually all firms, no matter how small, into its base (although there is a complex maze of exemptions), and the base as well as the exemption structure varies considerably from municipio to municipio. Evasion is estimated to be inordinately high, and the arbitrary method of imposing and collecting the tax gives rise to substantial opportunities for corruption. The tax is considered to be a nuisance by the business community, is regressive in its distributional impact, and has low revenue elasticity. It lacks any theoretical basis and very likely leads to distortions in business location decisions." 2/

95. The national sales tax, which is levied at the manufacturers level and on all imports, ranges between 3 and 15 percent, although most products fall in the 3 percent category.

1/ Musgrave Report, para. 6.3.

2/ Musgrave Report, para. 8.33.

96. As mentioned in the section on tariffs, indirect business taxes should be realigned so that the luxury tax effects of the present tariff schedule can be eliminated.

Monetary Policy - Impact on Industry

97. The Government's monetary policies have had the effect of favoring agricultural borrowers over private industrial or trade borrowers in a variety of ways. Direct preferences for agricultural borrowers have been reflected in (a) preferential interest rates and terms, (b) requirements that banks lend a minimum percentage of assets to favored groups, like agriculture. Furthermore, the loanable funds of banks available for discretionary lending have been reduced by increasing the reserve requirements of commercial banks with the Bank of the Republic and a requirement to buy government bonds, the proceeds of which are earmarked for specific purposes, usually non-industrial.

98. Recent social legislation has had the effect of channelling certain funds (for pensions and dismissal wages) formerly held and invested by enterprises, to the Social Security Institute, which has then channelled these funds to the Central Mortgage Bank and other institutions for investment in housing and other government-sponsored projects.

99. Governmental direction of credit is not new. Law 26 of 1959 required commercial banks to reserve a minimum of 15 percent of their portfolio for livestock loans. Taken by itself, this directed lending initially probably had limited economic effects. However, when for reasons of monetary policy private commercial banks are required to keep larger cash reserves with the Bank of the Republic and when official banks (Caja Agraria, Banco Cafetero and Banco Popular) are given greater access to such directed funds through preferential treatment on rediscounts, the effect is to rechannel banking funds away from industry and urban trade to agriculture, housing and other public projects favored by Government policy.

100. The effect of all these measures was to restrict the supply of loanable funds available from private commercial banks. While interest rates are nominally controlled, some borrowers and lenders have found loopholes which result in increased borrowing costs. Others, finding access to customary lenders restricted, are borrowing in the "street" market at 2 percent or more per month, as compared to the bank rate ceiling of 14 percent per year. This "street" market is allegedly fed in part by funds obtained by livestock raisers at much lower rates from Caja Agraria. Another influence is the fact that the Central Mortgage Bank, an official institution, is borrowing at 11-1/2 percent tax-free to the lender. The lender, moreover, has an instant cash option.

101. The combined effects of these measures and of prior import deposits (see section on import controls) have caused a substantial squeeze on the availability and cost of working capital for industry and trade. The extremely high net of tax rate offered by an official agency, the Central Mortgage Bank for a highly liquid investment, has put other capital suppliers or intermediaries at a considerable disadvantage and contributed to a high nominal cost of capital. Since the rate of overall price increases has been moderate in marked contrast with a number of other South American countries, the real costs of borrowing are and have been positive and rather high in Colombia in the last few years.

102. It is highly questionable whether, given such a high cost of capital, both real and nominal, the areas to which investment have been directed as a result of governmental policies have yielded as high a return to the economy as equivalent investments in industry and trade might have yielded.

Price Controls

103. Price controls were put into effect in 1961 under President Lleras Camargo. The peak of price controls was apparently in 1965, when controls were administered by a total staff of about 50 persons, half professional and covered about 35 percent of the economy. Controls have been eliminated or changed so that less than 4 percent is presently under control. Items remaining under control are primarily those that affect the cost of living index directly or indirectly. Examples are beer, cigarettes, rubber tires, gasoline, transport charges, some drugs and packaging materials. There are almost no controls on agricultural products, and agricultural inputs such as insecticides and herbicides were freed of price control early in 1970.

104. Where industries are not believed to be monopolistic or oligopolistic, controls have been removed. Certain basic products like steel and cement have also been freed, but the producers in such industries are required to furnish one month's advance notice of price increases, so that a judgment may be made as to whether to restore controls, or more often, to provide an opportunity to negotiate a lower increase. The trend is toward freeing items from price control with more reliance on competition, occasional removal of quantitative import restrictions or tariff reduction (e.g. glass) and at times concessions to the industry such as reduction of prior import deposit rates on imported parts or materials.

Social Legislation

105. In the field of social legislation, there are two aspects which have had adverse effects on industrial investment and operations: severance pay requirements and shift premium for night work.

106. The most significant is the severance pay requirement (cesantia). The cesantia legislation requires the employer to pay a lump sum equal to one month's wage for each year of service when a worker is dismissed (except for criminal acts, intentional damage to business property or disclosure of business secrets). This is viewed in some quarters as a substitute for unemployment insurance, but it should be noted that its incidence falls on the specific employer responsible, rather than being spread over the entire industrial sector or the economy as a whole, as is the case in an insurance scheme. For this reason, it becomes a greater risk to new ventures or to particular employers who add to their employment rolls. Where labor costs are an important cost element, this requirement may be particularly burdensome or at least be viewed in that way by the prospective investor. In some industries, special contracts of less than one year's duration can be used to avoid this requirement, but these do not appear to be widely used. On balance, it would appear that in industries where labor is a large cost element, the severance pay requirement serves to delay or deter new investment, reinforcing a strong tendency to restrict supply and maintain prices above levels likely to prevail in the absence of such requirements.

107. There are statutory overtime pay requirements of a 25 percent premium for work performed outside regular hours or in excess of the maximum daily hours (generally 8 hours). If the overtime work is night work, performed between 7 p.m. and 6 a.m., it calls for a 75 percent premium. Night work performed as a regular shift, calls for a 35 percent premium. It is the premium for regular night work, which deters many establishments from operating a multi-shift operation, especially where labor costs are a significant cost element.

108. This premium is of lesser significance in plants operating on a continuous process (rather than batch process) basis. Other factors may also be operative - for example, lack of adequate supervisory employees and inadequate public transport at night. This premium for night work has an important deterrent effect on multi-shift operation, particularly when taken in conjunction with the cesantia requirement.

Internal Policy Mix

109. The industrial boom of the 1950s, fed by the availability of foreign exchange resulting from high coffee prices, ended in 1957. While coffee prices fell sharply in 1955, the industrial boom continued for several years thereafter, due in part to the time that elapses between the initial commitment and the actual implementation of any investment. The much lower level of coffee prices of the late 1950s and early 1960s would have inhibited industrial investment in any case, but uncertainties as to governmental policies in the fiscal and monetary fields probably accentuated the decline.

110. In recent years, governmental policy has been directed at expanding investment and employment primarily in social overhead projects, but also in agriculture which appeared to have good prospects for

export expansion relative to the foreign exchange investment needed. The measures taken to implement the policy have directed capital away from private industrial investment and have led to high and rising interest rates, not only in nominal but also in real terms. As indicated earlier, the continuing availability of 11-1/2 percent tax-free bonds of the Central Mortgage Bank affords very stiff competition, deterring private investment.

111. Problems such as an adequate level of national savings, a proper taxation mix and the share of public investment in total investment, of course, affect other sectors as well as industry and must be viewed from an overall standpoint. However, it is evident that the fiscal, monetary and public investment policies followed in the last few years have had the effect of inhibiting industrial growth, while spurring investment in agriculture, public works and social sectors such as education and public health. In the case of severance pay, the risks to individual firms could be reduced by a national insurance scheme; this point seems worth further consideration by the Government.

112. The choice of priorities is clearly the responsibility of Colombia but the effects on the non-favored sectors flowing from such choices need to be understood by all concerned.

CHAPTER V

GOVERNMENT MEASURES AFFECTING INDUSTRIALIZATION: PROTECTION
AND EXPORT PROMOTION

113. Over the past ten years, Colombia has gradually evolved from pursuing predominantly inward-oriented trade policies to an outward-looking orientation. While many of the present policies of protection and export promotion can be traced back to the early sixties, it was not until 1967 that they were presented cohesively. The present system of non-tariff trade restrictions, foreign exchange regulations and export promotion policies were fully defined in Decree-Law 444 of March 1967. With some modifications to this Law, the system has remained basically unchanged since that time.

114. Unlike the trade policies of other Latin American countries, the Colombian policies of export promotion and import substitution were primarily designed to change the structure of the balance of payments in a broad sense, rather than assist industrialization in particular. The policies were, therefore, as much geared to promote exports and substitute for imports of agricultural products as of manufactures. The emphasis which has been given to the agricultural sector in other policy fields, such as credit, bears out this conclusion. As an example of the general nature of Colombia's commercial policy, the import of both processed and unprocessed foodstuffs has been curtailed over the past 15 years in a drive to attain self-sufficiency. This has been one of the few explicit trade policies pursued by the government. The policies, nevertheless, have had an impact on industrialization and have contributed to import substitution and export promotion in manufactured goods. An analysis of these policies follows.

THE SYSTEM OF PROTECTION

115. The present system of protection for Colombian manufactures is comprised of three elements: an ad valorem tariff enacted in 1964, but much amended since; a system of quantitative import restrictions embodied in an import licensing system; and a system of prior deposits. As mentioned above, Colombian protectionism was primarily a reaction to limited foreign exchange availability rather than a concerted effort to encourage industrialization.

116. The protective effect of tariffs and quantitative restrictions has varied with the strictness of quantitative restrictions and applies differently to the various classes of goods. Where import prohibitions exist, the level of protection is extremely high. For products which are subject to restrictive licensing the tariff level is, in fact, a minimum level of protection. Prior deposits raise the level of protection but have been used by the government more as an instrument of restriction on credit than as trade policy.

The Level of Protection

117. Calculating the level of effective protection for Colombia is a difficult task, particularly for consumer goods, for these imports are extremely restricted. Moreover, constantly changing non-tariff restrictions could make any calculation of effective protection outdated almost before it is completed. It is not surprising, therefore, that no adequate study has been carried out.

118. An attempt has been made in this report to assess the level of protection of selected finished manufactured products by taking into account the major inputs that are needed in producing them. The results of this analysis, which are summarized in Table V-1, give an indication of the differential between value-added on the finished product under the present structure of protection and value-added in a free trade situation.

119. The benefits to local producers of protecting a given product are eroded if the protection on the imported inputs required to produce this product in Colombia is also high. This analysis, of course, applies most readily to products which require large quantities of imported inputs such as capital goods and many non-durable consumer goods. Where imported inputs are not required, the level of protection granted to the final product is equal to the actual tariff (nominal rate) for this product.

120. The analysis summarized in Table V-1 indicates that for machinery and some metal manufactures the protection on value-added is probably quite low for two reasons: first, the tariff on the final product is relatively low; second, imported inputs are also protected.

121. At the other extreme, some consumer goods such as clothing have an almost infinite level of protection, because importation of the final product is prohibited. Even if there were no import prohibitions and the tariff rate applied protection on the value-added would be high since tariff rates for the final goods are very high and they require little in the way of imported inputs.

122. In considering the level of protection that the government is granting to the local producers, any charges that add to production costs, such as indirect business taxes, should be deducted. This discussion disregards indirect business taxes because in Colombia the incidence of these taxes on production costs is almost negligible.

Quantitative Restrictions

123. All imports into Colombia are classified into one of three categories: imports which require a prior license, imports which can be imported freely and goods under embargo. There are three corresponding lists of products: prior license, free and prohibited lists. All capital

Table V-1: LEVEL OF PROTECTION FOR SELECTED MANUFACTURED PRODUCTS

| | Prior | | | Prior | |
|--|-----------|-----------|---|-----------|-----------|
| | Tariff | Deposit | | Tariff | Deposit |
| | (percent) | (percent) | | (percent) | (percent) |
| I. INPUTS INTO CAPITAL GOODS INDUSTRIES | | | | | |
| a. Heavy Machinery | | | OUTPUTS OF CAPITAL GOODS INDUSTRIES | | |
| Special Steels | 25 | 130 | Machine tools | 19 | 1 |
| Cast iron | 8 | 130 | Hand tools | 50 | 30 |
| Copper wire | 35 | 130 | Electrical machinery | | |
| Copper sheets | 40 | 130 | (generators, motors, transformers) | 50 | 30 |
| Parts for electrical machinery | | | Engines - steam and internal | | |
| (transformers, generators, motors) | 40 | 10 | combustion | 27 | 50 |
| Parts for mechanical machinery | | | Compressors | 53 | 1 |
| (compressors) | 50 | 1 | | | |
| Engine parts | 5 | 10 | | | |
| Arithmetic average | 29 | 77 | Arithmetic average | 39 | 22 |
| b. Transport Equipment | | | | | |
| Chassis: trucks | 20 | 30 | Trucks | 120 | 10 |
| jeeps | 20 | 30 | Buses | 60 | 30 |
| buses | 25 | 5 | Jeeps | 20 | 30 |
| Bodies: jeeps | 40 | 70 | | | |
| buses | 40 | 70 | | | |
| Parts | 20 | 38 | | | |
| Spring steel | 40 | 130 | | | |
| Steel sheets | 30 | 30 | | | |
| Arithmetic average | 28 | 37 | Arithmetic average | 67 | 21 |
| Quantitative restrictions: All products subject to prior license. | | | | | |
| II. INPUTS INTO DURABLE CONSUMER GOODS INDUSTRIES | | | | | |
| a. Appliances | | | OUTPUTS OF DURABLE CONSUMER GOODS INDUSTRIES | | |
| Parts for electrical appliances | 50 | 130 | Electrical appliances | 50 | 130 |
| Motors for electrical appliances | 55 | 30 | Sewing machines | 90 | 1 |
| Electric wire | 45 | 130 | | | |
| Aluminum sheets | 30 | 130 | | | |
| Cold rolled steel sheets | 30 | 30 | | | |
| Parts for sewing machines | 75 | 1 | | | |
| Arithmetic average | 48 | 75 | Arithmetic average | 70 | 66 |
| b. Motor Cars | | | | | |
| Chassis for motor cars | 180 | 70 | Motor cars | 360 | 130 |
| Bodies for motor cars | 180 | 40 | | | |
| Parts | 50 | 30 | | | |
| Spring steel | 40 | 130 | | | |
| Steel sheets | 30 | 30 | | | |
| Arithmetic Average | 96 | 60 | Arithmetic average | 360 | 130 |
| c. Tires | | | | | |
| Tire cases, threads, tubes, tire flaps | 50 | 30 | Tires (except for tractors) | 50 | 30 |
| Zinc Oxide | 40 | 30 | | | |
| Plates, sheet, strip, etc. of unhardened, vulcanised rubber | 55 | 30 | | | |
| Carbon black | 5 | 1 | | | |
| Natural rubber | 10 | 1 | | | |
| Arithmetic average | 28 | 16 | Arithmetic average | 50 | 30 |
| Quantitative restrictions: All products subject to prior license except zinc oxide (which is on the free list). | | | | | |
| III. INPUTS INTO NON-DURABLE CONSUMER GOODS INDUSTRIES | | | | | |
| a. Textiles | | | OUTPUTS OF NON-DURABLE CONSUMER GOODS INDUSTRIES | | |
| Cotton yarn | 30 | 130 | Cotton textiles | 43 | 130 |
| Raw cotton | 20 | 1 | Wool textiles | 100 | 130 |
| Wool yarn | 60 | 130 | Synthetic textiles | 50 | 130 |
| Raw wool | 16 | 70 | | | |
| Synthetic yarn | 35 | 130 | | | |
| Synthetic fibers | 35 | 130 | | | |
| Arithmetic average | 33 | 92 | Arithmetic average | 64 | 130 |
| b. Clothing | | | | | |
| Wool textiles | 100 | 130 | Clothing | 225 | 130 |
| Cotton textiles | 43 | 130 | | | |
| Synthetic textiles | 50 | 130 | | | |
| Ornaments for clothing | 230 | 130 | | | |
| Arithmetic average | 106 | 130 | Arithmetic average | 225 | 130 |
| c. Leather Goods | | | | | |
| Parts for shoes | 100 | 130 | Footwear | 200 | 130 |
| Tanning materials | 30 | 130 | Handbags & all other leather goods | | |
| Cattle leather | 40 | 40 | of consumer use | 100 | 130 |
| Raw hides | 27 | 30 | | | |
| Arithmetic average | 51 | 83 | Arithmetic average | 140 | 130 |
| Quantitative restrictions: With the exception of textile inputs and tanning materials which are subject to prior license- all other products are prohibited. | | | | | |
| IV. INPUTS INTO INTERMEDIATE GOODS INDUSTRIES | | | | | |
| a. Refined Metals | | | OUTPUTS OF INTERMEDIATE GOODS INDUSTRIES | | |
| Refined copper | 8 | 30 | Copper wire | 35 | 130 |
| Refined zinc | 20 | 130 | Copper sheets | 40 | 130 |
| Refined lead | 20 | 70 | Brass | 5 | 130 |
| Tin | 20 | 1 | Batteries | 40 | 130 |
| | | | Finplate | 25 | 30 |
| Arithmetic average | 17 | 57 | Arithmetic average | 29 | 104 |
| Quantitative restrictions: refined zinc and tin are on the free list; all other products are subject to prior license. | | | | | |

Note: Appendix Table 22 gives the specifications of the products listed in this table. Whenever more than one rate applies to a given product, an arithmetic average has been calculated.

Source: Inestacion Economica, Ltda., Nuevo Arance! de Aduanas de Colombia.

goods and most intermediates are subject to prior license; many consumer goods are in the prohibited list while some intermediates not produced domestically are in the free list. Tables V-8 and V-9 give an indication of the most important manufactures in the free and prohibited lists. Most of the remaining manufactures are subject to prior license.

L24. The protective impact of the licensing system has varied with the type of products and with foreign exchange availability. In years of strict quantitative restrictions the level of protection has been higher than in years when quantitative restrictions are limited. Also, in years of strict quantitative restrictions, the import of consumer goods has been severely curtailed, whereas capital goods and intermediate goods have been allowed in with more freedom. The level of protection on consumer goods has, therefore, risen more than that for intermediates and capital goods in such years.

125. Quantitative restrictions have changed considerably from year to year, depending on the availability of foreign exchange. Hence, while in 1966 only about 45 percent of the products were subject to prior license, in 1967, 95 percent of imports were subject to prior license. In 1968, the figure fell to 88 percent and in 1969 it was 80 percent (see Table V-2 below). At the present time further additions to the free list are being considered. The rate of liberalization of quantitative restrictions is apt to be slow because Colombian authorities fear that pressures to accumulate inventories will cause so large a drain on reserves as to be self-defeating. Colombian authorities cite experiences in 1966 and earlier periods. The analysis of the Mission (Chapter VI) confirms that widespread inventory speculation occurred in periods of trade liberalization.

126. The licensing system therefore contributes to fluctuations in the demand for foreign exchange. In years when quantitative restrictions are not strict, the demand for foreign exchange increases markedly, almost irrespective of the need for imports. Much of this increased demand is inventory build-up in the manufacturing sector. The result of these increases in demand for imports is that the percentage of licenses denied (in terms of value) in total demand for licenses does not change drastically.

Table V-2: SHARE OF IMPORTS REQUIRING PRIOR LICENSE
IN TOTAL IMPORTS - 1956-1968

(Million US\$)

| <u>Year</u> | <u>Import Registries</u> | | | <u>Share of restricted imports to total imports (percent) (2/3)</u> |
|-------------|--------------------------|-------------------------------|-------------------|---|
| | <u>Free</u> 1 | <u>Prior License</u> 2 | <u>Total</u> 3 | |
| 1956 | 360.1 | 102.4 | 462.6 | 22.1 |
| 1957 | 289.4 | 118.7 | 408.1 | 29.1 |
| 1958 | 159.7 | 116.8 | 276.5 | 42.2 |
| 1959 | 230.1 | 147.0 | 377.1 | 39.0 |
| 1960 | 266.3 | 178.2 | 444.5 | 40.1 |
| 1961 | 280.3 | 182.2 | 462.5 | 39.4 |
| 1962 | 207.7 | 186.8 | 394.5 | 47.4 |
| 1963 | 177.1 | 293.7 | 470.8 | 62.4 |
| 1964 | 169.6 | 285.1 | 454.7 | 62.7 |
| 1965 | 72.1 | 405.1 | 477.2 | 84.9 |
| 1966 | 360.2 | 278.9 | 639.1 | 43.6 |
| 1967 | 19.8 | 505.0 | 524.8 | 96.2 |
| 1968 | 75.4 | 555.1 | 630.5 | 88.0 |

Source: Alberto Musalem, Demanda por Dinero y Balanza de Pagos; La Experiencia de Colombia, 1950-1967, unpublished document, 1969.

127. While in 1967, a year when strict quantitative restrictions were in effect, about 32 percent of the licenses requested were refused, in 1968 about 19 percent were refused, and in 1969 -- a year of trade liberalization -- about 22 percent were refused. In 1969 there was an increased demand for import resulting in part from the increased income of the coffee boom but also reflecting the importer's knowledge that there had been a liberalization of the restrictive policies. Table V-3 below indicates the relationship between the demand for foreign exchange and the value of licenses approved.

Table V-3: PERCENTAGE SHARE OF LICENSES DENIED IN
TOTAL DEMAND FOR LICENSES

(Million US\$)

| | <u>1967</u> | <u>1968</u> | <u>1969</u> |
|--|-------------|-------------|-------------|
| Demand for licenses (foreign exchange "pressure") | | (646.8 | 815.5 |
| Licenses approves | n.a. | (521.3 | 638.5 |
| Licenses denied | | (125.5 | 177.0 |
| Percentage share of licenses denied in total demand | 32.0 | 19.4 | 21.7 |

Source: Unpublished INCOMEX data.

128. The time taken in processing license applications is another form of protection and of saving foreign exchange. In years of severe quantitative restrictions, the processing of licenses is allowed to take a considerable amount of time, while in years of foreign exchange liberalization, they are processed quite rapidly. It is up to the Institute of Foreign Trade (Instituto de Comercio Exterior - INCOMEX), an agency of the Ministry of Development (Ministerio de Desarrollo) in charge of licensing to determine how much time processing applications should take.

129. The time taken to approve licenses has, therefore, varied. In 1967, when there were strict import controls and foreign exchange shortages, it would take an average of two months for a license to be approved. At that time delays in processing license applications were used as a means of controlling foreign exchange. In mid-1968, the time allowed to process a license was shortened to one month, although in practice it took a little longer. In February of this year the period allowed was further reduced to ten days. The administrative reforms of INCOMEX have contributed to the more rapid processing of license applications, although it is to be expected that at times of foreign exchange shortage, delays might occur again.

130. As mentioned above, the licensing system is administered by the Institute of Foreign Trade. There are two types of licenses in Colombia: the regular license and the global license. The discussion in the paragraphs that follow will concentrate on the former which applies to all imports in the "prior license" list. The second type of license, the global license, is required for all projects above 100,000 pesos and is one of the means by which the government regulates investment in the manufacturing sector.

131. License applications go through two stages: processing and approval. Licenses are processed at INCOMEX, where information on the product and the importer is supplied. There are about 40 persons engaged in processing the applications.

132. Unlike past practice when the entire application processing was handled from Bogota, causing undue administrative delays, the applications are now frequently received by INCOMEX field offices, which do not send them on to Bogota unless they are properly filled out. It is felt in the other major cities that this new practice will contribute significantly to the speeding up of license procedures.

133. After the license has been processed by the INCOMEX staff, it goes to the Council on Foreign Trade (Consejo de Comercio Exterior) for approval. The Council is composed of representatives of the Ministries of Development, Finance, and Agriculture, the Planning Office, I.F.I. and INCOMEX. Each member of the Council is specialized in one industrial field, and all applications for imports of these products are handled by this person. Once the product specialist has analyzed it, the license application goes to the Council, which as a rule accepts the opinion of

the specialist. The establishment of a multi-agency Council on Foreign Trade represents a change from past practice, when INCOMEX had the control of licensing approvals. This brought about disagreements between the other government agencies involved in industry and the Institute.

134. Although there are several criteria used for evaluating license applications, in the past, the main reason for refusing to grant a license has been that there is domestic production of the proposed import. This makes the licensing system the major tool of protection against foreign competition.

135. In 1969 there were 130,000 license applications, which in practice meant that the INCOMEX staff and the Council on Foreign Trade had to analyze and approve about 500 applications per day. No matter how competent and diligent, the staff of INCOMEX thus does not have time to evaluate the license applications thoroughly. The impact of this form of resource allocation on the manufacturing sector has unavoidably been arbitrary.

136. The effect on the manufacturing sector of quantitative restrictions on imports has been three-fold. First, it has contributed to over-capacity; second, it has been a bottleneck to increased production because of the difficulty in importing parts and raw materials, and third, by curtailing the import of many consumer goods it has probably contributed to lower quality and higher prices of some domestically produced products.

137. The Colombian manufacturing sector depends heavily on imported raw materials and equipment. In order to be sure of having the equipment when they want it, Colombian manufacturers tend to purchase equipment ahead of time, when foreign exchange is available. This leads to premature and excessive investment contributing to high overhead costs and over-capacity.

138. The tendency to purchase equipment ahead of time further accentuates the underutilization of capacity, stemming from a reluctance on the part of manufacturers to engage in multishift operation, unless assured of the regular and continued availability of raw materials, especially imports. This issue is more fully discussed in the section on social legislation.

139. The need to obtain a license for maintenance materials and spare parts for machinery has also tended to curtail production. This is always a problem, but it is particularly acute in years of strict quantitative restrictions. The problem of spare parts is so severe in Colombia that it has been estimated that much of the fifty-odd million dollars 1/ of smuggled goods into Colombia each year is in spare parts. The smuggling of spare parts negates the protective effect of trade barriers on these products, and is costly in foreign exchange expenditure.

1/ This figure is an official estimate and is taken into account in preparing the balance of payments.

140. There has been a virtual embargo on the importation of many consumer goods, such as clothing, leather goods, and electrical appliances. This prohibition, by eliminating foreign competition, has retarded quality improvements and adaptations in such fields as clothing and leather goods which have export potential.

Global Licenses

141. As mentioned above, all projects which require imports of capital equipment exceeding 100,000 pesos must obtain a global license to import the necessary equipment. Global licenses are important since they are in effect required for all new industrial projects and most industrial expansion programs, and are granted on the basis of the merit of the project. Global licenses are, therefore, a form of government regulation of investment.

142. The application for the global license is in the form of a questionnaire which contains information on the project, the market, factor requirements, installations, investment, cost of production and other economic indices. The Capital Goods Section of the Division of Imports at INCOMEX is in charge of studying applications for global licenses. The information contained in the questionnaire is incorporated into a project study which is submitted to the Council of Foreign Trade (see para. 133 above). The Council meets periodically to study global licenses. The general criteria used to evaluate projects subject to global license as well as those subject to regular license are set out in Decree 444. The project is evaluated primarily in terms of

"its contribution to the development and diversification of exports and the favorable impact of these exports on the balance of payments"; and

"the net savings of foreign exchange that may be obtained from import substitution (resulting from the project)" 1/

It is not clear, however, how these criteria are applied. At the present time, the foreign exchange cost of the project is compared to exchange earnings resulting from import substitution or increased exports. This criterion assumes that local resources are costless, which is a questionable assumption. In the future, more consideration should be given to a comparison of the projected price of the product produced domestically with the c.i.f. price of the equivalent imported product and of the implicit local currency costs involved in saving foreign exchange.

1/ Decree Law 444 of 1967, Article 77.

143. Once the project, with its corresponding imports, has been approved, the firm is able to import all the equipment under the global license by applying for a regular license. The regular license applications in such cases is approved with relative ease. The present system represents an improvement over past practice because the Council is now an intra-agency body; this gives a broader base to decision making. Council agencies such as the Planning Office, however, have a very limited time in which to study the projects.

144. In 1969, global licenses for over \$100 million were approved, which represents an increase of 100 percent over the previous year when only \$51 million was approved. The increase, however, does not necessarily represent the trend in investment, since the types of projects requiring global licenses have been broadened. Table 27 in the Appendix gives a summary of projects receiving global licenses.

The Tariff Structure

145. The present tariff schedule of Colombia dates from 1964. Decree 3168 of December of that year set Colombia in the Brussels Tariff Nomenclature and realigned some of the tariffs. Decree 3168 permits changes in the tariff rate of 30 percent in either direction. These changes have been frequent but must be approved by the Council on Tariff Policy (Consejo de Politica Aduanera) comprised of representatives of the Ministries of Finance, Development, and Agriculture, a representative from INCOMES and one representative from each House of Congress. The Council Secretariat is the Tariff Division (Division de Aranceles) of the Ministry of Finance.

146. Law 25 of 1968 granted authority to the President to make any fundamental changes in the tariff schedule which might have been needed; the authority expired at the end of 1968. For this purpose, the President named a Committee on Tariff Reform (Comite de Reforma Arancelaria). The proposals of the Committee involved mostly the realignment of some items to eliminate major inconsistencies in the tariff schedule. The changes, however, did not significantly alter the level of nominal protection, although they probably moderately raised the level of effective protection on some finished products.

147. On the average, tariffs are lowest for capital goods and intermediate products not available domestically and highest for consumer goods. A frequency distribution of the 3,000 odd manufactured goods in the tariff schedule by tariff rate groups is given in Appendix Table 21. Table V-4 below aggregates these into six tariff rate groups (0-15, 16-30, 31-45, 46-60, 61-100 and over 100) and shows the distribution of frequencies by industrial subgroups. Over 50 percent of tariff frequencies in the non-durable consumer goods category fall in the 61 percent and over range, and over 60 percent of the durable consumer goods fall in the 31 to 60 percent range. The bulk of the frequencies in intermediate goods fall in the 16 to 45 percent range, while 64 percent of the frequencies in capital goods fall in the 0 to 30 percent range.

Table V-4: PERCENT DISTRIBUTION OF TARIFF FREQUENCIES

| | Average Nominal Tariff* (%) | T a r i f f R a n g e | | | | | | Total (%) |
|-------------------------------|--------------------------------------|------------------------|--------------|--------------|--------------|---------------|--------------------|--------------|
| | | 15 and under (%) | 16-30 (%) | 31-45 (%) | 46-60 (%) | 61-100 (%) | Over 100 (%) | |
| Non-durable consumer goods | 108.4 | 6.3 | 9.1 | 14.5 | 17.0 | 21.9 | 31.2 | 100.0 |
| Durable consumer goods | 107.9 | 1.2 | 9.9 | 22.2 | 38.3 | 19.9 | 18.5 | 100.0 |
| Intermediate goods | 46.4 | 7.1 | 28.8 | 25.9 | 18.0 | 14.1 | 6.1 | 100.0 |
| Capital goods | 30.5 | 26.5 | 37.5 | 16.6 | 9.0 | 8.5 | 1.9 | 100.0 |
| <u>Total</u> | <u>73.1</u> | <u>11.0</u> | <u>26.6</u> | <u>21.6</u> | <u>15.9</u> | <u>14.2</u> | <u>10.7</u> | <u>100.0</u> |

*Arithmetic average.

Source: Appendix Tables 21 and 26.

148. Thus, if quantitative restrictions had not operated, tariffs high enough to preclude competition from imports in clothing, leather goods, and in some appliances apply. As far as luxury consumer goods such as automobiles are concerned, these tariffs in fact constitute a luxury tax levied on consumption. In this connection the Musgrave Commission Report points out that:

"Indirect taxes need be coordinated with the structure of custom duties. The main objective is to separate the function of luxury taxation from that of protection. Indirect taxes are to be used to tax luxury consumption, independent of whether an article is produced at home or imported; and customs policy is to be used to grant protection where import substitution is to be encouraged, independent of whether the product is purchased by high or low income consumers. Thereby high tariffs resulting in unintended protection for import substitution in luxury products are avoided, and the efficiency of resource allocation is improved." ^{1/}

Prior Deposits

149. An advance deposit in pesos equivalent to a specific percentage of the f.o.b. value of imports must be paid by the importer prior to submitting application for an import registration and, in most cases, an import license. Some types of Government bonds may be used for the deposit. The certificate of deposit may not be used as collateral nor for any similar purpose by the depositor.

^{1/} Musgrave Report, paragraph 8.3.

150. Prior deposits are now required on all imports except for selected imports such as imports of capital goods by official entities and some "basic industries". Imports from countries in the Latin American Free Trade Association and imports under some of the export promotion programs can also be exempted.

151. Imports usually fall, according to their tariff classification, into one of five prior deposit lists: 1, 10, 30, 70 and 130 percent, depending on the essentiality of the product and the extent of local production. Authorization may be obtained in some cases for reduction to a uniform rate of 5 percent for individual or groups of capital goods valued at over 100,000 pesos. The prior deposit is never returned before the imports arrive, and are usually held for a period of 6 months. An estimate of the average cost of prior deposits is shown in Table V-5 below. Prior deposits have been used more for purposes of tightening credit than for purposes of protection, but of course they also have a protectionist effect. Their impact on the manufacturing sector has been to further tighten the availability of working capital.

Table V-5: IMPLICIT COST OF PRIOR DEPOSITS
(as a percent of value of imports)

| <u>Year</u> | <u>Yearly average Ad Valorem</u> |
|-------------|--|
| 1956 | 5.1 |
| 1957 | 6.4 |
| 1958 | 8.2 |
| 1959 | 7.9 |
| 1960 | 9.1 |
| 1961 | 9.4 |
| 1962 | 8.5 |
| 1963 | 19.6 |
| 1964 | 10.9 |
| 1965 | 18.6 |
| 1966 | 11.3 |
| 1967 | 7.2 |

Note: This represents the imputed opportunity cost resulting from funds being tied up between the time of deposit and repayment. The opportunity cost estimate is based on the rate of interest paid on a selected number of issues in the Bogota Stock Exchange during a period of six months, the length of time usually required for remittance of the prior deposit. This sum is then taken as a percentage of the c.i.f. value of imports.

Source: Alberto Musalem, Demanda por Dinero y Balanza de Pagos; La Experiencia de Colombia, 1950-1967, unpublished document, 1969.

EXPORT PROMOTION

152. The Colombian Government began a policy of export promotion in the early sixties when a highly regressive export tax was removed, tax incentives were granted to exporters and an import-export scheme was introduced. However, the export promotion policies as presently in operation were introduced in 1967 under Decree 444. The government has a four-fold policy for export promotion: first, a subsidy is granted on exports; second, two variants of a drawback-type system are available to the exporter; third, the government has established an export marketing board; and fourth, export financing guaranteed by the Bank of the Republic is available to the exporters.

Tax Benefits

153. Tax credit certificates (Certificados de Abono Tributario-CAT) are issued to exporters when they surrender foreign exchange accruing from an export in an amount equivalent to 15 percent of the total value of the export. The certificates are granted for all exports other than coffee, petroleum and raw cattle hides. Certificados de Abono Tributario can be redeemed for cash a year after issue. CATs are negotiable and are traded freely at the Bogota Stock Exchange, although at a discount of their face value. Hence, in January 1970, CATs with cash redemptions dated February 1970 were being sold at 98.50 percent of their nominal value while those with a cash redemption date of January 1971 were sold at 81.96 percent of their face value. CATs, moreover, are not subject to tax and are accepted at parity for payment of sales and income taxes within a year of the date of issue. The present 15 percent rate is subject to annual adjustments depending on the competitive position of Colombian exports in foreign markets.

154. Certificados de Abono Tributario, which were introduced under Decree 444, supersede the system enacted in the early 1960s under which exporting firms could deduct income from exports -- which for this purpose was presumed to represent 40 percent of sales abroad -- from the taxable income accruing from their total operations. The tax exemption incentive was, undoubtedly, largely responsible for the increase of industrial exports in the mid-1960s.

155. The system enacted in the early 1960s favored large producers in that large-scale enterprises exported (sometimes at a loss) in order to minimize taxable profits on domestic sales. Producers with limited sales were not encouraged to export. CATs are more broadly applicable and have led to increased diversification of manufactured exports; the benefits can reach a greater number of exporters, including those operating on a small scale, and therefore contribute to increase capacity utilization in smaller plants. Moreover, the possibility of an annual review and adjustment of the refund percentage gives the system flexibility.

Drawbacks and Similar Arrangements

156. Drawbacks (refunds of duties paid) and temporary admission systems (conditional or total exemption from payment of duties) were already in force under Colombian law before the new foreign trade statute (Decree 444) was passed. Drawbacks authorizing the refund of 85 percent of the customs duties paid date back to 1931 (Act No. 79, Article 239). This drawback system was never implemented. Under Decree 444 a new system of drawbacks was introduced; this newer version has not yet been made operational. At the present time, there are two types of import-export schemes in operation in Colombia: The Plan Vallejo and the Modified Plan Vallejo -- both of which are temporary admission systems.

157. The Plan Vallejo, which was first introduced in 1959, provides that a manufacturer can import all the inputs needed for the production of exportable goods, free of tariffs and prior deposits and exempted from licensing requirements. Under a contract between the exporter and the government, the exporter provides assurance that he has obtained foreign financing for his imports, enters into an export guarantee, agrees to use special accounting and to submit regular reports to the government on the fulfillment of his contract.

158. Plan Vallejo has numerous advantages for the manufacturer. First, the importer does not have to obtain an import license for his imports. Second, the manufacturer can import any inputs that he may need -- even if these goods are on the prohibited list; third, the scheme reduces the cost of imports by releasing funds which would be tied up in prior deposits or used to pay import duties.

159. The program, however, has difficulties. First, the system assists mostly those who already have established markets, since it is difficult for a manufacturer who is new in the export field to obtain an export contract. Second, the exporter's contract which the manufacturer has to enter into with the government is very complicated. The complexity of the system makes it unavailable to small and medium industrialists who would have difficulty in handling all the requirements of the present contract. This is confirmed by the fact that of the 225 Plan Vallejo contracts that were valid in mid-March 1970, 51 percent were made by 12 large companies and another 34 percent by 83 companies. Third, in the past, a Plan Vallejo contract was difficult to obtain quickly because of government delays in processing the applications. In June 1969, however, both the legal requirements and the administrative procedures were greatly simplified. Before mid-1969, a contract had to be approved both by INCOMEX and the Ministry of Development; presently, the approval of INCOMEX alone is sufficient. While a more simple contract could be designed for smaller producers, it would seem that the difficulties of administering such a program would nullify any benefits derived from it. It may be more practical to further simplify the exporters' contracts for all manufacturers.

160. The second temporary scheme is what could be called the Modified Plan Vallejo - known to the Colombians as "Plan Vallejo Junior". The

Modified Plan Vallejo offers the same benefits as the Plan Vallejo, but these benefits are available only to a manufacturer who exports for a second or subsequent time. In other words, the industrialist must have exported at least once before he can apply for the benefits of the Plan. As with the old Plan Vallejo, the disadvantage of this program is that it does not encourage new firms to enter the export market. Its advantage is that it eliminates much of the administrative requirements involved in the exporters' contracts under the original Plan Vallejo. The more limited administrative requirements will probably encourage small producers to use the Modified Plan Vallejo.

161. As mentioned above, the drawback system introduced under Decree 444 has not been put into operation. This system consists of a partial return of custom duties. The extent to which custom duties can be returned depends on the value added of the products exported.

162. Of the systems discussed so far, only Plan Vallejo has been widely used; substantial amounts of manufactured goods have been exported under this program. Exports - most of which are manufactured - and imports under Plan Vallejo are summarized in Table V-6 below. It is significant that while exports have increased rapidly in the past four years, imports have remained quite stable, indicating a declining import content of exports.

Table V-6: TRADE UNDER PLAN VALLEJO - REGISTRATIONS

(thousands of U.S. dollars)

| <u>Year</u> | <u>Exports</u> | <u>Imports Total</u> | <u>Imports Machinery</u> | <u>Other Imports</u> | <u>Imports excluding machinery as a percent of exports</u> |
|-------------|----------------|--------------------------|------------------------------|--------------------------|--|
| 1965 | 26,147 | 9,829 | 875 | 8,954 | 34.2 |
| 1966 | 45,906 | 12,055 | 1,648 | 10,407 | 22.7 |
| 1967 | 40,786 | 17,012 | 1,514 | 15,498 | 38.0 |
| 1968 | 51,954 /1 | 17,742 | 4,163 | 13,579 | 26.1 |
| 1969 | 61,478 /1 | 13,653 | 1,281 | 12,282 | 20.0 |

/1 Includes some banana exports.

Source: Jose Teigeiro, Promotion of Non-Traditional Exports in Colombia, unpublished document, 1970.

Export Promotion Fund

163. The Export Promotion Fund (Fondo de Promocion de Exportaciones - PROEXPO) was created in 1967 as a coordinating agency to promote exports. It makes studies on the export potential of selected products, grants technical advice to exporters, interests manufacturers in the possibilities of exporting, is able to finance expenses of storing exportable items, discounts export credits, serves as intermediary to export credits granted by international organizations, and undertakes promotional activities abroad. At the present time the Export Promotion Fund has a staff of about 140 in Bogota and 10 missions abroad.

164. One of the major roles of the Export Promotion Fund has been to finance activities related to export. As of December 1968, about 231 million pesos had been lent for these purposes. The terms of such loans are summarized in Table V-7 below.

Export Credits

165. The most important system of export financing available in Colombia is the so-called "advance exchange surrender", (reintegros anticipados). This system operates as if it were in advance against the surrender of foreign exchange: the Banco de la Republica authorizes a commercial bank to lend the exporter a given amount of national currency with the export as the collateral. The loan is repaid with the pesos accruing from the export. The commercial banks can issue loans for a period of 180 days which may be extended up to one year, at a rate of interest of about 9 percent per annum, which is considerably below the average rate in Colombia. Up to 80 percent value of the export can be financed on these terms. If the exporter wishes to cover the total value of the export, the usual interest rate of 14 percent is payable on the remaining 20 percent. This scheme is available for all exports.

166. The advance exchange surrender system has been available for some time, although it has only recently become widely used. While exchange surrendered on account of non-traditional exports was equivalent to about 35 percent of these exports in 1966, it rose to 57 percent in 1967 and was 56 percent in 1968. It is believed that the reason why the export credit scheme was not more widely used in the past was the manufacturers' lack of awareness of its availability and usefulness. The increased use of this financing scheme also reflects the current shortage of working capital for the manufacturing sector. The interest rate is lower than the average rate for short-term loans and considerably lower than the "street" rate. More importantly, the system provides the exporter with credit when he needs it. Given that the manufacturers are frequently unable to obtain short-term credit, the "advance exchange surrender" contributes to the availability of working capital.

THE ANDEAN COMMON MARKET

167. Colombia has been instrumental in the creation of the Andean Common Market, a regional grouping within the Latin American Free Trade Association including Chile, Colombia, Ecuador, Peru and Bolivia. The Treaty of Cartagena, creating the Andean Common Market, was signed in May 1969. Venezuela has not signed the Treaty yet but participated in the negotiations.

168. The final version of the Treaty of Cartagena establishes a rapid integration pace, provided that the numerous escape clauses are used with moderation. Freedom for most intra-Andean trade is scheduled for no later than the end of 1980; all barriers to trade, excluding exchange controls and import licensing restrictions should also be eliminated by then. Trade

Table V-7

TERMS OF PROEXPO FINANCING OF PRODUCTION OF EXPORTS AND PROMOTIONAL ACTIVITIES

| <u>Purpose</u> | <u>Maximum Term</u> | <u>Maximum percentage of financing</u> | <u>Interest rate - %</u> |
|---|------------------------------|--|--------------------------|
| 1. New Markets | | | |
| Increased exports and diversification | 5 years | 100 | 3-5 |
| Promotion and advertisement | | | |
| i. Travel | 6 months | 50 | 10-12 |
| ii. Expositions, fairs, adv. | 2 years | 80 | 6-12 |
| iii. Samples | 1 year | 100 | 6-8 |
| 2. Working Capital | | | |
| Financing for national or imported inputs | According to sales contracts | 80 | 10-14 |
| Storage | | | |
| i. Abroad | 6 months extendible | 75 | 7-12 |
| ii. Local | 3 months | 75 | 7-12 |
| Loans with CAT guarantee | 1 year | 100 | 8 |
| 3. Other | | | |
| Discounts | | | |
| i. Capital goods exports and similars | 5 years | 100 | 7 |
| ii. All others | 2 years | 100 | 6-12 |
| Advance on letters of credit | 6 months | 100 | 6-8 |
| Financing of bilateral trade operations | 1 year | 80 | 12 |

Source: José Teigeiro, Promotion of Non traditional Exports in Colombia, unpublished document, 1970.

in goods included under sectoral complementation agreements (which usually involve new industries like petrochemicals) will be freed according to the pace specified in such agreements. Trade in goods not produced in any of the Andean Five should be freed totally by February 1971. Duties on the intra-Andean trade commodities other than those already negotiated under LAFTA will be reduced automatically every year. By the end of 1970 duties in the five countries will be brought down for each product, to the lowest duty found in Colombia, Chile or Peru. Annual ten percent cuts from that duty will start at the end of 1971, so that by the end of 1980 the duties for Andean trade would have been eliminated. Contrary to the LAFTA procedures, therefore, trade liberalization in the Andean Group could be automatic and across-the-board.

169. The pace of trade liberalization within the Andean Group will, of course, depend on the use which is made of the escape clauses in the Treaty. Each country can present "lists of exceptions". This escape clause is least generous for Chile and Colombia. Moreover, Bolivia and Ecuador, which are potential markets for Colombian manufactures, will not have to start cutting tariffs by ten percent until the end of 1976, thus postponing complete duty elimination until the end of 1985.

170. Unlike the LAFTA countries, the resource base of the Andean Five is basically non-competitive, which could facilitate the operation of the Common Market. If trade liberalization in the Andean countries does take place, Colombia could derive considerable gains. Colombia needs the metals of the other Andean countries (copper, lead, iron ore, and tin) for the development of its industrial sector. Colombia, moreover, is an efficient producer of many consumer non-durables and intermediates, which have a market in the Andean Group, particularly in Peru, Ecuador, and Bolivia. The considerable border trade in products like textiles, cattle and leather products confirms this argument (see Appendix Table 25 for a breakdown of Colombian manufactured exports to the Andean and LAFTA countries).

POLICY ALTERNATIVES

171. Any measures that are taken to improve the protection and export promotion systems will have a limited impact if they are not implemented in conjunction with monetary, fiscal, labor and other necessary policy changes. What is needed in Colombia is the coordination at a high level of all policies affecting the industrial sector.

172. Fortunately, the expanded foreign exchange availability resulting from the coffee boom provides a good and timely opportunity for a fundamental and lasting modification of the protective system. At the core of any reform of the protective system is the coordination of the quantitative restriction system with the tariff schedule. A major effort should be undertaken to gradually diminish the items on the prohibited list and to modify the tariff structure so as to make it the principal mechanism of protection.

173. Implicit in the liberalization of the quantitative restrictions system is a restructuring of the tariff schedule to make it the main instrument of import regulation in place of quantitative restrictions by legislative or administrative fiat. The Mission suggests that a detailed study of the tariff structure of Colombia is necessary. On the basis of its limited investigation, the Mission would argue that tariffs on some raw materials and luxury consumer goods should be lowered. However, for some products, tariffs may have to be raised.

174. Lowering the tariff on raw materials such as non-ferrous metals would raise the effective protection of finished products. Lowering the tariff on luxury goods will eliminate the luxury tax element of the tariff. The Mission is, in general, in agreement with the Musgrave Commission that from the standpoint of resource allocation it would be more satisfactory to have a luxury tax on all luxury consumer goods, domestic and imported, since the prohibitive tariffs on luxury items are encouraging inefficient domestic production of such goods. This may be a difficult measure to implement.

175. Phasing out the licensing system is not an easy task but the following steps could be taken to orient the protective system in that direction. First, increase the limit of spare parts for machinery which can be imported without a license. Second, use the concessions on the import of raw materials which Colombia will probably grant to the Andean Group as the first step towards the elimination of licensing of raw materials imports. The liberalization of spare parts and raw materials would make the task of the licensing board a more manageable one. Third, ease the licensing requirements for domestic producers with good price performance. Agreements between the good performance producers and INCOMEX would contribute to liberalizing imports and grant an incentive to efficient producers. (See the section on Durable Consumer Goods in Chapter VI below). Fourth, to allow some imports of consumer goods which have been prohibited in order to stimulate domestic producers, to raise the quality of domestic production and possibly lower prices. This should be done on a selective basis. Specific recommendations regarding the liberalization of selected imports are given in Chapter VI, where individual industries are discussed.

176. Equipment should be kept under license to avoid wasteful and misdirected investment on the part of the manufacturing sector. If the licensing system is to continue to serve for purposes of resource allocation, it would be helpful to increase the staff of INCOMEX, but it would be equally important to revise the implicit criteria now used in license evaluation, which favor self-sufficiency irrespective of cost. This applies to the processing of regular licenses, but it is particularly important for the processing of global licenses.

177. As a last step towards a better protective structure, the Colombian government should consider the gradual phasing out of prior deposits and seek more direct means of restricting credit.

178. The export promotion policies of Colombia have been very effective. The Mission recommends the maintenance of the CAT incentive. The administrative and legal requirements of Plan Vallejo should be further simplified so that the smaller exporters have easier access to it. The drawback system could also be of assistance to small exporters.

179. Colombian manufacturers are in great need of marketing assistance and organization in order to increase their exports. The Export Promotion Fund, if expanded, could assist in this marketing effort, and could be particularly useful in organizing smaller producers.

180. Given the advances made in the export field, this might be an opportune time to mount a more specific drive in addition to the general export promotion campaign now in progress. Three or four lines of industrial products in which Colombia has a comparative advantage could be promoted. PROEXPO could have a team of experts in these products. As examples, the possible export sale of cooked meat, wood products, and ready-made men's clothing could be explored in various markets and prospective producers could be encouraged to sustain the continued export of these products.

Table V-8: MANUFACTURES ON THE FREE LIST

INTERMEDIATE GOODS

Paper:

Newsprint imported by newspapers, cigarette paper

Glass:

Glass products for laboratory use

Chemicals:

- a) D.D.T.
- b) alcohols: propilic, acyclic, methanol
- c) selected basis chemicals
- d) explosives and some related products

Basic metals:

Ferro-alloys: ferro manganese, ferro silico-manganese, ferrochromium

Steel : a. stainless steel products - semi-finished and finished
b. hot rolled steel hoops
c. seamless tubes, nails
d. nails

Copper : wire

Aluminum : unwrought aluminum alloys and aluminum waste

Lead : unwrought and unwrought lead alloys

Zinc : unwrought

Tin : wrought

Metal manufactures:

Interchangeable tools for handtools and machine tools

CAPITAL GOODS

Mechanical machinery:

- a) internal combustion engines for aircraft, boats and motor vehicles
- b) internal combustion engines parts used in planes and boats
- c) machinery for public works
- d) transmission shafts for internal combustion engines
- e) some harvesting machinery such as hay and grass mowers
- f) agricultural tractors

Electrical machinery:

generators (5 to 100 Kw)
motors, three phased of more than 100 Hp.
microphones
carbon electrodes for electrical purposes

Transport:

sea-going vessels of over 10,000 tons
work trucks for handling goods

OTHER

various scientific and medical equipment

Table V-9: SELECTED MANUFACTURES ON THE PROHIBITED LIST

NON-DURABLE CONSUMER GOODS

Food

most mill industry produces, most fixed vegetable oils, meat preparations, fish preparations, most cereal, vegetable and fruit preparations

Beverages

all non-alcoholic beverages, beer, vinegar

Clothing

all items of clothing

Footwear

all footwear

Textiles

most textile manufactures other than clothing

DURABLE CONSUMER GOODS

Ceramic manufactures

ceramic manufactures for household use

Rubber manufactures

consumer goods of vulcanized rubber

INTERMEDIATE GOODS

Leather

leather and most leather products

Wood

wood and most wood products except wooden tools
all straw products

Paper

printing paper
paperboard for construction industry
all types of writing paper, notebooks, etc.
many articles made of paperboard, cardboard

Textiles

wool yarn and textiles
cotton, yarn and textiles
synthetic fiber yarn and textile, excluding polyester acrylic,
rayon and acetate
jute, paper and other vegetable textiles

Non-Ferrous and Non-Metallic Mineral Manufactures

selected non-industrial products made of non-ferrous metals
and of non-metallic minerals

Chemicals

fats and oils: dehydrated, hydrogenated, oxidized and boiled
inks for retail sale

CHAPTER VI

THE STRUCTURE AND COMPETITIVE POSITION OF COLOMBIAN MANUFACTURING

PURPOSES

181. This chapter has several main purposes:
- (a) to describe the development of the current structure of the Colombian manufacturing sector, both overall and its main branches;
 - (b) to appraise its competitiveness, branch by branch -- given the limited time and data available for this purpose; and
 - (c) to suggest areas of potential improvement and means for achieving such improvement.

After a brief discussion of the sector as a whole and a comparison of Brazil and Colombia, specific industrial branches are discussed and analyzed.

182. In each important branch, trends of output, employment and resultant productivity are discussed. Trends in the ratios of wages to value added are also commented on, because a rising ratio would appear to indicate reducing profit margins and vice versa, other things being equal. Where profits data are available these are cited to test that hypothesis. Unusual inventory or investment trends in particular years are commented upon to throw light on their behavior under import, foreign exchange and credit controls. Branches of industry where output is growing more rapidly than the average can be expected to account for a larger share of total manufacturing investment than of sales. Specific information collected in interviews or from other sources is cited to develop or strengthen a diagnosis.

OVERALL STRUCTURE

183. The growth of Colombian manufacturing, at an average rate of between 6 - 7 percent per annum for 14 years between 1953 and 1967, has resulted in a gradual shift of emphasis from production of non-durable consumer goods to production of intermediate products and to a lesser degree of capital goods and consumer durables. Not only did production of intermediates rise by about 10 percent per annum in this period but this group was mainly responsible for the growth in the exports of manufactures (see Chapter VI, paras 220-24).

184. An equally rapid rate of output growth in consumer durables and an even higher growth rate in capital goods was far less significant since the absolute volume of output is small and the consequences for employment and incomes are not nearly so great. The effect of higher output in these branches was primarily to substitute for imports rather than to enlarge export earnings. The following table summarizes the changes, by category, in the distribution of gross output in recent years.

Table VI - 1: DISTRIBUTION OF GROSS VALUE OF OUTPUT
IN MANUFACTURING INDUSTRIES
(percent)

| | <u>1953</u> | <u>1960</u> | <u>1967</u> |
|----------------------------|--------------|--------------|--------------|
| Non-durable consumer goods | 73.1 | 61.2 | 56.3 |
| Durable consumer goods | 3.9 | 4.9 | 6.1 |
| Intermediate goods | 20.8 | 30.1 | 32.2 |
| Capital goods | 1.4 | 2.4 | 3.3 |
| Other | 0.8 | 1.4 | 2.1 |
| Total | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Source: Appendix Table 2.

185. A comparison of Brazilian and Colombian industrial performance lends perspective to the relative level of Colombian industrial development. ^{1/} The economies of both countries rely heavily on the growth and export of coffee, and per capita income levels in the two countries are similar. Beyond that, however, differences outweigh similarities.

186. As indicated in Table VI-2, Brazil is considerably more industrialized than Colombia, and its manufacturing structure is more widely diversified. While Colombia is still specialized in the production of consumer goods with its capital goods industries undeveloped, Brazil has achieved considerable diversification into capital goods production. To illustrate, gross output in textiles in Colombia is double the value of capital goods output, a situation which is reversed in Brazil. This partly reflects Brazil's larger market and better resource endowment, but also a more vigorous policy of self-sufficiency, regardless of economic costs. The widest relative gap is in capital goods (both consumers and producers durables), an area where internal prices appear least competitive with imports in Brazil. This phenomenon is most visible in motor vehicles, and probably to a lesser degree in other mechanical industries.

^{1/} Brazilian statistics given in Report WH 195a cannot be adjusted to fit the analytical classification used elsewhere in this report. It was therefore necessary to arrange Colombian categories and data to fit the Brazilian classification.

Table VI-2: COMPARISON OF COLOMBIAN AND BRAZILIAN INDUSTRIAL STRUCTURE

| | <u>Gross output in</u> <u>Manufacturing per capita</u> | | <u>Percent distribution</u> <u>of gross value of output</u> | |
|-----------------------------|---|---------------|--|---------------|
| | <u>Colombia</u> | <u>Brazil</u> | <u>Colombia</u> | <u>Brazil</u> |
| | (in US \$) | | | |
| Traditional consumer goods: | 72.4 | 90.8 | 56.6 | 46.8 |
| of which textiles: | 15.3 | 17.4 | 12.0 | 9.0 |
| Intermediate goods | 45.1 | 69.8 | 35.1 | 35.9 |
| Capital goods | 7.8 | 30.8 | 6.2 | 15.9 |
| Other | 2.7 | 2.9 | 2.1 | 1.4 |
| <u>Total</u> | <u>128.0</u> | <u>194.3</u> | <u>100.0</u> | <u>100.0</u> |

Source: Appendix Table 7.

187. Within the capital goods industries, Colombia's per capita production of electrical equipment has attained a level equal to 40 percent of that in Brazil as compared to 20 percent in the mechanical and transport equipment industries.

NON-DURABLE CONSUMER GOODS

188. In 1967, gross value of output on non-durable consumer goods was 22.7 billion pesos (1968 prices) equivalent to over US\$1.3 billion (see Appendix Table 2). Imports were small amounting to less than US\$25 million in 1967. Exports were even smaller, amounting to just under US\$3 million.

189. Because trade is limited in these industry branches, production is about equal to the internal market. In fact, as is illustrated in a later chapter (Chapter VIII), production growth has been about equal to internal market growth and will likely continue to be so constrained unless exports can be greatly increased.

190. The factors limiting trade in these goods are discussed in more detail in connection with the analysis of each industrial branch, but import prohibitions were a major restraining factor in processed foods, textiles and clothing. How much higher imports of such goods would have been had they been subject only to tariffs rather than prohibition or other quantitative restrictions has not been subjected to testing in recent years.

Food Industries

191. The food industry accounts for about 15 percent of the employment in manufacturing and a slightly higher percentage of the value added. In terms of gross value of output, it constitutes over 27 percent, because

inputs constitute over 70 percent of output in foods as against just under 60 percent for the manufacturing sector as a whole. A very sizeable investment boom occurred in 1966 and 1967; in the latter year, the food industry accounted for over 20 percent of the fixed investment in manufacturing. Of this fixed investment, the sugar refining industry accounted for about 60 percent in 1966, and 70 percent in 1967 which contrasts with a 15 percent share in employment and about 20 percent in value added.

192. The growth rate in food processing which had lagged in the 1950s, accelerated in the 1960s. Gross output of processed food rose less than 2 percent per annum between 1953 and 1960, while employment declined about 1/4 percent per annum. In the period 1960-1967, gross output increased by over 5 percent per annum, while employment rose by less than 2 percent per annum. This implies a rise in productivity in the latter period to over 3 percent per annum in gross value of output per employee, but this may have been due to changes in product mix (increased production of refined sugar, for example).

193. There seems to have been no appreciable change in the ratios of wages to value added in the 1960s. Profits in the corporate sector of the industry rose as a percentage of invested capital in the period up to 1967, but declined somewhat in 1968, possibly because of price controls.

Beverages

194. The beverage industry accounts for about 6 percent of the employment in manufacturing, somewhat over 8 percent of gross output, and about 13 percent of value added. Breweries and soft-drink plants each account for about 40 percent of employment while wine and liquor production accounts for the remaining 20 percent. The proportion in terms of value of output and value added is much higher for beer and spirits because of the tax factor.

195. In contrast with the food industry, the development of the beverage industry was more marked in the 1950s than in the 1960s. It would appear from the limited data that the production of soft drinks has grown somewhat more rapidly than that of beer in the past decade.

196. Fixed investment in the beverage industry as a percentage of fixed investment in all manufacturing was highest in the period around 1959/60 when it approximated 10 percent, but fell sharply shortly thereafter to less than its 5 percent share of employment. It did not rise again until 1967. The beverage industry has been characterized by heavy inventory movements, most notably in the period from 1964 to 1966 when inventory accumulation was heavy, and in 1967 when there was a depletion of inventories as there had been in 1962. Profits data for the industry cannot be readily interpreted, as the largest brewery has extensive participations in other manufacturing industries.

Tobacco

197. This small industry employing about 1-1/2 percent of manufacturing labor has been declining absolutely as well as relatively since 1953.

Textiles

198. Textiles in Colombia have been in the vanguard of industrial development. About 17 percent of manufacturing employment in 1967 was in textiles; but the industry accounted for a smaller percentage of gross production and value added - 12 percent gross production and about 13 percent of value added. Because textiles were already well developed, they accounted for only 9 percent of the fixed investment in manufacturing in 1967 as contrasted with a peak ratio in 1957-58 of over 20 percent. Investment in textiles is highly cyclical: it fell sharply in the period 1959-62, rose briefly in 1963, slumped again in 1964-66 and showed another upturn in 1967.

199. The cyclical nature of this industry is also reflected in sharp swings in inventories in anticipation of devaluation, notably in 1963 and 1966. The upturn in each of these years was followed by a sharp decline in the following year.

200. Within textiles, cotton textiles are most important accounting for 42 percent of the employment, over 53 percent of the wages and social benefits, 41 percent of the gross output, and about 51 percent of the value added in 1967, but only 41 percent of the new fixed investment. The wool branch accounted for 11 percent of the employment, 10 percent of wages and social benefits, slightly under 9 percent of value added and 7 percent of the new fixed investment. The "seda" industry which undoubtedly represents the synthetic fabric plants, accounted for about 14 percent of employment and wages, 13 percent of value added, and 23 percent of new fixed investment. The remainder of the industry which accounts for 33 percent of the employment consists of knit goods (17 percent), cordage and hard fibers (4 percent) and miscellaneous textiles (12 percent). Synthetics were clearly the most dynamic segment from an investment standpoint and continue to be in 1970 as evidenced by recent information from Colombian private finance corporations.

201. Textile wage rates in Colombia appear to be relatively high. For example, textile wages plus social benefits per paid employee were 105 percent of the average per paid employee in all Colombian manufacturing. The corresponding figure for Brazil is 72 percent. The average wage in Colombian textiles was 130 percent of the Brazilian textiles wage, while in all industries combined Colombia's wage level was only 88 percent of Brazil's. By contrast, in most developed countries, textile wages are notoriously below the average for manufacturing. That this is not the case in Colombia can be attributed to its concentration primarily within Medellin, the first area to become industrialized, and also to strong labor organization. There is also a tendency of large employers, including textile firms, to pay social benefits beyond the legally required minimum.

202. Wages in the industry rose as a percentage of both gross output and value added in the 10-year period 1957-67. Wages and salaries, including social benefits, increased from 16 percent of gross output to 21 percent; wages increased from 35 percent to 46 percent of value added. Data indicate that profits in conventional cotton textiles were somewhat depressed in the period 1963-65, but have since recovered; whether the increased profits are due to a rise in profit margins in cotton textiles or because a growing proportion of output of primarily cotton textile firms is represented by the more profitable synthetic fabrics is difficult to determine from the limited data available. Profits have not increased evenly throughout the sector; one of the larger textile firms outside Medellin has not improved its profits at the same rate as other firms.

203. The textile industry has been a leading factor in the export drive, particularly in such intermediate products as yarns and print cloths. This was encouraged by the CAT export subsidy. The industry's physical efficiency (particularly in cotton textiles) appears up to international standards.

204. The tariff levels seem to be sufficiently high in cotton textiles (40 percent), synthetic textiles (50 percent) and wool textiles (100 percent) to afford considerable protection. Furthermore, the structure of tariffs provides adequate effective protection for each stage of output. For example, duties on raw materials are raw cotton (15-25 percent), uncarded or uncombed wool (15-17 percent) and synthetic fibers (35 percent). Clothing and footwear, both on the prohibited list, are also subject to tariffs of 200 percent or more. As indicated earlier, prohibitions and other quantitative restrictions have prevented a test of tariff adequacy.

205. Excessive import restrictions are retarding rather than assisting the development of natural fiber textile industries which have long since passed the infant stage. Restrictions have created excessive margins for producers, some of which have been translated into excessive distribution costs or profits and some of which have been shared with textile workers, whose wages, as noted above, are much higher relatively in Colombia than elsewhere. Reduced protection in these industries would increase competition, reduce margins and distribute more widely the benefits derived from efficient production.

206. Such reduced protection could also act as a stimulus to seek further cost economies in other branches of the textile industry (e.g. synthetic fabrics) and bring some pressure to bear on producers of synthetic yarns and fibers to reduce their prices. For example, polyester fiber is priced in Colombia at 180 percent of its c.i.f. price (ex duty). 1/

1/ This is discussed in connection with synthetic fibers in the section on Chemicals below.

207. Finally, by reducing the relative profitability of producing for the domestic market, it could act as a spur to promoting more exports of textiles, particularly more finished items. Lower textile prices would also help producers of clothing seeking to find export markets.

Clothing, Including Footwear

208. The factory sector of the clothing industry has shown a declining trend relative to manufacturing as a whole. While in 1957 clothing accounted for about 12-1/2 percent of total manufacturing, employment had fallen to below 11 percent in 1966 and apparently to less than 10 percent in 1967. Its share in gross output and value added for all manufacturing has dropped from about 6 percent to 4 percent in this ten year period. This labor intensive industry is also a low wage industry, with about 60 percent female employees.

209. The 1967 figures for the clothing industry are somewhat suspect since they indicate that the number of establishments had declined substantially (from 2,126 to 1,780) and that employment had fallen by over 10 percent in the same year. Since this is an industry in which small establishments predominate and there is much handicraft (dress making, custom shoes, etc.) the apparent decline in factory employment may have been partly offset by a rise in handicraft although this cannot be confirmed. ^{1/} The available data would seem to indicate that the share of wages in value added had dropped. For example, in the 1957-58 period, wages represented 43-44 percent of value added but declined to less than 40 percent in 1966 and 1967, pointing to higher profit margins.

210. In the manufacture of shoes there are apparently only a few large companies. These produce less than half of the men's shoes and probably no more than 10 percent of all the women's shoes produced in the country. The great bulk of shoes are produced in handicraft establishments, not covered in the census.

211. It is the opinion of some observers in Colombia, and a view shared by the Mission, that with appropriate organizational changes and a more intensive educational effort, both the clothing and footwear industries could make a substantial contribution to Colombia's export earnings. However, the factors militating against changes are:

- (a) the high profitability of the plants now catering to the assured domestic market as against uncertainties of export earnings;
- (b) a reluctance to make changes in product design and techniques necessary to gain consumer acceptance in foreign markets, and a probable reluctance in many larger establishments to delegate responsibility to subordinates outside the immediate family; and

^{1/} See also Appendix 1 on Colombian Statistics.

- (c) uncertainty of cooperation from suppliers, (such as textiles or leather producers) in the form of lower prices or better qualities to meet foreign market requirements.

Printing and Publishing

212. The printing and publishing industry experienced a steady growth during the whole period 1953-67, accelerating slightly in the latter half of the period. This industry, which accounts for about 4 percent of manufacturing employment is characterized by 17 large establishments which account for 48 percent of the employment and 65 percent of the value added, and over 400 smaller establishments. Value added represents about 3 percent of the manufacturing sector total, which indicates the labor intensive nature of this industry. Fixed investment in the industry grew steadily until 1965 but has slowed somewhat since.

213. This industry has been characterized by relatively heavy accumulation of inventories, particularly in 1960-63. This was followed by a running down of inventories in 1964. Inventory accumulation again became prominent in 1966 and 1967.

Pharmaceuticals

214. Pharmaceuticals, which accounted for 6 percent of the gross output in manufactures, has contributed over 7-1/2 percent of the value added in 1967. Average earnings in the industry are relatively high (over 18,000 current pesos per man year in 1967), probably because it employs a large proportion of professional personnel, but also because it is highly capital intensive. For example, wages, salaries and social benefits constituted only 27 percent of value added as compared to 40 percent or more in textiles, clothing and printing and publishing. Profits data in this industry were not available, but may be presumed high.

215. The growth rate of the pharmaceutical industry has been very rapid. Gross output rose by 12 percent per annum in the period 1953-67, with no great variation as between the two halves of the period. Imports as a percentage of the domestic market have declined from almost 25 percent in 1953 to less than 10 percent in 1967, indicating a major import saving effort, even though actual imports in 1967 of US\$17.6 million were about US\$1 million higher than in 1953. Had imports constituted the same share of the market in 1967 as in 1953, imports would have exceeded US\$40 million. Exports grew from US\$0.2 million in 1953 to US\$2.4 million in 1967.

216. While no reliable data were collected to make possible a judgment on how competitive the industry is in relation to imports, the general impression gathered was that retail prices were reasonable by comparison with those in the developed countries.

INTERMEDIATE GOODS

217. In 1967 the gross value of output of industries producing intermediate goods was about 13 billion pesos (1968 prices) equivalent to US\$770 million. As indicated in Chapter II, it was the growth of output in these industries which sparked the growth of Colombian manufacturing in the period 1953-60 and also, to a lesser degree, in the 1960-67 period. ^{1/} The annual rate of output growth of 9.8 percent in the entire fourteen-year period, averaged approximately 13 percent in the first half and 7 percent in the second half.

218. Imports fell slightly between 1953 and 1960 despite a 60 percent growth in the domestic demand because of massive import substitution in textiles, refined petroleum products and basic metals and metal products. The new Cartagena refinery helped achieve the savings in petroleum products and the Paz del Rio steel plant produced substitutes for imported steel.

219. There was a further fall in intermediate imports between 1960 and 1967, primarily in refined petroleum, basic metals and metal products and also in paper and paper products. In both periods, the absolute value of imports of chemicals (other than pharmaceuticals) rose, but by far less than would have been the case had imports supplied the same share of the market as in earlier years. Table VI-3 below compares actual imports of intermediates in 1960 with the amounts which would have been imported had imports constituted the same share of the internal market as in 1953. A similar comparison for 1967 as against 1960 is then made in Table VI-4.

220. Intermediate exports have been a major factor in the development of manufactured exports (see Appendix Table 24). Exports of manufactures amounted to only \$4.5 million in 1953 of which intermediates accounted for \$3.6 million or 79 percent. Exports of intermediates rose to US\$11.3 million by 1960 and to US\$45.9 million in 1967; in both years they accounted for over 80 percent of manufactured goods exports. The trend continued in 1968, when exports of intermediates rose to US\$57.1 million.

221. Exports of intermediates have constituted a rising share of domestic output of these products as indicated in Table VI-5 below:

^{1/} For statistical purposes, the output in textiles was divided equally between consumer non-durables and intermediates. The exports of textiles are almost entirely intermediate goods, cotton yarns and print-cloth. The textile industry was discussed above in the section on nondurable consumer goods.

Table VI - 3

Comparison of Actual and Hypothetical Imports in 1960
(million U.S. \$)

| | 1953 | | | 1960 | | | Import Saving | |
|--------------------------------|---------------|----------------|------------------|---------------|-----------------------|-----------------------------|--------------------------|----------------------------------|
| | <u>Market</u> | <u>Imports</u> | <u>% Imports</u> | <u>Market</u> | <u>Actual Imports</u> | <u>Hypothetical Imports</u> | <u>Over '53 % Amount</u> | <u>% of Hypothetical Imports</u> |
| Textiles | 89.7 | 26.9 | 30 | 115.5 | 4.2 | 34.6 | 30.4 | 88 |
| Wood Products | 10.4 | 1.3 | 12 | 18.2 | 1.5 | 2.2 | 0.7 | 31 |
| Paper & Products | 24.7 | 15.9 | 64 | 53.3 | 25.1 | 34.1 | 9.0 | 26 |
| Leather | 22.4 | 0.9 | 4 | 24.4 | 0.2 | 1.0 | 0.8 | 80 |
| Chemicals | 47.0 | 36.1 | 77 | 97.8 | 64.2 | 75.3 | 11.1 | 15 |
| Petroleum & Coal Products | 55.1 | 31.5 | 57 | 80.7 | 14.1 | 46.0 | 31.9 | 69 |
| Non-metallic Mineral Prods. | 42.2 | 4.9 | 12 | 66.0 | 7.4 | 7.9 | 0.5 | 6 |
| Basic Metals | 57.6 | 51.0 | 88 | 123.5 | 47.4 | 108.7 | 61.3 | 56 |
| Metal Products | 54.7 | 32.0 | 59 | 74.8 | 20.7 | 44.1 | 23.4 | 53 |
| T o t a l | 403.8 | 200.5 | 50 | 654.1 | 184.6 | 353.9 | 169.3 | 48 |

Source: Appendix Tables 9 and 23.

Table VI - 4

Comparison of Actual and Hypothetical Imports in 1967

| | 1960 | | | 1967 | | | Import Saving | |
|--------------------------------|---------------|----------------|------------------|---------------|-----------------------|-----------------------------|--------------------------|----------------------------------|
| | <u>Market</u> | <u>Imports</u> | <u>% Imports</u> | <u>Market</u> | <u>Actual Imports</u> | <u>Hypothetical Imports</u> | <u>Over '60 % Amount</u> | <u>% of Hypothetical Imports</u> |
| Textiles | 115.5 | 4.2 | 4 | 141.1 | 6.2 | 5.6 | - 0.6 | neg. |
| Wood Products | 18.2 | 1.5 | 8 | 18.1 | 0.2 | 1.4 | 1.2 | 85 |
| Paper & Products | 53.5 | 25.1 | 47 | 85.8 | 22.2 | 40.3 | 18.1 | 45 |
| Leather | 24.4 | 0.2 | 1 | 24.4 | 0 | 0.2 | 0.2 | 100 |
| Chemicals | 97.8 | 64.2 | 66 | 196.6 | 71.8 | 129.8 | 58.0 | 45 |
| Petroleum & Coal Products | 80.7 | 14.1 | 17 | 84.0 | 7.1 | 14.3 | 7.2 | 50 |
| Non-metallic Mineral Prods. | 66.0 | 7.4 | 11 | 93.8 | 3.4 | 10.3 | 6.9 | 67 |
| Basic metals | 123.5 | 47.4 | 38 | 137.1 | 43.3 | 52.1 | 8.8 | 17 |
| Metal Products | 74.8 | 20.7 | 28 | 102.7 | 10.8 | 28.8 | 18.0 | 62 |
| Total | 654.1 | 184.6 | 28 | 883.7 | 165.0 | 282.8 | 117.8 | 41 |

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Source: Appendix Tables 9 and 23

Table VI-5: EXPORT ORIENTATION OF OUTPUT OF INTERMEDIATE PRODUCTS

| | Exports (Million \$) | | | Exports as percent of Domestic production | | |
|---|-------------------------|-------------|-------------|--|------------|------------|
| | 1953 | 1960 | 1967 | 1953 | 1960 | 1967 |
| Textiles | 0.7 | 0.3 | 7.1 | 1 | /b | 5 |
| Wood & products | 0.1 | /a | 3.3 | 1 | /b | 15 |
| Paper & products | /a | /a | 8.6 | /b | /b | 12 |
| Leather & products | 1.8 | 0.6 | 2.4 | 8 | 3 | 9 |
| Chemicals other than pharmaceuticals | /a | 0.3 | 2.9 | /b | 1 | 2 |
| Petroleum & coal products | 0.3 | 7.8 | 13.5 | 1 | 10 | 15 |
| Non-metallic mineral products | 0.6 | 2.0 | 5.7 | 2 | 3 | 6 |
| Basic metals | /a | /a | 0.7 | /b | /b | 1 |
| Metal products | /a | 0.2 | 1.8 | /b | /b | 2 |
| Total | 3.6 | 11.3 | 45.9 | 0.2 | 2.3 | 6.0 |

/a less than US\$50,000.

/b less than half of 1 percent.

Source: Appendix Tables 9 and 24.

222. In wood products and petroleum products, exports have risen from a 1 percent share of output in 1953, to 15 percent by 1967. In paper products, where exports were negligible, they have risen to represent 12 percent of output.

223. Textile intermediates have risen from a 1 percent share to a 5 percent share of estimated output. In non-metallic mineral manufactures, cement and glass have been mainly responsible for a rise in exports which increased to 6 percent of output by 1967 from 2 percent in 1953. Chemicals and metals have participated to a limited degree. Even the leather industry, which has had little growth, has more than maintained its exports relative to domestic output.

224. The main factors in this growth of exports have been the stimulus afforded by the CAT subsidy (see Chapter V) to industries which had long had some surplus capacity, such as cotton yarn and print cloth mills. In other industries where capacity was being expanded (paper, petroleum refining and cement), the staging of expansions was such as to create temporary capacity surpluses, available for export. Rarely were such expansions primarily export-oriented, rather they were mainly intended to meet expected expansion of the internal market. However, the managements seized the opportunity to use such temporary surpluses of output over internal demand to export either main products (cement) or co-products (for example, residual fuel oil). Some few industries like glass and paper developed export markets in an imaginative fashion. Colombia's salt resources on the

north coast should enable it to enlarge its exports of heavy chemicals (soda ash and caustic soda) and probably basic salt as well.

Wood Products (Except Furniture)

225. This industrial sub-sector comprises establishments producing semi-finished products (sawn wood, planed wood, and wood-based panels) and finished products (doors, window-frames, packaging crates and others). The most important products are sawn wood including planed wood and plywood.

226. Available data indicate an increase of over 9 percent per annum in gross output of this industry between 1953 and 1960. The rate of growth then dropped to about 3 percent per annum in 1960-67 period. This industry accounts for about 2 percent of factory employment, but only about 1 percent of gross output and value added.

227. Average wages are about 40 percent lower in wood processing than the average wage in manufacturing. The average size of enterprises in wood processing (about 14 paid employees/enterprise) is about 45 percent smaller than the average number of paid employees per enterprise in total manufacturing. Small-scale operation, inadequate maintenance of equipment, and relatively limited investment impeded the growth of higher quality output and the reduction of the comparatively high waste share. This is especially true in saw mills.

228. The latest physical data on gross output by type of product are for 1966 and are reproduced in Annex 5 covering wood processing. Part of the difficulty with the data lies in that it does not cover small operations.

229. Although Colombia has about 25 million hectares of natural forests which are considered accessible for economical exploitation, logs for processing in saw mills and plymills are frequently in short supply. The main reasons are poor road transport facilities and low water levels in natural rivers or channels which hamper log floating. As is indicated in Annex 5, these difficulties can probably be reduced by closer cooperation between the logging and the processing interests and between various wood processing enterprises with different raw material requirements.

Pulp and Paper

230. This industry has been dynamic in Colombian industrial growth. Over the entire period from 1953 to 1967, the annual rate of growth was over 16 percent; it was 18 percent between 1953 and 1960, as compared to 14 percent in the 1960 to 1967 period. In the same periods, employment doubled between 1953 and 1960 and then rose another 50 percent in the 1960-67 period, showing an above average growth in output per man of 7.3 percent per annum.

231. In 1967, employment in the paper and products industry was slightly over 6,000, or more than 2 percent of manufacturing employment. Two large firms dominate the field, Cartones de Colombia (60 percent owned by Container Corporation of America) and Promotora de Papeles-Propal (partly owned by International Paper and W.R. Grace). This industry has been characterized by heavy new investment concentrated in particular periods, as in 1961 when the Cali writing paper plant of Propal was inaugurated and in 1966-1967 when it was further expanded. Prior to 1961, horsepower per employee was about 4 but rose to 7 with the inauguration of the writing paper plant in 1961 and has since risen to about 11 in 1966 and 1967, when the additional paper machinery came on stream. This high degree of mechanization accounts for part of the increased output per man cited above.

232. Despite rapidly rising wage rates, the wage factor has been favorable in this capital-intensive industry. Employment costs showed only a slight rise as a percentage of value added in the decade. The limited data available on profits indicate that this industry has been rather remunerative. The competitive position of the industry appears favorable since small quantities of certain paper products are exported, aided no doubt by the CAT export subsidy.

233. Short fiber pulp for paper is locally produced but all the long fiber pulp, representing about one-third of inputs is imported. Production in 1968 was about 85,000 metric tons. A Colombian group is currently considering a project to assemble and operate a forest of appropriate local wood species and a plant to produce long fiber pulp from that forest.

234. In this industry, Colombia has reached a degree of self-sufficiency in such products as writing paper, printing paper and to some degree in wrapping paper and paper-board products, although it is still a substantial importer of long fiber pulp and special grades of paper such as newsprint. There seems little reason to continue on the prohibited list such items as printing and writing paper, which Colombia is actually exporting. In fact, prices for writing paper are said to be below world levels so that removal of quantitative restrictions on these products should not affect the industry's profitability. Data are not available to indicate the degree to which pulp and other paper manufactures would be affected, but it is recommended that quantitative restrictions be removed unless it can be demonstrated that their removal could seriously damage the industry. A review of competitiveness would necessarily involve detailed examination of a wide variety of products, since the competitive position of the industry probably differs from product to product.

Leather (except shoes)

235. This small industry which accounted for only about 1-1/2 percent of total manufacturing employment in 1967, has shown the lowest rate of output growth of any of the industries - about 1 percent per annum or less than the rate of population growth. It is not surprising, therefore, that employment in this industry has declined both absolutely and relatively to manufacturing as a whole. This may partly have been due to the variable

supply of hides during this period. It may also be that, as in other countries, leather is experiencing increasing competition from substitute products such as rubber and plastics.

236. Wages per employee reflected the slow growth of the industry since they have apparently risen less than for manufacturing as a whole and constituted a smaller percentage of both value added and gross value of production in 1967 than in 1957.

237. There are indications that inventory accumulations were relatively substantial in 1959 and in 1963, followed by sharp declines in the following year. These seem to have been related to inflation fears in 1963 but may also have been related to fluctuations in hide supplies.

238. Along with textiles, leather products have export potential. As with clothing, there are problems of styling and organization for mass export. Unlike cotton textiles, however, variations in leather quality may hamper finished goods' producers in meeting foreign quality standards. Inquiries in the shoe trade indicate that the quality of domestic leather varies; part of the difficulty may lie in the fact that imports of tanning materials are restricted and that the quality of local tanning materials are frequently poor. It is recommended that the import restrictions on tanning materials, dutiable at 35 percent, be removed, since this represents a necessary prerequisite to similar treatment for leather which is dutiable at 40 percent. The increase in potential, if not actual, competition for imports, which would still be subject to adequate import tariffs, should stimulate quality improvements in both tanning materials and leather. If such improvement materializes, the processors of leather, including shoe producers, would be able to produce a better quality product for domestic and export markets. At a later stage, it might also be desirable to remove handbags and footwear from the prohibited list to stimulate improved quality and even more competitive pricing.

Chemicals (except pharmaceuticals)

239. The chemical industry in Colombia produces a variety of products ranging from matches, inedible oils, paints and pigments to such new products as synthetic fibers, fertilizers, petrochemicals and pharmaceuticals. ^{1/} In 1967, there were over 500 establishments employing over 23,000 persons or over 8 percent of manufacturing employment. Over 350 establishments employing almost 14,000 were in pharmaceuticals and soaps and related products. Thus, the more narrowly defined chemical industry discussed below accounts for employment of about 10,000 persons and a gross value of output of 2.2 billion pesos (\$130 million) in 1967.

^{1/} Pharmaceuticals and related products like soaps, are discussed separately above under non-durable consumer goods.

240. Large enterprises predominate in basic chemicals. Fourteen such establishments employ over 5,200 people, or 75 percent of the total employment in basic chemicals. There are about 20 additional establishments employing 100 or more persons each in other segments of the chemical industry, excluding pharmaceuticals and related products.

241. As indicated earlier, the growth of chemical production in Colombia has been rapid, well above the average for the manufacturing sector as a whole. It averaged 19 percent per annum in the period 1953-67. The census data offer no enlightenment on such segments of the industry as synthetic fibers, heavy chemicals, fertilizers or petrochemicals. Impressions as to the positions of these industries were gained from field visits. The scale of operations of the synthetic fiber industry is small, and capacities of nylon and polyester fibers are uneconomically fragmented between three producing firms in each case, which denies the economy the potential benefits of larger-scale production. It is not surprising, therefore, that domestic polyester fiber prices are at least 80 percent above duty-free c.i.f. prices, whereas domestically produced cellulosic filament yarns (acetate and viscose) sell in Colombia at prices within 15 percent of world price levels.

242. In fertilizers, heavy chemicals and petrochemicals, such fragmentation is absent and internal prices are believed more competitive with world prices.

243. Some of the chemical plants have been designed to produce a final product such as fertilizer from indigenous materials. Others merely produce an import substitute with a high import content, with limited net benefit to the economy (e.g. synthetic fiber from an imported chemical intermediate). The latter type of production, perhaps appropriate as an interim step, does not make use of the light oil fractions produced in existing petroleum refineries. Consequently, the existing fiber plants and other plants that use imported intermediates make only a limited contribution to the economy, particularly since there is an unnecessary proliferation of small plants (e.g. three polyester plants, three nylon plants) catering to a limited market. The contribution of industries using imported inputs would be increased by backward integration to plants that convert petroleum fractions into intermediates that were formerly imported.

244. The basic feed stocks for petrochemical operations are available from the existing refineries at Barrancabermeja and Cartagena. Additional feed stock will be available from the new western refinery which is likely to be in operation by 1974. 1/

1/ The annexes on basic chemicals and synthetic fibers furnish detailed information as to the kinds of feed stocks to be produced and the variety of petrochemical intermediates that will be available.

245. The crucial issue in most of these cases is not the prices of the inputs, which as by-products of refinery operation are clearly competitive, but rather the scale of operation contemplated in highly capital intensive petrochemical plants. The main danger to be guarded against is the initiation of small scale plants designed merely to supply the present limited domestic market. There are indications that negotiations have already started within the Andean Group to coordinate some plants of the member countries in this field to ensure against a proliferation of small, uneconomic plants in a number of countries. Elsewhere in this report, a preinvestment study designed to facilitate an already promising start in such coordination is strongly urged.

246. In the field of basic heavy chemicals, such as soda ash and caustic soda, Colombia is well endowed with salt resources and operating expertise. Plans are already under way for an expansion of the existing production facilities in these products in which Colombia has already demonstrated its competitiveness by exporting.

247. Because of its capital-intensive and continuous process nature, the chemical industry has high fixed costs represented by sunk investments, and low variable costs. Since economies of scale are great, there is a world-wide tendency to build large plants and to resort to pricing for export on an incremental cost basis plus margin, rather than to curtail the rate of operations or limit the initial capacity constructed. This tendency should be considered in evaluating price comparisons, which may or may not be representative over the life of a projected plant or plant expansion.

Petroleum and Coal Products

248. This industry, which employs a little over 2,000 people, or less than 1 percent of factory employment, is a strategic industry. Less than 300 persons were employed in coal products plants. The petroleum refineries numbered 9 and employed 1,778 workers in 1967. In refining there is traditionally a low percentage of wages to both value added or gross value of output (16 percent of value added and 6 percent of gross value of output). The two large refineries owned by Ecopetrol and Esso respectively employ over 1,500 workers. Total wages and benefits per employee in these plants are over 50,000 pesos in 1967, or more than double the national average for plants employing over 200 men. The other 7 refineries were small plants used mainly as auxiliaries to oil field operations and supply local needs.

249. This industry has been characterized by spurts in investment. For example, between 1953 and 1958, the average growth of output was very high because a second large refinery, the Esso refinery in Cartagena, was put into operation in 1958. While there have been sizeable new investments from time to time since then, these have been in the nature of expansions of particular sub-operations or up-grading of facilities so as to provide appropriate feed stock for petro-chemical plants rather than major new refineries. This is the main reason why employment has not grown in absolute terms.

250. Refinery location is largely determined by transport considerations from the oil fields and to the markets. In Colombia, a third new refinery designed to minimize marketing transport costs has long appeared desirable. Its location in western Colombia seems appropriate, but the precise location has not yet been made public.

251. With the substantial additions at the older Ecopetrol plant in recent years, refining facilities are comparatively modern. In view of the complexity of refining operations, and the numerous alternatives available for conversion of crude oil fractions, only a general opinion of efficient operation can be offered.

252. Many of the problems of this industry are related to price controls, exchange rates and concession policies which affect mainly crude oil operations. These are discussed in Part II, Chapter XI of this volume.

Non-metallic Mineral Manufactures

253. This industry has grown at about the same rate as manufacturing as a whole - an average of slightly under 7 percent per annum for each of the two periods 1953-60 and 1960-67. This branch of industry accounts for about 8-9 percent of manufacturing employment and about 6 percent of value added. The decline below 6 percent in 1967 probably reflects a price squeeze on profits, probably attributable to price controls.

254. The largest single part of this industry branch is the cement industry, which accounts for about one-third of the value added but a much smaller percentage of the employment. This is because cement production is more highly mechanized than the other building supply industries such as the production of bricks and roofing materials. The non-metallic minerals industry has experienced cycles in investment as in other countries, so that while fixed investment was relatively high for the period 1957-59, it remained rather low in the period 1960-62, then rose sharply in the period 1963 through 1966 and has apparently remained relatively low since. The Mission studied the cement industry in detail, but time did not permit similar coverage of other branches of the industry.

255. Cement production has exceeded 2 million tons per year since 1964 and exceeded 2.5 million tons in 1969. Production is divided among ten companies operating 13 plants. Profitability in the cement industry has been above average, although uneven in its incidence. The plants in Cali and North Coast areas, for example, appear to have been more profitable than other plants. It should further be noted that the northern plant has exported a substantial part of its output in some years and is considering a plant expansion that will enable it to augment its export capacity. Expanded production capacities will be needed in the central area in the near future if projections of increased demand are to be realized.

256. As has been indicated earlier, cement and cement products are already being exported at competitive prices from the Caribbean coast. In the interior of Colombia, notably in the Cali, Medellin and Bogota areas, natural barriers afford considerable inherent protection from cement plants that serve those areas.

257. Glass products produced by a company with a substantial foreign participation are already being exported competitively. An asbestos project is under consideration that is expected to export fiber at world prices. Some basic salt is already exported and quantities are likely to increase substantially (see discussion under chemicals).

258. Exports in non-metallic mineral manufactures exceeded imports, which consisted mostly of specialty refractories for metal production, abrasives, and special types of flat glass and glassware.

Base Metals and Metal Products

259. The only significant production of base metals in Colombia is in iron and steel which accounts for about 98 percent of the production, employment and value added. ^{1/} The main producer of steel, Acerias Paz del Rio, in Belencito, about 125 miles from Bogota, was built in the early 1950s. It was conceived and constructed under Government auspices and operated relatively inefficiently for many years. Ownership of the plant was transferred from the public to the private sector in the 1950s, and its top management was reorganized in the early 1960s. The plant involved an initial investment of between 120 and 145 million dollars equivalent and later required considerable auxiliary investment to round out its facilities and make possible fuller utilization of the coal, iron and scrap.

260. The investment in a hot strip mill, which is ready to be put into operation, is not presently productive because the plant lacks a complementary cold rolling facility. Furthermore, there is some question as to whether the Belencito site is the most advantageous one for these rolling mills. Given the investment already sunk in the hot mill, it appears likely that the cold rolling facilities will also be installed here. The alternative would be to dismantle the existing hot mill and erect it at another site alongside a new cold rolling mill.

261. The other iron and steel plants, all small, are essentially based on the processing of scrap, the domestic supply of which is limited. The present arc furnace capacity, which is based on scrap, already exceeds domestic supplies and except at coastal locations like Barranquilla, continued importation of scrap is clearly uneconomic. On the basis of the presently available data, domestic iron ore resources are limited and of only fair quality. A large expansion of the industry would therefore have to be based on imported ore, probably from Venezuela or Peru.

^{1/} See Annex 1 on the Iron and Steel Sector.

262. As Chapter X on the mining sector indicates, presently known resources of non-ferrous metallic ores in Colombia are limited. Only the Cerro Matoso nickel deposit affords a sound economic basis for smelting and refining of non-ferrous metals.

263. In 1967, the base metals industry accounted for about 1-1/2 percent of manufacturing employment, about 2 percent of wages, including social benefits, and a little over 2 percent of the value added. Calculations of growth rates are of limited significance. Paz del Rio only came into operation sometime after 1953 so that the growth rate for 1953-1960 of 42 percent per annum reflects the advent of this new plant. Somewhat more meaningfully, the 3 percent rate for 1960-1967 reflects the improvements in the existing Paz del Rio plant and the creation and expansion of capacity in several of the smaller plants. Year to year fluctuations in output, employment, etc., should be viewed with care since it is unclear whether the statistical classification of iron and steel plants in base metals or in metal products has been consistent from year to year.

264. As Annex 1 indicates, prices for non-flat steel (bars, rods, shapes and sections) are broadly competitive with imports in the interior of the country, aided by the natural protection of high transport costs. At locations closer to the coast than the Belencito, the present protection of about 25 percent for these products keeps them competitive. For flat-rolled products, price comparisons are also given in Annex 1, but it should be noted that quality differences preclude close comparison, except on a use by use basis. The bulk of flat rolled steel used currently in Colombia is imported.

265. The metal products industry accounts for about 7 percent of the employment, 6 percent of the wages, 4 percent of the gross output and about 4-1/2 percent of the value added of the total manufacturing sector. The metal products industry had also 700 establishments in 1967, with over 100 paid employees each, which accounted for 40 percent of the employment, but over 55 percent of the value added. The main products of this industry are non-ferrous metal products, foundry products, tools and cutlery.

266. It would appear that gross value of output in metal products rose about 13 percent per annum in the period 1953-1960 but then declined to a rate of about 8 percent in the seven year period ending 1967. As indicated earlier, the statistics are somewhat suspect because of doubts as to consistent classification over a period of time, although this probably affects the larger metal products sector less than it does the base metals sector.

267. These industries experienced wide variation in inventories. This was particularly notable in the year 1966 when the industry which then accounted for less than 5 percent of value added accounted for almost 8 percent of the increase in inventories in the manufacturing sector.

268. As indicated in Chapter X, Colombia's resources in non-ferrous metals other than nickel are very small. In view of the fact that Colombia's

Andean partners - Chile, Peru and Bolivia - are leading producers of copper, lead, zinc and tin, it is reasonable to assume that in these products those countries will seek trade concessions from Colombia. If Colombia makes such concessions on refined metals, but does not make equivalent concessions on fabricated products (for example, copper versus brass or copper wire, lead versus automobile batteries, etc.) the concession will not harm existing industries and will indirectly help metal processors by widening their margin of effective protection. In this field, there are very few prohibited items, presumably in recognition of Colombia's need to continue importation.

269. In view of the wide variety of imported finished metal products, it was not possible to make a detailed study of products in this category. There is little reason to believe, however, that a reduction of tariff barriers within the Andean Group would appreciably harm any significant portion of the industry given that the bulk of such imports are from more developed areas.

DURABLE CONSUMER GOODS

270. The durable consumer goods industries are still unimportant in Colombia; in 1967, the total value of output was just under 2.5 billion pesos (1968 prices) or less than US\$150 million. In 1967, these industries accounted for about 6 percent of the gross output and over 9 percent of the employment. The composition of output, value added and employment in the durable consumer goods branches is shown in Table VI-6 below.

Table VI-6: OUTPUT, VALUE ADDED AND EMPLOYMENT IN THE DURABLE CONSUMER GOODS INDUSTRIES - 1967

| | <u>Gross output</u> (mill. pesos 1968 prices) | <u>Value added</u> | <u>Paid employment</u> | <u>Gross output</u> (thou. pesos per paid employee) | <u>Value added</u> |
|---------------------------|---|--------------------|------------------------|---|--------------------|
| Furniture & fixtures | 194.1 | 98.1 | 4,759 | 411 | 21 |
| Rubber products | 972.0 | 439.4 | 6,736 | 145 | 65 |
| Ceramic products | 146.9 | 60.0 | 3,669 | 40 | 16 |
| Non-electrical appliances | 61.2 | 28.7 | 962 | 64 | 30 |
| Electrical appliances | 431.3 | 166.8 | 3,210 | 134 | 52 |
| Road vehicles | 649.8 | 296.6 | 8,090 | 80 | 37 |
| | <u>2,455.3</u> | <u>1,089.6</u> | <u>27,426</u> | <u>90</u> | <u>40</u> |

Source: Appendix Tables 2, 4 and 6.

271. Establishments of this sub-group are small. Of the over 1,100 establishments in these branches, only 42 employ 100 or more persons while total employment is about 13,600. Thus, only half of those employed in the durable consumer goods industries are in large establishments. This is

a smaller proportion than in non-durable consumer goods, intermediates or capital goods. Conversely, the share of employment in industry in plants employing 15 or less is greatest in consumer durables. This relationship is more precisely indicated in the table below.

Table VI-7: EMPLOYMENT BY SIZE OF FIRMS IN MAJOR INDUSTRIAL SUB-GROUPS 1967

| Firms employing | <u>Non-durable consumer goods</u> | | <u>Intermediate goods</u> | | <u>Consumer durable goods</u> | | <u>Capital goods</u> | |
|-----------------|-----------------------------------|---------------|---------------------------|---------------|-------------------------------|---------------|----------------------|---------------|
| | Employ- ment | % of Industry | Employ- ment | % of Industry | Employ- ment | % of Industry | Employ- ment | % of Industry |
| 100 & over | 93,959 | 60 | 39,463 | 55 | 13,643 | 50 | 11,049 | 65 |
| 50 - 99 | 18,277 | 12 | 9,944 | 14 | 3,461 | 13 | 2,124 | 12 |
| 15 - 49 | 24,661 | 16 | 13,396 | 19 | 6,104 | 22 | 2,458 | 14 |
| Under 15 | <u>20,551</u> | 13 | <u>8,887</u> | 12 | <u>4,218</u> | 15 | <u>1,462</u> | 9 |
| Total | <u>157,448</u> | | <u>71,690</u> | | <u>27,426</u> | | <u>17,093</u> | |

Source: Appendix Table 10.

272. When the anatomy of employment within durable consumer goods industries is dissected (see Table VI-8 below), it becomes clear that the concentration of small plants is in two branches: furniture and motor vehicles. Small establishments in furniture are common throughout the world but they are uncommon in motor vehicles. The causes for this unusual feature in Colombia are worth analyzing, and are elaborated in the section on road vehicles.

Table VI-8: EMPLOYMENT BY SIZE OF FIRMS IN DURABLE CONSUMER GOODS INDUSTRIES - 1967

| Size of Establishment | <u>Furniture & fixtures</u> | | <u>Rubber products</u> | | <u>Ceramic products</u> | |
|-----------------------|---------------------------------|-----------|------------------------|-----------|-------------------------|-----------|
| | Employ- ment | % of Ind. | Employ- ment | % of Ind. | Employ- ment | % of Ind. |
| 100 or over | 1,135 | 24 | 5,424 | 80 | 2,990 | 81 |
| 50 - 99 | 525 | 11 | 322 | 5 | 252 | 7 |
| 15 - 49 | 1,705 | 36 | 817 | 12 | 353 | 10 |
| Under 15 | <u>1,394</u> | 29 | <u>173</u> | 3 | <u>74</u> | 2 |
| Total | <u>4,759</u> | | <u>6,736</u> | | <u>3,669</u> | |

| Size of Establishment | Non-electrical appliances | | Electrical appliances | | Road vehicles | |
|-----------------------|---------------------------|-----------|-----------------------|-----------|---------------|-----------|
| | Employment | % of Ind. | Employment | % of Ind. | Employment | % of Ind. |
| 100 or over | 405 | 42 | 1,723 | 54 | 1,966 | 24 |
| 50 - 99 | 234 | 24 | 588 | 18 | 1,540 | 19 |
| 15 - 49 | 275 | 29 | 552 | 17 | 2,402 | 30 |
| Under 15 | 48 | 5 | 347 | 11 | 2,182 | 27 |
| Total | 962 | | 3,210 | | 8,090 | |

Source: Appendix Table 11.

Furniture

273. This industry, which accounts for less than 2 percent of the factory employment of Colombia, is characterized by relatively small establishments. Its contribution to gross output and value added in total manufacturing is less than 1 percent. Employment has been stagnant since 1957 and therefore contributes a smaller proportion of total manufacturing employment than it did a decade ago. It has concentrated on producing for the domestic market and has emphasized traditional furniture which is rather bulky and cannot be readily exported on any substantial scale. Imports are probably of a non-competing variety.

274. This industry has a large handicraft portion. It is believed that new designs followed by modernization of facilities, production processes and marketing practices would open up export possibilities. A market study of such potentials is thus desirable.

Rubber Products

275. In 1967, the rubber industry accounted for about 2-1/2 percent of factory employment, 3-1/2 percent of wages and social benefits, and 2-1/2 percent of value added of the manufacturing sector as a whole. This industry has shown a rapid increase in output and employment throughout the period, but the rate of growth appears to have been greater in the earlier period - 1953 to 1960 - than in the latter period - 1960 to 1967 (11 percent per annum versus 9 percent per annum). While employment more than doubled between 1953 and 1960, it rose less than 20 percent between 1960 and 1967, reflecting major increases in output per man. The expansion in the tire industry between 1958 and 1962 accounts for virtually all the rise in employment in the rubber industry in those years.

276. At least through 1967, the rubber industry seems to have been profitable despite an increasing share of wages in value added and gross output. The share of wages in gross output rose from 16-17 percent in 1957/58 to well over 20 percent by 1964 and subsequent years, whereas its share in value added rose from 40 percent or less in 1957 to 1959 to about

45 percent in 1966 and even higher in 1967. The rubber industry is characterized by wide inventory fluctuations; there was a marked rise in 1963, followed by declines in the following two years despite rising production and input usage, and then another sharp rise in 1966/67.

277. The rubber tire segment of this industry consists of three large plants that had a total employment of 3,200 in 1967. These three plants constitute over 80 percent of the total employment in the rubber tire industry and almost half of the total employment in the entire rubber products industry. All three are either partly or wholly owned by the international rubber giants.

278. Rubber tires are subject to a 50 percent duty, with even higher effective protection, since crude rubber is subject to only a 10 percent duty. Internal prices have been kept low by price controls and seem to be competitive. Exports in 1967 were almost as high as imports. This industry may benefit from any Andean Group concessions for its products.

Appliances

279. Time considerations did not permit study of the non-electrical appliance branch, which is much smaller than the electrical appliances branch. Employment in non-electrical appliances was less than 1,000 in 1967 as against over 3,000 in electrical appliances.

280. The electrical appliances industry in Colombia grew quite rapidly in the period 1953 to 1960, but growth has been slower in recent years, as indicated in the table below.

Table VI-9: GROWTH OF THE ELECTRICAL APPLIANCE INDUSTRY

| | <u>Gross output</u> (mill. 1968 pesos) | <u>Value added</u> | <u>Employment</u> | <u>Gross output</u> (thou. 1968 pesos per paid employee) | <u>Value added</u> |
|------|---|--------------------|-------------------|--|--------------------|
| 1953 | 57.5 | 27.8 | 839 | 69 | 33 |
| 1960 | 191.8 | 87.6 | 2,298 | 83 | 38 |
| 1963 | 369.2 | 137.9 | 2,937 | 126 | 47 |
| 1964 | 373.8 | 122.0 | 3,265 | 114 | 37 |
| 1965 | 412.4 | 162.1 | 3,433 | 120 | 47 |
| 1966 | 436.3 | 171.1 | 3,615 | 121 | 47 |
| 1967 | 431.3 | 157.8 | 3,210 | 134 | 49 |

Source: Appendix Tables 2, 4 and 6.

281. These figures indicate a growth rate in gross output of 19 percent per year between 1953-1960 and about 13 percent in the 1960-1967 period. The growth in value added in the latter period appears to have slowed, possibly reflecting higher costs of components (steel sheets, copper wire) which were not as fully reflected in selling prices as in the past. Also

new investment in 1964-1965 was very heavy creating large new capacities, more in those two years than in the four previous years combined.

282. Most electrical appliances are subject to a 50 percent duty and require prior licensing. Effective protection is probably not much greater than nominal protection since imported metal inputs are dutiable at 30-45 percent and production requires great quantities of imported inputs. Items like refrigerators, television sets, and electric stoves are highly prized, subject to smuggling. Demand, moreover, is highly responsive to changes in prices and incomes.

283. Mission studies indicate that the industry has ample installed capacity to produce at least 50 percent and possibly 100 percent more output than in 1969. Plant visits established that at least one plant is operating at less than one full shift and others only a partial second shift. Improved utilization of existing capacity would effect substantial cost economies in unit labor costs, overhead, and administration costs, and if reflected in ultimate selling prices would substantially raise effective demand.

284. To stimulate increased capacity utilization and eventually lower prices, it is recommended that the Government give consideration to an experiment along the following lines. If producers agree to maintain unchanged peso prices for specific appliance lines for a period of say, one year, the Government will (a) liberalize and speed up import licenses of materials, parts and components for a specified list of electrical appliances to enable production to increase by say 50 percent above the 1969 level; (b) allow special rediscount privileges at the Bank of the Republic for installment paper arising from sale of the specified appliances. The trade unions involved and the Labor Ministry will agree that the workers newly hired for such increase in output will be treated as contract workers, not subject to cesantia (severance pay) requirements. This experiment would not require any substantial new fixed investment, thus not involving any additional concessions on depreciation for tax purposes. The agreement could be reviewed after the initial experiment to determine whether it should be continued, modified or abandoned.

285. Present retail prices for refrigerators are estimated at about 3 times the U.S. level for a strictly comparable model. This is largely due to the low scale of operations, part of which is the result of insufficient utilization of already existing capacity. Some undetermined part of the difference is undoubtedly due to high retail mark-ups, a problem which also calls for some remedial action, but one which was not studied in detail by the Mission.

Motor Vehicles

286. This category includes (a) production of motor cars and trucks and components; (b) production of bicycles, and (c) repairs to both bicycles and motor vehicles. In 1967, the industry was divided on the following lines:

Table VI-10: BREAKDOWN OF THE MOTOR VEHICLE INDUSTRY - 1967

| | <u>Estab- lishments</u> | <u>Paid em- ployees</u> | <u>Gross output</u> (mill. current pesos) | <u>Value added</u> (mill. current pesos) | <u>Gross output</u> (thou. current pesos per em- ployee) | <u>Value added</u> (thou. current pesos per em- ployee) |
|-----------------------------|-----------------------------|-----------------------------|---|--|---|--|
| Motor vehicle production | 78 | 2,816 | 410.1 | 171.0 | 146 | 61 |
| Bicycle production | 12 | 409 | 26.9 | 15.6 | 67 | 38 |
| Repair shops | <u>475</u> | <u>4,865</u> | <u>201.1</u> | <u>104.7</u> | <u>41</u> | <u>22</u> |
| | <u>565</u> | <u>8,090</u> | <u>638.1</u> | <u>291.4</u> | <u>279</u> | <u>36</u> |

Source: Unpublished DANE data.

287. It will be noted that the net output per paid employee in motor vehicle production was almost three times that of an employee in a repair shop and one and one-half times that of an employee in bicycle production. This is to be expected because the material input/labor ratio in production is greater than in repairs. 1/ Between 1958 and 1967, the Census statistics indicate that employment in auto repair shops actually fell while employment in production rose about five-fold. However, in 1967, despite such sharp rises in production, employment in repair shops was still greatly in excess of employment in vehicle production. Future improvements in roads and a newer automotive park should help keep down repair shop employment.

288. This analysis of the components of the vehicle industry in the industrial statistics is intended to indicate that the high hopes held in some circles for increased employment in this industry, on the basis of high employment per unit of output value, are based on misleading information. The product mix of the future is bound to include relatively more production than repairs and consequently a labor/output ratio based on a continuation of past overall relationships has no logical foundation. 2/

1/ An odd feature of the repair statistics is that the largest repair shop, employing over 600 persons, was probably a governmental entity since the value added shown for it was exactly equal to the wages and social benefits paid. This was learned through an inspection of detailed statistics by size of establishment (both in 1962 and 1967). Even if repair statistics were adjusted for such undervaluation, this would probably raise the total value added for the repair industry by only about 5 percent, which would not materially reduce the gap between production per man as between production and repairs.

2/ The unusual case of the large repair establishment cited in the previous footnote also tends to overstate the employment per peso of work done by the establishment, since its policy of no margin for capital invested is not likely to be imitated by private firms.

289. Within the motor vehicle production branch of the industry, value added per employee varies with the size of establishment as indicated in the following table for 1967.

Table VI-11: PRODUCTIVITY OF MOTOR VEHICLE INDUSTRIES BY SIZE OF ESTABLISHMENT - 1967

| Size of establish- ment | Employment | Gross Value | | Total wages and social benefits (mill. pesos) | Per paid employee | |
|-------------------------------|--------------|-------------------------|------------------------|---|----------------------------------|--|
| | | output (mill. pesos) | added (mill. pesos) | | Value added (thous. pesos) | Wages and social benefits (thous. pesos) |
| 200 or more | 622 | 252.7 | 96.6 | 19.9 | 144 | 29 |
| 100-199 | 588 | 36.3 | 18.2 | 8.7 | 31 | 15 |
| 50-99 | 493 | 54.8 | 21.4 | 8.9 | 43 | 18 |
| Under 50 | <u>1,073</u> | <u>56.3</u> | <u>34.9</u> | <u>14.0</u> | <u>33</u> | <u>13</u> |
| | <u>2,816</u> | <u>410.1</u> | <u>171.1</u> | <u>51.5</u> | <u>61</u> | <u>18</u> |

Source: Unpublished DANE data.

290. Wages and social benefits per employee in bicycle production averaged about 14,000 pesos per man/year and about 13,000 in repair shops (19,000 in the largest repair shop) as against 18,000 in all motor vehicle production and parts plants. As might be expected, the two largest plants, the assemblers paid the highest wages.

291. A program is being implemented to increase substantially the production of motor vehicles, both cars and trucks. The two leading producers, Chrysler and Lara are planning to double 1969 output by 1971. A third plant is being constructed in which Renault cars and trucks are to be manufactured.

292. There were no data available which would permit close analysis of the profitability of the industry. Data by the Colombian statistical office are of limited value for this purpose and show very great variations from year to year as indicated in the comparison of 1965, 1966 and 1967 given in Table VI-12 below.

Table VI-12: NON-LABOR VALUE ADDED IN MOTOR VEHICLE INDUSTRY

| | <u>Gross output</u> (million pesos - current prices) | <u>Purchased materials</u> | <u>Value added</u> | <u>Wages and social benefits</u> | <u>Gross return available for capital & overhead</u> | |
|------|---|----------------------------|--------------------|----------------------------------|--|-------------------------|
| | | | | | <u>Total</u> | <u>Percent of sales</u> |
| 1965 | 232.0 | 158.0 | 74.0 | 36.9 | 37.1 | 18.0 |
| 1966 | 220.0 | 156.6 | 63.4 | 41.9 | 21.5 | 9.8 |
| 1967 | 410.1 | 239.0 | 171.1 | 51.5 | 119.6 | 28.1 |

Source: Unpublished DANE data.

293. When the data fluctuate so widely, no reasonable conclusions can be drawn except that, if the 1966 data were accepted at face value, that production that year was unprofitable. Whether the 1967 data represent a maintainable future margin or are a statistical aberration would be worth determining.

294. The automotive fleet in Colombia as of the end of 1967 is estimated at 256,000 (140,000 passenger cars and 116,000 trucks and buses); in 1968 trucks and buses increased to 125,000. On the basis of population per vehicle, Colombia ranks low in Latin America, well below all South American countries except Bolivia, Paraguay and Ecuador and below Central American countries except Guatemala and Honduras.

295. The fleet is comparatively old; a sample of 17,000 vehicles in public carrier service early in 1969 had a median age of 12-13 years.

Table VI-13: AGE OF AUTOMOTIVE FLEET, 1967

| <u>Year of Motor vehicles</u> | <u>Number</u> | <u>Percent</u> |
|-------------------------------|---------------|----------------|
| Before 1950 | 856 | 5 |
| 1950-1954 | 6,008 | 35 |
| 1955-1959 | 4,205 | 25 |
| 1960-1964 | 3,823 | 22 |
| 1965-1969 | 2,266 | 13 |
| | <u>17,158</u> | <u>100</u> |

Source: Direct communication with the Ministry of Development.

296. There is no doubt a significant demand for replacement of older vehicles in addition to the growth requirements of the economy. A basis for accurate demand estimates is, however, lacking, because of the unavailability of comparable data over long periods and because past demand has fluctuated widely, related more to shifts in foreign exchange availability than to other

factors. The fact that there are more 1946 vehicles in operation than 1947-1949 taken together is a good indication, as is the fact that there are more vehicles of the 1953-56 vintage for each of these years than for 1957-1959 combined. The Development Ministry has made an admittedly crude estimate of 1970 requirements, based on the following assumptions:

- (a) a useful vehicle life of 15 years;
- (b) the need to replace vehicles older than 15 years over a 5-year period in equal steps;
- (c) growth of demand annually of 6 percent per year; and
- (d) replacement of vehicles which reach a 15-year life.

297. On this basis, the annual demand is for about 40,000 vehicles compared with about 9,000 assembled in 1969. The foreign exchange quotas for 1970 are calculated to enable an output of 20,000 vehicles. Figures for earlier years are definitely lower than for 1969, probably of the order of 4,000 per year or less. Consequently, the operational data for these earlier years are unrepresentative of the results expected currently and in the projected future. However, an annual volume of even 40,000 vehicles divided among three producers is not likely to be very economic. It would be less than 30 percent of the 1968 output in Mexico and less than 25 percent of the size of Argentine output.

298. In Colombia, the truck and bus park is 80 percent of the size of the passenger car park, a higher figure than for Argentina (57 percent), Brazil (63 percent), and Mexico (51 percent). The fact that the truck park in Colombia is very old and that truck production and assembly is everywhere economic at much lower levels of output than for passenger cars, suggests the desirability of concentrating initial efforts on truck and bus production and assembly. 1/

299. Tariffs for truck imports range from 70 to 200 percent, depending on their size; buses are subject to a 60 percent duty, while the average duty for passenger cars is 340 percent. Passenger cars are also subject to a much higher prior import deposit than trucks and buses - 130 percent. As Appendix Table 22 indicates, the duties on parts, components or materials are far lower than for the finished products. 2/ For trucks, the duties on parts and components are 20-40 percent. For passenger cars, duties for chassis and body are 180 percent, but duties for parts and materials are 50 percent or less as against an average tariff of 340 percent

1/ Jack Baranson, Automotive Industries in Developing Countries, p. 24.

2/ An unusual anomaly is that bodies for jeeps are dutiable at 40 percent, and the jeeps themselves at only 20 percent.

on passenger cars. Since imports of cars and trucks are severely restricted, and domestic assembly and construction is being encouraged by various means, including high duties, serious consideration should be given to a refinement of these incentives to assure that they serve the intended purpose rather than creating windfalls to limited groups. For example, luxury taxes or registration fees might be imposed on purchasers, whether they buy a local or imported passenger car, rather than imposing a very high tariff which may benefit a limited number of domestic producers and perhaps some of their suppliers.

300. Various automotive suppliers would benefit from any increase in domestic production of trucks and cars by having a larger volume over which to spread overhead costs and from technical and perhaps financial assistance, from the vehicle producers. But prices for original equipment in tires, components, parts, etc., in developed countries usually are significantly lower than in the replacement market. If vehicle producers cannot bring down prices for original equipment items, they may either enter into competitive production, seek permission to import, raise prices for their own products, or curtail output, depending on their bargaining position and the price elasticity of demand for their product. No sound judgment can be rendered at present as to the course they are likely to follow. It should be noted, however, that from the standpoint of the economy as a whole, proliferation of parts suppliers as well as assemblers implies investment of scarce resources beyond the amounts required for economic production of the required goods. It would represent a tribute levied on the economy by strategically situated suppliers, in the absence of effective countervailing action by the Government and/or the vehicle producers. It would seem to warrant an effective progressive tax on vehicles sold at prices in excess of a given value (in units of foreign money per unit of weight) to deter such quasi-monopolistic tactics.

CAPITAL GOODS

301. For capital goods industries, output increased in the 1953-60 period by over 15 percent per annum, but in the following 7-year period, ending in 1967, the rate of growth slackened to slightly over 10 percent per annum. It should be borne in mind, however, that this group of industries is still very small in Colombia with a total gross output of about 1.3 billion pesos (1968 prices) accounting for only about 3 percent of manufacturing output and 4 percent of value added. These industries employed only 17,000 paid employees, or about 6 percent of total manufacturing employment. The reasons for the apparent high employment per unit of output will become evident as each branch is examined.

302. The sub-divisions of this group of industries is shown in the following table:

Table VI-14: OUTPUT AND EMPLOYMENT IN THE
CAPITAL GOODS INDUSTRIES

| | <u>Gross output</u> (mill. 1968 pesos) | <u>Value added</u> (mill. 1968 pesos) | <u>Paid employment</u> | <u>Gross output per employee</u> (thou. 1968 pesos) |
|---|---|--|------------------------|--|
| Mechanical machinery | 348.1 | 203.6 | 5,691 | 61 |
| Electrical machinery (except appliances) | 760.9 | 379.3 | 6,119 | 124 |
| Road equipment (except passenger motor) | <u>219.8</u> | <u>107.0</u> | <u>5,283</u> | <u>41</u> |
| | <u>1,328.8</u> | <u>689.9</u> | <u>17,093</u> | <u>78</u> |

Source: Appendix Tables 2, 4 and 6.

303. As indicated earlier, the concentration of output in larger firms is greater in capital goods than in other industries, but the reasons for this will also become more evident as each of the branches of capital goods is analyzed.

Mechanical Machinery

304. The available statistical data indicate that there were 240 establishments in this branch of industry, of which only 11 employed 100 or more persons; the distribution of establishments by size in 1967 is given in Table VI-15 below:

**Table VI-15: DISTRIBUTION OF EMPLOYMENT, GROSS OUTPUT AND
VALUE ADDED IN THE MECHANICAL MACHINERY INDUSTRY - 1967**
(firms employing more than 100 workers)

| | Total Industry | | | | Large Establishments | | | |
|---|---------------------|-----------------|--|----------------|----------------------|-----------------|--|----------------|
| | Establish- ments | Employ- ment | Gross output (mill.current pesos) | Value added | Establish- ments | Employ- ment | Gross output (mill.current pesos) | Value added |
| Moving machinery | 7 | 185 | 12.4 | 4.4 | 0 | 0 | 0 | 0 |
| Farm machinery | 81 | 1,550 | 92.6 | 47.3 | 2 | 527 | 38.8 | 18.6 |
| Industrial machinery | 75 | 1,947 | 146.5 | 78.4 | 4 | 1,042 | 106.4 | 55.1 |
| Parts for agricultural & industrial | 73 | 1,810 | 72.9 | 48.0 | 4 | 904 | 31.6 | 22.8 |
| Miscellaneous machinery | 4 | 199 | 5.8 | 3.7 | 1 | 147 | 3.1 | 2.1 |
| Mechanical machinery | 240 | 5,691 | 330.2 | 181.8 | 11 | 2,620 | 179.9 | 98.6 |

Source: Unpublished DANE data.

305. It is evident that the concentrations are in farm and industrial machinery and parts for them. Thus, 10 enterprises account for about half the employment and well over half the output in this industry. The output of these firms is so unhomogenous that it is difficult to make price or cost comparisons to determine competitive ability. This portion of capital goods industries appears least concentrated in large plants which account for only about 50 percent of total employment as compared with 57 percent for electrical machinery and over 90 percent in transport equipment.

306. The tariff level on machinery is about 30 percent (see Chapter V). Because tariffs on inputs are not significantly lower and imported inputs are a major cost element, effective protection is probably not greatly different than the nominal rate in most cases (see Table V-1). By comparison with other Colombian industries, these branches seem to get relatively little protection. These industries would be worth studying at greater depth to determine their future prospects; the Mission was unable to do so due to staff and time limitations.

Electrical Machinery

307. In 1967, this industry, which excludes electrical appliances and light bulbs which were covered earlier under durable consumer goods, comprised 135 plants employing about 6,100 persons. Fifty-seven percent of total employment in the industry was concentrated in 11 plants, each with more than 100 workers. These plants accounted for over 65 percent of the

gross output and 64 percent of the value added. Seven of these plants electrical equipment, including a Siemens plant in Bogota. There are two large electrical wire and cable manufacturers and two other large plants, which it is inferred, produce such miscellaneous electrical items as electrical signs and displays.

Table VI-16: DISTRIBUTION OF EMPLOYMENT, GROSS OUTPUT AND VALUE ADDED IN THE ELECTRICAL MACHINERY INDUSTRY - 1967
(firms employing 100 or more workers)

| | <u>Total Industry</u> | | | | <u>Large Establishments</u> | | | |
|--|-----------------------------|-------------------------|--|------------------------|-----------------------------|-------------------------|--|------------------------|
| | <u>Establish- ments</u> | <u>Employ- ment</u> | <u>Gross output</u> (mill.current pesos) | <u>Value added</u> | <u>Establish- ments</u> | <u>Employ- ment</u> | <u>Gross output</u> (mill.current pesos) | <u>Value added</u> |
| Electrical machinery | 60 | 3,492 | 298.1 | 130.9 | 7 | 2,506 | 236.2 | 103.8 |
| Wire & cable | 6 | 569 | 157.0 | 58.0 | 2 | 441 | 100.3 | 27.2 |
| Miscellaneous elec. manu- factures | <u>69</u> | <u>2,058</u> | <u>264.9</u> | <u>145.5</u> | <u>2</u> | <u>541</u> | <u>136.8</u> | <u>83.8</u> |
| Total | <u>135</u> | <u>6,119</u> | <u>720.0</u> | <u>334.4</u> | <u>11</u> | <u>3,488</u> | <u>473.3</u> | <u>214.8</u> |

Source: Unpublished DANE data.

308. There are indications that the electrical equipment industry is relatively more advanced than the non-electrical equipment industry. For example, the output of Colombian electrical equipment (including appliances) is at a level of about 40 percent of Brazil on a per capita basis, while in the mechanical and transport equipment industries, Colombia is at about 20 percent of the Brazilian level. Value added per employee is about 70 percent of the Brazilian level in electrical equipment as against 40 percent in transport equipment.

309. Here, as in mechanical machinery, the tariff levels are not unreasonable, particularly since the margins for finished equipment above components and parts imports are only 10-15 percent, far lower for example than in the automotive field.

Transport Equipment (other than road vehicles)

310. This industry is a composite of production and repair work. Unfortunately there is no breakdown between the two types of activities in the data. The entire industry is composed of 19 establishments of which the 10 large ones, each employing over 100 workers, account for over 90 percent of the employment. There are four large railway workshops, two large ship construction and repair shops and four aviation repair and maintenance shops. Because they are largely involved in repairs and because of the nature of

their operations and accounting, the railway repair and aviation repair organizations show little margin over wages and social benefits in their value added. 1/

311. In view of the nature of these industries, there is no particular competitive position to appraise, since it is hardly conceivable that such repair work would be done outside of Colombia. It also explains why the gross output per employee is low relative to other industries and why extrapolation of employment opportunity per monetary unit of work done on the basis of past performance is no criterion of the employment opportunity offered by production rather than the repair, of such equipment.

1/ Indeed the two largest aviation repair shops show wages and social benefits equal to value added; it will be recalled that a similar situation was indicated for automotive vehicle repairs.

CHAPTER VII

REGIONAL STRUCTURE OF INDUSTRY

312. Unlike other Latin American countries where the bulk of industrial production is concentrated in one city, industrial production in Colombia is distributed among four major urban centers and several smaller industrial cities. The process of industrialization in Colombia has thus developed along the lines of the country's four distinct regions: the Atlantic Coast, with the center in Barranquilla; the Southwest centered in Cali; the Northwest focusing on Medellín; and the Center oriented around Bogotá. All cities except Barranquilla, which grew as a trading center, have developed as centers for regions rich in agricultural or mining resources. Two of the basic characteristics of Colombian industry, therefore, fragmentation of a small market for industrial goods, and a tendency towards small and frequently unutilized capacities, are closely related to the question of industrial location.

Location of Industry

313. Geographic and political considerations have been important in bringing about the existing pattern of industrial location in Colombia. First, the mountainous topography of the country has made transportation difficult and costly. Second, rural unrest during the 1940s and 1950s caused regional markets to become even more inaccessible to the products of other areas and resulted in regional concentration of large industrial investments. Third, industrial location decisions have been determined almost entirely by the private sector. The relative isolation of the cities has caused each region to develop a native entrepreneurial class, which has invested in the regional center surplus capital available from regional primary activities. Until recently, it was common to speak of Medellín entrepreneurs rather than of Colombian entrepreneurs, and so forth.

314. Table VII-1 shows the distribution of manufacturing output and employment by major Departments and cities. In 1967, the last year for which data are available, about 79 percent of value-added in manufacturing and approximately 82 percent of employment in manufacturing originated in the Departments where the four main industrial cities are located. Sixty-seven percent of manufacturing value-added and 71 percent of manufacturing employment was generated in the four cities themselves. Since data for satellite cities, which surround industrial cities, are not included in city data, Departmental figures are generally more meaningful. The difference between figures for the city of Cali and the corresponding Department of Valle, however, derives from the importance of the sugar industry in that Department's figures. While Barranquilla contributes only 8 percent of national industrial value-added and 9 percent of Colombian industrial employment, its importance derives from the fact that the city is the industrial center for the entire northern coast. Within the city of Barranquilla, the manufacturing sector accounts for 50 percent of total employment.

315. Industry in Colombia has thus been concentrated near the several major markets for manufactured goods. In 1964, 45 percent of the population lived in the four above-mentioned Departments where the main industrial centers are located. Together, these Departments generated about 50 percent of the gross domestic product of the country. Figures are even higher if neighboring Departments are taken into account.

Table VII-1: VALUE-ADDED AND EMPLOYMENT IN MANUFACTURING BY MAJOR DEPARTMENTS AND CITIES - 1967

| | <u>Value Added</u> <u>(millions</u> <u>of current</u> <u>pesos)</u> | <u>Percent</u> <u>of</u> <u>national</u> <u>value</u> <u>added</u> | <u>Manufac-</u> <u>turing</u> <u>Employ-</u> <u>ment</u> | <u>Percent of</u> <u>national</u> <u>employment</u> <u>in</u> <u>manufacturing</u> | <u>Popu-</u> <u>lation</u> <u>(thou.)</u> |
|---------------------------------------|--|--|---|--|---|
| Cundinamarca | 4,172.9 | 27.1 | 88,861 | 30.2 | 3,234 |
| of which: Bogota | 3,537.1 | 23.0 | 74,442 | 25.3 | |
| Antioquia | 3,590.8 | 23.3 | 74,259 | 25.2 | 2,793 |
| of which: Medellin | 3,372.2 | 21.9 | 67,109 | 22.8 | |
| Valle | 3,076.1 | 20.0 | 50,597 | 17.2 | 1,940 |
| of which: Cali | 2,462.6 | 15.9 | 41,479 | 14.1 | |
| Atlantico | 1,285.4 | 8.2 | 26,809 | 9.1 | 804 |
| of which: | | | | | |
| Barranquilla | 1,173.0 | 7.6 | 24,274 | 8.3 | |
| Sub-total (four major Departments) | <u>12,098.2</u> | <u>78.6</u> | <u>240,526</u> | <u>81.7</u> | <u>8,771</u> |
| Other | 3,308.6 | 21.4 | 53,299 | 18.3 | 10,829 |
| National Total | <u>14,406.8</u> | <u>100.0</u> | <u>293,825</u> | <u>100.0</u> | 19,600 |

Note: City figures include production in the main industrial suburbs.
The figures for Cali include industrial production in Palmira.

Source: Appendix Tables 15 and 18.

In the sixties, industry has become more concentrated in the four major Departments. While national industrial production grew at an average annual rate of 5.8 percent from 1960 to 1967, the four major Departments as a group grew at the rate of 6.5 percent. Cundinamarca and Valle, where the new capital and intermediate goods industries have been located, grew at more rapid rates, as indicated in the summary table below. As elsewhere in this report, growth has been calculated on the basis of gross value of output

data because of the difficulties associated with measuring changes in value-added. In the static discussions of the regional structure of industry, however, value-added data was used.

Table VII-2: GROWTH OF GROSS VALUE OF OUTPUT IN MAJOR DEPARTMENTS

| | 1960 <u>(million 1968 pesos)</u> | 1967 | Average Annual growth <u>(percent)</u> |
|---------------------------------------|---------------------------------------|-----------------|--|
| Cundinamarca (Bogota) | 6,772.4 | 10,935.0 | 7.1 |
| Antioquia (Medellin) | 5,471.4 | 8,210.0 | 6.0 |
| Valle (Cali) | 5,115.2 | 7,880.8 | 6.4 |
| Atlantico (Barranquilla) | 2,073.2 | 3,102.8 | 5.9 |
| Sub-total (four major Departments) | <u>19,432.2</u> | <u>30,128.6</u> | <u>6.5</u> |
| National Total | <u>27,038.0</u> | <u>40,225.8</u> | <u>5.8</u> |

Source: Appendix Table 14.

316. In addition to Bogota, Medellin, Cali, and Barranquilla, Colombia has several other industrial centers of significance. The cities of Bucaramanga, Cartagena, Manizales, and Pereira are the largest. The Department of Boyaca has some industrial production partly based on Acerias Paz del Rio, the only integrated steel mill in the country, but otherwise Boyaca has not developed on industrial center of significance.

317. The Departments of Santander, Bolivar, Caldas and Risaralda, (in which are located Bucaramanga, Cartagena, Manizales, and Pereira respectively) account for 13 percent of national manufacturing value-added and 10 percent of Colombian manufacturing employment. Boyaca accounts for about 3 percent of manufacturing value-added and 2 percent of industrial employment.

Structure of Manufacturing Industries in the Major Industrial Centers

318. The structure of industrial production in the major Departments is generally similar, as can be seen in the summary table below, indicating no significant degree of industrial specialization among Colombia's several regions.

**TABLE VII-3: STRUCTURE OF MANUFACTURING INDUSTRIES
IN MAJOR DEPARTMENTS - 1967**

(Percent Distribution of Value-Added)

| | <u>National Average</u> | <u>Cundinamarca (Bogota)</u> | <u>Antioquia (Medellin)</u> | <u>Valle (Cali)</u> | <u>Atlantico (Barranquilla)</u> |
|-------------------------------|-----------------------------|----------------------------------|---------------------------------|-------------------------|-------------------------------------|
| Non-Durable Consumer Goods | <u>54.7</u> | 47.3 | 53.9 | 57.7 | 53.1 |
| Durable Consumer Goods | <u>6.5</u> | 11.5 | 2.5 | 8.2 | 5.1 |
| Intermediate Goods | <u>32.6</u> | 30.0 | 35.8 | 29.0 | 36.6 |
| Capital Goods | <u>3.5</u> | 6.4 | 3.8 | 3.8 | 3.7 |
| Other | <u>2.7</u> | 4.8 | 4.0 | 1.3 | 1.5 |
| Total | <u>100.0</u> | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Appendix Table 15.

319. However, certain industrial branches are more heavily concentrated in some Departments than in others, as shown in Table VII-4 and as discussed in paragraph 320 through 322 below. The Department with the greatest degree of specialization is Antioquia (center: Medellin) where 70 percent of Colombian textiles are produced. Textiles, moreover, account for 34 percent of industrial production in the Department and 13 percent of national industrial production.

Table VII-4: PERCENT DISTRIBUTION OF VALUE-ADDED IN
SELECTED MANUFACTURING BRANCHES BY DEPARTMENTS

| | <u>Textiles</u> | <u>Chemicals inclu. pharma.</u> | <u>Paper and Products</u> | <u>Electri- cal Machinery</u> | <u>Mechani- cal Machinery</u> | <u>Transport</u> |
|---------------------------------|-----------------|---|-----------------------------------|---------------------------------------|---------------------------------------|------------------|
| Cundinamarca (Bogota) | 14.4 | <u>36.6</u> | 14.9 | <u>51.2</u> | 19.8 | <u>55.8</u> |
| Antioquia (Medellin) | <u>70.6</u> | 12.6 | 12.3 | 10.6 | <u>48.4</u> | 10.7 |
| Valle (Cali) | 5.8 | <u>27.8</u> | <u>62.8</u> | 28.6 | 11.6 | 12.1 |
| Atlantico (Barranquilla) | 3.6 | 10.9 | 5.5 | 6.2 | 5.7 | 14.0 |
| Sub-total (four Departments) | <u>94.4</u> | <u>87.9</u> | <u>95.5</u> | <u>96.6</u> | <u>85.5</u> | <u>92.5</u> |
| National Total | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |
| Weight | (13.0) | (13.3) | (2.5) | (3.2) | (1.2) | (0.7) |

Npte: The weight represents the percent contribution of that industry in national value-added.

Source: Appendix Table 16.

320. Processed chemical industries have in the past been concentrated in Bogota, but in recent years have grown fastest in Cali. In 1967 Cali produced about 28 percent of all chemicals in Colombia. Value-added in the Cali chemical industry grew at the rate of about 18 percent between 1958 and 1966. Chemicals, however, account for only 18 percent of the total of manufacturing value-added in Cali.

321. Cali is also the country's major producer of paper products; about 62 percent of the national value-added originates in that city. Paper products, however, account for only 8 percent of the manufacturing value-added in Cali. The paper industry in Cali is supplied by the wood industry located in the Departments of Cauca and Narino, south of Cali.

322. The electrical machinery industry has been marked by a tendency towards concentration in Bogota. In 1967, Bogota produced about 51 percent (in terms of value) of all electrical equipment in Colombia. A large proportion of the automotive industry - consisting of two assembly plants - is also located in the capital. The trend towards concentration of the automotive industry in Bogota will probably be reversed, however, with completion of the new Renault plant in Medellin and the start of production in 1971. Electrical machinery production represents 5 percent of industrial value-added in Bogota, and the automotive industry close to 6 percent.

323. There are two types of medium-industrialized centers in Colombia. A few cities, like Bucaramanga, Cartagena and Barrancabermeja, are highly specialized, in that industrial production is concentrated in one or two plants. Others, like Manizales and Pereira produce a wider range of products. The major characteristics of the industrial structure of the Departments where these cities are located are summarized in Table VII-5 below.

324. About 67 percent of manufacturing value-added in Cartagena derives from the petroleum and chemical branches. Unlike the chemical industries in Bogota and Cali, Cartagena has specialized its production in basic industrial chemicals such as petrochemicals. Industrial production in Barrancabermeja is almost exclusively related to petroleum refining. Bucaramanga, which used to be an important tobacco center, is heavily dependent on metal industries because of the location there of Forjas de Colombia, a steel forging plant.

Table VII-5: STRUCTURE OF MANUFACTURING IN MEDIUM INDUSTRIALIZED DEPARTMENTS - 1967

(percent distribution of value-added)

| | Santander (Bucaramanga) (Barrancabermeja) | Bolivar (Cartegena) | Caldas (Manizales) | Risaralda (Pereira) | Boyaca |
|--------------------------------------|---|------------------------|-----------------------|------------------------|--------------|
| <u>Non-Durable Consumer Goods</u> | <u>44.1</u> | <u>52.9</u> | <u>66.2</u> | <u>82.2</u> | <u>40.9</u> |
| of which: | | | | | |
| Beverages | 14.4 | 8.7 | 24.7 | 19.0 | 36.2 |
| Tobacco products | 15.3 | 7.6 | - | - | - |
| Clothing | 4.1 | 1.4 | 8.1 | 17.8 | 0.5 |
| Pharmaceuticals & related products | 0.3 | 23.9 | 3.3 | 0.5 | 0.4 |
| <u>Durable Consumer Goods</u> | <u>1.8</u> | <u>1.0</u> | <u>2.0</u> | <u>2.3</u> | <u>0.5</u> |
| <u>Intermediate Goods</u> | <u>51.4</u> | <u>44.6</u> | <u>28.5</u> | <u>14.6</u> | <u>58.4</u> |
| of which: | | | | | |
| Chemicals other than pharmaceuticals | 0.3 | 17.6 | 2.5 | 0.3 | 0.3 |
| Petroleum | 43.8 | 25.2 | 0.9 | - | 7.7 |
| Basic metals | 1.0 | - | 0.2 | - | 44.6 |
| <u>Capital Goods</u> | <u>2.3</u> | <u>0.9</u> | <u>3.1</u> | <u>0.8</u> | <u>0.1</u> |
| <u>Other</u> | <u>0.4</u> | <u>0.6</u> | <u>0.2</u> | <u>0.1</u> | <u>0.1</u> |
| <u>Total</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Source: Appendix Table 15.

324. More representative of the structure of the manufacturing sector in smaller industrial centers are Manizales and Pereira, in the heart of the coffee-growing region. Industrial capital in each of these cities originally came from coffee, and the industrial structure is heavily concentrated in the production of traditional consumer goods (food, clothing, etc.). While some food and beverage (i.e. perishable goods) industries are commonly located near the market, the concentration in consumer goods which are either capital-intensive (i.e. beverages, food canning), or require female labor (i.e. clothing), has not contributed to relieve the unemployment problem in these cities. For example, Pereira, where 18 percent of industrial value-added is in clothing, has a high unemployment rate for men.

The Setting for Industrialization in the Major Centers

Capital Availability, Labor and Wages

326. Investment for fixed capital by government agencies has been concentrated in the three largest cities (Bogota, Medellin and Cali). About 63 percent of total loans to industry from the Private Investment Funds of the Bank of the Republic, for example, have been lent in these three cities --27 percent in Cali alone.

327. The absence of corporations with widespread ownership in Cali and Barranquilla makes the shortage of working capital more acute there than in Bogota and Medellin. Because of the prevalence of family-owned corporations in the first two cities, furthermore, some of the surplus capital generated there tends to be channeled to well-established firms (Bavaria and Coltejer, for example) located in Bogota and Medellin.

328. While foreign firms have invested in all major cities, there is a heavier concentration in Cali than in any of the other cities. The bulk of industrial investment in Medellin, on the other hand, is Colombian. The concentration of foreign investment in Cali is attributed in part to the business outlook of that city which, unlike Medellin views foreign investment favorably. Cali, moreover, has a pleasant climate (unlike Bogota) and is near the market for manufactures (unlike the cities in the Northern Coast).

329. With high unemployment rates in all industrial cities, there is an ample supply of unskilled labor. Training possibilities are considered adequate through government programs to which most enterprises have to contribute. Labor unrest was a serious problem in Cali in the early sixties, but labor-management relations have improved since. The migration of professionals to Bogota has contributed to the shortage of professional managers in Barranquilla and other small centers. Cali, on the other hand, has an adequate supply of managerial staff. The Advanced School of Business Administration of the University of Valle has contributed to the supply of managers in Cali and other large cities.

330. The entrepreneurial classes in the four main cities are dynamic and well organized. While Bogota industrialists tend to have an inward orientation, producing mainly for the home market, the entrepreneurial class of Barranquilla is outward-oriented and interested in exporting. The dynamism of the big city industrialists is not evident in the small industrial cities that the Mission visited.

331. Cali industrialists are becoming more interested in exporting as improved transportation facilities make foreign markets more accessible. The construction of the Palmaseca Airport and of the road to Buenaventura, the closest port, have been instrumental in this development. Cali industrialists have created an organization (Foundation for Industrial Develop-

ment - Fundacion para el Desarrollo Industrial) with the purpose of encouraging industrialization and of dissipating the frequently held view that investment in Cali is a bad risk because of past labor unrest. The Foundation is encouraging the establishment of a free trade zone for Cali.

332. The recent trends in average annual wages for the manufacturing sector in the major industrial centers are shown in Table VII-6 below. In 1967, average industrial wages were highest in Cali and lowest in Barranquilla. Average annual wages in Bogota, Cali and Barranquilla have grown faster than in Medellin. The rapid increase in average wages in Cali reflects the large and capital-intensive investments and rapid industrialization of the city in the past few years. The moderate increase of average wages in Medellin partly reflects the relatively slow growth of the textile industry.

Table VII-6: AVERAGE ANNUAL WAGES FOR MANUFACTURING INDUSTRIES IN MAJOR INDUSTRIAL CENTERS
(in thousand 1968 pesos)

| | <u>City</u> | | <u>City, including industrial suburbs</u> | <u>1967 Index for city 1964 = 100</u> |
|------------------|-------------|-------------|---|---------------------------------------|
| | <u>1964</u> | <u>1967</u> | <u>1967</u> | |
| Bogota | 13.7 | 14.9 | 15.2 | 108.7 |
| Medellin | 13.9 | 14.4 | 15.0 | 103.4 |
| Cali | 14.0 | 15.3 | 17.0 | 109.4 |
| Barranquilla | 13.0 | 14.2 | - | 108.9 |
| National Average | <u>13.7</u> | <u>14.7</u> | <u>14.7</u> | <u>107.2</u> |

Source: Unpublished DANE data.

333. Wages are considerably higher in the new industrial suburbs of the three largest cities than in the cities themselves. In Bogota and Cali this reflects the development of very capital-intensive intermediate and capital goods industries outside the city proper; these industries usually pay high wages. In Yumbo, the largest industrial suburb of Cali and the center for some of the new paper industries, average industrial wages were about 23,000 pesos in 1967 (in 1968 prices). For the same year, average wages in Soacha, the major industrial suburb of Bogota (where some rubber and construction material industries are located), were about 19,000 pesos (in 1968 prices).

334. In Medellin average wages were considerably higher than the national average in the early sixties, primarily as a result of the high wages paid by the textile sector. The high wages in the city itself led

to the rapid development of numerous industrial suburbs; the textile industry was, in fact, one of the first to move to the suburbs. Coltejer, the textile giant, has moved to Rio Negro, one of the industrial towns near Medellin, the Fabricato, the second largest textile producer in the country, has already bought land there and plans to build a plant in the near future.

335. Average industrial wages were considerably lower in the smaller industrial centers. Barrancabermeja and Cartagena are exceptions in that they depend heavily on the capital-intensive petroleum and chemical industries which are notably high-wage. While average wages were between 11,000 and 12,000 pesos per year in Bucaramanga, Manizales and Pereira, average wages in Cartagena were about 19,000 pesos and 30,000 pesos in Barrancabermeja (all wages are in 1968 prices).

Transport

336. Topography and transportation have, to a large extent, patterned the development of industry in Colombia. Colombia has made notable advances in improving its transportation network and this will unquestionably have an impact on the future pattern of industrialization. However, it might well be that future industrial development will require the further expansion of transportation facilities of the country.

337. There are now good road links between Cali and Medellin and it is expected that by the end of 1972 a good connection will exist between Medellin and the Atlantic Coast. For the purpose of moving industrial products, the route between Bogota and the Atlantic Coast seems to be less than adequate. Moreover, the low carrying capacity of the bridges limits the weights of articles that can be moved on this road. Certainly the bridge over the Magdalena River, that will connect Barranquilla with Santa Marta, the terminal for both the Atlantic railroad and the North highway, will improve transportation between Barranquilla and the center of the country. The road from Buenaventura to Cali should aid in connecting the interior with the Pacific Coast and possibly affect future industrial location decisions.

338. From the point of view of developing external markets, of particular interest for Cali and Barranquilla, the improvement of port handling and speeding up of customs procedures in Buenaventura, Cartagena, Barranquilla and Santa Marta are important.

Urban Infrastructure and Taxation

339. There is adequate water supply and power for manufacturing in most major industrial cities. At the present time there is a shortage of power for the steel mill in Boyaca and it is anticipated that there will be temporary power shortages in Barrancabermeja where the petroleum refinery is located and in Barranquilla until plant now under construction is installed. Of the four major industrial cities, electric power rates are highest in Cali and lowest in Bogota. In Cartagena industrial water supply is a bottleneck for the growing petrochemical industry.

340. Urban transportation could be a bottleneck to industrialization. Transportation in the cities is not adequate partly because of the restrictions on the importation of automotive equipment, but also because of lack of access to the new industrial suburbs and the insecurity of nighttime travel. These problems are most serious in the three largest cities which have developed satellite industrial towns. The difficulties of nighttime transportation have contributed to capacity underutilization by making second and third shift staffing difficult and costly.

341. Land for industrial uses is readily available in or nearby most of the industrial cities; Manizales, however, is an exception.

342. Departmental and city taxation to industry (primarily a property tax) is not very important in Colombia. Medellin, however, charges from two to three times more in taxes than all the other major cities.

Future Directors of Growth

343. If Colombia's mountainous topography did not entail such heavy transport costs, the size of the Colombia market for manufactured goods would justify the development of only one or two large industrial centers. Many of the geographical considerations which led to the original development of four industrial centers, however, are still valid today, and even with greatly improved means of transportation, transport costs are almost certain to remain so high as to justify the continued pre-eminence of the four main industrial centers. Moreover, low-value, high-bulk industrial goods such as cement will probably have to continue to be supplied locally. Given the present fragmentation of capacity, the underutilization of already existing capacities, the resulting high costs for many industrial projects, and the poor organization of marketing, the creation of new industrial centers unless founded on inherent resource advantages, is questionable.

344. It is frequently argued that the need for employment creation necessitates the development of an industrial sector in the smaller cities. Unemployment problems in the main cities are equally serious, however, and in any case, manufacturing does not absorb a great deal of manpower. On the other hand, the continued concentration of manufacturing in the four major centers, accompanied by a greater degree of specialization in each city, would contribute much needed internal economies of scale and external economies to the manufacturing sector in Colombia.

345. The tendency to locate industry near the market has led to the fragmentation of capacity in many industrial branches. Private entrepreneurs, lacking knowledge of government transport investment planning, have located industries irrespective of prospective reduction in internal transport costs and therefore their locational decisions have turned out to be less than optimal. The scale of plants and the related question of location will be more important in the future since Colombia, having already developed the traditional industries, may go into more capital-intensive industries such as basic chemicals, where size and transport costs are a crucial factor in pricing. Some examples of fragmented capacities follow.

346. By the end of 1971, there will be three automotive assembly plants in Colombia; two in Bogota and one in Medellin. The decision to locate the Renault plant in Medellin will reduce unemployment in that city deriving from the relatively slow growth of the textile sector. However, the location in Medellin will not permit the new plant to derive external economies--such as the sharing of equipment and urgently needed inputs--which it might have enjoyed if it had been located in Bogota, where the other two plants are located.

347. There are steel-making capacities not only in Belencito, Boyaca where Paz del Rio is located, but also in Medellin, Barranquilla, Cali and a re-roller in Tunja, also in Boyaca. The latter plant, which is halfway between Bogota and Belencito, is planning an expansion program involving backward integration into steel-making. 1/

348. There are five major electrical appliance manufacturers in Colombia: three in Bogota, one in Medellin, and one in Manizales. All these plants have unutilized capacities, and their prices are about three to four times the world market price.

349. The basic chemical industry--which almost universally derives major benefits from large-scale production--is fragmented. For example, there are three polyester fiber plants: two in Medellin and one in Barranquilla. All are very small by present day standards, and while operating at near capacity, the selling price of their products is considerably above industry sub-sectors are frequently small.

350. As mentioned above, the traditional consumer goods industries are located throughout the country. Economies of scale which can be derived from large capacities in the clothing, leather products, or footwear industries are more limited than in other industrial branches. However, experience in countries specializing in labor-intensive exports strongly suggests that there are considerable gains in labor productivity in large-scale production. Moreover, large size plants or alternatively concentration in one city would greatly facilitate the redirection of entrepreneurial skills, improved marketing procedures, product design, and industrial services which are essential if an export market is to be opened up for these products. Therefore, while it is possible to develop mass consumption industries anywhere in the country provided that they are located near the market and that there is sufficient labor available, it would be advantageous to concentrate the export sector of these industries in one city so that they will derive the benefits mentioned above.

1/ For details on the Iron and Steel and Basic Chemicals industries, see the sector annexes.

351. In the light of the foregoing comments, it would seem advisable to give more attention in the future to the question of location in determining investment in Colombian manufacturing. This is particularly important in this country since the industrial centers have—because of their location—a comparative advantage in some products. Careful study of location issues is therefore advisable as a part of any government policies for the industrial sector. Some brief comments on locational advantages follow.

352. Advantage could be taken of the location in Barranquilla and the outward-orientation of its entrepreneurs to develop an export center in this city. Barranquilla's coastal location makes it an ideal site for export industries which are labor intensive and require substantial imported raw materials. This is particularly important because the distance between Barranquilla and the main centers of consumption would make it difficult for this city to supply the domestic market in many of the intermediate and capital goods industries which are already established in the southern cities.

353. Barranquilla, with its cheap labor has potential for developing an export-oriented garment industry. This will become more important when there are adequate transport facilities between Medellin and Barranquilla. If Medellin is producing textiles at competitive prices, there is no economic need to develop a textile industry in Barranquilla. (Average wages for clothing are given in Table VII-7 below). Barranquilla should also promote the development of the meat, fish and wood industries, which satisfy the requirements of export-orientation and locally-available inputs.

Table VII-7: AVERAGE ANNUAL WAGE IN THE CLOTHING AND FOOTWEAR INDUSTRIES
(thousand 1968 pesos)

| | <u>Clothing and Footwear</u> |
|--------------|----------------------------------|
| Bogota | 9.21 |
| Medellin | 9.50 |
| Barranquilla | 8.37 |

Source: Unpublished DANE data.

354. Economic advantages will probably lead to the continued concentration of textile production in Medellin. The efficiency and dynamism of the textile industry of Medellin is a good example of the advantages of large capacities and concentration in one city.

355. There has been an increasing concentration of electrical equipment goods in Bogota and of the metal industries in Medellin. Since the market for these products is primarily in the Medellin-Bogota-Cali triangle, the

location of these industries seems appropriate. Petrochemicals will probably be developed in Cali if the planned petroleum refinery is located in that city.

356. The paper industry seems logically located in Cali. The paper industry could consider some of the Andean or Caribbean markets for export. It is important that good transportation facilities be made available between Medellin and Bogota, and Cali and Bogota, if each one of these cities is to specialize in heavy industrial goods.

357. The possibilities of industrialization for the smaller industrial centers seem more limited. The Manizales area might be able to process some of its coffee locally. Pereira is closer (in time) to Medellin and could continue as a clothing center with the textiles being supplied from Medellin. A solution should be found for its peculiar unemployment problem resulting from its specialization in clothing. Pereira could be associated with the growing metal-mechanical industry of Medellin by becoming a supplier of parts for this industry.

358. Cartagena is an obvious choice for some chemical production based on salt although these prospects are limited until some substantial market is developed for the chlorine which is a concomitant product from the electrolysis of salt. Cartagena has potentials as a petrochemical center given that the city is situated on the coast which makes imported inputs relatively inexpensive and readily accessible, and that one of the two existing petroleum refineries in Colombia is located there. The existence of numerous petrochemicals plants in that city will make possible external economies for new plants. The good harbor, moreover, could facilitate exports in petrochemicals. There is a certain conflict between the development of Cartagena as a tourist center and a major industrial city. It may be possible to minimize these conflicts through careful land use planning and strict zoning regulations. A study of this problem is incorporated into the tourism preinvestment study (Volume VI).

Regional Industrial Planning

359. Pressure has been mounting in Colombia for government regional incentives to industry, and it seems likely that in the near future the President will be given the legal power to grant such incentives.

360. In the light of the mounting pressures, the Regional and Urban Development Unit of the Planning Office in Colombia is undertaking a series of studies designed to assess the present structure of industry in the various regions, and to determine which policies are best suited to encourage optimal regional industrial growth.

361. The regional industrial studies are part of a program designed to give guidelines for the general development of the regions. As background, the planning group has elaborated a general "model of regionalization".

362. The model of regionalization defines the present economic regions of Colombia by ranking the major urban centers according to economic (industrial indicators), demographic and infrastructure criteria and by determining migration patterns, geographical barriers and political subdivisions. The model has defined four main economic regions and their regional urban centers: the Atlantic Coast (center: Barranquilla), the Central Region (center: Bogota), the Southwest (center: Cali), and the Northwest (Center: Medellin).

363. As a second step, the model seeks to redefine the regions of the country for planning purposes. The model defines eight planning regions for Colombia and identifies development poles for the regions. All regions except the Putumayo (where petroleum has been discovered) and the Magdalena Region, already have industrial centers (development poles) of some importance, although the model does not presume rapid industrialization in all regions. Bogota, Medellin, Cali, Barranquilla, Manizales/Pereira and Bucaramanga are the "development poles for six of the regions.

364. The model also sets general regional sectoral policies. On industry, the model assumes that regional industrial strategy and policies must be in agreement with the national strategy and policies for the industrial sector. Incentives to industry in each region will be granted as part of the program of regional development.

365. As a first step in formulating regional industrial incentives, the Regional and Urban Development Unit of the National Planning Office has developed a strategy for regional industrialization and is preparing a series of related studies. The strategy under discussion is two-sided. First, it seeks to rationalize industry at the national level by promoting specialization in the main cities: Bogota, Medellin, Cali and Barranquilla, and in selected smaller industrial centers (all defined as "development poles" by the Planning Office) by encouraging the development of "dynamic" and related industries. "Dynamic" industries will be identified primarily on the basis of past performance according to statistical indicators. Second, labor-intensive industries will be promoted in small cities to absorb the unemployed labor and reverse the present pattern of migration to the larger cities.

366. The specific policies designed to carry out the strategy will be based on the results of an investigation, now underway, by the Regional and Urban Development Unit of the Planning Office. The investigation will be undertaken for all planning regions and will be carried out in four stages. The first stage will be a survey of the existing industry in each of the major centers to identify the "dynamic" and related industries. An attempt will be made in these studies to identify possible growth industries in the smaller centers in the region. Secondly, a questionnaire will be given to private entrepreneurs to assist the Planning Office, in: (a) identifying specific industrial projects which could be promoted; (b) determining major production bottlenecks; (c) assessing the availability of capital; (d) establishing intra- and extraregional relationships; and (e) determining

proper incentives. Thirdly, on the basis of the regional industrial survey and the questionnaire to industrialists, the Planning Office will decide which industrial sectors and subsectors should be promoted in each city/region and will develop a program of localized incentives for each area. The last stage would be the preparation of pre-feasibility or feasibility studies for the selected industrial subsectors in each major city.

367. The present attempts to approach the locational problem in a systematic fashion are useful, but their usefulness would be greatly enhanced if they were combined with an overall national strategy for their industrial sector in terms of decision as to which industries should be stimulated at different stages of development.

368. The analysis of existing regional industry and the questionnaire to industrialists should be supplemented with information regarding transport costs, urban infrastructure and demand data. Given the importance of the location studies in determining the future development of the industrial sector in Colombia, the staff working on these problems should be expanded. Advisors with experience in industrial location problems could be of great assistance in arriving at sound location decisions and in developing appropriate incentives to industry in the regions if it is believed, after study that such incentives would in fact be beneficial. Should the development of an explicit national strategy be delayed, the information on market, transport costs and international competitiveness which could be included in location preinvestment studies of particular industries would serve as the basis for policy decisions with respect to that particular industry, both in and outside the government.

CHAPTER VIII

PROJECTED GROWTH AND ITS IMPLICATIONS FOR
TRADE, EMPLOYMENT AND INVESTMENT

369. In this chapter, an attempt is made to project the growth of the Colombian market for manufactures by 1975. Consistent with alternative assumptions of future economic growth (measured in terms of real gross domestic product) estimates of physical production growth, foreign trade, employment and investment in the manufacturing sector are developed. These estimates are examined for consistency and judgments are offered as to the feasibility of achievement within the allowed time period. Alternative policy approaches are analyzed, wherever possible.

370. As indicated in Chapter II, factory production increased at an average annual rate of 6.4 percent between 1953 and 1967. The rate in the first half of the period was substantially higher - 7.0 percent - falling to 5.8 percent in the second half of the period. The growth of the domestic market 1/ for manufactures averaged 4.6 percent while the rate for the latter half of the period fell slightly to 4.4 percent. This indicates that the substitution of domestic production for imports proceeded at a more rapid rate in the earlier period than in the later period. Exports, however, rose more significantly in the latter period.

371. To illustrate this point, the tabulation below compares the actual imports and exports in 1960 with what they would have been had they accounted for the same proportions of the market as they did in 1953. The process is then repeated for the year 1967 where actual imports and exports are compared with what they would have been had they accounted for the same proportion of the market or output as they did in 1960. The results in the form of estimated imported savings and increased export earnings in millions of U.S. dollars are shown in the following table:

1/ Defined as production plus imports minus exports.

Table VIII-1: HYPOTHETICAL IMPORT SAVINGS AND EXPORT EARNINGS
(million US\$)

| | Non-durable Consumer Goods | | Intermediate Goods | | Other Goods | | Total Manufactures | |
|------------------------|----------------------------------|-------------|-----------------------|--------------|----------------|-------------|-----------------------|-------------|
| | Imports | Exports | Imports | Exports | Imports | Exports | Imports | Exports |
| Actual 1960 | 27.9 | 0.6 | 184.6 | 11.3 | 240.6 | 2.2 | 453.1 | 14.1 |
| Hypothetical 1960 | <u>52.2</u> | <u>1.0</u> | <u>324.4</u> | <u>5.9</u> | <u>302.4</u> | <u>0.4</u> | <u>679.0</u> | <u>7.3</u> |
| Saving for Colombia | +24.3 | -0.4 | +139.8 | +5.4 | +61.8 | +1.8 | +225.9 | +6.8 |
| Actual 1967 | 25.0 | 3.0 | 165.0 | 45.9 | 243.3 | 6.7 | 433.3 | 55.6 |
| Hypothetical 1967 | <u>38.8</u> | <u>0.8</u> | <u>249.2</u> | <u>15.0</u> | <u>324.5</u> | <u>3.0</u> | <u>611.5</u> | <u>18.8</u> |
| Saving for Colombia | <u>+13.8</u> | <u>+2.2</u> | <u>+84.2</u> | <u>+30.9</u> | <u>+81.2</u> | <u>+3.7</u> | <u>+179.2</u> | <u>36.8</u> |

Source: Based on data in Appendix Tables 23 and 24.

372. As is apparent from the foregoing table, the major import savings and export earnings have been realized in intermediate goods. The "other" category which comprises capital goods, consumer durables and miscellaneous products also showed considerable import savings. In the field of non-durable consumer goods, both import savings and export earnings were relatively small.

373. Projections of the Colombian market for factory output in 1975 are presented below. The assumptions underlying these estimates are as follows:

- (a) because of uncertainty of the rate at which gross domestic product will rise, four alternative projections are presented based on a rise of 5, 6, 7 and 8 percent per annum in gross domestic product;
- (b) consistent with each of the foregoing assumptions is a rate of growth of the domestic demand for manufactures; past experience within Colombia indicates that changes in the overall market demand for manufactures tend toward equality with changes in GDP within a fraction of 1 percent;
- (c) within the total increase in market demand, the commodity composition of growth in market demand is expected to follow more closely the 1960/67 pattern than that of the earlier period;

- (d) income elasticities of demand of 0.8 for non-durable consumer goods, 1.0 for intermediates and 1.5 for "others" i.e. capital goods, consumer durables and miscellaneous, are assumed. These rates, coupled with 1967 weights for market share are consistent with a unit income elasticity for manufactures, taken as a whole.

374. The following table summarizes the past rates of change in real gross domestic product and in the internal market for broad categories of manufactures and projected rates of growth in line with the assumptions stated above.

Table VIII-2: AVERAGE ANNUAL RATE OF GROWTH IN GROSS DOMESTIC PRODUCT AND IN THE MARKET FOR MANUFACTURES BY CATEGORY

(Percent)

| | Actual | | Projected | | | |
|--|---------|---------|-----------|-----|-----|------|
| | 1953-60 | 1960-67 | 5 | 7 | 7 | 8 |
| <u>Changes in Gross Domestic Product</u> | 4.4 | 4.7 | 5 | 7 | 7 | 8 |
| <u>Total Internal Market</u> | 4.7 | 4.4 | 5.0 | 7.0 | 7.0 | 8.0 |
| Non-durable consumer goods | 3.9 | 4.4 | 4.5 | 5.3 | 6.1 | 6.9 |
| Intermediate goods | 7.1 | 4.4 | 5.5 | 6.5 | 7.5 | 8.5 |
| Others | 3.2 | 4.4 | 5.5 | 7.0 | 8.5 | 10.0 |
| of which Durable Consumer Goods | (6.7) | (8.8) | | | | |
| Capital Goods | (1.7) | (1.6) | | | | |
| Miscellaneous | (6.3) | (7.2) | | | | |

Relation of Production to Domestic Market

375. Table VIII-3 below shows (a) the past relation of production growth to demand growth, and (b) the estimated production growth as compared to the demand estimates formulated above. The assumptions underlying these production estimates are as follows:

- (1) Non-durable consumer goods output increases at the same rate as internal demand.
- (2) Intermediate goods output rises 2 percent per year faster than internal demand.
- (3) Production of "Other" goods rises at rates of 7-1/2 - 12 percent per annum as compared to internal demand growth of 5-1/2 - 10 percent. The 7-1/2 - 12 percent is made up of an increase of only 1 percent per annum higher for production than the domes-

tic market for durable consumer goods and miscellaneous and a 4-1/2 percent increase per annum in production over market demand for capital goods. Such a rate of increase would about maintain a negative trade balance of 30 million per year in the former categories as compared to \$35 million in 1967 (see Table VIII-6). A spread of 4-1/2 percent per annum, as for capital goods, would imply Colombia becoming a net exporter in these categories by 1971, which seems highly unlikely. Of course, lower prices for durable consumer goods, would increase local demand and since there is excess capacity in electrical appliances, it is suggested that policies conducive to price reduction be undertaken (see paras 283-85 above). This possibility is not allowed for above, since it is unclear which categories of demand would be affected adversely and by how much, if such actions were taken to change relative prices.

Table VIII-3: RELATION OF RATES OF GROWTH OF MARKET AND PRODUCTION BY CATEGORIES OF MANUFACTURES - PAST AND PROJECTED

(Percent)

| Growth Rates | 1953/60 | 1960/67 | 1967-75 | | | |
|-----------------------------------|---------|---------|---------|-----|------|------|
| Gross Domestic Product | 4.4 | 4.7 | 5 | 6 | 7 | 8 |
| Non-durable consumer goods | | | | | | |
| Market | 3.9 | 4.4 | 4.5 | 5.3 | 6.1 | 6.9 |
| Production | 4.3 | 4.6 | 4.5 | 5.3 | 6.1 | 6.9 |
| Intermediate goods | | | | | | |
| Market | 7.1 | 4.4 | 5.5 | 6.5 | 7.5 | 8.5 |
| Production | 12.8 | 6.9 | 7.5 | 8.5 | 9.5 | 10.5 |
| Others | | | | | | |
| Market | 3.2 | 4.4 | 5.5 | 7.0 | 8.5 | 10.0 |
| Production | 12.6 | 10.1 | 7.5 | 9.0 | 10.5 | 12.0 |
| Total | | | | | | |
| Market | 4.7 | 4.4 | 5.0 | 6.0 | 7.0 | 8.0 |
| Production | 7.0 | 5.8 | 5.9 | 6.9 | 7.9 | 8.8 |

Sources: Banco de la Republica, Cuentas Nacionales 1950-67 and Appendix Table 9.

376. It will be noted that in consumer non-durable goods, production had risen faster than internal demand in earlier periods; the growth rate of production was 0.4 percent higher than demand in 1953-60 and 0.2 percent higher in 1960-67. It is assumed that they will grow at equal rates in the future because import substitution possibilities appear limited. Also, some liberalization of import prohibitions on consumer non-durables would appear desirable as a prelude to making these industries more export-oriented. As has been indicated earlier, export potential in this field is large but may take years to become effective. Our estimate implies no appreciable rise in exports of consumer non-durables. To the extent such an increase did transpire, it would raise the production growth rate above the market growth rate for consumer non-durables. For most non-durable goods industries, there is substantial production potential in that only one shift is worked in most clothing and footwear factories.

377. For intermediates, as we noted earlier, the import substitution rate had already slowed noticeably in 1960-67 as compared to the earlier period, the gap between production and market growth rates dropped from 5.7 percent to 2.5 percent per annum. Our projection is for the gap to decline to 2 percent, which would mean that by 1975 production would be equal to internal demand, with exports offsetting imports, as compared to net imports of US\$119 million in 1967. This implies that exports of intermediates (chemicals, petroleum, etc.) which rose sharply from \$11 to \$46 million between 1960 and 1967, would continue rising to offset a variety of imports which probably cannot be substituted at all or economically such as non-ferrous metals and metal products, specialized chemical and paper products, etc. Most of these industries are on a two or three shift basis, so that unused capacity is limited. Expansion of output will generally require investment in new capacity, except perhaps in metal fabricating.

378. For "other" products, notably capital goods and consumer durables, the estimates are necessarily less precise. The domestic production base is small, it constitutes only 12 percent of manufacturing output and comprises a number of specialized producer goods as well as such consumer durables as furniture, tires, appliances and motor vehicles. From this small variegated base past production increases were 12-1/2 percent and 10 percent per year in the earlier two seven-year periods. Our projections call for an increase of 7-1/2 to 12 percent per annum for an 8-year period, a formidable task. To achieve these rates of growth will require substantial new investment, except in appliances, improvement in the existing organization of work and perhaps creation of a number of large new firms with experienced management.

379. Table VIII-4 below sets forth in summary form the projections of 1975 market and output for manufactures by categories. The differences between market and output projections are conceptually accounted for by net trade, although in any particular year inventory changes not allowed for could be significant.

Table VIII-4: PROJECTIONS OF COLOMBIAN MARKET FOR
MANUFACTURES BY CATEGORIES
(million US\$ - constant prices)

| | <u>1967</u> | <u>1975 Alternatives</u> | | | |
|-----------------------------|-------------|--------------------------|-------|-------|-------|
| | | 5% | 6% | 7% | 8% |
| <u>Non-durables</u> | | | | | |
| Production | 1,336.5 | 1,901 | 2,020 | 2,146 | 2,280 |
| Market | 1,358.5 | 1,932 | 2,054 | 2,182 | 2,318 |
| Net Trade | -22.0 | -31 | -34 | -36 | -38 |
| <u>Intermediates</u> | | | | | |
| Production | 764.6 | 1,364 | 1,469 | 1,580 | 1,700 |
| Market | 883.7 | 1,357 | 1,462 | 1,577 | 1,698 |
| Net Trade | -119.1 | +7 | +7 | +3 | +2 |
| <u>Others</u> | | | | | |
| Production | 272.1 | 485 | 542 | 604 | 674 |
| Market | 508.7 | 781 | 674 | 977 | 1,091 |
| Net Trade | -236.6 | -296 | -332 | -373 | -417 |
| <u>Total</u> | | | | | |
| Production | 2,373.2 | 3,750 | 4,031 | 4,330 | 4,654 |
| Market | 2,750.9 | 4,070 | 4,390 | 4,736 | 5,107 |
| Net Trade | -377.7 | -320 | -359 | -406 | -453 |
| *Net Trade: Net Imports = 1 | | Net Exports = + | | | |

Source: Appendix Table 9.

Employment Implications

380. If factory output achieved levels projected for 1975, the output levels at the various alternative GDP levels could rise from the 1967 level by 58 percent for the low alternative and 96 percent for the high alternative. Clearly, employment would rise more slowly because output per employee could be expected to rise, as it does everywhere else, with better facilities, improved layout, learning from previous experience by both management and labor and other factors too numerous to mention. The question is how much should be allowed for this factor.

381. Past experience over the period 1953-67 indicates that for factory output as a whole, output per employee rose by an average 3.1 percent over the entire period. Statistically, there appears to have been a rise from 2.5 percent in the period 1953-60 to 3.6 percent in 1960-67. For our present purpose, it would suffice to project alternative estimates of employment growth for factory industry as a whole by use of a range of productivity growth assumptions of 3 to 4 percent per annum as is done in the table below.

Table VIII-5: EMPLOYMENT PROJECTIONS IN THE MANUFACTURING INDUSTRY

(1967 = 100)

| Productivity growth assumptions 1967 | <u>Production</u> | <u>Output per Man</u> | | <u>Employment</u> | |
|---|-------------------|-----------------------|---------|-------------------|---------|
| | | 3% p.a. | 4% p.a. | 3% p.a. | 4% p.a. |
| | 100 | 100 | | 100 | |
| 1975 - A (5%) | 158 | 126.7 | 136.9 | 125 | 116 |
| B (6%) | 170 | 126.7 | 136.9 | 134 | 122 |
| C (7) | 183 | 126.7 | 136.9 | 145 | 134 |
| D (8%) | 196 | 126.7 | 136.9 | 155 | 143 |

Sources: Appendix Tables 2 and 6 and Mission estimates.

382. Paid employment in factory industry was 283,000 in 1967 and total employment, including unpaid personnel was 294,000. Consequently, applying the above assumptions, total employment might rise by between 47,000 using a low output, high productivity assumption and 162,000 using a high output, low productivity assumption. A rise of 34 percent or about 110,000 would be compatible with an 8 percent annual output increase and a 4 percent per annum productivity growth or a 7.1 percent output increase and a 3 percent productivity growth. For policy planning purposes this would appear to be a reasonably attainable target in the light of present information and policies. It is obviously not a maximum target and if appropriate policies were adopted and implemented, it could be exceeded. Merely to achieve the target would require, however -

- (a) a growth in real gross domestic product of 6-7 percent per annum above the 1967 level;
- (b) a business climate conducive to high investment rates in industry, including foreign investment;
- (c) maintenance of a high level of foreign trade (see implications for foreign trade below).

383. The targets could be exceeded if the foregoing were achieved and, in addition, a vigorous promotional effort for exports of consumer non-durables were launched which increased exports in this category from approximately \$3 million in 1967 to US\$50 million per year or more by 1975. This would imply a vigorous export drive centering around clothing and leather goods including footwear aimed primarily at mass markets like North America and Europe. Another potential area for export promotion would appear to be furniture.

Implications for Foreign Trade

384. The market and production models described above imply that Colombia's negative trade balance in manufactures would not change appreciably from US\$378 million (US\$433 million imports and US\$55 million exports) to about US\$380 million by 1975. One possible trade model consistent with the market and production projection for 1975 as compared with 1967 is shown below.

Table VIII-6: PROJECTED NET TRADE IN MANUFACTURES

(US\$ million)

| | 1967 | | | 1975 | | |
|-----------------------|------------------|----------------|----------------|------------------|----------------|----------------|
| | <u>Net Trade</u> | <u>Exports</u> | <u>Imports</u> | <u>Net Trade</u> | <u>Exports</u> | <u>Imports</u> |
| Consumer non-durables | - 22.0 | 3.0 | 25.0 | - 35 | 5 | 40 |
| Intermediates | -119.1 | 45.9 | 165.0 | + 5 | 130 | 125 |
| Others | -236.6 | 6.7 | 243.3 | -350 | 20 | 70 |
| of which | | | | | | |
| Capital goods | (201.8) | (3.4) | (205.2) | (-320) | | |
| Consumer durables | (23.6) | (2.7) | (26.3) | (-20) | | |
| Rest | (11.2) | (0.6) | (11.8) | (-10) | | |
| Total | -377.7 | 55.6 | 433.3 | 380 | 155 | 535 |
| + net exports | | | | | | |
| - Net imports | | | | | | |

Sources: Appendix tables 23 and 24 and Mission estimates.

385. In this model, the major anticipated changes in the trade pattern are the continuing large import substitution in intermediates and a sizeable increase in the exports of intermediates offset by a large increase in imports of capital goods. In consumer non-durables, increases in both exports and imports are modest and point to the basic assumption that trade patterns in that sub-sector will be little changed, reflecting mainly income growth transmitted to increased imports of pharmaceuticals and foreign language publications which cannot be effectively substituted for by domestic output.

386. In the "other" category composed mainly of capital goods and consumer durables, the volume of net trade is projected to rise sharply because of a rise in capital goods imports. To keep imports from rising further than projected will necessitate domestic output rising from 53 percent of the market in 1967 to over 60 percent by 1975, because of rapid market growth.

387. In intermediate goods, net trade for 1975 is assumed to be barely positive (US\$5 million per year) as against a negative balance of US\$119 million in 1967. The gap is assumed to be closed by a major increase in exports and a small net decline in imports. On the import side, reductions are expected in paper and chemicals, which together, accounted for about 60 percent of the imports of intermediates but imports of base metals will likely rise because of Colombia's inadequate non-ferrous metal resource base.

388. Steel imports may be reduced if the new sheet mill is in operation by that time. The anticipated reduction in imports of about US\$40 million appears attainable but only barely so.

389. On the export side, the projection requires an increase from US\$46 million in 1967 to US\$130 million by 1975. 1967 exports of intermediates and our estimated export potential for 1975 are set out in the following table.

Table VIII-7: EXPORT POTENTIAL OF SELECTED MANUFACTURED PRODUCTS
(million US\$)

| | <u>1967</u> | <u>1975</u> |
|---------------------------|-------------|-------------|
| Wood products | 3.3 | 10 |
| Metals and metal products | <u>2.5</u> | <u>40</u> |
| sub total | 5.8 | 50 |
| Others | 40.1 | 80 |
| of which | | |
| Textiles | 7.1 | |
| Paper | 8.6 | |
| Leather | 2.4 | |
| Chemicals | 2.9 | |
| Non-metallic minerals | 5.7 | |
| Petroleum | 13.4 | |
| Total | <u>45.9</u> | <u>130</u> |

Source: Appendix Table 24 and Mission estimates.

390. Wood. The first two items, wood products and metal and metal products require special explanation. Our estimates are based on the knowledge of specific investment undertakings, which are under consideration now. In wood products, there are several sawmill projects and at least one plywood project clearly oriented for export. At least one large American company is undertaking an investment program which would yield an estimated US\$10 million a year in exports. Other proposals are also under consideration. It would require the export of about 200,000 cubic meters of sawn wood (or its equivalent in other wood products) in addition to the 1967 exports to attain the US\$10 million export target.

391. Metals. In metals, the ferro-nickel project has been under discussion for several years and if put into operation on the scale projected by its sponsors it would yield 37.5 million pounds (nickel content) of ferro-nickel, conservatively valued at a metal price of US\$1 per lb. Such a project would probably require a physical investment in fixed assets of at least US\$75 million. (This project is discussed in more detail in Chapter X.) Exports would be in the form of ferro-nickel, an intermediate manufacture.

39.2 Other intermediates. The exports of other intermediates are intermittent and are essentially dependent on capacity exceeding internal demand and export prices being sufficiently attractive to cover cash costs with some margin. It should be noted that fluctuations occur from year to year. Because new oil refining, chemical, paper and cement plants are being planned some excess capacity for export will be available and there are good grounds for believing exports in these fields and perhaps also in textile and leather can be expanded by 75 percent in 8 years. In fact, exports in these very categories rose from US\$40 million in 1967 to US\$47 million in 1968, but the reasons for cyclicity given above make it unwise to project such year-to-year movements over longer periods. The export target for intermediates as a whole obviously depends heavily on the early implementation of projected foreign investment in wood products and nickel.

Investment Implications

393. The investment implications of the output rise projected above must of course be taken into account. Between 1967 and 1975, the domestic production rise is estimated at between US\$1.5 billion and US\$2.4 billion, depending on the alternative assumptions of real income increase. The breakdown by category for each assumption is shown in the following table:

Table VIII-8: PROJECTED INCREASE IN OUTPUT BY 1975

(million US\$ - constant prices)

| | 1967 Output | GDP growth assumptions | | | |
|---------------|----------------|------------------------|--------------|--------------|--------------|
| | | 5% p.a. | 6% p.a. | 7% p.a. | 8% p.a. |
| Non-durables | 1,336 | 565 | 684 | 810 | 944 |
| Intermediates | 765 | 599 | 704 | 815 | 935 |
| Others | 272 | 213 | 270 | 332 | 402 |
| Total | <u>2,373</u> | <u>1,377</u> | <u>1,658</u> | <u>1,957</u> | <u>2,281</u> |

394. In the 7-year period ending 1966 ^{1/} fixed investment was about \$800 million equivalent while gross production rose \$778 million between 1960-67. Overall therefore the relation of new fixed investment to increased gross output appears to be about one to one, but the ratio differs as between industries. Our best estimates by categories are reflected in the following table:

Table VIII-9: RELATION BETWEEN OUTPUT AND INVESTMENT GROWTH

(million US\$ - Constant prices)

| | Gross Gross Output Increase 1960-67 | Fixed Fixed Invest- ment 1960-66 inclusive | Investment per \$ of gross output increase (rounded) |
|---------------|--|---|--|
| Non-durables | 361 | 235 | 0.65 |
| Intermediates | 284 | 470 | 1.65 |
| Others | 133 | 95 | 0.70 |
| Total | <u>778</u> | <u>800</u> | <u>1.00</u> |

Sources: Appendix Table 9 and DANE, Boletín Mensual de Estadística, Nos. 148, 170, 180, 201 and 207.

^{1/} Our estimates of output are lagged one year behind fixed investments to allow for start-up delays and the fact that partially completed plants reflected in investment figures do not customarily yield out corresponding to investment.

If we apply these ratios to projected output increases shown in Table VIII-8 of para 394 above, we arrive at the following alternative estimates of future fixed investment for the period 1967-74.

Table VIII-10: PROJECTED INVESTMENT IN MANUFACTURING
(million US\$ - constant prices)

Consistent with production increases related
to GDP growth of:

| | <u>5%</u> | <u>6%</u> | <u>7%</u> | <u>8%</u> |
|---------------------|--------------|--------------|--------------|--------------|
| Non-durables | 370 | 440 | 530 | 610 |
| Intermediates | 990 | 1,160 | 1,340 | 1,540 |
| Others | 150 | 190 | 230 | 280 |
| Total | <u>1,150</u> | <u>1,770</u> | <u>2,100</u> | <u>2,430</u> |
| Actual 1967 | 150 | 152 | 152 | 150 |
| Average for 1968-74 | 195 | 230 | 280 | 325 |

Source: Mission estimates.

CHAPTER IX

CONCLUSIONS

395. Manufacturing (excluding handicraft) has slowly increased its share in Colombia's national income from 12 percent of GDP in 1953 to 16 percent in 1968. In 1969, there was probably a further small increase although detailed data are not available to indicate the gain more precisely (Chapter I) the Mission's projections (Chapter VIII) indicate that industrial output will grow somewhat faster than GDP in the near future.

396. The growth rate of Colombian manufacturing (in real terms) was approximately 6.4 percent per annum in the period 1953-67 (Chapter II). The growth was uneven in time and as between branches. The growth rate was greater in the first half of the period (1953-60), 7.0 percent per annum, than in the second half, 5.8 percent. Certain branches grew more rapidly than the sector as a whole, notably intermediates and durable goods. These latter are at the present time of lesser importance in Colombia than nondurable consumer goods and intermediate industries.

397. Colombia's manufacturing sector is characterized by many small plants, often catering to regional rather than national markets, resulting partly from a difficult transport problem influenced by a unique topography (Chapter III). Financing of expansion or new ventures is less easy to arrange for small family type firms than for the larger corporations. The latter are in a position to attract funds more readily and/or on better terms because of their access to the limited public capital market.

398. The limitations of the capital market have been accentuated by a mix of policy measures which directed local capital away from private industrial investment to social overhead and agricultural projects. These measures have led to high and rising interest rates, not only in nominal but also in real terms. This, combined with a tax structure which inhibits private investment (e.g. an excess profit tax) suggests prompt consideration of measures which would enhance the inducements for industrial investment and the accompanying employment opportunities.

399. Governmental policies on protection of industry have resulted in industrial expansion. In some cases, industry has been the beneficiary of excessive levels of protection against import competition generally. The net effect of excessive protection has been a price level for some industrial goods, above that which would have prevailed had the policy been less restrictive, particularly as to quantitative restrictions. The nature and extent of these restrictions is developed in Chapter V and suggestions for changes in specific industry branches are made in Chapter VI. The annexes on specific industries contain more detailed information and discussion of comparative prices in Colombia and foreign markets.

400. Specific suggestions which might assist in improved utilization of existing capacity in textiles, clothing, leather and electrical appliances are made in Chapter VI. Market studies of export prospects in clothing, leather and furniture are advised while regional study on petrochemical prospects for Andean Group integration is specifically recommended. The likely impact of the removal of quantitative import restrictions on specific Colombian industries (e.g. textiles, leather, paper) is described. The anatomy of durable goods branches is analyzed indicating the large employment role played by repair shops, particularly in regard to motor vehicles and other transport equipment. In motor vehicles, tariff and taxation changes are suggested and the evidence for emphasizing truck production over passenger cars is presented.

401. The process of industrialization of Colombia has taken place in Colombia's four distinct regions. Industrial production in Colombia, unlike that in other Latin American countries, is distributed among four major urban centers and several smaller industrial cities. Two basic characteristics of the manufacturing sector in Colombia -- the fragmentation of a small market for manufactured products and a tendency toward small and frequently unutilized capacities -- are closely related to this regional development of industry. Economies of scale are more significant in the capital-intensive industries like chemicals, paper, appliance and vehicle production than in the presently predominant non-durable consumer goods branches. In such cases, if economic waste is to be minimized, government decisions affecting industrial location choices need to be based on careful studies of alternative sites taking account of transport cost differentials.

402. Because of the understandably keen interest in fuller and more productive employment of the labor force, growth projections for manufacturing to 1975 were prepared consistent with alternative growth rates for the economy as a whole (Chapter VII). These projections and their implications for employment, foreign trade and investment are necessarily tentative. It is appreciated that with more detailed study they could be made more useful and probably modified in some cases. They are meant to be construed as an indication of alternative paths of change rather than as definitive forecasts.

403. Colombian industrial development has been moderate in degree and evolutionary in its rate of change. The impact of industrial growth on employment has also been limited and gradual, and not up to the expectations held in some quarters. The outlook, based on our projections, is for further moderate and slightly accelerated growth in output and employment opportunities, given the continuation of present policies. Our specific policy recommendations are intended to help improve the utilization of existing resources (labor, capital, etc.) and to channel new resources to branches, so located as to be economically competitive and thus benefit the economy as a whole, as well as the particular branch. The major growth

opportunities aside from further import substitution in intermediate products, lie in promotion of exports of non-durable consumer goods (clothing, footwear and leather products for example) produced efficiently to the specifications of foreign markets. Both in this field and in capital goods, producers will need to make strenuous efforts to meet a more demanding, sophisticated market than has been encountered thus far in the production of consumer goods for a sheltered domestic market.

PART TWO: THE EXTRACTIVE INDUSTRIES

CHAPTER X

MINING

Introduction

404. For the purposes of the discussion in this chapter, mining consists of the extraction from underground mines and open-pits and quarries of non-metallic and metallic minerals, precious stones and metals and coal and, where appropriate, their primary transformation such as concentration, smelting or processing. It excludes the production of petroleum, petroleum derivatives and natural gas, which is covered in the following chapter.

405. Colombia has the largest known coal reserves in Latin America, is the world's only important producer of emeralds, the leading producer in South America and the eight largest producer of gold in the world and the only producer in South America and the fourth largest producer of platinum in the world. However, known resources of metallic minerals are not imposing and, given the present incomplete stage of geological investigation, the extent to which Colombia is endowed with mineral resources cannot be fully determined.

406. This chapter is based on information obtained in meetings with the Minister of Mines and Petroleum, the management and staff of the Instituto de Fomento Industrial (IFI), Empresa Colombiana de Minas (ECOMINAS), Colombiana de Minería (COLMINAS), Instituto de Investigaciones Geológico Mineras (INGEOMINAS), Hanna Mining Company, Chevron Petroleum Company of Colombia, Carbones del Carare, Asbestos Colombianos and Kaiser Engineers and a review of published literature on aspects of the mining sector in Colombia.

Contribution of the Mining Sector to the Economy

407. In the past, mining has played a comparatively minor role in the economy of Colombia. This is evident from the contribution of the mining sector to gross domestic product in 1968, which was 0.6 percent or 568.3 million pesos. ^{1/}

408. The sector is not a major source of employment. The most recent census, which was taken in 1964, registered only 73,000 workers engaged in mining, or slightly more than one percent of the economically active population of the country. This number probably includes the 8,000 workers engaged in the production of petroleum. An indication of the activity of the sector is given in the data on mining concessions. As of mid-1969 there

^{1/} This figure will not coincide with that given in the National Accounts, because it excludes petroleum.

were only about 150 active concession contracts in all branches of mineral development. According to the Minister of Mines and Petroleum, only 47 of these concessions were in exploitation as of June 1969. This number includes captive mines, such as the iron ore, coal and limestone mines supplying Acerias Paz del Rio and limestone quarries exploited by cement companies, but excludes a few generally small scale mining operations on private properties, for which national concession contracts are not required.

409. Although Colombia has in the past been a net importer of minerals and mineral products (see Table X-4), the mining sector has obvious export potential. In the medium term the implementation of the Cerro Mayoso nickel, Cerrejon coal and Campamento asbestos projects (see section on Mining Potential) would increase foreign exchange revenue by an estimated 63 million dollars per year. In the longer term the discovery of sizeable lead, zinc, or copper or bauxite deposits may lead to projects based on their exploitation.

410. However, as in other forms of industrial activity in Colombia, the mountainous topography and the resultant high cost of inland transport makes it difficult for low-value materials, such as non-metallic minerals and coal, to be placed at the ports of export at internationally competitive prices. The granting of the 15 percent tax credit certificate (CAT) on some mineral exports after January 1, 1969 is likely to influence a greater export orientation by the mining industry.

411. The mining sector in Colombia lacks organization, as evidenced by the absence of reliable statistics of mine production, except for precious metals and emeralds, employment and investment. The only regularly published production figures are those appearing in the U.S. Bureau of Mines Yearbook. Other data are contained in the Memoranda of the Minister of Mines and Petroleum of the Congress, which give partial volumes, and occasional publications by the Ministry of Mines and Petroleum and the Planning Department. In general, Colombian mineral data must therefore be regarded as uncertain and the various sets of published production figures as not necessarily comparable. Any conclusions drawn from a combination of these figures, as has been attempted in Table X-1, have therefore to be qualified in this regard. The situation will, however, be somewhat improved when the results of the 1969 Mining Census, which is now being conducted, are made available.

412. The growth of the mining sector as a whole has been sluggish over the past decade. In fact, while the gross value of mine production in current pesos increased from 499.4 million pesos in 1962 to 842.7 million pesos in 1969 (see Table X-1), production in constant pesos terms increased by only about 4 percent in this period. This was recognized by the Lleras administration, which progressively enacted legislation designed to stimulate exploration and development of the country's mineral resources and their subsequent exploitation. It is too early to assess the extent to which the proper incentives have now been provided.

Table X-1

Break-down of Mine Production in 1962 and 1969
(excluding emeralds)

| | <u>1962</u> | | | <u>1969</u> | | |
|---|--|----------------|----------------------------------|--|----------------|----------------------------------|
| | <u>Value</u> | | <u>Quantity</u> | <u>Value</u> | | <u>Quantity</u> |
| | <u>Million</u> <u>Current</u> <u>Pesos</u> | <u>Percent</u> | <u>(thousand</u> <u>tons)</u> | <u>Million</u> <u>Current</u> <u>Pesos</u> | <u>Percent</u> | <u>(thousand</u> <u>tons)</u> |
| <u>Mineral Fuels</u> | | | | | | |
| Coal | 165.0 | 33.0 | 3,000 | 248.8 | 29.5 | 3,317 |
| Coke | <u>50.4</u> | <u>10.1</u> | 360 | <u>65.2</u> | <u>7.7</u> | 465 |
| Sub-total | 215.4 | 43.1 | | 314.0 | 37.2 | |
| <u>Precious Metals</u> (thousand troy oz.) | | | | | | |
| Gold | 125.0 | 25.0 | 397 | 133.8 | 15.9 | 218.9 |
| Platinum | <u>6.8</u> | <u>1.4</u> | 17 | <u>78.4</u> | <u>9.3</u> | 27.8 |
| Sub-total | 131.8 | 26.4 | | 212.2 | 25.2 | |
| <u>Non-Metallic Minerals</u> | | | | | | |
| Limestone | 16.0 | 3.2 | 3,200 | 127.7 | 15.2 | 4,258 |
| Salt | 29.4 | 5.9 | 305 | 87.4 | 10.4 | 678 |
| Clays and Felspar | 39.5 | 7.9 | 541 | 39.8 | 4.7 | 681 |
| Gypsum | 9.1 | 1.8 | 83 | 18.2 | 2.2 | 151 |
| Sulfur | <u>4.1</u> | <u>0.8</u> | 10 | <u>5.8</u> ^{1/} | <u>0.7</u> | 12 |
| Sub-total | 98.1 | 19.6 | | 278.9 | 33.2 | |
| <u>Metallic Minerals</u> | | | | | | |
| Iron Ore | 37.4 | 7.5 | 680 | 16.2 | 1.9 | 352.3 |
| Lead, zinc and mercury | <u>1.4</u> | <u>0.3</u> | 1 | <u>4.1</u> | <u>0.5</u> | 1 |
| Sub-total | 38.8 | 7.8 | | 20.3 | 2.4 | |
| <u>Others</u> | <u>15.3</u> | <u>3.1</u> | | <u>17.3</u> | <u>2.0</u> | |
| TOTAL | <u>499.4</u> | <u>100.0</u> | | <u>842.7</u> | <u>100.0</u> | |

^{1/} Mission estimate

Sources: 1962: U.S. Department of the Interior, Minerals Yearbook 1963;
1969: U.S. Department of State, Embassy Report No. A-196 dated
April 28, 1970.

Structure and Growth

413. Mining in Colombia has traditionally been based on the extraction of high value, low tonnage commodities, such as emeralds, gold, platinum and silver, coal and salt. More recently some new small-scale mines have been opened up to extract both metallic minerals (lead, zinc, and mercury) and non-metallic minerals (sulfur, limestone, clay, gypsum and silica sand). It is noteworthy that only three minerals (coal, gold and limestone) had production values in 1969 in excess of 100 million pesos each. With the exception of emeralds and salt, mine production is entirely in the private sector.

414. The value and quantity of mine production broken down by minerals groups for the years 1962 and 1969 is shown in Table I. It will be seen that in physical terms production of non-metallic minerals increased substantially, while that of mineral fuels was largely stagnant and that of metallic minerals and precious metals declined sharply. Salt mining is currently one of the most dynamic elements in the sector; production increased from 305,000 tons in 1962 to 678,000 tons in 1969, which corresponds to an average growth rate of 12.1 percent per annum. In the same period production of limestone increased from 3.20 million tons to 4.26 million tons, a growth of 4.2 percent per annum, and gypsum from 83,000 tons to 151,000 tons, a growth of 8.9 percent per annum.

415. On the other hand, production of mineral fuels showed only a slight increase in the period 1962 to 1969. In precious metals, gold production fell sharply from 397,000 troy ounces in 1962 to 218,900 troy ounces in 1969, a total reduction of 44.9 percent, while platinum production rose by 63.5 percent from 17,000 troy ounces to 27,800 troy ounces. Production of iron ore decreased by 48.2 percent from 680,000 tons to 352,000 tons in the same period.

Present Production

416. A brief review of present mining operations by mineral groups follows:

Mineral fuels

417. Colombia has an estimated 18 billion tons of known coal reserves, which are the largest in Latin America. Production used to be entirely geared to the needs of the domestic market, with Acerias Paz del Rio producing about 750,000 tons of coking coal per annum for consumption in its blast furnace at Belencito. However, the new anthracite mine at Landazuri, Santander Department, the output of which (300/400,000 tons per annum) is intended for export to Europe, may be the forerunner of a number of other export oriented coal mining operations.

Precious metals and precious stones

418. A major portion of Colombia's gold output is accounted for by a consortium of five companies owned or controlled by the International Mining

Corporation of the U.S. The production of these companies derives from dredging operations and the Frontino underground mine in Antioquia Department which in 1967 produced 25 percent of the Colombian total.

419. As can be seen from Table X-2, the output of gold and silver declined steadily during the period 1960 through 1969, while that of platinum remained practically unchanged, except for 1969 when there was a marked increase. These production totals are only rough estimates as significant quantities of gold, as well as platinum and silver, enter the contraband trade.

Table X-2: PRODUCTION OF PRECIOUS METALS, 1960 TO 1969

| <u>Year</u> | <u>Gold</u> | <u>Platinum</u> | <u>Silver</u> |
|-------------|------------------------|-----------------|---------------|
| | (thousand troy ounces) | | |
| 1960 | 434 | 16.9 | 134 |
| 1961 | 401 | 20.2 | 128 |
| 1962 | 397 | 14.1 | 132 |
| 1963 | 325 | 23.0 | 106 |
| 1964 | 365 | 20.6 | 131 |
| 1965 | 319 | 11.1 | 116 |
| 1966 | 381 | 15.7 | 107 |
| 1967 | 258 | 12.4 | 110 |
| 1968 | 240 | 15.1 | 100 |
| 1969 | 219 | 27.8 | 77 |

Sources: Minerals Yearbook, 1963 and 1968, U.S. Department of Interior.
Embassy Report dated April 28, 1970, Department of State.

420. The progressive decline in precious metals output stems partly from depletion of the better grade deposits under exploitation and partly, in the view of the Government, from a lack of vigorous development effort on the part of the principal producers, which have large tracts of territory tied up under perpetuity mining titles. In an attempt to reverse this trend, legislation was introduced by the Government and approved by Congress in December 1969. The intent of this legislation will be discussed in the section dealing with Government policies and a summary of it given in Annex.

421. Colombia is the world's leading producer of emeralds. The majority of the production has in the past been smuggled out of the country and has not benefited the nation fiscally or in official exchange reserves. Registered emerald exports for the period 1960 through 1968 are shown in Table X-3.

Table X-3: REGISTERED EMERALD EXPORTS, 1960 TO 1968

| <u>Year</u> | <u>Thousand dollars</u> |
|-------------|-------------------------|
| 1960 | 0.1 |
| 1961 | 172.4 |
| 1962 | 118.3 |
| 1963 | 38.5 |
| 1964 | 290.7 |
| 1965 | 221.8 |
| 1966 | 75.2 |
| 1967 | 141.2 |
| 1968 | 1,412.7 |

Source: Ministry of Mines and Petroleum External
Trade of Mineral and Mineral Products,
1960-1968, September 1969.

422. The sharp increase in registered exports in 1968 is attributed to Government efforts to improve controls and provide incentives for legitimate trade. At the beginning of 1969 the responsibility for the production of emeralds was transferred from the Bank of the Republic to the Colombian Mining Enterprises (Empresa Colombiana de Minas, ECOMINAS), the newly created operating arm of the Ministry of Mines and Petroleum. For the first eight months of 1969 registered emerald exports were running at an annual rate in excess of US\$3 million.

423. The Ministry of Mines and Petroleum estimates that the annual value of emerald production in Colombia may exceed US\$10 million, nearly all of which is exported through legitimate or contraband channels. This would make emeralds a more important mineral product by value than gold and or a par with coal.

Non-metallic minerals

424. Colombia is well endowed with non-metallic minerals for the construction industry, such as limestone and gypsum (for cement), clay (for bricks), silica sand (for glass) and marble. Salt is another important non-metallic mineral, the production of which is being stimulated by the current expansion programs for the caustic soda industry.

425. Present production of phosphates is small and is being sold in ground rock form. A simple superphosphate plant at Ventaquemada, Boyaca Department, with an annual capacity of 40,000 tons of phosphate (P_2O_5) units is expected to go into operation in the second half of 1970.

426. As stated in the preceding section, production of non-metallic minerals is growing substantially and now ranks first in value among the mineral groups.

Metallic minerals

427. Iron ore is the only metallic mineral mined in quantity. The principal producer is Acerias Paz del Rio, which consumes about 500,000 tons of ore per annum in its blast furnace at Belencito, including a large proportion of fines which had to be stock-piled before the commissioning of the sinter plant in late 1968. Exploitable iron ore reserves in the vicinity of the plant are estimated at 66 million tons with an iron content ranging from 42 to 47 percent, phosphorus content of 1.1 percent and sulfur content of 0.1 percent.

428. Aside from iron ore, less than 10 tons per year of mercury is extracted, while minor quantities of lead and zinc concentrates are produced, essentially as by-products from gold mining operations.

Mineral Trade

429. Colombia is a net importer of minerals and mineral products. Statistics of the commercial trade balance for minerals and mineral products for the years 1960 to 1968 are shown in Table X-4 below. These figures exclude imports and exports of finished and semi-finished ferrous and non-ferrous metal products, finished non-metallic mineral products and petroleum and petroleum derivatives. Sales of gold to the Bank of the Republic constitute the major portion of exports, except in 1968 when they were almost matched by platinum. Inorganic chemical products rather than minerals are the leading import item.

430. As stated above these statistics do not include indirect mineral exports, such as cement, asbestos cement and glass, which together amounted to over US\$6 million in 1968.

431. By 1975 the Ministry of Mines and Petroleum expects the Cerro Matoso nickel, Cerrejon coal and Campamento asbestos projects, which are described in the following section, to be in full operation. The export of their production, which is estimated to yield approximately US\$63 million in foreign exchange per annum, would not only wipe out the mineral trade deficit, but result in a substantial surplus.

Table X-4: TRADE IN MINERALS AND MINERAL PRODUCTS
(excluding petroleum and petroleum products)

| <u>Year</u> | <u>Imports</u> c.i.f. | <u>Exports</u> /a f.o.b. | <u>Net Imports</u> |
|-------------|---------------------------|-----------------------------|--------------------|
| | -----million dollars----- | | |
| 1960 | 13.3 | 9.6 | 3.7 |
| 1961 | 14.4 | 11.7 | 2.7 |
| 1962 | 17.7 | 13.0 | 4.7 |
| 1963 | 22.1 | 9.0 | 13.1 |
| 1964 | 23.1 | 14.0 | 9.1 |
| 1965 | 20.0 | 14.8 | 5.2 |
| 1966 | 34.3 | 11.3 | 23.0 |
| 1967 | 18.9 | 9.8 | 9.1 |
| 1968 | 22.9 | 13.8 | 9.1 |

/a including sales of gold to the Bank of the Republic.

Source: Ministry of Mines and Petroleum, External Trade of Minerals and Mineral Products, 1960-1968, September 1969.

432. For comparison purposes the export in 1968 of petroleum and petroleum derivatives amounted to US\$50.8 million and that of manufactured goods to approximately US\$71 million.

Mining Potential

433. As stated in the introductory section, the extent of Colombia's mineral resources has not been fully determined at the present time. In fact, the Ministry of Mines and Petroleum estimates that only about 20 percent of the possible mineralized area in Colombia has been investigated. Sufficient exploration and development work has, however, already been done on a number of deposits to show that they could be economically exploited. A summary of the more important mineral deposits and their possible method of exploitation is given below. The location of these deposits is shown in Appendix 4 and further details are given in Appendix 5.

434. Indicated reserves of approximately 460 million tons of phosphate rock have been discovered in various locations along the Eastern Cordillera, ranging in grade from 15 to 30 percent phosphate (P_2O_5). Certain of these deposits may be sufficiently extensive and high grade to supply the fertilizer demands of the country. A note on the outlook for exploration of and fertilizer production from these phosphate deposits is given in Appendix 5.

435. The most promising deposit is located near Sardinata, North Santander Department, with a good grade of close to 30 percent P_2O_5 . Sulfur for the production of sulfuric acid required to process the rock to single or triple superphosphate could most economically come from the Maracaibo district of western Venezuela. A feasibility study shows that the production costs of a plant located at Sardinata and sized in accordance with the expected fertilizer demand of the surrounding region, would be fully competitive with those of a plant located on the Atlantic coast using imported phosphate rock. Further development work on the Sardinata deposit appears to be contingent on a ruling from the Minister of Mines and Petroleum as to the mining title.

436. A project based on the exploitation of an asbestos deposit near Campamento, Antioquia Department, is planned to be in operation by the end of this year. Annual mine production is rated at 25,000 tons of fiber, just over one half of which will be exported.

437. There is a large limestone deposit near Durania, Cesar Department, on which a sizeable export-oriented cement plant could be based. Another limestone deposit near Villavicencio, Meta Department, may be exploited to supply limestone for agricultural purposes, possibly by pipeline, to the Llanos.

438. A gypsum deposit near Mesa de los Santos, Santander Department, is shortly expected to be brought into operation.

439. In the field of mineral fuels a great deal of work has been done on the Carrejon coal deposit, Guajira Department, which is located some 8-km from the Caribbean coast. Indicated reserves thus far amount to about 30 million tons. The coal, which has a low sulfur content, is expected to be suitable for coking if blended with a selected hard coal. An export-oriented project with an annual output of about 3 million tons and foreign exchange revenue of approximately US\$24 million is being contemplated.

440. A large deposit of coking coal has been found near Cucuta, North Santander Department, and results of tests carried out to date have proved satisfactory. However, there is insufficient demand for coking coal in Colombia at present and the deposit could be economically exploited only if the bulk of the production were exported. This would necessitate transporting the coal some 280 km by road to Gamarra and from there by barge to Cartagena Bay. The question of whether the coal could be placed at the loading terminal at internationally competitive prices has not yet been investigated.

441. In the field of metallic minerals the outstanding prospect is the Cerro Matoso nickel project in Cordoba Department. The project, which would be the largest mining operation in Colombia, is for the production of 37.5 million pounds per annum of contained nickel in ferronickel. Negotiations

between the Ministry of Mines and Petroleum and the prospective foreign partners, Hanna Mining and Chevron Petroleum Companies, had reached an advanced stage by mid-March 1970, when they were adjourned. They have since been resumed, and there are good indications that the outgoing administration is anxious to come to an agreement on the concession contract before leaving office. ^{1/} This large project, if realized, would contribute about US\$37.5 million of exports to the US\$63 million total of potential new mineral exports referred to in the preceding section.

442. A description of the known mineral potential of the four zones of the National Mineral Reserves (see section entitled "Government Institutions dealing with the Mining Sector") appears in Project Report (IR) CO-5 entitled "Advanced Summary of Mineral Resources Encountered in Colombia" by the U.S. Geological Survey dated July 1968.

Government Policies Toward The Mining Sector

443. As mentioned earlier, mining has recently played a comparatively minor role in the economy of Colombia. The Ministry of Mines and Petroleum claims that there have been several causes for the slow development of the sector in the past: First, there were no institutions responsible for the planning of the sector and for the development of programs of investigation and investment. Second, the information available on mineral resources was quite limited. Third, there was a shortage of technically qualified personnel for the development of mining. Fourth, an anachronistic, inadequate and in many instances contradictory mining code governed the relationship between the State and private mining companies. Fifth, there was neither a policy for domestic financing nor a clearly defined code for foreign investment in the sector.

444. In an attempt to correct these weaknesses, stimulate the development of the mining sector and promote the exploitation of mineral resources by domestic and foreign mining companies, the Government has evolved a policy towards the sector which has the following declared aims: First the Ministry of Mines and Petroleum is charged with the formulation of an official policy on exploration, exploitation, refining, transportation and distribution of minerals. Action on mining concession applications will be speeded up; operations in the public sector are henceforth to be conducted through four organizations, viz; the National Institute of Geological and Mining Surveys (INGEOMINAS), Colombian Mining Enterprise (ECONOMINAS), Institute of Nuclear Affairs (IAN), and the Colombian Petroleum Enterprise (ECOPETROL). Second, a systematic survey of exploitation mineral deposits will be undertaken on a regional basis. Third, economic information will be gathered to provide basic data for the planning of the sector and the identification of technically and economically feasible projects. Fourth, the Government will provide financial assistance for the training of qualified personnel required for the growth of the mining sector. Fifth, the Government has

^{1/} An agreement was reported as having been reached during the summer.

created a legal framework which permits the State to be associated in the exploitation of the country's mineral deposits, and to cancel the mining rights held by private concerns if they fail to explore, exploit and continue exploitation of the mineral deposits within stipulated periods. Sixth, the Government will facilitate the raising of external funds for the implementation of mining projects by permitting the repatriation of capital and remittance of reasonable profits, and by exempting imported mining machinery and equipment and spare parts from duty.

445. The degree of success the Government has had in speeding up the exploration and development of the country's mineral resources, excluding uranium and petroleum, is apparent from the record of INGEOMINAS. The extent to which recent decrees and legislation have stimulated exploitation of these mineral deposits can be inferred from the progress made on three types of mining projects - large projects requiring the participation of international mining companies; projects based on the exploitation of non-metallic minerals and mineral fuels, such as phosphate rock, asbestos, limestone and coal; and traditional gold, platinum and emerald mining operations.

446. INGEOMINAS was created in December 1968 to consolidate within one enterprise the scientific functions carried out under the auspices of the Ministry of Mines and Petroleum. After its formation it became the Colombian counterpart organization for the USAID loan under which a national mineral survey was initiated. INGEOMINAS is primarily engaged in geologic mapping, using geochemistry and other modern tools, which will for the first time give graphic expression to the rock and structural framework of the country. These are the elements that control the occurrence of mineral deposits and their determination is a most important first step towards establishing the mineral potential of Colombia.

447. In view of the physical conditions of much of the country, the preparation of geologic maps can be expected to be a long and hard task. INGEOMINAS has, however, made a good start on this work and in the short time it has been in existence, has developed into a competent organization under capable management. It is therefore recommended that all basic pre-investment work in the field of mineral surveys be channeled in future through INGEOMINAS to assure that scarce personnel and resources be employed in a systematic of the mining sector and promote the exploitation of mineral resources by domestic and foreign mining companies, the Government has evolved a policy towards the sector which has the following declared aims: First, the Ministry of Mines and Petroleum is charged with the formulation of an official policy on exploration, exploitation, refining, transportation and distribution of minerals. Action on mining concession applications will be speeded up; operations in the public sector are henceforth to be conducted through four organizations, viz: the National Institute of Geological and Mining Surveys (INGEOMINAS), Colombian Enterprise (ECOMINAS), Institute of Nuclear Affairs (IAN), and the Colombian Petroleum Enterprise (ECOPETROL). Second, a systematic survey of exploitable mineral deposits will be undertaken on a regional basis. Third, economic information will be gathered to provide basic data for the planning of the sector and the identification of technically and

economically feasible projects. Fourth, the Government will provide financial assistance for the training of qualified personnel required for the growth of the mining sector. Fifth, the Government has created a legal framework which permits the State to be associated in the exploitation of the country's mineral deposits, and to cancel the mining rights held by private concerns if they fail to explore, exploit and continue exploitation of the mineral deposits within stipulated periods. Sixth, the Government will facilitate the raising of external funds for the implementation of mining projects by permitting the repatriation of capital and remittance of reasonable profits, and by exempting imported mining machinery and equipment and spare parts from duty.

448. A summary of the evolution of the present mining code is given in Appendix 3.

449. A second loan application to USAID for US\$2 million essentially to continue the programs begun under the initial loan, is now being processed and is expected to be approved shortly. The activities of INGEOMINAS are largely controlled by the availability of funds. If additional sums of money would be made available, through the Bank or UNDP, they could be used by INGEOMINAS to purchase equipment to speed up both the mineral reconnaissance program now in progress south of Bogota and the phosphate rock drilling programs.

450. The best example of a large mining project is the Cerro Matoso nickel project, although the Cerrejon coal project may also fall into this category. Compared with Hanna's earlier proposal, the project has been increased in capacity and now includes a smelter. It has thus been made to comply with Mining Law 60 of 1967, which requires mining companies to process their output within the country to the extent that this is technically and economically justified. Negotiations on the concession and joint venture contracts between the Ministry of Mines and Petroleum, Hanna and Chevron and the principal local partners, the Instituto de Fomento Industrial (IFI), were adjourned in mid-March 1970 when agreement was almost in sight and the effectiveness of the Government's intention to speed up action on concession applications has yet to be demonstrated for large mining projects.

451. In the field of non-metallic minerals and mineral fuels, the start-up in March 1970 of the Landazuri anthracite mine and the proposed construction, during the second half of this year, of the Campamento asbestos project indicate that recent Government measures have been successful in stimulating exploitation of the country's mineral deposits. On the other hand, the refusal on the part of the Government to grant the 15 percent tax credit for exports of asbestos fibers from the Campamento project may seriously delay its implementation. There also appears to be some avoidable delay in establishing the mining title to the Sardinata phosphate deposits as between Chevron and IFI.

452. In the field of precious metals and emerald mining, the Government's primary aims are to stimulate production and reduce the amounts entering the contraband trade. While it is too early to draw conclusions, the effect of

Mining Law 20 of 1969, which requires exploitation at an economic rate, and the introduction of improved controls on production and export incentives are judged to be steps in the right direction.

Government Institutions Dealing with the Mining Sector

453. The four institutions engaged in mineral exploration and development and mining as defined in this chapter, are INGEOMINAS, ECOMINAS, IFI and its mining subsidiary, Colombiana de Minería (COLMINAS). As stated in the preceding section, INGEOMINAS and ECOMINAS are two of the four operating departments of the Ministry of Mines and Petroleum.

454. INGEOMINAS has already been referred to. A national geologic survey organization is needed because private enterprise is generally not in a position to assume the high cost of basic geologic research. INGEOMINAS has been conducting its work in certain pre-selected zones, considered exploration for commercial extraction. These zones, designated national mineral reserves by the Ministry of Mines and Petroleum, are not open for mining concession applications by private parties during the course of the exploration program. The first program covered the period 1964-1968 and the second program, covering the period 1968-1973, is now being executed. The areas of the national mineral reserves covered by these two programs is listed in Table X-5 below and their location is shown in the attached map.

Table X-5: NATIONAL MINERAL RESERVES

First Program 1964-1968

| <u>Location</u> | <u>Area</u> (km ²) |
|--|-----------------------------------|
| Santa Marta area, Magdalena Department | 16,000 |
| Central Antioquia, Northern Caldas | 22,600 |
| Santander and North Santander | 10,200 |
| Cundinamarca and Boyaca | <u>5,200</u> |
| <u>TOTAL</u> | 54,000 |

Second Program 1968-1972

| | |
|-------------------------------|---------------|
| Eastern Narino, Cauca, Tolima | 21,600 |
| Antioquia, Caldas, Risaralda | 24,000 |
| Boyaca and North Santander | 20,575 |
| Boyaca and Santander | <u>26,400</u> |
| <u>TOTAL</u> | 92,575 |

455. The results of the mineral resources survey in the areas covered by the first program are now being published. Perhaps the most important finding has been the discovery and preliminary investigation of phosphate rock deposits along the Eastern Cordillera.

456. ECOMINAS was established at the beginning of 1969 as the operating arm of the Ministry of Mines and Petroleum in the field of mining. Its functions are essentially similar to those of ECOJETROL in the petroleum sector. Its immediate task was to take over the production and commercialization of emeralds from the Bank of the Republic. ECOMINAS is also now involved in the development of the gypsum deposit near Mesa de los Santos and of the small occurrences of copper which have been found in Antioquia Department.

457. More importantly, however, ECOMINAS together with IFI and its subsidiary COLMINAS, have been designated by the Ministry of Mines and Petroleum as the Colombian partners in the Cerro Matoso nickel project. It appears to be the Ministry's policy to have ECOMINAS exploit by itself or in or in joint ventures with local or foreign mining partners mineral deposits discovered by INGEOMINAS in national mineral reserves. At this time ECOMINAS has not been in existence long enough, nor has it built up a large enough staff, to permit meaningful comments on its capabilities.

458. IFI, which is owned 99.5 percent by the Government and 0.5 percent by the Central Mortgage Bank and the Bank of the Republic, was established in 1940 to assist in the promotion of new enterprises that were unable to attract private investors. Its role was broadened in 1963 when it was granted the powers of a private "corporacion financiera". IFI has three operational departments, including a mining department responsible for the identification, promotion and implementation of mining projects. To date IFI has made 16 loans and investments in the mining sector.

459. It has recently extended loans for the Landazuri anthracite and Turmeque phosphate projects and is currently engaged in establishing the technical and economic feasibility of the Cerrejon coal, Sardinata phosphate and Villavicencio limestone projects. As stated above, IFI will be the principal Colombian partner in the Cerro Matoso nickel project. The mining department of IFI, which consists of well qualified staff, appears capable of playing a useful role in the development of the sector.

460. COLMINAS, which is owned 99 percent by IFI and 1 percent by Caja Agraria, was established during the early part of 1968 as IFI's executive arm in the area of mineral development and exploitation. At one time it seemed as if IFI and COLMINAS would be the main instruments of State participation in mining ventures, but the creation of ECOMINAS at the beginning of 1969 appears to have restricted the scope of COLMINAS.

Summary and Conclusions

461. The need for the mining sector to make a greater contribution to the economy of Colombia has long been recognized. Recent legislation has been designed to stimulate the development of new mining projects and increase the rate of exploitation of existing operations, while the granting of tax credit certificates has been extended to cover certain mineral exports. Generally these measures are regarded as soundly conceived, but they have not been in effect long enough to enable their full impact to be assessed.

462. The Government should strive to reach early agreement on the Cerro Matoso nickel concession and joint-venture contracts, not only because the project would be an important source of foreign exchange (US\$37.5 million per annum) but also because the contracts would demonstrate the implications of the present, and so far untested, mining legislation. A clear understanding of these implications and of the role of ECOMINAS in joint ventures would facilitate a preliminary evaluation of potential mining operations by international companies, which might otherwise not be willing to commit funds for the development of mineral deposits in Colombia. On the other hand, where foreign mining partners are not required, the situation is much clearer and projects are being actively developed and implemented.

463. The sub-division of the Ministry of Mines and Petroleum's operational functions into four separate institutions may have brought about a situation, in which no single institution can negotiate with interested mining companies on all aspects of potential mining projects. The Ministry may therefore wish to consider recruiting a small staff with a good understanding of the essentials of mining to deal with new projects in their initial stages until such time as they can be turned over to ECOMINAS.

464. As far as the operational side is concerned, the existence side-by-side of ECOMINAS and COLMINAS may not represent the best use of the available qualified personnel. The Government may wish to investigate whether these two organizations, in fact, have disparate functions and, if not, whether a merger of their non-emerald mining activities would be desirable. The production of emeralds, with its heavy emphasis on security, is probably best handled by a separate entity, as was at one time envisioned.

465. The Ministry of Mines and Petroleum should take steps to introduce a reporting system for mine production, employment and investment. Such a system would permit more comprehensive statistics to be prepared and would facilitate the planning of the sector - one of the declared aims of the Ministry of Mines and Petroleum.

466. To ensure proper allocation of scarce resources all pre-investment work in the field of mineral surveys should, in future, be channeled through INGEOMINAS.

CHAPTER XI

PETROLEUM

467. The Colombian petroleum industry was originally developed by private firms, including such well known international oil firms as Standard of New Jersey, Shell, Texaco, Chevron, Gulf and Mobil, all of which also operate in neighboring Venezuela. Other smaller oil companies also operate concessions such as Cities Service, Sinclair and several lesser-known companies. The term of the original De Mares concession expired in the early 1950s and that property reverted to the State. An arrangement for a 10-year operating contract was entered into between the former operator (a Jersey Standard affiliate) and the State. In 1961, Ecopetrol, a state-owned enterprise, took over formal operations of the De Mares concession and the petroleum refinery at Barranca Bermeja. All other oil fields and refineries are privately operated.

468. Table XI-1 summarizes the main facets of petroleum operations in Colombia showing data separately for Ecopetrol and the private companies. It indicates that Ecopetrol's share of crude oil output has been declining since 1962, when it represented about 20 percent of the national total. The absolute volume of crude oil produced by Ecopetrol reached a peak of 13.4 million barrels in 1964 (not shown in the table) and has since fallen below 10 million barrels in 1969. On the other hand, private industry has increased its output by 26 million barrels per year to a total of 67.3 million in 1969. In addition to the very new ORITO field, a Texaco-Gulf Oil operation in southern Colombia which produced 17.8 million barrels in 1969, the data indicate that private oil output in the older areas of production rose over 7 million barrels between 1962 and 1969. However, oil production by private companies outside Orito, has fallen by 10 million barrels since 1965.

469. Natural gas operations in Colombia have not been of major significance. In most fields there is a low gas-oil ratio. On the demand side, the climate in the major population areas precludes a major demand for heating, and power generation except in the North and West is primarily hydroelectric. The main demands for gas are for energy in the North Coast and for chemical processing; these are provided by short lines from oil fields or refineries to processing plants or power stations.

470. Ecopetrol has expanded its refining capacity and has steadily raised its output to about double the 1962 level, on the basis of increased crude oil purchases from other producers. Whether the increased output has been profitable is not clear. Of the 13 million barrel increase in crude treated by Ecopetrol, almost 10 million has been exported. This rise in exports, almost entirely in the form of fuel oil, constituted 87 percent by volume of Ecopetrol's exports in 1969.

471. Private refiners, whose output rose more slowly, exported about 25 percent of their refinery product in 1962 and less than 10 percent in 1969, of which over two-thirds was fuel oil. Domestic sales have increased rather slowly, about one-third in a seven-year period. The rate of growth has quickened in the last few years, which presumably reflects improved highways, a larger automotive fleet, and perhaps improved gas station service. Marketing is all in private hands, except for small sales by Ecopetrol at the Barranca Bermeja refinery to other than the leading marketers.

472. The two major refineries owned by Ecopetrol and Intercol (a Jersey Standard affiliate) account for 90 percent of the refined products output. The other five small refineries are operated mainly for field purposes. Ecopetrol plans a new refinery in western Colombia of 40,000 barrels/day capacity, which would add about 30 percent to existing capacity. This refinery should add an even larger proportion of light products (e.g. gasoline) because it would have a crude (ORITO) better suited for such products and it would likely be designed to maximize light products yield. This additional refinery capacity should suffice to meet Colombia's internal growth for at least five years.

473. Colombia's oil reserves should suffice to maintain crude oil output at the 1969 level (76.8 million barrels) or higher for at least a decade. The likely trend is that Orito output will reach 25-35 million barrels per year, but that annual output in the northern fields may fall steadily below the 59 million figure of 1969 as older fields become depleted and/or more costly to operate. Total Colombian reserves are estimated in trade journals at 1 billion barrels or more. Any substantial increase in reserves would probably result from drilling in new areas, such as the Llanos; some firms believe the discovery prospects are good there but that costs may not warrant extensive exploration unless incentives are increased.

474. The Orito crude now exported through Tumaco, the terminus of a pipeline with a present capacity of about 36 million barrels per year, is likely to be used in part for the new western refinery to be built for Ecopetrol. While the site for the refinery had not yet been announced in March 1970, it is likely to be either in Cali or Buenaventura. Western Colombia is now served by products shipped from northern ports through the Canal or from the Ecopetrol refinery at Barranca Bermeja. The new refinery should reduce overall transport costs for the economy and thereby should somewhat improve the marketing returns of the existing refineries. The new western refinery may have a capacity of 40,000 barrels per day, which would require about half the crude available from the Orito field, leaving the rest to be exported.

475. Crude oil prices vary somewhat as between location and of course with differences in quality. A price of US\$1.80 per barrel at each coast is estimated to be with 5 percent of the actual price realized by sellers in arms-length dealings. However, it should be noted that the seller of

crude can retain only 75 percent of the foreign exchange (about US\$1.35) and is required to surrender 25 percent of the sale proceeds to the Bank of the Republic at a 9-1 peso rate. With the peso exchange rate at about 18 (March 1970), this in effect reduces the equivalent dollar price to the seller by US\$0.22-1/2 per barrel, to an estimated US\$1.57-1/2.

476. The effect of this policy is to keep both crude and product prices low. Price controls on refinery products and allegedly low marketing margins also help to keep down product prices, particularly gasoline and diesel oil. The controlled refinery price of gasoline, before excise tax, is about US\$0.6-1/4 per gallon, about one-third below U.S. refinery prices. The effect of controlled low petroleum product prices is to keep transport costs (not necessarily charges) low as do price controls on rubber tires.

477. Since Ecopetrol is the largest refiner and is a large buyer of crude on balance, its operations are particularly handicapped by low product prices. If, as has been urged by both Ecopetrol and the private oil companies, the Government were to raise the peso rate per dollar for the 25 percent surrender portion to or toward the prevailing exchange rate (about 18-1 in March 1970), the costs of crude oil to the refineries would be raised. The squeeze on refiners, particularly Ecopetrol which bought over 16 million barrels on balance, would be considerable and would require substantial price increases on refiner products. It is this impact on transport costs if reflected in delivered prices of products, particularly those with a heavy transport costs component, that has prompted the Government to postpone its decision. Since about 85 percent of the gasoline is used in trucks and buses, the incidence of higher gasoline prices would be mainly directly on business costs or indirectly through higher transport fares causing cost of living pressures on wages. The impact on personal passenger car owners would be correspondingly small.

478. The profitability of the older oil fields is alleged to be insufficient at present levels of prices and taxes, including the "reintegro", to warrant extensive exploitation expenditures. The policies followed by the private oil companies are consistent with this view and the view is also supported by Ecopetrol. The impression left by our discussions with Ecopetrol and the private companies is that incentives for new exploration need to be increased either by reducing or eliminating the "reintegro", which they prefer, or by some other incentive such as increased depletion allowances. The Government has been understandably reluctant to act on this issue before the elections, since the abolition of the "reintegro" might be interpreted as mainly a sop to foreign-based oil producers, even though the benefits to Ecopetrol would also be substantial.

479. On the assumption that considerations of Government revenue losses and possible political repercussions will probably delay further action to increase appreciably producer realizations per barrel, it seems reasonable to assume that exploration expenditures will be limited to amounts which are unlikely to raise output above the late 1969 level; output may indeed fall somewhat. By 1975, assuming the Western refinery is in operation,

refinery input is likely to approximate 60 million barrels, leaving about 20 million barrels of crude available for export almost entirely from Orito. If domestic sales increase to about 43 million barrels (5 percent per annum), product exports by 1975 are likely to approximate 12 million barrels, 1/ with a value of say US\$20 million, as against about 8 million barrels valued at US\$13.4 million in 1967. These refined product exports are included in the total for intermediate manufactures in Chapter VIII of Part I of this report. In addition, crude oil exports of say 20 million barrels with a value of US\$36 million (at current prices) are likely in 1975; the latter are not included in the projections of manufactured goods exports.

480. Beyond 1975, the outlook is more speculative and dependent on the degree of effort and success in oil exploration. A pessimistic view would be that internal oil consumption would grow perhaps to 55 million barrels leaving no refined products available for net export (in fact there would be some imports of specialized refined products which would be offset by exports of others). Crude oil available for export would not increase and might decrease further if declining output from the older fields were not offset by new discoveries. The crucial factor will be whether new fields have been developed in the interim. If new fields are not developed, the present refineries may not be able to operate at capacity without using imported crude.

1/ Allowing 5 million barrels or 8 percent for refinery losses.

TABLE XI-1 COLOMBIA - PETROLEUM PRODUCTION AND EXPORTS BY TYPE
OF OWNERSHIP
(Millions of barrels)

| | <u>1962</u> | <u>1965</u> | <u>1967</u> | <u>1968</u> | <u>1969</u> |
|-------------------------------------|-------------|-------------|-------------|-------------|---------------------------|
| <u>Crude Oil Production</u> | | | | | |
| Ecopetrol | 10.5 | 13.0 | 10.7 | 10.4 | 9.5 |
| Private | <u>41.4</u> | <u>59.5</u> | <u>58.2</u> | <u>53.0</u> | <u>67.3</u> ^{1/} |
| Total | <u>51.9</u> | <u>72.5</u> | <u>68.9</u> | <u>63.4</u> | <u>76.8</u> |
| <u>Crude Oil Exports</u> | | | | | |
| Ecopetrol | - | 2.0 | 2.0 | 0.2 | - |
| Private | <u>24.3</u> | <u>38.7</u> | <u>27.9</u> | <u>18.2</u> | <u>29.2</u> ^{2/} |
| Total | <u>24.3</u> | <u>40.7</u> | <u>29.9</u> | <u>18.4</u> | <u>29.9</u> |
| <u>Crude Oil Refined Internally</u> | | | | | |
| Ecopetrol | 13.2 | 16.0 | 20.2 | 24.8 | 26.1 |
| Private | <u>14.3</u> | <u>16.9</u> | <u>18.8</u> | <u>20.4</u> | <u>20.5</u> |
| Total | <u>27.5</u> | <u>32.9</u> | <u>39.0</u> | <u>45.2</u> | <u>46.6</u> |
| <u>Product Exports</u> | | | | | |
| Ecopetrol | 0.4 | 3.8 | 5.8 | 8.5 | 10.1 |
| Private | <u>3.5</u> | <u>1.6</u> | <u>2.7</u> | <u>2.2</u> | <u>1.7</u> |
| Total | <u>3.9</u> | <u>5.4</u> | <u>8.5</u> | <u>10.7</u> | <u>11.8</u> |
| <u>Domestic Sales</u> | | | | | |
| | <u>24.1</u> | <u>25.9</u> | <u>27.7</u> | <u>30.7</u> | <u>32.0</u> |

^{1/} of which 17.3 million from the Orito field in Southern Colombia. 1969 was the first year of production.

^{2/} of which 16.6 million from the Orito field.

Source: Direct communication with the Centro de Información de la Industria Petrolena.

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Table 1: GROSS VALUE OF PRODUCTION IN MANUFACTURING INDUSTRIES
(million current pesos)

| | 1953 | 1958 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <u>Non-durable consumer goods</u> | <u>2,862.6</u> | <u>5,591.7</u> | <u>7,143.1</u> | <u>7,822.8</u> | <u>8,913.5</u> | <u>11,204.6</u> | <u>13,988.6</u> | <u>15,236.8</u> | <u>18,916.2</u> | <u>21,178.5</u> |
| Food | 1,575.3 | 2,694.6 | 3,223.8 | 3,440.3 | 3,894.7 | 4,713.4 | 6,641.7 | 7,403.3 | 8,950.5 | 10,346.6 |
| Beverages | 470.0 | 819.2 | 1,124.3 | 1,260.3 | 1,414.8 | 1,945.0 | 2,235.1 | 2,631.0 | 2,867.2 | 3,125.9 |
| Tobacco products | 94.8 | 295.1 | 347.4 | 377.4 | 449.4 | 505.7 | 690.9 | 804.8 | 791.0 | 829.2 |
| Textiles | 273.8 | 645.5 | 914.4 | 1,014.7 | 1,122.2 | 1,437.2 | 1,557.9 | 1,730.4 | 2,062.5 | 2,194.7 |
| Clothing and footwear | 251.2 | 501.3 | 631.6 | 697.7 | 847.9 | 1,030.5 | 1,068.4 | 1,332.3 | 1,572.4 | 1,575.8 |
| Printing and publishing | 71.2 | 184.4 | 254.0 | 307.5 | 364.5 | 465.4 | 525.8 | 573.6 | 738.4 | 864.3 |
| Pharmaceuticals and related products | 126.3 | 451.6 | 647.6 | 724.9 | 820.0 | 1,007.6 | 1,268.8 | 1,461.4 | 1,934.2 | 2,242.0 |
| <u>Durable consumer goods</u> | <u>140.2</u> | <u>428.1</u> | <u>633.0</u> | <u>771.0</u> | <u>859.2</u> | <u>1,312.6</u> | <u>1,466.8</u> | <u>1,655.5</u> | <u>2,008.2</u> | <u>2,261.9</u> |
| Furniture and fixtures | 24.2 | 63.5 | 74.4 | 89.3 | 108.0 | 117.4 | 130.3 | 146.3 | 177.9 | 186.1 |
| Rubber products | 64.0 | 187.9 | 254.4 | 302.9 | 387.8 | 542.3 | 549.0 | 623.5 | 811.7 | 840.8 |
| Ceramic products | 9.4 | 16.4 | 36.2 | 55.6 | 60.9 | 74.8 | 83.1 | 97.0 | 141.7 | 134.4 |
| Non-electrical appliances | 2.0 | 10.3 | 16.6 | 30.1 | 35.2 | 34.2 | 39.1 | 45.9 | 48.4 | 54.5 |
| Electrical appliances | 12.0 | 57.8 | 102.6 | 124.5 | 170.4 | 247.7 | 265.7 | 324.3 | 400.9 | 408.1 |
| Motor vehicles | 28.6 | 92.2 | 148.8 | 168.6 | 96.8 | 296.2 | 399.6 | 418.5 | 427.6 | 638.0 |
| <u>Intermediate goods</u> | <u>771.1</u> | <u>2,597.0</u> | <u>3,719.2</u> | <u>4,283.8</u> | <u>4,948.5</u> | <u>6,443.8</u> | <u>7,362.1</u> | <u>8,645.3</u> | <u>10,990.1</u> | <u>11,912.0</u> |
| Textiles | 273.8 | 645.5 | 914.3 | 1,014.7 | 1,122.3 | 1,437.2 | 1,557.9 | 1,730.4 | 2,062.5 | 2,194.7 |
| Wood and products | 41.5 | 93.0 | 117.6 | 117.9 | 145.1 | 191.2 | 215.4 | 259.9 | 329.6 | 330.3 |
| Paper and products | 30.3 | 141.2 | 227.5 | 288.8 | 421.9 | 612.8 | 673.5 | 794.7 | 1,224.4 | 1,177.4 |
| Leather and products | 71.5 | 137.1 | 183.5 | 199.9 | 233.4 | 263.4 | 276.2 | 346.6 | 427.1 | 431.5 |
| Chemicals other than pharmaceuticals | 40.9 | 190.5 | 265.9 | 308.6 | 420.3 | 589.5 | 865.3 | 1,173.2 | 1,704.9 | 1,967.3 |
| Petroleum and coal products | 88.8 | 506.3 | 636.3 | 710.0 | 760.6 | 944.9 | 1,071.8 | 1,204.8 | 1,305.9 | 1,472.8 |
| Non-metallic mineral products | 146.7 | 304.8 | 458.1 | 530.3 | 614.1 | 877.9 | 1,003.4 | 1,170.9 | 1,477.5 | 1,491.7 |
| Basic metals | 21.1 | 360.8 | 554.3 | 677.7 | 659.4 | 745.7 | 796.4 | 865.0 | 1,039.5 | 1,434.1 |
| Metal products | 56.5 | 217.8 | 361.7 | 435.9 | 571.4 | 781.2 | 902.2 | 1,099.8 | 1,418.7 | 1,412.2 |
| <u>Capital goods</u> | <u>19.5</u> | <u>204.3</u> | <u>322.9</u> | <u>395.4</u> | <u>632.4</u> | <u>629.4</u> | <u>782.5</u> | <u>955.5</u> | <u>1,241.8</u> | <u>1,266.1</u> |
| Mechanical machinery | 15.1 | 50.6 | 80.4 | 102.2 | 145.5 | 174.0 | 219.2 | 253.1 | 309.8 | 330.3 |
| Electrical machinery (except appliances) | 8.1 | 89.2 | 165.2 | 216.9 | 263.9 | 327.6 | 414.1 | 529.1 | 731.3 | 720.0 |
| Transport equipment (except motor vehicles) | 16.3 | 64.5 | 77.3 | 76.3 | 223.0 | 127.8 | 149.2 | 173.3 | 200.8 | 215.8 |
| <u>Other</u> | <u>26.9</u> | <u>118.5</u> | <u>201.0</u> | <u>232.1</u> | <u>282.6</u> | <u>364.8</u> | <u>447.0</u> | <u>552.8</u> | <u>689.7</u> | <u>783.4</u> |
| <u>Total</u> | <u>3,840.3</u> | <u>8,939.6</u> | <u>12,019.2</u> | <u>12,505.1</u> | <u>15,636.2</u> | <u>19,955.2</u> | <u>24,047.0</u> | <u>27,745.9</u> | <u>33,846.1</u> | <u>37,401.9</u> |

Notes: Data for the textile industry does not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use. Totals may not add up because of rounding.

Source: 1953, 1958, 1961, 1963-1966: DANE, Boletín Mensual de Estadística, Numbers, 67, 117, 148, 170, 180, 201 and 207; 1960, 1962 and 1967: unpublished DANE data.

Table 2: GROSS VALUE OF PRODUCTION IN MANUFACTURING INDUSTRIES
(million 1968 pesos)

| | 1953 | 1958 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| <u>Non-durable consumer goods</u> | <u>12,321.1</u> | <u>14,576.0</u> | <u>16,539.5</u> | <u>17,235.4</u> | <u>19,044.7</u> | <u>18,869.9</u> | <u>20,173.4</u> | <u>21,368.2</u> | <u>21,735.4</u> | <u>22,654.1</u> |
| Food | 6,877.8 | 7,402.6 | 7,762.3 | 7,681.8 | 8,596.2 | 8,154.4 | 9,255.9 | 9,686.5 | 10,051.2 | 11,042.2 |
| Beverages | 2,129.6 | 2,275.6 | 2,795.4 | 3,293.2 | 3,293.8 | 3,452.6 | 3,505.6 | 3,744.5 | 3,403.0 | 3,308.8 |
| Tobacco products | 453.7 | 848.0 | 920.1 | 962.1 | 1,045.6 | 859.2 | 945.8 | 948.1 | 899.4 | 868.3 |
| Textiles | 1,076.4 | 1,484.3 | 1,891.5 | 2,062.5 | 2,214.4 | 2,333.1 | 2,355.8 | 2,492.5 | 2,504.3 | 2,406.7 |
| Clothing and footwear | 924.5 | 1,231.7 | 1,403.5 | 1,515.1 | 1,754.3 | 1,694.0 | 1,588.8 | 1,829.3 | 1,770.7 | 1,647.0 |
| Printing and publishing | 352.1 | 400.9 | 534.8 | 602.1 | 663.3 | 686.8 | 717.2 | 712.6 | 801.0 | 898.4 |
| Pharmaceuticals and related products | 507.0 | 932.9 | 1,231.9 | 1,343.6 | 1,477.1 | 1,689.8 | 1,804.3 | 1,954.7 | 2,305.8 | 2,482.7 |
| <u>Durable consumer goods</u> | <u>653.8</u> | <u>1,032.0</u> | <u>1,312.0</u> | <u>1,530.7</u> | <u>1,638.2</u> | <u>1,878.1</u> | <u>1,924.5</u> | <u>2,107.6</u> | <u>2,332.3</u> | <u>2,455.3</u> |
| Furniture and fixtures | 113.0 | 156.2 | 185.2 | 213.7 | 241.2 | 207.3 | 205.9 | 205.6 | 209.7 | 194.1 |
| Rubber products | 250.4 | 416.6 | 527.7 | 595.5 | 713.0 | 720.4 | 727.9 | 797.7 | 1,030.3 | 972.0 |
| Ceramic products | 41.1 | 45.1 | 81.2 | 122.1 | 123.9 | 117.6 | 132.2 | 132.2 | 167.1 | 146.9 |
| Non-electrical appliances | 13.6 | 31.8 | 42.2 | 74.8 | 82.9 | 62.8 | 65.6 | 67.1 | 58.4 | 61.2 |
| Electrical appliances | 57.5 | 130.7 | 151.8 | 228.8 | 315.4 | 369.2 | 373.8 | 412.4 | 436.3 | 431.3 |
| Motor vehicles | 178.2 | 221.6 | 283.9 | 295.8 | 161.8 | 400.8 | 499.5 | 492.6 | 430.5 | 649.8 |
| <u>Intermediate goods</u> | <u>3,507.9</u> | <u>6,485.2</u> | <u>8,149.4</u> | <u>9,158.3</u> | <u>10,156.1</u> | <u>10,567.9</u> | <u>11,181.4</u> | <u>12,047.8</u> | <u>13,032.4</u> | <u>12,959.7</u> |
| Textiles | 1,076.4 | 1,484.3 | 1,891.5 | 2,062.5 | 2,214.4 | 2,333.1 | 2,355.8 | 2,492.5 | 2,504.3 | 2,406.6 |
| Wood and products | 156.3 | 278.3 | 285.3 | 269.0 | 298.7 | 322.0 | 321.7 | 329.7 | 381.0 | 358.0 |
| Paper and products | 149.9 | 307.1 | 479.0 | 565.5 | 767.8 | 904.4 | 918.7 | 987.5 | 1,328.2 | 1,223.9 |
| Leather and products | 395.2 | 468.0 | 421.9 | 453.4 | 514.5 | 503.4 | 505.4 | 572.5 | 528.9 | 455.1 |
| Chemicals other than pharmaceuticals | 184.5 | 451.7 | 574.3 | 650.0 | 852.1 | 974.4 | 1,329.1 | 1,667.3 | 2,064.6 | 2,163.3 |
| Petroleum and coal products | 406.1 | 1,081.9 | 1,259.9 | 1,376.4 | 1,444.9 | 1,400.5 | 1,487.0 | 1,570.3 | 1,541.2 | 1,531.8 |
| Non-metallic mineral products | 643.5 | 839.7 | 1,026.5 | 1,164.3 | 1,249.0 | 1,379.3 | 1,470.6 | 1,596.1 | 1,742.2 | 1,630.3 |
| Basic metals | 112.4 | 901.9 | 1,250.0 | 1,532.5 | 1,468.4 | 1,314.2 | 1,279.2 | 1,226.4 | 1,231.7 | 1,603.4 |
| Metal products | 383.6 | 672.3 | 921.0 | 1,084.7 | 1,345.9 | 1,436.6 | 1,513.9 | 1,605.5 | 1,710.3 | 1,587.3 |
| <u>Capital goods</u> | <u>239.8</u> | <u>518.3</u> | <u>661.4</u> | <u>754.7</u> | <u>1,168.3</u> | <u>986.6</u> | <u>1,141.1</u> | <u>1,255.4</u> | <u>1,368.7</u> | <u>1,328.8</u> |
| Mechanical machinery | 99.8 | 161.2 | 205.1 | 222.3 | 307.5 | 325.4 | 372.1 | 378.7 | 370.6 | 346.1 |
| Electrical machinery (except appliances) | 38.6 | 201.9 | 308.8 | 398.6 | 488.4 | 488.3 | 582.5 | 672.8 | 795.9 | 760.9 |
| Transport equipment (except motor vehicles) | 101.4 | 155.2 | 147.5 | 133.8 | 372.4 | 172.9 | 186.5 | 203.9 | 202.2 | 219.8 |
| <u>Other</u> | <u>128.3</u> | <u>268.1</u> | <u>375.7</u> | <u>426.4</u> | <u>523.0</u> | <u>543.7</u> | <u>628.7</u> | <u>702.8</u> | <u>750.6</u> | <u>827.9</u> |
| <u>Total</u> | <u>16,850.9</u> | <u>22,879.6</u> | <u>27,038.0</u> | <u>29,105.5</u> | <u>32,534.3</u> | <u>32,846.2</u> | <u>35,119.1</u> | <u>37,481.8</u> | <u>39,215.4</u> | <u>40,225.8</u> |

Notes: Data for the textile industry does not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use. Totals may not add up because of rounding.

Sources: 1953, 1958, 1961, 1963-1966: DANE, Boletín Mensual de Estadística, Numbers, 67, 117, 148, 170, 180, 201 and 207; 1960, 1962 and 1967: unpublished DANE data.

Table 3: GROSS VALUE ADDED IN MANUFACTURING INDUSTRIES
(million current pesos)

| | 1953 | 1958 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|
| <u>Non-durable consumer goods</u> | <u>1,010.7</u> | <u>1,977.5</u> | <u>2,683.4</u> | <u>3,066.9</u> | <u>3,676.6</u> | <u>4,814.4</u> | <u>5,730.4</u> | <u>6,637.3</u> | <u>7,535.0</u> | <u>8,429.8</u> |
| Food | 273.0 | 517.9 | 658.3 | 785.8 | 941.6 | 1,208.2 | 1,574.4 | 1,759.6 | 2,251.0 | 2,442.3 |
| Beverages | 340.7 | 480.6 | 693.7 | 794.0 | 945.9 | 1,326.9 | 1,509.4 | 1,829.0 | 1,809.4 | 2,072.4 |
| Tobacco products | 55.9 | 225.6 | 259.4 | 279.9 | 344.7 | 355.2 | 515.4 | 583.4 | 559.1 | 609.7 |
| Textiles | 133.4 | 267.3 | 364.3 | 391.7 | 461.6 | 654.3 | 682.8 | 797.5 | 876.9 | 1,001.1 |
| Clothing and footwear | 95.6 | 175.1 | 233.8 | 259.0 | 333.3 | 422.5 | 443.6 | 538.3 | 647.8 | 643.8 |
| Printing and publishing | 42.7 | 94.7 | 132.6 | 162.6 | 195.5 | 245.4 | 289.4 | 316.1 | 395.9 | 477.7 |
| Pharmaceuticals and related products | 65.4 | 216.7 | 341.3 | 393.8 | 454.0 | 601.9 | 715.4 | 813.4 | 994.9 | 1,182.8 |
| <u>Durable consumer goods</u> | <u>72.7</u> | <u>193.9</u> | <u>304.3</u> | <u>381.4</u> | <u>433.1</u> | <u>709.1</u> | <u>706.0</u> | <u>811.7</u> | <u>900.8</u> | <u>1,003.7</u> |
| Furniture and fixtures | 14.2 | 33.5 | 38.6 | 49.2 | 61.6 | 66.6 | 72.8 | 81.9 | 99.9 | 94.1 |
| Rubber products | 35.6 | 75.7 | 114.2 | 147.9 | 200.6 | 297.0 | 275.4 | 317.4 | 361.4 | 380.1 |
| Ceramic products | 6.8 | 19.1 | 21.1 | 31.2 | 37.2 | 47.5 | 52.6 | 59.0 | 74.4 | 54.9 |
| Non-electrical appliances | 1.2 | 8.6 | 8.5 | 16.1 | 17.9 | 17.3 | 18.6 | 20.9 | 22.8 | 25.6 |
| Electrical appliances | 5.8 | 24.9 | 46.9 | 52.9 | 82.7 | 137.9 | 122.0 | 162.1 | 171.1 | 157.8 |
| Motor vehicles | 16.1 | 45.1 | 75.0 | 84.1 | 33.1 | 142.8 | 164.6 | 170.4 | 171.2 | 291.3 |
| <u>Intermediate goods</u> | <u>369.0</u> | <u>903.5</u> | <u>1,418.9</u> | <u>1,652.3</u> | <u>1,902.4</u> | <u>2,721.8</u> | <u>3,022.6</u> | <u>3,418.8</u> | <u>4,414.1</u> | <u>4,939.9</u> |
| Textiles | 133.4 | 267.3 | 364.3 | 391.7 | 461.6 | 654.3 | 682.8 | 797.5 | 876.9 | 1,001.1 |
| Wood and products | 16.9 | 33.1 | 44.3 | 48.7 | 62.0 | 88.2 | 95.8 | 117.3 | 151.7 | 150.3 |
| Paper and products | 15.5 | 45.7 | 85.0 | 103.8 | 155.5 | 249.5 | 277.7 | 274.2 | 416.0 | 392.5 |
| Leather and products | 26.2 | 49.0 | 67.4 | 73.3 | 90.0 | 102.4 | 111.2 | 144.6 | 171.1 | 167.6 |
| Chemicals other than pharmaceuticals | 23.6 | 72.9 | 132.1 | 148.7 | 197.3 | 273.7 | 342.1 | 469.0 | 725.0 | 865.6 |
| Petroleum and coal products | 24.7 | 108.7 | 163.0 | 182.8 | 214.6 | 258.2 | 295.5 | 282.3 | 389.8 | 571.6 |
| Non-metallic mineral products | 92.0 | 171.4 | 248.5 | 293.8 | 336.5 | 489.9 | 539.8 | 644.6 | 816.1 | 794.2 |
| Basic metals | 8.3 | 71.3 | 157.4 | 212.5 | 117.7 | 236.1 | 244.8 | 161.9 | 223.9 | 323.2 |
| Metal products | 28.4 | 86.1 | 156.9 | 197.0 | 267.2 | 373.5 | 432.9 | 541.4 | 643.8 | 673.8 |
| <u>Capital goods</u> | <u>23.4</u> | <u>97.1</u> | <u>147.9</u> | <u>193.8</u> | <u>317.3</u> | <u>380.7</u> | <u>410.0</u> | <u>487.7</u> | <u>625.0</u> | <u>621.0</u> |
| Mechanical machinery | 6.9 | 25.9 | 40.8 | 56.3 | 80.9 | 98.5 | 127.3 | 144.1 | 170.2 | 181.9 |
| Electrical machinery (except appliances) | 4.8 | 39.7 | 64.6 | 92.6 | 111.9 | 144.0 | 190.1 | 245.2 | 348.5 | 334.4 |
| Transport equipment (except motor vehicles) | 11.7 | 31.5 | 42.5 | 44.9 | 124.5 | 78.2 | 92.6 | 98.4 | 106.3 | 104.7 |
| <u>Other</u> | <u>15.9</u> | <u>61.5</u> | <u>94.1</u> | <u>120.4</u> | <u>151.9</u> | <u>202.7</u> | <u>232.4</u> | <u>306.3</u> | <u>348.8</u> | <u>412.0</u> |
| <u>Total</u> | <u>1,498.7</u> | <u>3,233.9</u> | <u>4,648.6</u> | <u>5,444.8</u> | <u>6,481.3</u> | <u>8,768.7</u> | <u>10,101.4</u> | <u>11,661.8</u> | <u>13,823.7</u> | <u>15,406.4</u> |

Notes: Data for the textile industry does not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use. Totals may not add up because of rounding.

Source: 1953, 1958, 1961, 1963-1966: DANE, Boletín Mensual de Estadística, Numbers, 67, 117, 148, 170, 180, 201 and 207; 1960, 1962 and 1967: unpublished DANE data.

Table 11. GROSS VALUE ADDED IN MANUFACTURING INDUSTRIES (million 1968 pesos)

| Year | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|---|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Non-durable consumer goods | 4,360.2 | 5,090.7 | 6,184.6 | 6,794.9 | 7,843.2 | 8,073.7 | 8,252.5 | 8,352.5 | 8,414.6 | 8,719.9 | 8,933.2 | 9,073.7 | 9,214.6 | 9,288.1 | 9,414.6 | 9,540.2 | 9,614.6 |
| Food | 1,191.8 | 1,122.9 | 1,585.1 | 1,754.6 | 2,078.3 | 2,154.0 | 2,302.2 | 2,352.8 | 2,465.4 | 2,527.8 | 2,582.2 | 2,636.6 | 2,691.0 | 2,745.4 | 2,799.8 | 2,854.2 | 2,908.6 |
| Beverages | 1,543.7 | 1,334.9 | 1,724.8 | 1,932.9 | 2,202.2 | 2,367.5 | 2,603.1 | 2,747.5 | 2,914.9 | 3,052.8 | 3,197.2 | 3,341.6 | 3,486.0 | 3,630.4 | 3,774.8 | 3,919.2 | 4,063.6 |
| Tobacco products | 267.6 | 448.3 | 607.3 | 803.5 | 1,062.1 | 1,320.7 | 1,579.3 | 1,837.9 | 2,096.5 | 2,355.1 | 2,613.7 | 2,872.3 | 3,130.9 | 3,389.5 | 3,648.1 | 3,906.7 | 4,165.3 |
| Textiles | 521.3 | 614.1 | 733.6 | 796.2 | 910.8 | 1,024.5 | 1,138.1 | 1,251.7 | 1,365.3 | 1,478.9 | 1,592.5 | 1,706.1 | 1,819.7 | 1,933.3 | 2,046.9 | 2,160.5 | 2,274.1 |
| Clothing and footwear | 366.7 | 430.2 | 513.6 | 562.5 | 649.5 | 736.6 | 823.7 | 910.8 | 997.9 | 1,085.0 | 1,172.1 | 1,259.2 | 1,346.3 | 1,433.4 | 1,520.5 | 1,607.6 | 1,694.7 |
| Printing and publishing | 211.2 | 205.5 | 219.1 | 218.4 | 252.2 | 296.8 | 341.4 | 386.0 | 430.6 | 475.2 | 519.8 | 564.4 | 609.0 | 653.6 | 698.2 | 742.8 | 787.4 |
| Pharmaceuticals and related products | 255.0 | 334.1 | 635.4 | 716.8 | 804.8 | 905.6 | 1,006.4 | 1,107.2 | 1,208.0 | 1,308.8 | 1,409.6 | 1,510.4 | 1,611.2 | 1,712.0 | 1,812.8 | 1,913.6 | 2,014.4 |
| Durable consumer goods | 372.1 | 473.7 | 632.4 | 761.7 | 872.3 | 1,017.1 | 1,161.9 | 1,306.7 | 1,451.5 | 1,596.3 | 1,741.1 | 1,885.9 | 2,030.7 | 2,175.5 | 2,320.3 | 2,465.1 | 2,609.9 |
| Furniture and fixtures | 66.6 | 98.2 | 117.6 | 137.5 | 157.4 | 177.3 | 197.2 | 217.1 | 237.0 | 256.9 | 276.8 | 296.7 | 316.6 | 336.5 | 356.4 | 376.3 | 396.2 |
| Rubber products | 139.0 | 167.9 | 236.8 | 290.8 | 358.8 | 426.8 | 494.8 | 562.8 | 630.8 | 698.8 | 766.8 | 834.8 | 902.8 | 970.8 | 1,038.8 | 1,106.8 | 1,174.8 |
| Corsets products | 29.9 | 29.0 | 66.4 | 75.6 | 144.1 | 173.0 | 201.9 | 230.8 | 259.7 | 288.6 | 317.5 | 346.4 | 375.3 | 404.2 | 433.1 | 462.0 | 490.9 |
| Non-electrical appliances | 8.2 | 17.4 | 21.6 | 40.3 | 48.1 | 66.8 | 85.5 | 104.2 | 122.9 | 141.6 | 160.3 | 179.0 | 197.7 | 216.4 | 235.1 | 253.8 | 272.5 |
| Electrical appliances | 27.8 | 56.5 | 87.6 | 97.8 | 153.0 | 205.3 | 257.6 | 310.0 | 362.3 | 414.7 | 467.0 | 519.4 | 571.8 | 624.2 | 676.6 | 729.0 | 781.4 |
| Motor vehicles | 100.6 | 108.7 | 143.2 | 176.5 | 225.3 | 293.2 | 361.1 | 429.0 | 496.9 | 564.8 | 632.7 | 700.6 | 768.5 | 836.4 | 904.3 | 972.2 | 1,040.1 |
| Investment goods | 1,668.8 | 2,224.4 | 3,125.4 | 3,552.8 | 4,292.6 | 4,767.3 | 5,242.0 | 5,716.7 | 6,191.4 | 6,666.1 | 7,140.8 | 7,615.5 | 8,090.2 | 8,564.9 | 9,039.6 | 9,514.3 | 9,989.0 |
| Textiles | 524.3 | 614.5 | 753.6 | 796.2 | 910.8 | 1,024.5 | 1,138.1 | 1,251.7 | 1,365.3 | 1,478.9 | 1,592.5 | 1,706.1 | 1,819.7 | 1,933.3 | 2,046.9 | 2,160.5 | 2,274.1 |
| Wood and products | 61.5 | 99.2 | 107.4 | 127.5 | 148.5 | 169.5 | 190.5 | 211.5 | 232.5 | 253.5 | 274.5 | 295.5 | 316.5 | 337.5 | 358.5 | 379.5 | 400.5 |
| Paper and products | 76.8 | 99.3 | 178.9 | 203.2 | 282.9 | 358.2 | 433.5 | 508.8 | 584.1 | 659.4 | 734.7 | 810.0 | 885.3 | 960.6 | 1,035.9 | 1,111.2 | 1,186.5 |
| Leather and products | 174.9 | 160.4 | 194.9 | 168.2 | 198.3 | 195.7 | 203.4 | 201.7 | 209.4 | 207.7 | 206.0 | 204.3 | 202.6 | 200.9 | 199.2 | 197.5 | 195.8 |
| Clothes other than pharmaceuticals | 106.5 | 122.7 | 289.3 | 313.1 | 400.1 | 452.4 | 504.7 | 557.0 | 609.3 | 661.6 | 713.9 | 766.2 | 818.5 | 870.8 | 923.1 | 975.4 | 1,027.7 |
| Pharmaceuticals | 112.8 | 122.3 | 322.8 | 354.4 | 407.7 | 459.8 | 511.9 | 564.0 | 616.1 | 668.2 | 720.3 | 772.4 | 824.5 | 876.6 | 928.7 | 980.8 | 1,032.9 |
| Platinum and coal products | 105.5 | 122.7 | 289.3 | 313.1 | 400.1 | 452.4 | 504.7 | 557.0 | 609.3 | 661.6 | 713.9 | 766.2 | 818.5 | 870.8 | 923.1 | 975.4 | 1,027.7 |
| Non-metallic minerals | 403.7 | 472.3 | 556.8 | 645.0 | 733.2 | 821.4 | 909.6 | 997.8 | 1,086.0 | 1,174.2 | 1,262.4 | 1,350.6 | 1,438.8 | 1,527.0 | 1,615.2 | 1,703.4 | 1,791.6 |
| Basic metals | 44.4 | 47.4 | 366.2 | 480.5 | 621.5 | 716.0 | 810.5 | 905.0 | 1,000.0 | 1,095.0 | 1,190.0 | 1,285.0 | 1,380.0 | 1,475.0 | 1,570.0 | 1,665.0 | 1,760.0 |
| Metal products | 192.9 | 265.5 | 399.5 | 590.2 | 829.4 | 1,068.6 | 1,307.8 | 1,547.0 | 1,786.2 | 2,025.4 | 2,264.6 | 2,503.8 | 2,743.0 | 2,982.2 | 3,221.4 | 3,460.6 | 3,700.0 |
| Capital goods | 140.8 | 247.5 | 309.8 | 371.5 | 504.6 | 589.6 | 722.7 | 807.7 | 892.8 | 977.8 | 1,062.9 | 1,148.0 | 1,233.1 | 1,318.2 | 1,403.3 | 1,488.4 | 1,573.5 |
| Mechanical machinery (except appliances) | 45.5 | 82.3 | 104.1 | 122.6 | 171.0 | 184.1 | 202.6 | 216.1 | 229.6 | 243.1 | 256.6 | 270.1 | 283.6 | 297.1 | 310.6 | 324.1 | 337.6 |
| Electrical machinery (except appliances) | 22.8 | 89.7 | 120.7 | 170.1 | 207.1 | 214.7 | 228.2 | 241.7 | 255.2 | 268.7 | 282.2 | 295.7 | 309.2 | 322.7 | 336.2 | 349.7 | 363.2 |
| Transport equipment (except motor vehicles) | 72.6 | 75.5 | 81.0 | 78.8 | 207.9 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 | 207.1 |
| Other | 76.6 | 132.2 | 176.0 | 221.2 | 281.1 | 302.1 | 323.1 | 344.1 | 365.1 | 386.1 | 407.1 | 428.1 | 449.1 | 470.1 | 491.1 | 512.1 | 533.1 |
| Total | 6,618.9 | 8,245.5 | 10,424.2 | 11,709.2 | 13,445.2 | 14,732.8 | 16,020.4 | 17,308.0 | 18,595.6 | 19,883.2 | 21,170.8 | 22,458.4 | 23,746.0 | 25,033.6 | 26,321.2 | 27,608.8 | 28,896.4 |

Notes: Data for the textile industry does not permit a clear distinction between exports for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use. Totals may not add up because of rounding.

Source: 1953, 1958, 1961, 1963-1966: DANF, BOLETIN Mensual de Estadística; Numbers, 67, 117, 128, 170, 180, 201 and 207; 1960, 1962 and 1967: unpublished DANF data.

Table 5: TOTAL EMPLOYMENT IN MANUFACTURING INDUSTRIES
SELECTED YEARS 1953 - 1967

| | |
|------|---------|
| 1953 | 199,117 |
| 1958 | 236,748 |
| 1960 | 254,099 |
| 1961 | 265,225 |
| 1962 | 276,159 |
| 1963 | 280,519 |
| 1964 | 283,840 |
| 1965 | 294,220 |
| 1966 | 299,508 |
| 1967 | 293,825 |

Source: 1953-1966: DANE, Boletín Mensual de Estadística;
Numbers 67, 117, 170, 180, 201 and 207; 1967: unpublished
DANE data.

Table 6: PAID EMPLOYMENT IN MANUFACTURING INDUSTRIES

| | 1953 | 1958 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <u>Non-durable consumer goods</u> | <u>109,523</u> | <u>148,397</u> | <u>126,192</u> | <u>128,233</u> | <u>131,212</u> | <u>132,474</u> | <u>133,006</u> | <u>137,242</u> | <u>138,685</u> | <u>134,392</u> |
| Food | 36,757 | 33,885 | 36,002 | 36,067 | 36,573 | 37,160 | 38,229 | 40,032 | 40,934 | 40,820 |
| Beverages | 10,746 | 13,305 | 14,375 | 15,387 | 15,663 | 16,401 | 16,577 | 16,674 | 16,344 | 15,247 |
| Tobacco products | 6,012 | 4,334 | 4,215 | 4,075 | 3,946 | 3,747 | 3,634 | 3,547 | 3,367 | 3,295 |
| Textiles | 17,736 | 19,435 | 21,888 | 21,780 | 21,644 | 22,290 | 21,831 | 22,047 | 22,680 | 23,049 |
| Clothing and footwear | 24,298 | 28,240 | 27,416 | 28,176 | 30,041 | 29,824 | 29,022 | 30,961 | 30,155 | 26,979 |
| Printing and publishing | 7,342 | 9,394 | 10,472 | 10,772 | 11,528 | 10,999 | 11,348 | 11,322 | 11,642 | 11,449 |
| Pharmaceuticals and related products | 6,632 | 9,800 | 11,824 | 11,976 | 11,817 | 12,053 | 12,365 | 12,659 | 13,563 | 13,560 |
| <u>Durable consumer goods</u> | <u>12,469</u> | <u>20,568</u> | <u>24,031</u> | <u>26,448</u> | <u>21,145</u> | <u>27,110</u> | <u>27,838</u> | <u>28,652</u> | <u>28,956</u> | <u>27,426</u> |
| Furniture and fixtures | 3,432 | 5,015 | 4,624 | 4,893 | 4,720 | 4,588 | 4,483 | 4,680 | 4,694 | 4,759 |
| Rubber products | 2,758 | 5,004 | 5,781 | 6,629 | 6,819 | 7,005 | 6,853 | 6,938 | 6,896 | 6,736 |
| Ceramic products | 1,794 | 1,763 | 3,252 | 3,477 | 3,454 | 3,252 | 3,258 | 3,638 | 4,166 | 3,669 |
| Non-electrical appliances | 258 | 589 | 766 | 1,325 | 1,072 | 981 | 931 | 989 | 1,044 | 962 |
| Electrical appliances | 839 | 1,894 | 2,298 | 2,713 | 2,828 | 2,937 | 3,265 | 3,433 | 3,615 | 3,210 |
| Motor vehicles | 3,388 | 6,303 | 7,310 | 7,411 | 2,222 | 8,347 | 9,048 | 8,981 | 8,541 | 8,090 |
| <u>Intermediate goods</u> | <u>52,846</u> | <u>71,141</u> | <u>76,266</u> | <u>79,849</u> | <u>85,248</u> | <u>87,342</u> | <u>88,735</u> | <u>92,296</u> | <u>94,271</u> | <u>94,139</u> |
| Textiles | 17,736 | 19,435 | 21,888 | 21,780 | 21,644 | 22,290 | 21,831 | 22,047 | 22,680 | 23,049 |
| Wood and products | 3,580 | 5,099 | 5,536 | 5,280 | 5,319 | 5,753 | 5,734 | 6,045 | 6,197 | 5,587 |
| Paper and products | 1,927 | 3,328 | 3,916 | 4,700 | 5,322 | 5,485 | 5,414 | 5,781 | 6,248 | 6,092 |
| Leather and products | 3,587 | 4,674 | 4,215 | 4,507 | 4,460 | 4,272 | 4,153 | 4,436 | 4,323 | 4,065 |
| Chemicals other than pharmaceuticals | 2,688 | 3,811 | 4,325 | 4,621 | 5,597 | 5,948 | 7,060 | 7,773 | 8,541 | 9,920 |
| Petroleum and coal products | 1,585 | 2,389 | 2,072 | 2,029 | 2,048 | 2,049 | 2,020 | 2,059 | 2,070 | 2,058 |
| Non-metallic mineral products | 14,540 | 17,893 | 18,632 | 19,476 | 20,316 | 21,145 | 21,322 | 21,523 | 21,261 | 20,203 |
| Basic metals | 1,326 | 5,339 | 3,179 | 2,954 | 3,254 | 3,490 | 3,624 | 3,939 | 3,942 | 4,700 |
| Metal products | 5,877 | 9,173 | 12,503 | 14,502 | 17,288 | 16,910 | 17,577 | 18,693 | 19,009 | 18,665 |
| <u>Capital goods</u> | <u>3,857</u> | <u>10,596</u> | <u>11,574</u> | <u>13,025</u> | <u>19,276</u> | <u>14,886</u> | <u>15,521</u> | <u>16,489</u> | <u>17,652</u> | <u>17,093</u> |
| Mechanical machinery | 1,418 | 3,014 | 3,143 | 3,537 | 4,270 | 4,355 | 4,675 | 4,809 | 5,491 | 5,691 |
| Electrical machinery (except appliances) | 812 | 2,728 | 3,721 | 4,786 | 5,008 | 5,465 | 5,689 | 6,372 | 6,614 | 6,119 |
| Transport equipment (except motor vehicles) | 1,627 | 4,854 | 4,710 | 4,702 | 10,698 | 5,066 | 5,157 | 5,308 | 5,547 | 5,283 |
| <u>Other</u> | <u>2,645</u> | <u>5,075</u> | <u>6,114</u> | <u>6,625</u> | <u>7,087</u> | <u>7,636</u> | <u>7,358</u> | <u>7,872</u> | <u>8,474</u> | <u>2,326</u> |
| <u>Total</u> | <u>181,340</u> | <u>225,773</u> | <u>244,177</u> | <u>254,180</u> | <u>264,668</u> | <u>269,448</u> | <u>272,458</u> | <u>282,552</u> | <u>288,038</u> | <u>282,983</u> |

Notes: Data for the textile industry does not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use.

The data for paid workers excludes from the total employment figure owners, partners and family members of owners who do not receive a regular salary.

Source: 1953, 1958, 1961, 1963-1966: DANE, Boletín Mensual de Estadística, Numbers, 67, 117, 148, 170, 180, 201 and 207; 1960, 1962 and 1967: Unpublished DANE data.

Table 7: Comparison between Colombian and Brazilian Manufacturing Output, 1967

| | Output in manufacturing | | Per capita output in manufacturing | |
|--|-----------------------------|---------------|---------------------------------------|--------------|
| | Colombia (mill. US \$) | Brazil | Colombia (US \$) | Brazil |
| <u>Traditional consumer goods</u> | <u>1,389</u> | <u>7,774</u> | <u>72.4</u> | <u>90.8</u> |
| Textiles | 294 | 1,494 | 15.3 | 17.4 |
| Clothing and footwear | 100 | 494 | 5.2 | 5.8 |
| Food | 673 | 4,749 | 35.1 | 55.4 |
| Beverages | 202 | 331 | 10.5 | 3.9 |
| Tobacco | 53 | 180 | 2.8 | 2.1 |
| Printing and publishing | 55 | 305 | 2.9 | 3.6 |
| Furniture and fixtures | 12 | 221 | 0.6 | 2.6 |
| <u>Intermediate goods</u> | <u>864</u> | <u>5,963</u> | <u>45.1</u> | <u>69.8</u> |
| Non-metallic mineral manufactures | 108 | 674 | 5.6 | 7.9 |
| Metal industries | 195 | 1,540 | 10.2 | 18.0 |
| Wood and products | 22 | 330 | 1.2 | 3.9 |
| Paper and products | 75 | 445 | 3.9 | 5.2 |
| Rubber and products | 59 | 297 | 3.1 | 3.5 |
| Leather and products | 28 | 141 | 1.5 | 1.7 |
| Chemicals | 377 | 2,536 | 19.6 | 29.6 |
| <u>Capital goods</u> | <u>151</u> | <u>2,632</u> | <u>7.9</u> | <u>30.8</u> |
| Mechanical | 25 | 512 | 1.3 | 6.0 |
| Electrical | 73 | 812 | 3.8 | 9.5 |
| Transport equipment (including automotives) | 53 | 1,308 | 2.8 | 15.3 |
| <u>Other</u> | <u>51</u> | <u>246</u> | <u>2.7</u> | <u>2.9</u> |
| <u>Total</u> | <u>2,455</u> | <u>16,615</u> | <u>128.1</u> | <u>194.3</u> |

Note: Brazilian statistics could not be adjusted to the analytical classification used in this report. Colombian data was therefore adjusted to fit the Brazilian classification. The differences are as follows: ceramic manufactures are included in non-metallic mineral manufactures; the metal industry includes basic metals and non-electrical appliances; chemicals include petroleum and coal products and pharmaceuticals; the electrical industry includes electrical appliances; and passenger motor vehicles are included in transport equipment.

The figures were inflated to 1968 prices and converted at the 1968 exchange rate. For Brazil the rate of exchange used was 3.396 NCr. per US \$; for Colombia, 16.40 pesos per US \$.

The population of Brazil in 1967 was 85.7 million and for Colombia 19.2 million.

Source: I.B.R.D., Current Economic Position and Prospects of Brazil, Vol. III, Report No. WH-195a, December 1969, and Appendix Table 2.

Table 8: GROSS VALUE OF PRODUCTION PER WORKER IN MANUFACTURING
(thousand 1968 pesos)

| | <u>1953</u> | <u>1960</u> | <u>1967</u> |
|---|--------------|--------------|--------------|
| <u>Non-durable consumer goods</u> | <u>112.5</u> | <u>131.1</u> | <u>168.6</u> |
| Food | 187.1 | 215.6 | 270.5 |
| Beverages | 198.2 | 194.5 | 217.0 |
| Tobacco products | 75.5 | 218.3 | 263.5 |
| Textiles | 60.7 | 86.4 | 104.4 |
| Clothing and footwear | 38.1 | 51.2 | 61.0 |
| Printing and publishing | 48.0 | 51.1 | 78.5 |
| Pharmaceuticals and related products | 76.4 | 104.2 | 183.1 |
| <u>Durable consumer goods</u> | <u>52.4</u> | <u>54.6</u> | <u>89.5</u> |
| Furniture and fixtures | 32.9 | 40.0 | 40.8 |
| Rubber products | 90.8 | 91.3 | 114.3 |
| Ceramic products | 22.9 | 25.0 | 40.0 |
| Non-electrical appliances | 52.9 | 55.1 | 63.6 |
| Electrical appliances | 68.6 | 83.5 | 134.4 |
| Motor vehicles | 42.2 | 38.8 | 80.3 |
| <u>Intermediate goods</u> | <u>66.4</u> | <u>106.9</u> | <u>136.8</u> |
| Textiles | 60.7 | 86.4 | 104.4 |
| Wood and products | 43.7 | 51.5 | 59.8 |
| Paper and products | 77.8 | 122.3 | 200.9 |
| Leather and products | 110.2 | 100.1 | 111.9 |
| Chemicals and other pharmaceuticals | 68.7 | 132.8 | 218.1 |
| Petroleum and coal products | 256.2 | 608.1 | 744.3 |
| Non-metallic mineral products | 44.3 | 55.1 | 80.7 |
| Basic metals | 84.7 | 405.7 | 341.1 |
| Metal products | 65.3 | 73.7 | 85.0 |
| <u>Capital goods</u> | <u>62.2</u> | <u>57.1</u> | <u>77.7</u> |
| Mechanical machinery | 70.4 | 65.3 | 61.2 |
| Electrical machinery (except appliances) | 47.6 | 83.0 | 124.3 |
| Transport equipment (except motor vehicles) | 62.3 | 31.3 | 41.6 |
| <u>Other</u> | <u>48.5</u> | <u>61.5</u> | <u>88.8</u> |
| <u>Total</u> | <u>92.9</u> | <u>110.7</u> | <u>142.2</u> |

Source: Appendix Tables 2 and 6.

Note: Employment figures refer to paid workers

Table 9: Production and Market for Manufactured Products

| | 1953 | | Ratio of imports to market (%) | 1960 | | Ratio of imports to market (%) | 1967 | | Ratio of imports to market (%) |
|-----------------------------------|----------------------------|--------------------|--------------------------------|----------------------------|--------------------|--------------------------------|----------------------------|--------------------|--------------------------------|
| | Production (thou. U.S. \$) | Market | | Production (thou. U.S. \$) | Market | | Production (thou. U.S. \$) | Market | |
| Non-Durable Consumer Goods | | | | | | | | | |
| Food | 405,773.8 | 422,439.8 | 3.9 | 457,955.6 | 465,256.6 | 1.6 | 651,455.0 | 654,349.0 | 0.4 |
| Beverages | 125,638.6 | 128,526.6 | 2.2 | 164,919.7 | 166,584.7 | 1.0 | 195,207.1 | 196,615.1 | 0.7 |
| Tobacco products | 26,768.6 | 28,058.6 | 4.6 | 54,284.9 | 55,639.9 | 2.5 | 51,225.2 | 51,351.2 | 0.2 |
| Textiles | 63,503.5 | 63,776.5 | 0.5 | 111,594.6 | 112,324.6 | 0.7 | 141,988.1 | 141,991.1 | 0.1 |
| Clothing & Footwear | 54,543.5 | 54,646.5 | 1.0 | 82,802.2 | 86,067.2 | 3.8 | 97,167.5 | 97,968.5 | 1.2 |
| Printing & Publishing | 20,772.3 | 22,588.3 | 8.1 | 31,551.4 | 32,482.4 | 2.9 | 53,004.1 | 56,719.1 | 7.7 |
| Pharmaceuticals & related prod. | 29,509.6 | 45,938.6 | 35.4 | 72,676.9 | 84,795.9 | 14.8 | 146,469.7 | 159,525.7 | 9.3 |
| Sub-Total | 726,909.9 | 765,974.9 | 5.2 | 975,785.4 | 1,003,151.4 | 2.8 | 1,336,516.7 | 1,358,519.7 | 1.8 |
| Durable Consumer Goods | | | | | | | | | |
| Furniture & Fixtures | 6,669.1 | 7,399.1 | 9.9 | 10,924.2 | 10,888.2 | 0.3 | 11,449.6 | 11,456.6 | 1.2 |
| Rubber products | 14,770.5 | 16,692.5 | 11.5 | 31,135.4 | 34,611.4 | 10.1 | 57,343.7 | 58,059.7 | 4.5 |
| Ceramic products | 2,422.3 | 7,174.3 | 66.3 | 4,789.1 | 4,935.1 | 3.1 | 8,666.5 | 8,852.5 | 7.5 |
| Stoves | 804.5 | 2,477.5 | 67.5 | 2,490.3 | 2,490.3 | 0.0 | 3,612.6 | 3,612.6 | - |
| Electrical Appliances | 3,394.8 | 5,262.8 | 35.5 | 11,316.5 | 12,166.5 | 7.0 | 25,446.6 | 25,968.6 | 2.0 |
| Automotives | 10,511.8 | 69,436.8 | 84.9 | 16,716.2 | 28,376.2 | 41.1 | 38,337.1 | 60,498.1 | 37.0 |
| Sub-Total | 38,573.0 | 108,443.0 | 64.4 | 77,401.7 | 93,467.7 | 17.3 | 144,856.3 | 168,448.3 | 15.6 |
| Intermediate Goods | | | | | | | | | |
| Textiles | 63,503.5 | 89,699.5 | 30.0 | 111,594.6 | 115,473.6 | 3.6 | 141,988.1 | 141,135.1 | 4.4 |
| Wood products | 9,222.8 | 10,434.8 | 12.1 | 16,831.7 | 18,244.7 | 8.0 | 21,122.6 | 18,087.6 | 1.3 |
| Paper & products | 8,844.7 | 24,694.7 | 64.2 | 28,258.3 | 53,303.3 | 47.0 | 72,203.7 | 85,822.7 | 25.9 |
| Leather products | 23,314.9 | 22,442.9 | 4.2 | 24,892.4 | 24,410.4 | 0.7 | 26,847.9 | 24,427.9 | 0.0 |
| Chemicals | 10,886.2 | 16,991.2 | 76.9 | 33,883.8 | 97,756.8 | 65.6 | 127,629.8 | 196,574.8 | 36.5 |
| Petroleum & Coal products | 23,958.4 | 55,068.4 | 57.1 | 74,331.0 | 80,709.0 | 17.5 | 90,372.7 | 83,989.7 | 8.4 |
| Non-metallic Mineral Products | 37,966.9 | 42,198.9 | 11.6 | 60,563.1 | 65,976.1 | 11.3 | 96,180.0 | 93,841.0 | 3.6 |
| Basic Metal Products | 6,629.4 | 57,604.4 | 88.5 | 76,096.9 | 123,464.9 | 38.4 | 94,596.9 | 137,118.9 | 31.5 |
| Metal products | 22,628.7 | 54,651.7 | 58.6 | 54,337.9 | 74,789.9 | 27.6 | 93,648.1 | 102,702.3 | 10.5 |
| Sub-Total | 206,555.5 | 403,839.5 | 49.6 | 480,789.7 | 654,128.7 | 28.2 | 764,590.0 | 883,700.0 | 18.7 |
| Capital Goods | | | | | | | | | |
| Mechanical Machinery | 5,860.2 | 119,737.2 | 95.2 | 12,100.6 | 133,311.6 | 92.3 | 20,538.4 | 136,240.4 | 87.0 |
| Electrical Machinery | 2,277.8 | 35,370.8 | 93.6 | 18,216.0 | 54,041.0 | 66.4 | 44,888.3 | 78,593.3 | 43.6 |
| Transport | 5,979.4 | 15,826.4 | 62.2 | 8,703.7 | 59,381.7 | 85.4 | 12,968.1 | 65,449.1 | 80.2 |
| Sub-Total | 14,117.4 | 170,934.4 | 91.8 | 39,020.3 | 246,734.3 | 85.0 | 78,394.8 | 280,282.8 | 73.2 |
| Miscellaneous | 7,566.6 | 24,004.6 | 68.7 | 22,166.8 | 36,789.8 | 10.0 | 48,846.0 | 59,996.0 | 19.6 |
| Total | 994,152.4 | 1,473,205.4 | 32.8 | 1,595,163.9 | 2,034,271.9 | 22.3 | 2,373,203.8 | 2,750,916.8 | 15.8 |

Note: Production figures were inflated to 1968 prices and converted into dollars at the 1968 exchange rate (principal selling rate). Market equals production plus imports less exports.

Sources: Appendix Tables 2, 23 and 24.

Table 10: WAGES AND SALARIES AND GROSS VALUE ADDED PER MAN BY INDUSTRIAL SUB-GROUP AND SIZE OF FIRM, 1967

| | <u>Firms</u> | <u>Employment</u> | <u>Value Added</u> (mill. current pesos) | <u>Wages</u> (thousand current pesos) | <u>Wages, Salaries and Social Benefits</u> (thousand current pesos) | <u>Value Added per man</u> (thousand current pesos) | <u>Wages and Salary per man</u> (thousand current pesos) | <u>Wages, Salaries and Social Benefits per Man</u> (thousand current pesos) | <u>Share of Wages Salaries and Social Benefits in Value Added</u> (percent) |
|-----------------------------------|--------------|-------------------|---|--|--|--|---|--|--|
| <u>Non-durable consumer goods</u> | | | | | | | | | |
| 1 - 14 | 4,866 | 20,551 | 559.8 | 127,533.1 | 145,360.6 | 27.4 | 6.2 | 7.1 | 26.0 |
| 15 - 19 | 287 | 4,610 | 145.0 | 37,281.8 | 44,164.5 | 31.5 | 8.1 | 9.6 | 30.5 |
| 20 - 49 | 662 | 20,051 | 795.1 | 188,029.7 | 233,084.0 | 39.7 | 9.4 | 11.6 | 29.3 |
| 50 - 99 | 265 | 18,277 | 958.6 | 210,450.3 | 269,186.7 | 52.5 | 11.5 | 14.7 | 28.1 |
| 100 - 199 | 156 | 21,734 | 1,906.9 | 318,552.2 | 398,734.2 | 87.7 | 14.7 | 18.4 | 20.9 |
| 200 and over | 133 | 72,225 | 5,065.6 | 1,239,357.4 | 1,678,848.5 | 70.1 | 17.2 | 23.2 | 33.1 |
| <u>Durable consumer goods</u> | | | | | | | | | |
| 1 - 14 | 855 | 4,218 | 81.4 | 32,964.7 | 36,788.2 | 19.3 | 7.8 | 8.7 | 45.2 |
| 15 - 19 | 75 | 1,196 | 27.8 | 11,234.0 | 13,161.4 | 23.2 | 9.4 | 11.0 | 47.3 |
| 20 - 49 | 168 | 4,908 | 116.8 | 51,932.5 | 63,181.3 | 23.8 | 10.6 | 12.9 | 51.1 |
| 50 - 99 | 49 | 3,461 | 109.6 | 32,313.7 | 42,372.4 | 31.7 | 9.3 | 12.2 | 38.7 |
| 100 - 199 | 22 | 2,645 | 95.2 | 31,977.4 | 40,275.3 | 36.4 | 12.1 | 15.2 | 41.9 |
| 200 and over | 20 | 10,998 | 593.5 | 195,996.4 | 293,332.4 | 54.0 | 17.8 | 26.7 | 49.4 |
| <u>Intermediate goods</u> | | | | | | | | | |
| 1 - 14 | 1,714 | 8,887 | 191.1 | 59,477.2 | 67,830.8 | 21.5 | 6.7 | 7.6 | 35.5 |
| 15 - 19 | 168 | 2,659 | 61.5 | 23,020.8 | 27,498.4 | 23.13 | 8.7 | 10.3 | 44.7 |
| 20 - 49 | 367 | 10,737 | 420.2 | 106,527.2 | 132,697.4 | 39.1 | 9.9 | 12.4 | 31.6 |
| 50 - 99 | 144 | 9,944 | 490.1 | 141,092.3 | 179,404.4 | 42.3 | 14.2 | 18.0 | 36.6 |
| 100 - 199 | 77 | 10,766 | 640.6 | 163,567.4 | 230,626.9 | 59.5 | 15.2 | 21.4 | 36.0 |
| 200 and over | 67 | 28,697 | 2,110.4 | 527,245.7 | 748,720.4 | 73.5 | 18.4 | 26.1 | 35.5 |
| <u>Capital goods</u> | | | | | | | | | |
| 1 - 14 | 225 | 1,462 | 32.8 | 12,724.2 | 14,390.0 | 22.4 | 8.7 | 9.8 | 43.9 |
| 15 - 19 | 35 | 533 | 13.2 | 4,736.5 | 5,557.0 | 24.8 | 8.9 | 10.4 | 42.1 |
| 20 - 49 | 71 | 1,925 | 60.0 | 20,543.5 | 25,133.7 | 31.2 | 10.7 | 13.1 | 41.9 |
| 50 - 99 | 31 | 2,124 | 108.4 | 37,822.5 | 44,722.0 | 51.0 | 17.8 | 21.1 | 41.3 |
| 100 - 199 | 13 | 1,813 | 74.6 | 29,710.8 | 40,760.6 | 41.2 | 15.4 | 22.5 | 54.6 |
| 200 and over | 19 | 9,236 | 335.2 | 148,724.8 | 198,556.8 | 36.3 | 15.1 | 21.5 | 59.2 |
| <u>TOTAL</u> | | | | | | | | | |
| 1 - 14 | 7,829 | 36,045 | 891.7 | 240,358.5 | 273,339.5 | 24.7 | 6.7 | 7.6 | 30.6 |
| 15 - 19 | 584 | 9,295 | 255.3 | 78,954.4 | 93,546.3 | 27.5 | 8.5 | 10.1 | 35.6 |
| 20 - 49 | 1,338 | 39,782 | 1,435.7 | 390,966.8 | 483,932.0 | 37.4 | 9.8 | 12.2 | 32.6 |
| 50 - 99 | 525 | 36,293 | 1,766.3 | 450,995.7 | 573,218.8 | 48.7 | 12.4 | 15.8 | 32.4 |
| 100 - 199 | 283 | 38,939 | 2,827.5 | 571,405.5 | 749,522.9 | 72.6 | 14.7 | 19.3 | 25.5 |
| 200 and over | 244 | 122,629 | 3,179.9 | 2,137,033.0 | 2,956,149.8 | 66.7 | 17.4 | 24.1 | 31.1 |

Note: All textile production is shown under non-durable consumer goods.

Note: Employment figures refer to paid workers

Source: Unpublished DANE data.

Table 11: WAGES AND SALARIES AND GROSS VALUE ADDED PER MAN BY INDUSTRY BRANCH AND SIZE OF FIRM, 1967

| Firms | Deployment | Value Added (mill. current pesos) | Wages (thousand current pesos) | Wages, Salaries and Social Benefits (thousand current pesos) | Value Added per man (thousand current pesos) | Wages and Salaries per man (current pesos) | Wages, Salaries and Social Benefits per Man (current pesos) | Share of Wages Salaries and Social Benefits in Value Added (percent) | |
|---|--------------|--------------------------------------|--------------------------------------|--|--|---|---|---|-------------|
| Non-durable consumer goods | | | | | | | | | |
| Food | 2,936 | 40,820 | 2,442.4 | 495,986.6 | 642,999.1 | 59.83 | 12.2 | 15.8 | 26.3 |
| 1 - 14 | 2,452 | 9,706 | 320.2 | 55,441.1 | 62,283.9 | 33.0 | 5.7 | 6.4 | 19.5 |
| 15 - 19 | 108 | 1,750 | 76.5 | 15,350.8 | 18,284.3 | 43.7 | 8.8 | 10.5 | 23.9 |
| 20 - 49 | 226 | 6,581 | 409.4 | 67,157.5 | 82,459.0 | 61.3 | 10.1 | 12.3 | 20.1 |
| 50 - 99 | 83 | 5,899 | 403.0 | 72,856.3 | 92,592.8 | 58.3 | 12.4 | 15.7 | 23.0 |
| 100 - 199 | 36 | 5,227 | 426.8 | 74,694.2 | 74,718.2 | 81.7 | 14.3 | 14.3 | 17.5 |
| 200 and over | 31 | 11,557 | 806.5 | 210,476.7 | 210,554.9 | 69.8 | 18.2 | 18.2 | 26.1 |
| Beverages | 220 | 15,247 | 2,072.6 | 292,893.1 | 431,384.2 | 135.9 | 19.2 | 28.3 | 20.8 |
| 1 - 14 | 116 | 619 | 26.2 | 6,314.8 | 8,213.6 | 42.3 | 10.2 | 13.3 | 31.3 |
| 15 - 19 | 11 | 180 | 6.5 | 1,917.5 | 2,268.5 | 36.1 | 10.7 | 12.6 | 34.9 |
| 20 - 49 | 24 | 814 | 50.2 | 10,476.8 | 14,030.3 | 61.7 | 12.9 | 17.2 | 28.0 |
| 50 - 99 | 23 | 1,735 | 188.5 | 30,339.2 | 41,354.3 | 108.1 | 17.5 | 23.8 | 21.9 |
| 100 - 199 | 28 | 3,767 | 691.0 | 70,707.5 | 103,503.7 | 183.4 | 18.8 | 27.5 | 15.0 |
| 200 and over | 18 | 8,132 | 1,110.2 | 173,137.3 | 262,013.8 | 136.5 | 21.3 | 32.2 | 23.6 |
| Tobacco products | 161 | 3,295 | 609.5 | 51,002.2 | 77,147.9 | 185.0 | 15.5 | 23.4 | 12.7 |
| 1 - 14 | 132 | 635 | 5.3 | 1,477.5 | 1,524.2 | 8.3 | 2.3 | 2.4 | 28.8 |
| 15 - 19 | 4 | 65 | 0.7 | 260.3 | 281.0 | 10.6 | 3.9 | 4.3 | 40.2 |
| 20 - 49 | 13 | 332 | 3.2 | 2,245.4 | 2,997.1 | 9.6 | 6.8 | 9.0 | 93.7 |
| 50 - 99 | 3 | 169 | 1.9 | 776.0 | 878.7 | 11.2 | 4.6 | 5.2 | 46.3 |
| 100 - 199 | 4 | 541 | 99.9 | 8,993.4 | 12,964.3 | 184.7 | 16.6 | 24.0 | 13.0 |
| 200 and over | 5 | 1,551 | 489.4 | 37,269.6 | 58,522.6 | 321.3 | 24.0 | 37.7 | 11.7 |
| Textiles | 442 | 46,098 | 2,002.2 | 660,078.5 | 927,475.4 | 43.4 | 14.3 | 20.1 | 46.3 |
| 1 - 14 | 229 | 1,002 | 27.6 | 7,903.4 | 9,043.0 | 27.5 | 7.9 | 9.0 | 32.7 |
| 15 - 19 | 19 | 319 | 11.0 | 2,536.3 | 2,990.0 | 34.5 | 8.0 | 9.4 | 27.2 |
| 20 - 49 | 92 | 2,987 | 70.5 | 26,635.5 | 33,730.2 | 23.6 | 8.9 | 11.3 | 47.8 |
| 50 - 99 | 41 | 2,703 | 73.8 | 26,775.7 | 34,369.7 | 27.3 | 9.9 | 12.7 | 46.6 |
| 100 - 199 | 23 | 3,280 | 112.5 | 36,266.4 | 45,059.8 | 34.3 | 11.1 | 13.7 | 40.1 |
| 200 and over | 38 | 35,807 | 1,705.8 | 559,961.2 | 802,282.7 | 47.7 | 15.6 | 22.4 | 47.0 |
| Clothing and footwear | 1,780 | 26,979 | 643.9 | 207,983.5 | 257,486.3 | 23.9 | 7.7 | 2.5 | 40.0 |
| 1 - 14 | 1,405 | 5,442 | 109.0 | 34,182.7 | 38,959.3 | 19.3 | 5.1 | 5.9 | 35.8 |
| 15 - 19 | 83 | 1,298 | 22.4 | 8,075.3 | 9,404.7 | 17.3 | 6.2 | 7.3 | 42.0 |
| 20 - 49 | 176 | 5,239 | 109.6 | 44,922.3 | 42,114.2 | 20.9 | 6.7 | 3.0 | 38.4 |
| 50 - 99 | 72 | 4,849 | 93.1 | 35,106.0 | 42,817.6 | 19.2 | 7.2 | 8.8 | 45.9 |
| 100 - 199 | 27 | 3,591 | 99.5 | 29,733.6 | 37,014.3 | 27.7 | 8.3 | 10.3 | 37.2 |
| 200 and over | 17 | 5,360 | 271.0 | 55,963.6 | 87,156.2 | 33.0 | 10.4 | 13.7 | 41.5 |
| Printing and publishing | 477 | 11,445 | 477.8 | 166,736.4 | 212,622.4 | 41.7 | 14.6 | 18.6 | 44.5 |
| 1 - 14 | 332 | 1,923 | 37.7 | 15,081.4 | 16,979.6 | 19.6 | 7.8 | 8.8 | 45.0 |
| 15 - 19 | 39 | 525 | 14.2 | 5,887.6 | 6,950.4 | 22.7 | 9.4 | 11.1 | 48.9 |
| 20 - 49 | 70 | 2,087 | 55.5 | 23,275.5 | 27,878.6 | 27.1 | 11.2 | 13.4 | 49.3 |
| 50 - 99 | 19 | 1,285 | 59.7 | 19,307.2 | 24,502.2 | 46.5 | 15.0 | 19.1 | 41.0 |
| 100 - 199 | 8 | 1,146 | 38.7 | 17,142.3 | 21,258.1 | 33.8 | 15.0 | 18.5 | 54.9 |
| 200 and over | 9 | 4,383 | 271.0 | 85,441.4 | 115,053.5 | 61.8 | 19.6 | 25.3 | 42.5 |
| Pharmaceuticals and related products | 353 | 13,560 | 1,182.7 | 246,504.2 | 322,345.1 | 87.2 | 18.2 | 23.8 | 27.3 |
| 1 - 14 | 200 | 1,023 | 33.8 | 7,132.2 | 8,357.0 | 33.0 | 7.0 | 8.2 | 24.7 |
| 15 - 19 | 23 | 377 | 11.7 | 1,251.0 | 1,905.6 | 36.8 | 8.8 | 10.1 | 29.1 |
| 20 - 49 | 41 | 1,911 | 71.7 | 23,365.7 | 29,374.7 | 50.1 | 12.2 | 15.3 | 31.2 |
| 50 - 99 | 27 | 1,517 | 133.1 | 25,289.9 | 32,531.4 | 94.5 | 15.5 | 20.0 | 23.6 |
| 100 - 199 | 36 | 4,182 | 418.5 | 91,014.8 | 104,235.3 | 104.9 | 19.4 | 23.9 | 23.8 |
| 200 and over | 15 | 4,535 | 462.2 | 105,537.5 | 141,534.9 | 191.3 | 24.0 | 29.3 | 31.0 |

Wages and Salaries.....1967, contd. from Table 11

| | Firms | Employment | Value added (mill. current pesos) | Wages, Salaries and Social Benefits | | Value Added per man (thousand current pesos) | Wages and Salaries per man (thousand current pesos) | Wages, Salaries and Social Benefits per Man (thousand current pesos) | Share of Wages, Salaries and Social Benefits in Value Added (percent) |
|----------------------------------|------------|--------------|--------------------------------------|---|--|---|--|--|--|
| | | | | Wages (thousand current pesos) | Social Benefits (thousand current pesos) | | | | |
| <u>Durable consumer goods</u> | | | | | | | | | |
| <u>Furniture and fixtures</u> | <u>390</u> | <u>4,752</u> | <u>24.2</u> | <u>44,086.6</u> | <u>54,496.3</u> | <u>19.8</u> | <u>9.3</u> | <u>11.5</u> | <u>57.9</u> |
| 1 - 14 | 308 | 1,394 | 22.7 | 9,645.0 | 10,548.2 | 16.3 | 6.9 | 7.6 | 46.5 |
| 15 - 19 | 20 | 304 | 5.7 | 2,227.8 | 2,576.6 | 18.8 | 7.3 | 8.5 | 45.2 |
| 20 - 49 | 49 | 1,401 | 23.6 | 12,466.9 | 14,495.0 | 16.9 | 8.9 | 10.4 | 61.4 |
| 50 - 99 | 8 | 525 | 9.8 | 4,200.6 | 5,085.8 | 18.7 | 8.0 | 9.7 | 51.9 |
| 100 - 199 | 2 | 222 | 3.4 | 1,488.0 | 1,588.6 | 15.3 | 6.7 | 7.2 | 46.6 |
| 200 and over | 3 | 913 | 29.0 | 14,058.3 | 20,202.1 | 31.8 | 15.4 | 22.1 | 69.7 |
| <u>Rubber products</u> | <u>62</u> | <u>6,736</u> | <u>380.1</u> | <u>120,952.8</u> | <u>182,283.8</u> | <u>56.4</u> | <u>18.0</u> | <u>27.1</u> | <u>48.0</u> |
| 1 - 14 | 25 | 173 | 4.2 | 1,628.2 | 2,142.3 | 24.3 | 9.4 | 12.4 | 51.0 |
| 15 - 19 | 8 | 130 | 3.3 | 1,372.4 | 1,844.8 | 253.9 | 10.5 | 14.2 | 5.6 |
| 20 - 49 | 23 | 687 | 24.4 | 9,892.6 | 13,358.3 | 35.5 | 14.4 | 19.4 | 54.7 |
| 50 - 99 | 5 | 322 | 7.9 | 3,120.1 | 3,743.4 | 24.5 | 9.7 | 11.6 | 47.4 |
| 100 - 199 | 2 | 200 | 10.5 | 8,011.5 | 2,815.8 | 52.5 | 10.1 | 14.1 | 26.8 |
| 200 and over | 6 | 5,224 | 329.8 | 102,928.0 | 158,379.2 | 63.1 | 19.7 | 30.3 | 48.0 |
| <u>Ceramic products</u> | <u>38</u> | <u>1,669</u> | <u>72.5</u> | <u>42,853.8</u> | <u>54,656.7</u> | <u>21.7</u> | <u>11.7</u> | <u>14.9</u> | <u>68.8</u> |
| 1 - 14 | 14 | 74 | 0.8 | 328.8 | 373.4 | 10.0 | 2.4 | 5.1 | 45.7 |
| 15 - 19 | 2 | 38 | 0.7 | 241.9 | 281.2 | 18.4 | 6.4 | 7.4 | 40.2 |
| 20 - 49 | 10 | 315 | 3.4 | 1,930.1 | 2,261.4 | 10.8 | 6.1 | 7.2 | 66.5 |
| 50 - 99 | 3 | 252 | 4.1 | 2,111.8 | 2,589.9 | 16.3 | 8.4 | 10.3 | 63.2 |
| 100 - 199 | 4 | 540 | 13.9 | 5,919.0 | 7,905.1 | 25.7 | 11.0 | 14.6 | 56.9 |
| 200 and over | 5 | 2,450 | 56.6 | 32,322.2 | 41,245.7 | 23.1 | 13.2 | 16.8 | 72.9 |
| <u>Non-electrical appliances</u> | <u>25</u> | <u>962</u> | <u>25.6</u> | <u>10,950.4</u> | <u>13,931.1</u> | <u>26.6</u> | <u>11.4</u> | <u>14.5</u> | <u>54.4</u> |
| 1 - 14 | 10 | 48 | 1.0 | 397.1 | 341.6 | 20.8 | 6.2 | 7.1 | 34.2 |
| 15 - 19 | 1 | 18 | 0.7 | 259.5 | 336.2 | 38.9 | 14.4 | 18.7 | 46.0 |
| 20 - 49 | 8 | 257 | 5.9 | 2,654.3 | 3,157.8 | 23.0 | 10.3 | 12.3 | 68.5 |
| 50 - 99 | 3 | 234 | 9.5 | 3,803.7 | 3,952.9 | 40.6 | 13.7 | 10.9 | 63.6 |
| 100 - 199 | 3 | 406 | 8.5 | 4,535.8 | 6,142.6 | 41.0 | 11.2 | 15.8 | 72.3 |
| 200 and over | - | - | - | - | - | - | - | - | - |
| <u>Electrical appliances</u> | <u>102</u> | <u>3,210</u> | <u>157.9</u> | <u>49,698.8</u> | <u>72,045.0</u> | <u>49.2</u> | <u>15.5</u> | <u>22.4</u> | <u>45.6</u> |
| 1 - 14 | 65 | 347 | 11.4 | 3,911.9 | 4,639.1 | 32.9 | 11.3 | 13.4 | 40.7 |
| 15 - 19 | 9 | 156 | 5.8 | 2,060.3 | 2,360.5 | 37.2 | 13.2 | 15.1 | 40.7 |
| 20 - 49 | 11 | 396 | 14.9 | 4,139.2 | 4,942.8 | 37.6 | 10.5 | 12.5 | 33.2 |
| 50 - 99 | 9 | 588 | 22.9 | 7,394.2 | 9,148.0 | 39.0 | 12.6 | 15.6 | 40.0 |
| 100 - 199 | 5 | 587 | 34.1 | 8,399.3 | 10,083.8 | 58.1 | 14.3 | 17.2 | 29.6 |
| 200 and over | 3 | 1,235 | 58.8 | 23,793.9 | 40,870.8 | 60.6 | 21.0 | 26.0 | 59.4 |
| <u>Motor vehicles</u> | <u>565</u> | <u>8,090</u> | <u>291.4</u> | <u>95,976.3</u> | <u>119,798.1</u> | <u>36.0</u> | <u>11.9</u> | <u>14.8</u> | <u>41.1</u> |
| 1 - 14 | 433 | 2,182 | 41.3 | 17,153.7 | 18,743.6 | 18.9 | 7.9 | 8.6 | 45.4 |
| 15 - 19 | 35 | 550 | 11.5 | 5,072.1 | 5,762.1 | 21.1 | 9.2 | 10.5 | 49.7 |
| 20 - 49 | 67 | 1,852 | 44.5 | 20,849.4 | 24,966.0 | 24.1 | 11.3 | 13.5 | 56.0 |
| 50 - 99 | 21 | 1,540 | 55.4 | 12,283.3 | 17,852.4 | 36.0 | 8.0 | 11.6 | 32.2 |
| 100 - 199 | 6 | 691 | 25.8 | 9,623.8 | 11,739.4 | 37.3 | 13.9 | 17.0 | 45.5 |
| 200 and over | 3 | 1,275 | 109.3 | 22,894.0 | 32,634.6 | 85.7 | 18.0 | 25.6 | 29.9 |

Wages and Salaries....., contd. from table 11

| Firms | Employment | Value Added (mill. current pesos) | Wages, Salaries and Social Benefits | | Value Added per man (thousand current pesos) | Wages and Salaries per man | | Wages, Salaries and Social Benefits per Man | Share of Wages, Salaries and Social Benefits and Value Added (percent) |
|---|------------|--------------------------------------|---|------------------|--|-------------------------------|------------------|---|---|
| | | | Wages (thousand current pesos) | Social Benefits | | Wages and Salaries | Benefits per Man | | |
| Intermediate goods | | | | | | | | | |
| Food and products | 406 | 2,587 | 150.2 | 55,214.6 | 68,189.6 | 25.1 | 7.3 | 11.4 | 45.4 |
| 1 - 14 | 127 | 1,571 | 29.9 | 10,244.2 | 11,445.1 | 17.9 | 6.1 | 6.9 | 38.1 |
| 15 - 19 | 25 | 388 | 7.1 | 3,057.3 | 3,470.7 | 18.1 | 7.9 | 9.0 | 48.9 |
| 20 - 49 | 34 | 888 | 20.6 | 7,658.2 | 8,944.7 | 21.2 | 8.6 | 10.0 | 43.4 |
| 50 - 99 | 5 | 239 | 6.0 | 2,861.8 | 3,137.0 | 20.8 | 9.9 | 10.9 | 52.3 |
| 100 - 199 | 3 | 1,082 | 27.2 | 11,055.6 | 13,931.2 | 25.1 | 10.2 | 12.9 | 51.2 |
| 200 and over | 5 | 1,569 | 59.5 | 21,037.5 | 27,260.9 | 35.7 | 12.6 | 16.3 | 45.8 |
| Paper and products | 110 | 6,092 | 392.5 | 113,974.5 | 154,378.5 | 64.4 | 18.7 | 25.3 | 39.1 |
| 1 - 14 | 37 | 284 | 7.5 | 2,068.1 | 2,395.7 | 26.4 | 7.3 | 8.4 | 32.0 |
| 15 - 19 | 11 | 181 | 4.0 | 1,541.7 | 1,890.3 | 22.1 | 8.5 | 10.4 | 47.2 |
| 20 - 49 | 16 | 1,321 | 19.2 | 11,441.2 | 14,796.5 | 38.3 | 11.2 | 14.5 | 37.7 |
| 50 - 99 | 15 | 1,083 | 81.0 | 17,121.5 | 21,857.8 | 76.6 | 15.8 | 20.2 | 26.3 |
| 100 - 199 | 8 | 1,127 | 67.7 | 21,380.2 | 30,754.2 | 60.1 | 19.0 | 27.3 | 45.4 |
| 200 and over | 3 | 2,394 | 191.1 | 60,421.8 | 83,134.0 | 79.8 | 25.2 | 34.7 | 43.5 |
| Leather and products | 267 | 4,065 | 167.5 | 46,227.7 | 52,395.4 | 41.2 | 11.4 | 14.6 | 35.5 |
| 1 - 14 | 227 | 810 | 15.9 | 4,818.9 | 5,751.7 | 19.6 | 5.6 | 7.1 | 36.2 |
| 15 - 19 | 10 | 149 | 3.8 | 1,118.1 | 1,345.0 | 25.5 | 22.8 | 27.5 | 107.6 |
| 20 - 49 | 15 | 433 | 10.5 | 3,427.4 | 4,199.7 | 24.3 | 7.9 | 9.7 | 40.0 |
| 50 - 99 | 5 | 381 | 11.5 | 3,205.6 | 4,092.9 | 30.2 | 8.4 | 10.7 | 35.6 |
| 100 - 199 | 6 | 864 | 38.3 | 10,384.1 | 13,391.8 | 44.3 | 12.0 | 15.5 | 35.0 |
| 200 and over | 4 | 1,428 | 87.5 | 23,273.6 | 30,614.3 | 61.3 | 16.3 | 21.4 | 35.0 |
| Chemicals other than pharmaceuticals | 165 | 2,220 | 865.6 | 189,609.2 | 265,021.3 | 87.2 | 19.1 | 26.7 | 30.6 |
| 1 - 14 | 78 | 490 | 34.4 | 5,850.1 | 7,165.5 | 70.2 | 11.9 | 14.6 | 20.8 |
| 15 - 19 | 12 | 159 | 10.4 | 2,452.7 | 3,103.8 | 55.0 | 13.0 | 16.4 | 29.8 |
| 20 - 49 | 30 | 925 | 143.9 | 17,069.4 | 20,875.6 | 153.4 | 18.5 | 22.6 | 14.7 |
| 50 - 99 | 21 | 1,527 | 134.9 | 34,516.9 | 44,782.1 | 88.3 | 22.6 | 29.3 | 33.2 |
| 100 - 199 | 15 | 2,012 | 168.4 | 36,789.3 | 51,131.3 | 83.7 | 18.3 | 25.4 | 30.4 |
| 200 and over | 9 | 4,777 | 375.6 | 92,931.5 | 137,963.0 | 78.6 | 19.5 | 28.9 | 36.7 |
| Petroleum and coal products | 17 | 2,028 | 571.6 | 73,206.2 | 91,434.2 | 277.8 | 35.6 | 44.4 | 16.0 |
| 1 - 14 | 8 | 70 | 6.3 | 937.9 | 1,095.0 | 90.0 | 13.4 | 15.6 | 17.4 |
| 15 - 19 | - | - | - | - | - | - | - | - | - |
| 20 - 49 | 4 | 113 | 13.7 | 2,429.2 | 3,162.7 | 121.2 | 21.5 | 28.0 | 23.1 |
| 50 - 99 | 2 | 139 | 13.1 | 3,205.7 | 4,128.5 | 94.2 | 21.1 | 29.7 | 31.5 |
| 100 - 199 | 1 | 185 | 29.6 | 3,124.4 | 5,367.4 | 150.0 | 17.4 | 29.0 | 18.1 |
| 200 and over | 2 | 1,551 | 508.9 | 63,421.0 | 77,680.6 | 328.1 | 40.9 | 50.1 | 15.3 |
| Non-metallic mineral products | 535 | 20,201 | 769.6 | 278,460.0 | 355,671.5 | 38.1 | 12.6 | 17.6 | 44.2 |
| 1 - 14 | 719 | 3,252 | 48.9 | 17,935.0 | 19,846.3 | 15.0 | 5.5 | 6.1 | 40.6 |
| 15 - 19 | 43 | 707 | 12.5 | 5,256.4 | 6,291.1 | 17.7 | 7.4 | 8.9 | 50.3 |
| 20 - 49 | 100 | 3,075 | 57.1 | 28,675.2 | 35,009.4 | 21.8 | 9.3 | 11.4 | 52.2 |
| 50 - 99 | 37 | 2,511 | 84.4 | 28,313.7 | 35,673.0 | 33.6 | 11.3 | 14.2 | 42.3 |
| 100 - 199 | 13 | 2,103 | 95.5 | 31,927.4 | 39,377.4 | 45.4 | 15.2 | 9.2 | 20.3 |
| 200 and over | 21 | 6,552 | 461.2 | 143,152.3 | 209,474.3 | 53.9 | 15.8 | 24.5 | 45.4 |
| Basic metal products | 34 | 4,700 | 221.1 | 67,844.2 | 102,135.4 | 68.7 | 14.4 | 21.7 | 31.6 |
| 1 - 14 | 10 | 79 | 4.0 | 1,025.6 | 1,207.3 | 60.6 | 13.0 | 15.3 | 30.2 |
| 15 - 19 | 2 | 77 | 2.1 | 823.2 | 1,125.2 | 51.6 | 25.1 | 44.1 | 51.6 |
| 20 - 49 | 7 | 143 | 14.1 | 2,073.0 | 2,351.7 | 98.6 | 14.5 | 15.5 | 15.8 |
| 50 - 99 | 25 | 253 | 24.4 | 4,521.4 | 5,820.5 | 83.5 | 15.3 | 20.8 | 24.9 |
| 100 - 199 | 1 | 11 | 0.7 | 9,141.1 | 14,193.3 | 106.5 | 15.7 | 23.3 | 21.9 |
| 200 and over | 1 | 11 | 21.3 | 49,491.9 | 77,227.1 | 40.3 | 14.0 | 21.8 | 35.1 |
| Metal products | 667 | 18,005 | 671.7 | 228,993.5 | 300,852.1 | 36.1 | 12.3 | 16.1 | 44.7 |
| 1 - 14 | 78 | 2,225 | 33.2 | 10,597.4 | 18,921.2 | 19.8 | 7.5 | 9.5 | 42.8 |
| 15 - 19 | 1 | 1,112 | 21.5 | 8,754.4 | 10,272.3 | 21.3 | 2.7 | 15.2 | 47.5 |
| 20 - 49 | 17 | 1,000 | 11.1 | 11,551.6 | 13,547.1 | 27.4 | 10.7 | 13.0 | 47.4 |
| 50 - 99 | 1 | 11 | 1.1 | 17,801.7 | 59,912.3 | 10.3 | 12.7 | 1.1 | 44.8 |
| 100 - 199 | 1 | 2,177 | 11.7 | 3,111.1 | 4,730.1 | 11.7 | 15.3 | 19.0 | 36.5 |
| 200 and over | 1 | 11 | 12.1 | 7,511.1 | 11,495.1 | 11.7 | 11.1 | 22.7 | 22.5 |

-Wages and Salaries.....1967, contd. from Table 11

| | <u>Firms</u> | <u>Employment</u> | <u>Value Added</u> (mill. current pesos) | <u>Wages</u> (thousand current pesos) | <u>Wages, Salaries and Social Benefits</u> (thousand current pesos) | <u>Value Added</u> <u>per man</u> (thousand current pesos) | <u>Wages and Salaries</u> <u>per man</u> (thousand current pesos) | <u>Wages, Salaries and Social Benefits per Man</u> (thousand current pesos) | <u>Share of Wages, Salaries and Social Benefits in Value Added</u> (percent) |
|--|--------------|-------------------|---|---|---|---|--|---|---|
| <u>Capital goods</u> | | | | | | | | | |
| <u>Mechanical machinery</u> | <u>240</u> | <u>5,691</u> | <u>181.9</u> | <u>71,980.6</u> | <u>25,241.2</u> | <u>12.0</u> | <u>12.7</u> | <u>16.2</u> | <u>52.8</u> |
| 1 - 14 | 160 | 1,029 | 23.8 | 9,211.3 | 10,382.6 | 23.1 | 9.0 | 10.1 | 43.5 |
| 15 - 19 | 20 | 314 | 8.0 | 2,853.2 | 3,304.1 | 25.5 | 9.1 | 10.5 | 41.3 |
| 20 - 49 | 39 | 1,044 | 30.9 | 10,907.2 | 13,260.9 | 29.6 | 10.5 | 12.7 | 42.9 |
| 50 - 99 | 10 | 684 | 20.6 | 9,080.4 | 11,431.7 | 30.1 | 13.3 | 16.7 | 55.5 |
| 100 - 199 | 6 | 848 | 32.2 | 15,309.8 | 21,980.1 | 38.0 | 18.1 | 25.9 | 56.3 |
| 200 and over | 5 | 1,772 | 66.4 | 24,618.7 | 35,581.8 | 37.5 | 13.9 | 20.1 | 53.6 |
| <u>Electrical machinery (except appliances)</u> | <u>135</u> | <u>6,112</u> | <u>334.4</u> | <u>96,037.8</u> | <u>130,821.5</u> | <u>54.7</u> | <u>15.7</u> | <u>21.4</u> | <u>32.1</u> |
| 1 - 14 | 63 | 413 | 8.2 | 3,258.1 | 3,718.0 | 19.9 | 7.9 | 9.0 | 45.3 |
| 15 - 19 | 13 | 186 | 4.4 | 1,588.9 | 1,884.4 | 23.7 | 8.5 | 10.1 | 42.8 |
| 20 - 49 | 31 | 859 | 28.3 | 9,446.4 | 11,666.7 | 33.0 | 11.0 | 13.6 | 41.2 |
| 50 - 99 | 17 | 1,173 | 78.6 | 16,985.9 | 20,928.0 | 67.0 | 14.5 | 17.8 | 26.6 |
| 100 - 199 | 4 | 574 | 31.5 | 7,949.4 | 10,491.6 | 54.9 | 13.9 | 18.3 | 33.3 |
| 200 and over | 7 | 2,914 | 183.4 | 56,809.1 | 82,132.8 | 62.9 | 19.5 | 28.2 | 44.8 |
| <u>Transport equipment (except motor vehicles)</u> | <u>19</u> | <u>5,283</u> | <u>104.5</u> | <u>78,143.9</u> | <u>24,257.4</u> | <u>12.8</u> | <u>14.8</u> | <u>17.8</u> | <u>20.2</u> |
| 1 - 14 | 2 | 20 | 0.8 | 254.8 | 289.4 | 40.0 | 12.7 | 14.5 | 36.2 |
| 15 - 19 | 2 | 33 | 0.8 | 294.4 | 368.5 | 24.2 | 8.9 | 11.2 | 46.1 |
| 20 - 49 | 1 | 22 | 0.8 | 189.9 | 206.1 | 36.4 | 8.6 | 9.4 | 25.8 |
| 50 - 99 | 4 | 267 | 9.2 | 11,756.2 | 12,362.3 | 34.5 | 14.0 | 16.3 | 134.4 |
| 100 - 199 | 3 | 391 | 10.9 | 6,451.6 | 8,288.9 | 27.9 | 16.5 | 21.2 | 75.0 |
| 200 and over | 7 | 4,550 | 85.4 | 67,297.0 | 80,842.2 | 18.8 | 14.8 | 17.8 | 94.7 |
| <u>Other</u> | <u>314</u> | <u>2,326</u> | <u>412.0</u> | <u>116,248.4</u> | <u>155,321.3</u> | <u>44.2</u> | <u>12.5</u> | <u>16.7</u> | <u>37.7</u> |
| 1 - 14 | 169 | 927 | 26.6 | 7,659.3 | 8,969.9 | 28.7 | 8.3 | 9.7 | 33.7 |
| 15 - 19 | 19 | 297 | 7.8 | 2,681.3 | 3,165.0 | 26.3 | 9.0 | 10.7 | 40.6 |
| 20 - 49 | 70 | 2,161 | 93.6 | 23,933.9 | 29,835.6 | 43.3 | 11.1 | 13.8 | 31.9 |
| 50 - 99 | 36 | 2,487 | 99.6 | 29,316.9 | 37,533.3 | 40.1 | 11.8 | 15.1 | 37.7 |
| 100 - 199 | 15 | 1,981 | 109.2 | 27,597.7 | 39,125.9 | 55.1 | 13.9 | 19.8 | 35.8 |
| 200 and over | 5 | 1,473 | 75.2 | 25,759.3 | 36,691.6 | 51.1 | 17.5 | 24.9 | 48.8 |
| <u>TOTAL</u> | | | | | | | | | |
| 1 - 14 | 7,829 | 36,045 | 891.7 | 240,358.5 | 273,339.5 | 24.7 | 6.7 | 7.6 | 30.5 |
| 15 - 19 | 584 | 9,295 | 255.3 | 78,954.4 | 93,546.3 | 27.5 | 8.5 | 10.1 | 36.5 |
| 20 - 49 | 1,338 | 39,782 | 1,405.7 | 390,966.8 | 483,932.0 | 37.4 | 9.8 | 12.2 | 32.6 |
| 50 - 99 | 525 | 36,293 | 1,756.3 | 450,995.7 | 573,218.8 | 48.7 | 12.4 | 15.8 | 32.4 |
| 100 - 199 | 283 | 38,939 | 2,827.5 | 571,405.5 | 749,522.9 | 72.6 | 14.7 | 19.3 | 25.5 |
| 200 and over | 241 | 122,629 | 8,179.9 | 2,137,083.6 | 2,956,149.8 | 66.7 | 17.4 | 24.1 | 36.1 |

Note: All textile production is shown under non-durable consumer goods.

Note:

Employment figures refer to paid workers

Source: Unpublished DANE data.

Table 12: HORSEPOWER INSTALLED PER EMPLOYEE, GROSS VALUE ADDED PER EMPLOYEE AND WAGES AND SALARIES AS PERCENTAGE OF GROSS VALUE ADDED, 1953, 1960 and 1967.

| | Horse-power installed per employee | | | Gross Value Added per employee | | | Percentage of Wages, Salaries and Social Benefits in Gross Value Added | | |
|---|---------------------------------------|-------------|-------------|-----------------------------------|--------------|--------------|---|-------------|-------------|
| | 1953 | 1960 | 1967 | 1953 | 1960 | 1967 | 1953 | 1960 | 1967 |
| | (thousand 1968 pesos) | | | | | | | | |
| <u>Non-durable consumer goods</u> | <u>1.81</u> | <u>2.31</u> | <u>3.04</u> | <u>29.81</u> | <u>49.01</u> | <u>67.05</u> | <u>0.25</u> | <u>0.27</u> | <u>0.29</u> |
| Food | 2.59 | 3.42 | 5.34 | 32.42 | 44.03 | 63.85 | 0.26 | 0.27 | 0.26 |
| Beverages | 3.13 | 5.06 | 4.63 | 143.65 | 119.99 | 143.88 | 0.14 | 0.18 | 0.21 |
| Tobacco products | 0.33 | 0.90 | 1.36 | 44.50 | 163.00 | 153.74 | 0.22 | 0.10 | 0.13 |
| Textiles | 2.56 | 2.84 | 3.35 | 29.56 | 34.43 | 47.63 | 0.34 | 0.37 | 0.46 |
| Clothing and footwear | 0.32 | 0.38 | 0.69 | 15.09 | 18.95 | 24.94 | 0.38 | 0.44 | 0.40 |
| Printing and publishing | 0.96 | 0.93 | 0.99 | 28.77 | 26.65 | 43.37 | 0.50 | 0.49 | 0.45 |
| Pharmaceuticals and related products | 1.07 | 0.80 | 1.04 | 38.45 | 53.74 | 96.68 | 0.28 | 0.27 | 0.27 |
| <u>Durable consumer goods</u> | <u>1.47</u> | <u>1.82</u> | <u>5.20</u> | <u>29.84</u> | <u>26.32</u> | <u>39.73</u> | <u>0.35</u> | <u>0.48</u> | <u>0.50</u> |
| Furniture and fixtures | 0.84 | 1.24 | 1.68 | 19.40 | 20.76 | 20.61 | 0.47 | 0.57 | 0.58 |
| Rubber products | 3.78 | 4.39 | 16.20 | 50.41 | 40.97 | 65.23 | 0.23 | 0.39 | 0.48 |
| Ceramic products | 0.89 | 1.30 | 2.18 | 16.67 | 14.53 | 16.35 | 0.51 | 0.77 | 1.00 |
| Non-electrical appliances | 0.91 | 1.09 | 2.35 | 31.85 | 28.23 | 29.86 | 0.51 | 0.38 | 0.55 |
| Electrical appliances | 0.33 | 0.68 | 0.87 | 33.08 | 38.13 | 51.97 | 0.36 | 0.33 | 0.46 |
| Motor vehicles | 0.84 | 0.81 | 1.53 | 29.69 | 19.58 | 36.67 | 0.44 | 0.59 | 0.41 |
| <u>Intermediate goods</u> | <u>3.25</u> | <u>4.98</u> | <u>6.66</u> | <u>31.59</u> | <u>40.98</u> | <u>56.77</u> | <u>0.35</u> | <u>0.34</u> | <u>0.38</u> |
| Textiles | 2.56 | 2.84 | 3.35 | 29.56 | 34.43 | 47.63 | 0.34 | 0.37 | 0.46 |
| Wood and products | 3.41 | 3.68 | 5.44 | 17.75 | 19.40 | 27.21 | 0.36 | 0.51 | 0.45 |
| Paper and products | 4.58 | 4.14 | 11.35 | 39.77 | 45.68 | 66.97 | 0.33 | 0.30 | 0.39 |
| Leather and products | 3.08 | 4.32 | 3.73 | 40.39 | 36.75 | 43.48 | 0.40 | 0.35 | 0.35 |
| Chemicals other than pharmaceuticals | 3.57 | 4.02 | 9.28 | 39.61 | 65.97 | 95.95 | 0.28 | 0.24 | 0.31 |
| Petroleum and coal products | 2.66 | 27.50 | 45.30 | 71.17 | 155.79 | 288.89 | 0.38 | 0.24 | 0.16 |
| Non-metallic mineral products | 4.26 | 6.48 | 7.67 | 27.76 | 29.88 | 42.96 | 0.33 | 0.41 | 0.45 |
| Basic metals | 3.73 | 12.00 | 9.13 | 33.46 | 115.20 | 76.89 | 0.46 | 0.16 | 0.32 |
| Metal products | 2.30 | 2.38 | 2.86 | 32.82 | 31.95 | 40.57 | 0.45 | 0.46 | 0.45 |
| <u>Capital goods</u> | <u>2.64</u> | <u>2.10</u> | <u>3.74</u> | <u>36.55</u> | <u>26.42</u> | <u>38.13</u> | <u>0.46</u> | <u>0.54</u> | <u>0.52</u> |
| Mechanical machinery | 1.99 | 2.72 | 3.84 | 32.12 | 33.12 | 33.68 | 0.45 | 0.44 | 0.53 |
| Electrical machinery (except appliances) | 1.05 | 1.58 | 5.69 | 28.06 | 32.44 | 57.76 | 0.40 | 0.36 | 0.39 |
| Transport equipment (except motor vehicles) | 3.99 | 2.10 | 1.36 | 44.65 | 17.19 | 20.18 | 0.49 | 0.90 | 0.90 |
| <u>Other</u> | <u>1.05</u> | <u>2.10</u> | <u>1.96</u> | <u>28.73</u> | <u>28.78</u> | <u>46.68</u> | <u>0.38</u> | <u>0.36</u> | <u>0.38</u> |
| <u>Total</u> | <u>2.21</u> | <u>3.06</u> | <u>4.47</u> | <u>36.50</u> | <u>42.69</u> | <u>58.56</u> | <u>0.29</u> | <u>0.31</u> | <u>0.34</u> |

Notes: Data for the textile industry does not permit a clear distinction between textiles for consumer and industrial uses. The Mission has estimated that about half of the textiles produced in Colombia are for consumer use. The share of wages, salaries and social benefits in gross value added were calculated at current prices.

Note: Employment figures refer to paid workers

Sources: 1953: DANE, Boletín Mensual de Estadística, Number 67; 1960 and 1967, unpublished DANE data.

Table 13: Comparison of Imported and Domestic Prices for Selected Manufactured Products

| | I M P O R T S | | | | D O M E S T I C M A N U F A C T U R E S | | | | | | F.O.B. plant C.I.F. Barranquilla | |
|---|------------------------|--------------|----------|--------|---|----------------------------|--------------|--------------|----------|--------|--|------|
| | Delivered to | | | | Delivered to | | | | | | | |
| | C.I.F. Barranquilla | Barranquilla | Medellin | Bogota | F.O.B. Plant | Name of Plant | Location | Barranquilla | Medellin | Bogota | | |
| <u>Steel</u> | (pesos/ton) | | | | | | | | | | | |
| 1/4 dia. wire rod | 3,145 | 3,648 | 3,848 | 3,508 | 3,480 | Paz del Rio | Belancito | 3,715 | 3,660 | 3,545 | 1.10 | |
| 3/8 dia. bars | 3,176 | 3,679 | 3,879 | 3,539 | 3,240 | " | " | 3,475 | 3,420 | 3,305 | 1.02 | |
| 3/4 dia. bars | 2,719 | 3,050 | 3,250 | 3,310 | 3,100 | " | " | 3,335 | 3,280 | 3,165 | 1.14 | |
| Channels and beams | 2,902 | 3,370 | 3,570 | 3,630 | 3,960 | " | " | 4,195 | 4,140 | 4,025 | 1.36 | |
| 9-gauge bright wire | 3,085 | 3,577 | 3,777 | 3,837 | 3,740 | " | " | 3,975 | 3,920 | 3,805 | 1.21 | |
| 8-gauge galvanized wire | 3,436 | 3,573 | 4,173 | 4,233 | 4,490 | " | " | 4,725 | 4,670 | 4,555 | 1.30 | |
| Galvanized barbed wire | 3,795 | 4,521 | 4,721 | 4,781 | 4,980 | " | " | 5,215 | 5,160 | 5,045 | 1.31 | |
| 16-gauge hot-rolled sheet | 3,158 | 3,659 | 3,859 | 3,919 | 3,760 | " | " | 3,995 | 3,940 | 3,825 | 1.19 | |
| Electrolytic triplate (107 lb) | 4,400 | 4,500 | 5,100 | 5,160 | 5,390 | Exp. Siderurgica | Medellin | 5,510 | 5,390 | 5,540 | 1.22 | |
| <u>Aluminum</u> | (Pesos/kg) | | | | | | | | | | | |
| 0085 mm foil x 500-760mm wide | 27.06 | 27.22 | 27.42 | 27.48 | 33.90 | Al. Reynolds | Barranquilla | 33.90 | 34.10 | 34.16 | 1.25 | |
| | (Pesos/lineal foot) | | | | | | | | | | | |
| Corrugated sheets 1mm thick, 6 ft. long x 32in. wide | 5.65 | 5.70 | 5.76 | 5.78 | 6.34 | " " | " | 6.34 | 6.40 | 6.42 | 1.12 | |
| Class 150 irrigation pipe, 2 in. dia. | 4.33 | 4.36 | 4.39 | 4.40 | 4.56 | " " | " | 4.56 | 4.59 | 4.60 | 1.05 | |
| | | | | | 4.80 | Al. Alcan | Cali | 4.84 | 4.81 | 4.83 | 1.10 | |
| Class 150 irrigation pipe, 3 in. dia. | 6.07 | 6.11 | 6.16 | 6.17 | 6.95 | Al Reynolds | Barranquilla | 6.95 | 7.00 | 7.01 | 1.14 | |
| | | | | | 7.31 | Al Alcan | Cali | 7.37 | 7.32 | 7.35 | 1.20 | |
| Class 150 irrigation pipe, 6 in. dia. | 15.05 | 15.14 | 15.26 | 15.29 | 19.57 | " | " | 19.72 | 19.76 | 19.81 | 1.30 | |
| <u>Synthetic Fibers</u> | (Pesos/kg) | | | | | | | | | | | |
| Nylon yarn | 32.89 | 33.63 | 34.03 | 34.13 | 52.00 | Colnylon | Medellin | 52.40 | 52.00 | 52.26 | 1.58 | |
| | | | | | 57.75 | Enka | " | 58.15 | 57.75 | 58.01 | 1.75 | |
| | | | | | 57.00 | Vanylon | Barranquilla | 57.00 | 57.40 | 57.26 | 1.73 | |
| Nylon tire canvas | 34.79 | 35.55 | 35.95 | 36.05 | 46.00 | Enka | Medellin | 46.40 | 46.00 | 46.26 | 1.32 | |
| Polyester filament | 59.22 | 60.23 | 60.63 | 60.73 | 76.40 | Polymeros Col. | " | 76.80 | 76.40 | 76.66 | 1.29 | |
| | | | | | 76.50 | { Enka de Col. | } | 76.90 | 76.50 | 76.16 | 1.30 | |
| | | | | | 41.80 | { Polymeros Col. | | 42.20 | 41.80 | 42.06 | 1.80 | |
| | | | | | 44.00 | { Enka de Col. Celanese | | Cali | | | | 1.89 |
| <u>Chemicals</u> | (Pesos/kg) | | | | | | | | | | | |
| P.V.C. | 7.06 | 7.54 | 7.96 | 8.07 | 8.07 | Petroquimica | Cartagena | 8.11 | 8.25 | 9.24 | 1.14 | |
| Carbon black | 4.09 | 4.54 | 4.94 | 5.04 | 4.28 | Phillips | Cali | | | | 1.04 | |
| <u>Complex fertilizer</u> | (Pesos/ton) | | | | | | | | | | | |
| 20-20-0 | 1080-1440 | | | | 1150 | Monomeros Colombianos | | | | | .79-1.06 | |
| Caustic soda | 720 | | | | 1200 | Planta de Soda | | | | | 1.66 | |
| Chlorine | 954 | | | | 1468 | " " " | | | | | 1.53 | |
| <u>Cardboard boxes (bananas)</u> | (Pesos/unit) | | | | | | | | | | | |
| | 5.94 | | | | 8.46 | Carton de Colombia | | | | | 1.42 | |
| <u>Automobiles</u> | | | | | | | | | | | | |
| Dodge Dart | 44200 | | | | 178,949 | Chrysler | Bogota | 178,949 | | | 4.04 | |
| Dodge truck - 5 tons | 65000 | | | | 156,989 | | | 156,989 | | | 2.41 | |

Note: The difference between imports "c.i.f. Barranquilla" and imports "delivered Barranquilla" are port handling charges, based on figures given to the Mission by Acerias Paz del Rio. The "delivered" figures, both for domestic and imported manufactures, exclude taxes. Imported manufactures exclude tariffs. The figures on internal transport should be taken as rough estimates rather than definite quotations. The steel rates were supplied by Acerias Paz del Rio. The aluminum rates were estimated on the basis of steel rates. Internal transport costs of synthetic fibers are based on figures given in Board Report on Enka de Colombia (Reference: IFC/t-40, dated July 30, 1969). The internal transport costs exclude insurance during transit which can be quite high. Internal insurance during transit for synthetic fibers, for example, was estimated in the ENKA Report to be about \$80 per ton. All dollar quotations were converted into pesos at the rate of 18 pesos per US\$1.

Sources: Domestic prices from company price lists or direct communication with companies; international prices were, in most cases, calculated from f.o.b. quotations in principal selling markets plus allowance for freight, insurance and consular fees.

Table 11: GROSS VALUE OF PRODUCTION IN MAJOR DEPARTMENTS, 1960 and 1967

| | Dundinamarca (Bogotá) | | | Antioquia (Medellín) | | | Valle (Cali) | | | Atlántico (Barranquilla) | | | Total - Four Main Departments | | |
|------------------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|------------------------------|------------------------------|-----------------------------|-------------------------------|------------------------------|-----------------------------|
| | 1970 (million 1968 pesos) | 1967 (million 1968 pesos) | Average Annual Growth | 1960 (million 1968 pesos) | 1967 (million 1968 pesos) | Average Annual Growth | 1960 (million 1968 pesos) | 1967 (million 1968 pesos) | Average Annual Growth | 1960 (million 1968 pesos) | 1967 (million 1968 pesos) | Average Annual Growth | 1960 (million 1968 pesos) | 1967 (million 1968 pesos) | Average Annual Growth |
| | | | 1960-1967 (percent) | | | 1960-1967 (percent) | | | 1960-1967 (percent) | | | 1960-1967 (percent) | | | |
| Non-durable Consumer Goods | 3,843.0 | 5,097.3 | 4.1 | 4,092.4 | 5,559.4 | 4.5 | 3,370.9 | 4,185.9 | 3.1 | 1,172.2 | 1,515.2 | 2.7 | 12,478.5 | 16,357.8 | 2.9 |
| Food | 1,540.2 | 2,444.8 | 6.6 | 971.1 | 1,284.6 | 4.1 | 2,182.7 | 2,964.5 | 4.5 | 532.0 | 744.4 | 4.9 | 5,226.0 | 7,408.3 | 5.1 |
| Beverages | 991.5 | 949.1 | -0.6 | 324.9 | 523.6 | 7.1 | 278.9 | 276.8 | -0.1 | 249.5 | 277.0 | 1.5 | 1,844.8 | 2,026.5 | 1.3 |
| Tobacco products | 176.5 | 184.1 | 0.6 | 241.8 | 238.2 | -0.2 | 148.4 | 122.2 | -2.8 | - | 69.8 | - | 566.7 | 614.3 | 1.2 |
| Textiles | 473.1 | 777.9 | 7.4 | 2,059.4 | 2,892.2 | 5.0 | 426.7 | 362.6 | -2.4 | 247.0 | 182.1 | -4.5 | 3,206.2 | 4,214.8 | 4.0 |
| Clothing and footwear | 432.2 | 355.9 | -2.1 | 389.3 | 493.5 | 3.5 | 214.4 | 204.7 | -0.7 | 130.2 | 216.3 | 7.6 | 1,146.1 | 1,270.4 | 1.5 |
| Printing and publishing | 249.5 | 415.5 | 7.6 | 105.9 | 127.3 | 2.7 | 129.8 | 255.1 | 11.4 | 13.5 | 25.6 | 9.6 | 488.7 | 823.5 | 7.7 |
| Durable Consumer Goods | 282.1 | 542.3 | 9.8 | 32.2 | 110.2 | 19.2 | 291.7 | 431.3 | 5.8 | 22.6 | 32.2 | 5.2 | 628.6 | 1,116.0 | 8.5 |
| Furniture and fixtures | 82.1 | 97.4 | 2.5 | 22.9 | 18.6 | -3.0 | 25.1 | 20.4 | -3.0 | 22.6 | 22.3 | -0.2 | 152.7 | 158.7 | 0.5 |
| Rubber products | 200.0 | 444.9 | 12.1 | 9.3 | 91.6 | 38.6 | 266.6 | 410.9 | 6.4 | - | 9.9 | - | 475.9 | 957.3 | 10.5 |
| Intermediate Goods | 2,004.7 | 3,654.7 | 9.0 | 1,065.7 | 1,943.6 | 9.0 | 1,176.8 | 2,720.8 | 12.7 | 620.9 | 1,257.9 | 10.6 | 4,868.1 | 9,577.0 | 10.2 |
| Wood and products | 78.9 | 35.2 | -10.9 | 37.4 | 35.9 | -0.6 | 30.3 | 59.6 | 10.1 | 61.7 | 112.7 | 9.0 | 208.3 | 243.4 | 2.3 |
| Paper and products | 103.8 | 199.0 | 9.7 | 60.4 | 157.0 | 14.7 | 268.8 | 751.9 | 15.8 | 43.6 | 79.6 | 9.0 | 476.6 | 1,187.5 | 13.9 |
| Leather and products | 148.3 | 127.4 | -2.1 | 128.7 | 179.3 | 4.9 | 53.3 | 57.4 | 1.1 | 47.4 | 46.9 | -0.2 | 377.7 | 411.0 | 1.2 |
| Chemicals | 743.5 | 1,736.6 | 12.9 | 245.9 | 630.8 | 14.4 | 522.1 | 1,174.1 | 12.3 | 134.0 | 477.7 | 19.9 | 1,645.5 | 4,019.2 | 13.6 |
| Petroleum and coal products | 12.7 | 45.3 | 19.9 | 3.8 | 11.3 | 16.9 | - | - | - | - | 0.5 | - | 16.5 | 57.1 | 19.4 |
| Non-metallic minerals and products | 459.2 | 749.2 | 7.2 | 292.8 | 401.2 | 4.6 | 126.2 | 205.5 | 7.2 | 107.0 | 196.2 | 9.1 | 985.2 | 1,552.1 | 6.7 |
| Basic metals | 70.8 | 136.4 | 9.8 | 164.9 | 305.7 | 8.0 | - | 104.8 | - | - | 49.4 | - | 235.7 | 596.3 | 14.2 |
| Metal Products | 387.5 | 625.6 | 7.1 | 131.8 | 222.4 | 7.7 | 176.1 | 367.5 | 11.1 | 227.2 | 294.9 | 3.8 | 922.6 | 1,510.4 | 7.3 |
| Capital Goods | 478.5 | 1,218.8 | 14.3 | 162.0 | 347.0 | 11.5 | 236.2 | 461.1 | 10.0 | 152.3 | 249.5 | 7.3 | 1,029.0 | 2,276.4 | 12.0 |
| Machinery (non-electrical) | 44.1 | 84.3 | 9.7 | 79.1 | 156.0 | 10.2 | 26.0 | 40.6 | 6.6 | 19.1 | 18.1 | -0.8 | 168.3 | 299.0 | 8.6 |
| Electrical machinery | 261.7 | 624.6 | 13.2 | 41.3 | 106.0 | 14.4 | 126.2 | 317.3 | 14.1 | 38.9 | 105.2 | 15.3 | 468.1 | 1,153.1 | 13.7 |
| Transport equipment | 172.7 | 509.9 | 16.7 | 41.6 | 85.0 | 10.7 | 84.0 | 103.2 | 3.0 | 94.3 | 126.2 | 4.3 | 392.6 | 824.3 | 11.2 |
| Miscellaneous | 164.1 | 421.9 | 14.4 | 119.1 | 249.8 | 11.2 | 39.6 | 81.7 | 10.9 | 105.2 | 45.0 | -11.8 | 428.0 | 801.4 | 9.4 |
| Total | 6,772.4 | 10,235.0 | 7.1 | 5,471.4 | 8,210.0 | 6.0 | 5,115.2 | 7,880.8 | 6.4 | 2,273.2 | 2,102.6 | 5.9 | 19,432.2 | 30,128.6 | 6.5 |

Note: The classification used in this table differs from that used elsewhere in the report because data was not available. The differences are as follows: Pharmaceuticals are included in chemicals, ceramic products in non-metallic mineral manufactures, non-electrical appliances in metal products, electrical appliances in electrical machinery and motor vehicles in transport equipment. All textiles are included in non-durable consumer goods.

Sources: 1960: DANE, Boletín Mensual de Estadística, Nos. 137 and 145, 1967; unpublished DANE data.

Table 15: VALUE ADDED IN MANUFACTURING BY MAJOR DEPARTMENTS, 1967
(million current pesos)

| | <u>Cundinamarca</u> (Bogota) | <u>Antioquia</u> (Medellin) | <u>Valle</u> (Cali) | <u>Atlantico</u> (Barranquilla) | <u>Subtotal</u> | <u>Santander</u> (Bucaramanga Barrancabermeja) | <u>Bolivar</u> (Cartagena) | <u>Caldas</u> (Manizales) | <u>Risaralda</u> (Pereira) | <u>Boyaca</u> | <u>Total 9</u> <u>Depts.</u> | <u>National</u> <u>Total</u> |
|---|---------------------------------|--------------------------------|------------------------|------------------------------------|-----------------|--|-------------------------------|------------------------------|-------------------------------|---------------|---------------------------------|---------------------------------|
| <u>Non-durable consumer goods</u> | <u>1,975.9</u> | <u>1,935.8</u> | <u>1,773.6</u> | <u>668.1</u> | <u>6,353.4</u> | <u>372.0</u> | <u>296.6</u> | <u>172.8</u> | <u>255.7</u> | <u>156.9</u> | <u>7,607.4</u> | <u>8,429.7</u> |
| Food | 415.3 | 257.9 | 909.6 | 165.9 | 1,748.7 | 69.2 | 47.0 | 51.8 | 116.8 | 13.6 | 2,047.1 | 2,442.3 |
| Beverages | 500.7 | 368.8 | 181.6 | 191.7 | 1,242.8 | 121.2 | 49.0 | 64.4 | 59.1 | 138.7 | 1,675.2 | 2,072.4 |
| Tobacco products | 122.5 | 172.4 | 89.3 | 52.0 | 436.2 | 128.5 | 42.6 | - | - | - | 607.3 | 609.7 |
| Textiles | 144.2 | 707.0 | 58.5 | 36.8 | 946.5 | 8.2 | 0.3 | 21.8 | 20.1 | 0.2 | 997.1 | 1,001.1 |
| Clothing and footwear | 136.7 | 218.6 | 76.1 | 79.0 | 510.4 | 34.2 | 7.6 | 21.2 | 55.2 | 1.9 | 630.5 | 643.8 |
| Printing and publishing | 223.9 | 61.9 | 138.5 | 13.7 | 438.0 | 7.8 | 15.5 | 4.9 | 3.0 | 1.0 | 470.2 | 477.7 |
| Pharmaceuticals and related products | 432.6 | 149.2 | 320.0 | 129.0 | 1,030.8 | 2.9 | 134.6 | 8.7 | 1.5 | 1.5 | 1,180.0 | 1,182.7 |
| <u>Durable consumer goods</u> | <u>478.6</u> | <u>92.1</u> | <u>237.9</u> | <u>63.3</u> | <u>871.9</u> | <u>14.9</u> | <u>6.1</u> | <u>5.3</u> | <u>7.1</u> | <u>1.8</u> | <u>907.1</u> | <u>923.3</u> |
| Furniture and fixtures | 47.5 | 9.8 | 9.7 | 8.0 | 75.0 | 4.5 | 2.7 | 1.3 | 1.8 | 0.5 | 85.8 | 94.1 |
| Rubber products | 187.8 | 34.1 | 147.7 | 4.4 | 374.0 | 1.5 | - | 0.9 | 2.6 | - | 379.0 | 380.1 |
| Electrical appliances | 80.7 | 16.8 | 45.1 | 9.9 | 152.5 | 0.4 | 1.9 | 2.5 | 0.2 | - | 157.5 | 157.8 |
| Motor vehicles | 162.6 | 31.4 | 35.4 | 41.0 | 270.4 | 8.5 | 1.5 | 0.6 | 2.5 | 1.3 | 284.8 | 291.3 |
| <u>Intermediate goods</u> | <u>1,253.3</u> | <u>1,285.7</u> | <u>893.9</u> | <u>461.8</u> | <u>3,894.7</u> | <u>430.1</u> | <u>250.3</u> | <u>84.3</u> | <u>45.7</u> | <u>223.9</u> | <u>4,919.0</u> | <u>5,020.3</u> |
| Textiles | 144.1 | 706.9 | 58.5 | 36.8 | 946.3 | 8.2 | 0.2 | 21.7 | 20.0 | 0.2 | 996.7 | 1,001.1 |
| Wood and products | 24.9 | 13.7 | 20.0 | 54.4 | 113.0 | 3.2 | 4.5 | 0.8 | 0.9 | 0.5 | 122.9 | 150.3 |
| Paper and products | 58.6 | 48.6 | 246.6 | 21.6 | 375.4 | 0.2 | - | 0.1 | 16.1 | - | 391.8 | 392.5 |
| Leather and products | 49.7 | 64.4 | 28.6 | 10.9 | 153.65 | 3.9 | - | 0.4 | 3.5 | 0.1 | 161.5 | 167.6 |
| Chemicals other than pharmaceuticals | 317.1 | 109.3 | 234.6 | 94.6 | 755.6 | 2.2 | 98.6 | 6.4 | 0.9 | 1.1 | 864.8 | 865.6 |
| Petroleum and coal products | 13.6 | 5.5 | - | 0.1 | 19.2 | 367.8 | 141.1 | 2.3 | - | 29.6 | 560.0 | 571.6 |
| Non-metallic mineral products | 365.4 | 176.6 | 101.3 | 106.0 | 749.3 | 18.9 | 4.5 | 9.8 | 1.7 | 21.1 | 805.3 | 849.1 |
| Basic metals | 35.1 | 54.8 | 44.4 | 9.2 | 143.5 | 8.1 | - | 0.5 | - | 171.0 | 323.1 | 323.2 |
| Metal products | 244.8 | 105.9 | 159.9 | 128.2 | 638.8 | 17.7 | 1.4 | 32.3 | 2.4 | 0.3 | 692.9 | 699.3 |
| <u>Capital goods</u> | <u>266.1</u> | <u>135.0</u> | <u>129.8</u> | <u>46.3</u> | <u>577.2</u> | <u>18.7</u> | <u>4.9</u> | <u>8.1</u> | <u>2.3</u> | <u>0.5</u> | <u>611.7</u> | <u>621.0</u> |
| Mechanical machinery | 36.1 | 88.1 | 21.2 | 10.5 | 155.9 | 14.9 | 0.3 | 2.5 | 1.1 | - | 174.7 | 181.9 |
| Electrical machinery (except appliances) | 171.4 | 35.6 | 95.8 | 21.0 | 323.8 | 0.8 | 4.1 | 5.4 | 0.3 | - | 334.4 | 334.4 |
| Transport equipment (except motor vehicles) | 58.6 | 11.3 | 12.8 | 14.8 | 97.5 | 3.0 | 0.5 | 0.2 | 0.9 | 0.5 | 102.6 | 104.7 |
| <u>Other</u> | <u>195.0</u> | <u>142.2</u> | <u>40.9</u> | <u>19.0</u> | <u>401.1</u> | <u>3.7</u> | <u>2.8</u> | <u>0.5</u> | <u>0.3</u> | <u>0.2</u> | <u>408.6</u> | <u>412.0</u> |
| <u>Total</u> | <u>4,172.9</u> | <u>3,250.8</u> | <u>3,076.1</u> | <u>1,258.4</u> | <u>12,098.2</u> | <u>839.4</u> | <u>560.7</u> | <u>261.0</u> | <u>310.9</u> | <u>383.3</u> | <u>14,453.5</u> | <u>15,406.3</u> |

Note: The classification in this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of departmental production in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national production of chemicals, electrical equipment and transport equipment respectively.

Source: Unpublished DANE data.

Table 16: CONTRIBUTION OF MAJOR DEPARTMENTS TO TOTAL VALUE ADDED IN MANUFACTURING, 1967
(percentages of National Total)

| | <u>Quindimarcas</u> (Bogota) | <u>Antioquia</u> (Medellin) | <u>Valle</u> (Cali) | <u>Atlantico</u> (Barranquilla) | <u>Subtotal</u> | <u>Santander</u> (Bucaramanga Barrancabermeja) | <u>Bolivar</u> (Cartagena) | <u>Caldas</u> (Manizales) | <u>Risaralda</u> (Pereira) | <u>Boyaca</u> | <u>Total 9</u> <u>Depts</u> | <u>National</u> <u>Total</u> |
|---|---------------------------------|--------------------------------|------------------------|------------------------------------|-----------------|--|-------------------------------|------------------------------|-------------------------------|---------------|--------------------------------|---------------------------------|
| <u>Non-durable consumer goods</u> | <u>23.4</u> | <u>23.0</u> | <u>21.0</u> | <u>7.2</u> | <u>75.4</u> | <u>4.4</u> | <u>2.5</u> | <u>2.0</u> | <u>3.0</u> | <u>1.2</u> | <u>90.2</u> | <u>100.0</u> |
| Food | 17.0 | 10.6 | 37.2 | 6.8 | 71.6 | 2.8 | 1.9 | 2.1 | 4.8 | 0.6 | 83.8 | 100.0 |
| Beverages | 24.2 | 17.8 | 8.8 | 9.3 | 60.0 | 5.8 | 2.4 | 3.1 | 2.9 | 6.7 | 80.8 | 100.0 |
| Tobacco products | 20.1 | 28.3 | 14.6 | 8.5 | 71.5 | 21.1 | 7.0 | - | - | - | 99.6 | 100.0 |
| Textiles | 14.4 | 70.6 | 5.8 | 3.7 | 94.5 | 0.8 | - | 2.2 | 2.0 | - | 99.5 | 100.0 |
| Clothing and footwear | 21.2 | 34.0 | 11.8 | 12.3 | 79.3 | 5.3 | 1.2 | 3.3 | 8.6 | 0.3 | 97.9 | 100.0 |
| Printing and publishing | 46.9 | 13.0 | 29.0 | 2.9 | 91.8 | 1.6 | 3.4 | 1.0 | 0.6 | 0.1 | 98.5 | 100.0 |
| Pharmaceuticals and related products | 36.8 | 12.6 | 27.1 | 10.9 | 87.2 | 0.2 | 11.4 | 0.7 | 0.1 | 0.1 | 99.8 | 100.0 |
| <u>Durable consumer goods</u> | <u>51.8</u> | <u>10.0</u> | <u>25.8</u> | <u>6.9</u> | <u>94.4</u> | <u>1.6</u> | <u>0.7</u> | <u>0.6</u> | <u>0.8</u> | <u>0.2</u> | <u>98.4</u> | <u>100.0</u> |
| Furniture and fixtures | 50.5 | 10.4 | 10.3 | 8.5 | 79.7 | 4.8 | 2.9 | 1.4 | 1.9 | 0.5 | 91.2 | 100.0 |
| Rubber products | 49.4 | 9.0 | 38.9 | 1.2 | 98.5 | 0.4 | - | 0.2 | 0.7 | - | 99.8 | 100.0 |
| Electrical appliances | 51.1 | 10.6 | 28.6 | 6.3 | 96.6 | 0.3 | 1.2 | 1.6 | 0.1 | - | 99.8 | 100.0 |
| Motor vehicles | 55.8 | 10.8 | 12.2 | 14.1 | 92.9 | 2.9 | 0.5 | 0.2 | 0.9 | 0.4 | 97.8 | 100.0 |
| <u>Intermediate goods</u> | <u>25.0</u> | <u>25.6</u> | <u>17.8</u> | <u>2.2</u> | <u>77.6</u> | <u>8.6</u> | <u>5.0</u> | <u>1.5</u> | <u>0.2</u> | <u>4.5</u> | <u>92.3</u> | <u>100.0</u> |
| Textiles | 14.4 | 70.6 | 5.8 | 3.7 | 94.5 | 0.8 | - | 2.2 | 2.0 | - | 99.5 | 100.0 |
| Wood and products | 16.6 | 9.1 | 13.3 | 36.2 | 75.2 | 2.1 | 3.0 | 0.5 | 0.6 | 0.3 | 81.7 | 100.0 |
| Paper and products | 14.9 | 12.4 | 62.8 | 5.5 | 95.6 | - | - | - | 4.1 | - | 99.7 | 100.0 |
| Leather and products | 29.7 | 38.4 | 17.1 | 6.5 | 91.7 | 2.3 | - | 0.2 | 2.1 | 0.1 | 96.3 | 100.0 |
| Chemicals other than pharmaceuticals | 36.6 | 12.6 | 27.1 | 10.9 | 87.2 | 0.3 | 11.4 | 0.7 | 0.1 | 0.1 | 99.8 | 100.0 |
| Petroleum and coal products | 2.4 | 1.0 | - | - | 3.4 | 64.3 | 24.7 | 0.4 | - | 5.1 | 97.9 | 100.0 |
| Non-metallic mineral products | 43.0 | 20.8 | 11.9 | 12.5 | 88.2 | 2.2 | 0.5 | 1.2 | 0.2 | 2.5 | 94.8 | 100.0 |
| Basic metals | 10.9 | 17.0 | 13.7 | 2.8 | 44.4 | 2.5 | - | 0.2 | - | 52.9 | 100.0 | 100.0 |
| Metal products | 35.0 | 15.1 | 22.9 | 18.3 | 91.3 | 2.5 | 0.2 | 4.6 | 0.3 | - | 98.9 | 100.0 |
| <u>Capital goods</u> | <u>42.9</u> | <u>21.7</u> | <u>20.2</u> | <u>7.5</u> | <u>93.0</u> | <u>3.0</u> | <u>0.8</u> | <u>1.3</u> | <u>0.4</u> | <u>0.1</u> | <u>98.6</u> | <u>100.0</u> |
| Mechanical machinery | 19.8 | 48.4 | 11.7 | 5.8 | 85.7 | 8.2 | 0.2 | 1.4 | 0.6 | - | 96.1 | 100.0 |
| Electrical machinery (except appliances) | 51.3 | 10.6 | 28.6 | 6.3 | 96.8 | 0.2 | 1.2 | 1.6 | - | - | 99.8 | 100.0 |
| Transport equipment (except motor vehicles) | 56.0 | 10.8 | 12.2 | 14.1 | 93.1 | 2.9 | 0.5 | 0.2 | 0.9 | 0.5 | 98.1 | 100.0 |
| <u>Other</u> | <u>48.3</u> | <u>34.5</u> | <u>2.2</u> | <u>4.6</u> | <u>27.3</u> | <u>0.2</u> | <u>0.7</u> | <u>0.1</u> | <u>0.1</u> | <u>-</u> | <u>22.1</u> | <u>100.0</u> |
| <u>Total</u> | <u>27.1</u> | <u>23.3</u> | <u>20.0</u> | <u>8.2</u> | <u>78.6</u> | <u>5.4</u> | <u>3.6</u> | <u>1.7</u> | <u>2.0</u> | <u>2.5</u> | <u>93.8</u> | <u>100.0</u> |

Note: The classification in this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of value added in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national value added of chemicals, electrical equipment and transport equipment respectively.

Source: Appendix Table 15.

Table 17: PERCENT DISTRIBUTION OF VALUE ADDED IN MANUFACTURING IN MAJOR DEPARTMENTS, 1967

| | <u>Dundinamarca</u> (Bogota) | <u>Antioquia</u> (Medellin) | <u>Valle</u> (Cali) | <u>Atlantico</u> (Barranquilla) | <u>Subtotal</u> | <u>Santander</u> (Bucaramanga Barrancabermeja) | <u>Bolivar</u> (Cartagena) | <u>Caldas</u> (Manizales) | <u>Risaralda</u> (Pereira) | <u>Boyaca</u> | <u>Total 9</u> <u>Depts.</u> | <u>National</u> <u>Total</u> |
|---|---------------------------------|--------------------------------|------------------------|------------------------------------|-----------------|--|-------------------------------|------------------------------|-------------------------------|---------------|---------------------------------|---------------------------------|
| <u>Non-durable consumer goods</u> | <u>47.4</u> | <u>53.2</u> | <u>57.7</u> | <u>53.1</u> | <u>52.5</u> | <u>44.1</u> | <u>52.9</u> | <u>66.2</u> | <u>82.2</u> | <u>41.0</u> | <u>52.7</u> | <u>54.7</u> |
| Food | 10.0 | 7.2 | 29.6 | 13.2 | 14.5 | 8.2 | 8.4 | 19.8 | 37.6 | 3.5 | 14.2 | 15.9 |
| Beverages | 12.0 | 10.3 | 5.9 | 15.2 | 10.3 | 14.4 | 8.7 | 24.7 | 19.0 | 36.2 | 11.6 | 13.5 |
| Tobacco products | 2.9 | 4.8 | 2.9 | 4.1 | 3.6 | 15.3 | 7.6 | - | - | - | 4.2 | 4.0 |
| Textiles | 3.5 | 15.7 | 6.3 | 2.9 | 7.8 | 1.0 | 0.1 | 8.4 | 6.5 | 0.1 | 6.9 | 6.5 |
| Clothing and footwear | 3.3 | 6.1 | 1.1 | 6.3 | 4.2 | 4.0 | 1.4 | 8.1 | 17.8 | 0.5 | 4.4 | 4.2 |
| Printing and publishing | 5.4 | 1.7 | 4.5 | 1.1 | 3.6 | 0.9 | 2.8 | 1.9 | 1.0 | 0.3 | 3.3 | 3.1 |
| Pharmaceuticals and related products | 10.4 | 4.2 | 10.4 | 10.3 | 8.5 | 0.3 | 23.9 | 3.3 | 0.5 | 0.4 | 8.2 | 7.7 |
| <u>Durable consumer goods</u> | <u>11.4</u> | <u>2.6</u> | <u>7.8</u> | <u>5.0</u> | <u>7.2</u> | <u>1.8</u> | <u>1.1</u> | <u>2.0</u> | <u>2.3</u> | <u>0.4</u> | <u>6.3</u> | <u>6.0</u> |
| Furniture and fixtures | 1.1 | 0.3 | 0.3 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.1 | 0.6 | 0.6 |
| Rubber products | 4.5 | 0.9 | 4.8 | 0.3 | 3.1 | 0.2 | - | 0.3 | 0.8 | - | 2.6 | 2.5 |
| Electrical appliances | 1.9 | 0.5 | 1.5 | 0.8 | 1.3 | 0.1 | 0.3 | 1.0 | 0.1 | - | 1.1 | 1.0 |
| Motor vehicles | 3.9 | 0.9 | 1.2 | 3.3 | 2.2 | 1.0 | 0.3 | 0.2 | 0.8 | 0.3 | 2.0 | 1.9 |
| <u>Intermediate goods</u> | <u>30.0</u> | <u>35.8</u> | <u>29.0</u> | <u>36.7</u> | <u>32.2</u> | <u>51.4</u> | <u>44.6</u> | <u>28.5</u> | <u>14.6</u> | <u>58.3</u> | <u>34.1</u> | <u>32.6</u> |
| Textiles | 3.5 | 19.7 | 1.9 | 2.9 | 7.8 | 1.0 | - | 8.3 | 6.4 | - | 6.9 | 6.5 |
| Wood and products | 0.6 | 0.4 | 0.7 | 4.3 | 0.9 | 0.4 | 0.8 | 0.3 | 0.3 | 0.1 | 0.9 | 1.0 |
| Paper and products | 1.4 | 1.4 | 8.0 | 1.7 | 3.1 | - | - | - | 5.2 | - | 2.7 | 2.5 |
| Leather and products | 1.2 | 1.8 | 0.9 | 0.9 | 1.3 | 0.5 | - | 0.2 | 1.1 | - | 1.1 | 1.1 |
| Chemicals other than pharmaceuticals | 7.6 | 3.0 | 7.6 | 7.5 | 6.2 | 0.3 | 17.6 | 2.5 | 0.3 | 0.3 | 6.0 | 5.6 |
| Petroleum and coal products | 0.3 | 0.2 | - | 0.1 | 0.2 | 43.8 | 25.2 | 0.9 | - | 7.7 | 3.9 | 3.7 |
| Non-metallic mineral products | 8.8 | 4.9 | 3.3 | 8.4 | 6.2 | 2.3 | 0.8 | 3.8 | 0.5 | 5.5 | 5.6 | 5.5 |
| Basic metals | 0.8 | 1.5 | 1.4 | 0.7 | 1.2 | 1.0 | - | 0.2 | - | 44.6 | 2.2 | 2.1 |
| Metal products | 5.9 | 2.9 | 5.2 | 10.2 | 5.3 | 2.1 | 0.2 | 12.4 | 0.8 | 0.1 | 4.8 | 4.5 |
| <u>Capital goods</u> | <u>6.4</u> | <u>3.8</u> | <u>4.2</u> | <u>3.7</u> | <u>4.8</u> | <u>2.3</u> | <u>0.9</u> | <u>2.1</u> | <u>0.8</u> | <u>0.1</u> | <u>4.2</u> | <u>4.0</u> |
| Mechanical machinery | 0.9 | 2.5 | 0.7 | 0.8 | 1.3 | 1.8 | 0.1 | 1.0 | 0.4 | - | 1.2 | 1.2 |
| Electrical machinery (except appliances) | 4.1 | 1.0 | 3.1 | 1.7 | 2.7 | 0.1 | 0.7 | 2.1 | 0.1 | - | 2.3 | 2.2 |
| Transport equipment (except motor vehicles) | 1.4 | 0.3 | 0.4 | 1.2 | 0.8 | 0.4 | 0.1 | 0.1 | 0.3 | 0.1 | 0.7 | 0.7 |
| <u>Other</u> | <u>4.8</u> | <u>4.0</u> | <u>1.3</u> | <u>1.5</u> | <u>3.3</u> | <u>0.4</u> | <u>0.5</u> | <u>0.2</u> | <u>0.1</u> | <u>0.1</u> | <u>2.8</u> | <u>2.7</u> |
| <u>Total</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Note: The classification of this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of value added in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national value added of chemicals, electrical equipment and transport equipment respectively.

Source: Appendix Table 15.

Table 18: TOTAL EMPLOYMENT IN MANUFACTURING BY MAJOR DEPARTMENTS, 1967

| | Cundinamarca (Bogotá) | Antioquia (Medellín) | Valle (Cali) | Atlántico (Barranquilla) | Subtotal | Santander (Bucaramanga Barrancabermeja) | Bolívar (Cartagena) | Caldas (Manizales) | Risaralda (Pereira) | Boyacá | Total 9 Depts. | National Total |
|--|--------------------------|-------------------------|-----------------|-----------------------------|----------------|---|------------------------|-----------------------|------------------------|--------------|-------------------|-------------------|
| <u>Non-durable consumer goods</u> | <u>37,671</u> | <u>33,367</u> | <u>25,169</u> | <u>12,275</u> | <u>108,182</u> | <u>6,507</u> | <u>3,604</u> | <u>2,289</u> | <u>4,824</u> | <u>2,396</u> | <u>128,872</u> | <u>140,235</u> |
| Food | 10,074 | 5,577 | 11,613 | 2,969 | 30,233 | 2,234 | 981 | 993 | 1,285 | 1,287 | 37,013 | 44,057 |
| Beverages | 4,579 | 2,129 | 1,242 | 1,890 | 9,840 | 779 | 477 | 367 | 517 | 740 | 12,720 | 15,362 |
| Tobacco products | 476 | 622 | 655 | 131 | 1,884 | 1,240 | 145 | - | - | - | 3,269 | 3,469 |
| Textiles | 4,815 | 13,704 | 1,776 | 1,437 | 21,732 | 421 | 23 | 556 | 382 | 31 | 23,145 | 23,290 |
| Clothing and footwear | 7,249 | 7,611 | 3,847 | 3,726 | 22,433 | 1,341 | 474 | 630 | 2,550 | 238 | 27,666 | 29,037 |
| Printing and publishing | 5,123 | 1,700 | 2,834 | 539 | 10,196 | 376 | 369 | 254 | 101 | 74 | 11,370 | 11,884 |
| Pharmaceuticals and related products | 5,355 | 2,024 | 3,202 | 1,583 | 12,164 | 116 | 1,135 | 198 | 59 | 26 | 13,689 | 13,836 |
| <u>Durable consumer goods</u> | <u>10,178</u> | <u>3,225</u> | <u>4,811</u> | <u>2,587</u> | <u>20,901</u> | <u>238</u> | <u>292</u> | <u>284</u> | <u>339</u> | <u>159</u> | <u>22,213</u> | <u>23,824</u> |
| Furniture and fixtures | 2,124 | 688 | 561 | 463 | 3,836 | 319 | 184 | 98 | 152 | 50 | 4,639 | 5,177 |
| Rubber products | 2,649 | 1,233 | 2,433 | 213 | 6,528 | 57 | - | 41 | 119 | - | 6,745 | 6,781 |
| Electrical appliances | 1,795 | 445 | 630 | 221 | 3,095 | 20 | 47 | 97 | 10 | - | 3,269 | 3,283 |
| Motor vehicles | 3,610 | 955 | 1,187 | 1,690 | 7,442 | 542 | 61 | 48 | 58 | 109 | 8,260 | 8,653 |
| <u>Intermediate goods</u> | <u>24,231</u> | <u>30,900</u> | <u>16,640</u> | <u>2,188</u> | <u>86,659</u> | <u>3,560</u> | <u>1,727</u> | <u>2,076</u> | <u>1,249</u> | <u>2,286</u> | <u>97,557</u> | <u>101,949</u> |
| Textiles | 4,816 | 13,704 | 1,776 | 1,437 | 21,733 | 421 | 23 | 556 | 381 | 32 | 23,145 | 23,290 |
| Wood and products | 1,109 | 748 | 1,235 | 1,157 | 4,249 | 175 | 209 | 70 | 87 | 38 | 4,828 | 6,366 |
| Paper and products | 1,305 | 1,020 | 3,084 | 479 | 5,898 | 15 | - | 9 | 245 | - | 6,171 | 6,183 |
| Leather and products | 1,126 | 1,632 | 549 | 311 | 3,618 | 197 | - | 25 | 179 | 6 | 4,025 | 4,377 |
| Chemicals other than pharmaceuticals | 3,878 | 1,466 | 2,318 | 1,148 | 8,810 | 84 | 822 | 137 | 42 | 18 | 9,913 | 9,996 |
| Petroleum and coal products | 176 | 73 | - | 6 | 255 | 1,199 | 352 | 12 | - | 180 | 1,998 | 2,061 |
| Non-metallic mineral products | 9,250 | 7,165 | 3,015 | 1,533 | 20,963 | 743 | 251 | 292 | 172 | 552 | 22,973 | 24,739 |
| Basic metals | 600 | 1,391 | 613 | 392 | 2,996 | 183 | - | 107 | - | 1,427 | 4,713 | 4,713 |
| Metal products | 7,671 | 3,691 | 4,050 | 2,725 | 18,137 | 543 | 70 | 869 | 139 | 33 | 19,791 | 20,224 |
| <u>Capital goods</u> | <u>6,837</u> | <u>3,870</u> | <u>2,804</u> | <u>1,832</u> | <u>15,343</u> | <u>554</u> | <u>153</u> | <u>258</u> | <u>123</u> | <u>67</u> | <u>16,898</u> | <u>17,450</u> |
| Mechanical machinery | 1,217 | 2,434 | 880 | 375 | 4,906 | 582 | 25 | 45 | 67 | - | 5,625 | 5,937 |
| Electrical machinery (except appliances) | 3,407 | 851 | 1,196 | 421 | 5,875 | 39 | 90 | 184 | 20 | - | 6,208 | 6,224 |
| Transport equipment (except motor vehicles) | 2,213 | 505 | 728 | 1,036 | 4,562 | 333 | 38 | 29 | 36 | 67 | 5,065 | 5,289 |
| <u>Other</u> | <u>4,244</u> | <u>2,797</u> | <u>1,173</u> | <u>927</u> | <u>9,141</u> | <u>162</u> | <u>55</u> | <u>45</u> | <u>14</u> | <u>-</u> | <u>9,417</u> | <u>9,527</u> |
| <u>Total</u> | <u>88,861</u> | <u>74,259</u> | <u>50,597</u> | <u>26,809</u> | <u>240,526</u> | <u>12,121</u> | <u>5,831</u> | <u>3,652</u> | <u>6,619</u> | <u>4,908</u> | <u>275,657</u> | <u>293,825</u> |

Note: The classification in this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of departmental employment in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national employment of chemicals, electrical equipment and transport equipment respectively.

Source: Unpublished EANE data.

Table 19: CONTRIBUTION OF MAJOR DEPARTMENTS TO EMPLOYMENT IN MANUFACTURING, 1967
(percentages of National Total)

| | <u>Quindimamarca</u> (Bogota) | <u>Antioquia</u> (Medellin) | <u>Valle</u> (Cali) | <u>Atlantico</u> (Barranquilla) | <u>Subtotal</u> | <u>Santander</u> (Bucaramanga Barrancabermeja) | <u>Bolivar</u> (Cartagena) | <u>Caldas</u> (Manizales) | <u>Risaralda</u> (Pereira) | <u>Boyaca</u> | <u>Total 9</u> <u>Depts.</u> | <u>National</u> <u>Total</u> |
|--|----------------------------------|--------------------------------|------------------------|------------------------------------|-----------------|--|-------------------------------|------------------------------|-------------------------------|---------------|---------------------------------|---------------------------------|
| <u>Non-durable consumer goods</u> | <u>26.7</u> | <u>23.7</u> | <u>17.9</u> | <u>8.7</u> | <u>77.0</u> | <u>4.6</u> | <u>2.5</u> | <u>2.1</u> | <u>3.5</u> | <u>1.7</u> | <u>91.4</u> | <u>100.0</u> |
| Food | 22.9 | 12.7 | 26.4 | 6.7 | 68.6 | 5.1 | 2.2 | 2.3 | 2.9 | 2.9 | 84.0 | 100.0 |
| Beverages | 29.8 | 13.9 | 8.1 | 12.0 | 63.8 | 5.1 | 3.1 | 2.4 | 3.4 | 4.8 | 82.6 | 100.0 |
| Tobacco products | 13.7 | 17.9 | 18.9 | 3.8 | 54.3 | 35.7 | 4.2 | - | - | - | 94.2 | 100.0 |
| Textiles | 20.7 | 58.8 | 7.6 | 6.2 | 93.3 | 1.8 | 0.1 | 2.4 | 1.6 | 0.1 | 99.3 | 100.0 |
| Clothing and footwear | 25.0 | 26.2 | 13.2 | 12.8 | 77.2 | 4.6 | 1.6 | 2.2 | 8.8 | 0.8 | 95.2 | 100.0 |
| Printing and publishing | 43.1 | 14.3 | 23.8 | 4.5 | 85.7 | 3.2 | 3.1 | 2.1 | 0.8 | 0.6 | 95.5 | 100.0 |
| Pharmaceuticals and related products | 38.7 | 14.6 | 23.1 | 11.4 | 87.8 | 0.8 | 8.2 | 1.4 | 0.4 | 0.2 | 98.8 | 100.0 |
| <u>Durable consumer goods</u> | <u>42.6</u> | <u>13.9</u> | <u>20.1</u> | <u>10.8</u> | <u>87.4</u> | <u>3.9</u> | <u>1.2</u> | <u>1.2</u> | <u>1.4</u> | <u>0.7</u> | <u>95.8</u> | <u>100.0</u> |
| Furniture and fixtures | 41.0 | 13.3 | 10.8 | 8.9 | 74.0 | 6.2 | 3.6 | 1.9 | 2.9 | 1.0 | 89.6 | 100.0 |
| Rubber products | 39.1 | 18.2 | 35.9 | 3.1 | 96.3 | 0.8 | - | 0.6 | 1.8 | - | 99.5 | 100.0 |
| Electrical appliances | 54.7 | 13.7 | 19.2 | 6.7 | 94.3 | 0.6 | 1.4 | 3.0 | 0.3 | - | 99.6 | 100.0 |
| Motor vehicles | 41.7 | 11.0 | 13.2 | 19.5 | 85.4 | 6.3 | 0.7 | 0.6 | 0.7 | 1.3 | 95.5 | 100.0 |
| <u>Intermediate goods</u> | <u>29.4</u> | <u>30.3</u> | <u>16.3</u> | <u>9.0</u> | <u>85.0</u> | <u>3.5</u> | <u>1.7</u> | <u>2.0</u> | <u>1.2</u> | <u>2.2</u> | <u>95.6</u> | <u>100.0</u> |
| Textiles | 20.7 | 58.8 | 7.6 | 6.2 | 93.3 | 1.8 | 0.1 | 2.4 | 1.6 | 0.1 | 99.3 | 100.0 |
| Wood and products | 17.4 | 11.7 | 19.4 | 18.2 | 66.7 | 2.7 | 3.3 | 1.1 | 1.4 | 0.6 | 75.8 | 100.0 |
| Paper and products | 21.1 | 16.7 | 49.9 | 7.7 | 95.4 | 0.2 | - | 0.1 | 4.0 | - | 99.7 | 100.0 |
| Leather and products | 25.7 | 37.3 | 12.5 | 7.1 | 82.6 | 4.5 | - | 0.6 | 4.1 | 0.1 | 92.0 | 100.0 |
| Chemicals other than pharmaceuticals | 38.8 | 14.7 | 23.2 | 11.5 | 88.2 | 0.8 | 8.2 | 1.4 | 0.4 | 0.2 | 99.2 | 100.0 |
| Petroleum and coal products | 8.5 | 3.5 | - | 0.3 | 12.3 | 58.7 | 17.1 | 0.6 | - | 8.7 | 97.4 | 100.0 |
| Non-metallic mineral products | 37.4 | 29.0 | 12.2 | 6.2 | 84.8 | 3.0 | 1.0 | 1.2 | 0.7 | 2.2 | 92.9 | 100.0 |
| Basic metals | 12.7 | 29.5 | 13.0 | 8.3 | 63.5 | 3.9 | - | 2.3 | - | 30.3 | 100.0 | 100.0 |
| Metal products | 37.9 | 18.3 | 20.0 | 13.5 | 89.7 | 2.6 | 0.3 | 4.3 | 0.7 | 0.2 | 97.8 | 100.0 |
| <u>Capital goods</u> | <u>39.2</u> | <u>22.2</u> | <u>16.1</u> | <u>10.5</u> | <u>87.9</u> | <u>5.5</u> | <u>0.9</u> | <u>1.5</u> | <u>0.7</u> | <u>0.4</u> | <u>97.0</u> | <u>100.0</u> |
| Mechanical machinery | 20.5 | 41.0 | 14.8 | 6.3 | 82.6 | 9.8 | 0.4 | 0.8 | 1.1 | - | 94.7 | 100.0 |
| Electrical machinery (except appliances) | 54.7 | 13.7 | 19.2 | 6.8 | 94.4 | 0.6 | 1.4 | 3.0 | 0.3 | - | 99.7 | 100.0 |
| Transport equipment (except motor vehicles) | 41.8 | 11.1 | 13.8 | 19.6 | 86.3 | 6.3 | 0.7 | 0.5 | 0.7 | 1.3 | 95.8 | 100.0 |
| <u>Other</u> | <u>44.2</u> | <u>29.1</u> | <u>12.2</u> | <u>9.6</u> | <u>95.1</u> | <u>1.7</u> | <u>0.6</u> | <u>0.5</u> | <u>0.1</u> | <u>-</u> | <u>98.0</u> | <u>100.0</u> |
| <u>Total</u> | <u>30.2</u> | <u>25.3</u> | <u>17.2</u> | <u>9.1</u> | <u>81.8</u> | <u>4.1</u> | <u>2.0</u> | <u>1.9</u> | <u>2.3</u> | <u>1.7</u> | <u>93.8</u> | <u>100.0</u> |

Note: The classification of this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of employment in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national employment of chemicals, electrical equipment and transport equipment respectively.

Source: Appendix Table 18.

Table 20: PERCENTAGE DISTRIBUTION OF TOTAL EMPLOYMENT IN MANUFACTURING BY MAJOR DEPARTMENTS, 1967

| | <u>Cundinamarca</u> (Bogota) | <u>Antioquia</u> (Medellin) | <u>Valle</u> (Cali) | <u>Atlantico</u> (Barranquilla) | <u>Subtotal</u> | <u>Santander</u> (Bucaramanga Barrancabermeja) | <u>Bolivar</u> (Cartagena) | <u>Caldas</u> (Manisales) | <u>Risaralda</u> (Pereira) | <u>Boyaca</u> | <u>Total 9</u> <u>Depts.</u> | <u>National</u> <u>Total</u> |
|---|---------------------------------|--------------------------------|------------------------|------------------------------------|-----------------|--|-------------------------------|------------------------------|-------------------------------|---------------|---------------------------------|---------------------------------|
| <u>Non-durable consumer goods</u> | <u>42.4</u> | <u>44.9</u> | <u>42.7</u> | <u>45.8</u> | <u>45.1</u> | <u>52.7</u> | <u>55.8</u> | <u>52.8</u> | <u>73.9</u> | <u>50.9</u> | <u>46.8</u> | <u>48.0</u> |
| Food | 11.3 | 7.5 | 23.0 | 11.1 | 12.6 | 18.4 | 16.8 | 17.6 | 19.4 | 26.2 | 13.4 | 15.0 |
| Beverages | 5.2 | 2.9 | 2.5 | 7.0 | 4.1 | 6.4 | 8.2 | 6.5 | 7.8 | 15.1 | 4.6 | 5.2 |
| Tobacco products | 0.5 | 0.8 | 1.3 | 0.5 | 0.8 | 10.2 | 2.5 | - | - | - | 1.2 | 1.2 |
| Textiles | 5.4 | 18.5 | 3.5 | 5.4 | 9.0 | 3.5 | 0.4 | 9.8 | 5.8 | 0.6 | 8.4 | 7.9 |
| Clothing and footwear | 8.2 | 10.2 | 7.6 | 13.9 | 9.3 | 11.1 | 8.1 | 11.1 | 38.5 | 4.8 | 10.0 | 9.9 |
| Printing and publishing | 5.8 | 2.3 | 5.6 | 2.0 | 4.2 | 3.1 | 6.3 | 4.5 | 1.5 | 1.5 | 4.1 | 4.0 |
| Pharmaceuticals and related products | 6.0 | 2.7 | 6.3 | 5.9 | 5.1 | 1.0 | 13.5 | 3.3 | 0.9 | 2.6 | 4.8 | 4.7 |
| <u>Durable consumer goods</u> | <u>11.5</u> | <u>4.5</u> | <u>2.5</u> | <u>2.6</u> | <u>8.7</u> | <u>7.7</u> | <u>5.0</u> | <u>5.0</u> | <u>5.1</u> | <u>3.2</u> | <u>8.3</u> | <u>8.1</u> |
| Furniture and fixtures | 2.4 | 0.9 | 1.1 | 1.7 | 1.6 | 2.6 | 3.2 | 1.7 | 2.3 | 1.0 | 1.7 | 1.8 |
| Rubber products | 3.0 | 1.7 | 4.8 | 0.8 | 2.7 | 0.5 | - | 0.7 | 1.8 | - | 2.4 | 2.3 |
| Electrical appliances | 2.0 | 0.6 | 1.2 | 0.8 | 1.3 | 0.2 | 0.8 | 1.7 | 0.2 | - | 1.2 | 1.1 |
| Motor vehicles | 4.1 | 1.3 | 2.3 | 6.3 | 3.1 | 4.5 | 1.0 | 0.8 | 0.9 | 2.2 | 3.0 | 2.9 |
| <u>Intermediate goods</u> | <u>33.7</u> | <u>41.6</u> | <u>32.9</u> | <u>34.3</u> | <u>36.0</u> | <u>30.3</u> | <u>35.6</u> | <u>36.7</u> | <u>18.9</u> | <u>44.4</u> | <u>35.4</u> | <u>34.7</u> |
| Textiles | 5.4 | 18.5 | 3.5 | 5.4 | 9.0 | 3.5 | 0.4 | 9.8 | 5.8 | 0.7 | 8.4 | 7.9 |
| Wood and products | 1.2 | 1.0 | 2.4 | 4.3 | 1.8 | 1.4 | 3.6 | 1.2 | 1.3 | 0.8 | 1.8 | 2.2 |
| Paper and products | 1.5 | 1.4 | 6.1 | 1.8 | 2.5 | 0.1 | - | 0.2 | 3.8 | - | 2.2 | 2.1 |
| Leather and products | 1.3 | 2.2 | 1.1 | 1.2 | 1.5 | 1.6 | - | 0.4 | 2.7 | 0.1 | 1.5 | 1.5 |
| Chemicals other than pharmaceuticals | 4.4 | 2.0 | 4.6 | 4.3 | 3.7 | 11.5 | 26.1 | 2.4 | 0.6 | 1.9 | - | 3.4 |
| Petroleum and coal products | 0.2 | 0.1 | - | - | 0.1 | - | - | 0.2 | - | - | 0.1 | 0.7 |
| Non-metallic mineral products | 10.4 | 9.6 | 6.0 | 5.7 | 8.7 | 6.1 | 4.3 | 5.2 | 2.6 | 11.2 | 8.4 | 8.4 |
| Basic metals | 0.7 | 1.9 | 1.2 | 1.5 | 1.2 | - | - | 1.9 | - | 29.1 | 1.6 | 1.6 |
| Metal products | 8.6 | 5.0 | 8.0 | 10.2 | 7.5 | 6.0 | 1.2 | 15.4 | 2.1 | 0.7 | 7.2 | 6.9 |
| <u>Capital goods</u> | <u>7.7</u> | <u>5.2</u> | <u>5.5</u> | <u>6.8</u> | <u>6.4</u> | <u>7.9</u> | <u>2.6</u> | <u>4.6</u> | <u>1.9</u> | <u>1.4</u> | <u>6.1</u> | <u>5.2</u> |
| Mechanical machinery | 1.4 | 3.3 | 1.7 | 1.4 | 2.0 | 4.8 | 0.4 | 0.8 | 1.0 | - | 2.0 | 2.0 |
| Electrical machinery (except appliances) | 3.8 | 1.1 | 2.4 | 1.6 | 2.4 | 0.3 | 1.5 | 3.3 | 0.3 | - | 2.3 | 2.1 |
| Transport equipment (except motor vehicles) | 2.5 | 0.8 | 1.4 | 3.9 | 1.9 | 2.7 | 0.9 | 0.5 | 0.5 | 1.4 | 1.8 | 1.8 |
| <u>Other</u> | <u>4.8</u> | <u>2.8</u> | <u>2.3</u> | <u>2.5</u> | <u>3.8</u> | <u>1.3</u> | <u>0.9</u> | <u>0.8</u> | <u>0.2</u> | <u>-</u> | <u>3.4</u> | <u>3.3</u> |
| <u>Total</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> | <u>100.0</u> |

Note: The classification of this table differs slightly from the classification shown in the national tables. In regional tables ceramic manufactures are included in non-metallic mineral manufactures and non-electrical appliances in metal products. Estimates of total employment in the pharmaceutical, electrical appliance and motor vehicle sub-sectors were made on the basis of the share of the sub-sectors in the national employment of chemicals, electrical equipment and transport equipment respectively.

Source: Appendix Table 16.

Table 21: TARIFF FREQUENCIES FOR MANUFACTURED GOODS
(As of May, 1969)

| | Tariff Range (percent) | | | | | | Total | Percent Distribution |
|---|------------------------|------------|------------|------------|------------|------------|--------------|----------------------|
| | 15 or under | 16 to 30 | 31 to 45 | 46-60 | 61-100 | Over 100 | | |
| <u>Non-durable consumer goods</u> | <u>27</u> | <u>32</u> | <u>62</u> | <u>73</u> | <u>94</u> | <u>134</u> | <u>429</u> | <u>16.0</u> |
| Food | 5 | 7 | 32 | 34 | 17 | 37 | 132 | 4.9 |
| Beverages | - | 2 | 1 | 8 | 20 | 2 | 33 | 1.2 |
| Tobacco products | - | - | - | - | - | - | - | - |
| Textiles | 1 | 13 | 11 | 20 | 45 | 54 | 144 | 5.4 |
| Clothing and footwear | - | - | - | - | 7 | 38 | 45 | 1.7 |
| Printing and publishing | 5 | 1 | - | 4 | 4 | 3 | 17 | 2.6 |
| Pharmaceuticals and related products | 16 | 16 | 18 | 7 | 1 | - | 58 | 2.2 |
| <u>Durable consumer goods</u> | <u>1</u> | <u>8</u> | <u>18</u> | <u>31</u> | <u>8</u> | <u>15</u> | <u>81</u> | <u>2.9</u> |
| Furniture and fixtures | - | - | 3 | - | 1 | 9 | 13 | 0.5 |
| Rubber products | 1 | 3 | 3 | 24 | 5 | - | 36 | 1.3 |
| Ceramic products | - | - | - | - | 1 | 3 | 4 | 0.1 |
| Non-electrical appliances | - | - | 5 | - | - | - | 5 | 0.2 |
| Electrical appliances | - | 4 | 7 | 7 | 1 | - | 19 | 0.7 |
| Motor vehicles | - | 1 | - | - | - | 3 | 4 | 0.1 |
| <u>Intermediate goods</u> | <u>22</u> | <u>373</u> | <u>336</u> | <u>233</u> | <u>183</u> | <u>72</u> | <u>1,296</u> | <u>48.1</u> |
| Textiles | 3 | 16 | 83 | 29 | 14 | 11 | 156 | 5.8 |
| Wood and products | 3 | 4 | 8 | 20 | 7 | 7 | 49 | 1.8 |
| Paper and products | - | 24 | 2 | 20 | 16 | 11 | 73 | 2.7 |
| Leather and products | - | 6 | 5 | 2 | 19 | 9 | 41 | 1.5 |
| Chemicals other than pharmaceuticals | 32 | 111 | 56 | 55 | 33 | 8 | 295 | 11.0 |
| Petroleum and coal products | 23 | 19 | 4 | 1 | - | - | 47 | 1.7 |
| Non-metallic mineral products | 1 | 30 | 31 | 16 | 34 | 19 | 131 | 4.9 |
| Basic metals | 29 | 116 | 82 | 11 | - | - | 238 | 8.8 |
| Metal products | 1 | 47 | 65 | 79 | 60 | 14 | 266 | 9.9 |
| <u>Capital goods</u> | <u>171</u> | <u>242</u> | <u>107</u> | <u>58</u> | <u>55</u> | <u>12</u> | <u>645</u> | <u>23.9</u> |
| Mechanical machinery | 125 | 145 | 41 | 30 | 23 | - | 364 | 13.5 |
| Electrical machinery (except appliances) | 10 | 62 | 49 | 13 | 12 | - | 146 | 5.4 |
| Transport equipment (except motor vehicles) | 36 | 35 | 17 | 15 | 20 | 12 | 135 | 5.0 |
| <u>Other</u> | <u>5</u> | <u>53</u> | <u>57</u> | <u>32</u> | <u>44</u> | <u>48</u> | <u>239</u> | <u>8.9</u> |
| <u>Total</u> | <u>296</u> | <u>715</u> | <u>580</u> | <u>427</u> | <u>384</u> | <u>288</u> | <u>2,690</u> | <u>100.0</u> |

Source: Legislacion Economica, Limitada, Nuevo Arancel de Aduanas de Colombia.

Table 22: Levels of Protection of Manufactured Products
by Degree of Fabrication - Durable Consumer Goods

| | <u>Ad Valorem Tariff (%)</u> | <u>Prior Deposit (%)</u> | <u>Type of License</u> |
|--|--------------------------------------|----------------------------------|----------------------------|
| <u>Electrical Appliances</u> | | | |
| All electrical appliances including refrigerators | 50 | 130 | Prior license |
| Parts | 50 | 130 | Prior license |
| Motors | 50-60 | 30 | Prior license |
| Electric wire | 45 | 30 | Prior license |
| Aluminum sheets | 30 | 130 | Prior license |
| Cold rolled steel sheets | 30 | 30 | Prior license |
| <u>Automotive</u> | | | |
| Passenger motorcars | 230-450 | 130 | Prior license |
| Chassis for motorcars | 180 | 70 | Prior license |
| Bodies | 180 | 40 | Prior license |
| Parts | 5, 40, 60, 100 | 30 | Prior license |
| Spring steel | 40 | 130 | Prior license |
| Cold rolled steel sheets | 30 | 30 | Prior license |
| <u>Non-Electrical Appliances</u> | | | |
| Sewing machines | 100 | 1 | Prior license |
| Furniture for sewing machines | 50 | 1 | Prior license |
| Needles | 100 | 1 | Prohibited |
| Sewing head | 50-100 | 1 | Prior license |
| Other parts | 50 | 1 | Prior license |
| <u>Rubber Products</u> | | | |
| Tires (except for tractors) | 50 | 1-30 | Prior license |
| Tire cases, threads, tubes, tire flaps | 50 | 30 | Prior license |
| Zinc Oxide | 40 | 30 | Free |
| Plates, sheet, strip, etc. of unhardened, vulcanized rubber | 55 | 30 | Prior license |
| Carbon black | 5 | 1 | Prior license |
| Natural rubber | 10 | 1 | Prior license |

Table 22 (Continued)

Levels of Protection of Manufactured Products by
Degree of Fabrication - Non-Durable Consumer Goods

| | <u>Ad Valorem Tariff (%)</u> | <u>Prior Deposit (%)</u> | <u>Type of License</u> |
|--|--------------------------------------|----------------------------------|----------------------------|
| <u>Textiles</u> | | | |
| Cotton textiles, not bleached or mercerized | 40 - 45 | 130 | Prohibited |
| Unbleached cotton yarn, not for retail trade | 30 | 130 | Prior License |
| Cotton, corded or combed | 30 | 130 | Prohibited |
| Raw cotton | 15 - 25 | 1 | Prior License |
| Wool textiles | 100 | 130 | Prohibited |
| Corded or combed wool yarn, wholesale | 55 - 65 | 130 | Prior License |
| Corded or combed wool | 40 | 130 | Prior License |
| Wool, not corded or combed | 15 - 17 | 70 | Prior License |
| Synthetic textiles | 50 | 130 | Prohibited |
| Synthetic yarn | 35 | 130 | Prior License |
| Synthetic fibers | 35 | 130 | Prior License |
| <u>Clothing</u> | | | |
| Clothing | 200 - 250 | 130 | Prohibited |
| Wool textiles | 100 | 130 | Prohibited |
| Cotton textiles | 40 - 45 | 130 | Prohibited |
| Synthetic textiles | 50 | 130 | Prohibited |
| Ornaments for clothing | 230 | 130 | Prohibited |
| <u>Footwear, and other Consumer Goods of Leather</u> | | | |
| Footwear | 200 | 130 | Prohibited |
| Handbags and all other leather goods of consumer use | 100 | 130 | Prohibited |
| Parts for shoes | 100 | 130 | Prohibited |
| Tanning materials | 35 | 130 | Prohibited |
| Bovine cattle leather | 40 | 40 | Prohibited |
| Raw hides | 25 - 30 | 30 | Prohibited |

Table 22 (Continued)

Levels of Protection of Manufactured Products
by Degree of Fabrication - Capital Goods

| | <u>Ad Valorem Tariff (%)</u> | <u>Prior Deposit (%)</u> | <u>Type of License</u> |
|---|--------------------------------------|----------------------------------|----------------------------|
| <u>Metal Manufactures</u> | | | |
| Metal working - machine tools | 15 | 1 | Prior License |
| Hand tools - shovels, picks, etc. | 50 | 30 | " " |
| Special steels | 25 | 130 | " " |
| Cast iron | 8 | 130 | " " |
| <u>Electrical Machinery</u> | | | |
| Generators, motors, transformers | 40 - 60 | 30 | " " |
| Parts | 40 | 10 | " " |
| Copper wire | 35 | 130 | " " |
| Copper sheets | 40 | 130 | " " |
| Cast iron | 8 | 130 | " " |
| <u>Mechanical Machinery</u> | | | |
| Engines - steam and internal combustion | 25 - 30 | 30 - 70 | " " |
| Engine parts | 5 | 10 | " " |
| Compressors & parts | 50 - 60 | 1 | " " |
| Generators & parts | 40 | 1 | " " |
| Special steels | 25 | 130 | " " |
| Cast iron | 8 | 130 | " " |
| <u>Transport Equipment</u> | | | |
| Trucks: | | | |
| up to 5 tons | 200 | 10 | " " |
| 5 to 10 tons | 100 | 10 | " " |
| over 10 tons | 70 | 10 | " " |
| Buses | 60 | 30 | " " |
| Jeeps | 20 | 30 | " " |
| Chassis: trucks) | 20 | 30 | " " |
| Jeeps) | 20 | 30 | " " |
| buses) | 25 | 5 | " " |
| Bodies: jeeps) | 40 | 70 | " " |
| buses) | | | |
| Parts | 5,40,60,100 | 30 | " " |
| Motorcycles, etc. | 25 | 30 | " " |
| Spring steel | 40 | 130 | " " |
| Cold-rolled steel sheets (less than 3 mm.) | 30 | 30 | " " |

Source: Legislacion Economica, Limitada, Nuevo Arancel de Aduanas de Colombia.

Table 23: IMPORTS OF MANUFACTURED PRODUCTS
(thousand US\$)

| | 1953 | 1960 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Non-durable consumer goods | 39,827 | 27,926 | 25,233 | 29,053 | 22,984 | 16,237 | 35,653 | 24,962 | 36,566 |
| Food | 16,672 | 7,313 | 4,979 | 1,524 | 8,732 | 1,353 | 8,135 | 2,894 | 1,768 |
| Beverages | 2,888 | 1,666 | 1,413 | 1,244 | 1,253 | 1,246 | 3,932 | 1,408 | 2,825 |
| Tobacco products | 1,294 | 1,377 | 1,021 | 680 | 188 | 127 | 145 | 126 | 3,192 |
| Textiles | 349 | 742 | 551 | 4,967 | 467 | - | 178 | 114 | - |
| Clothing and footwear | 534 | 3,291 | 2,485 | 3,206 | 3,262 | 478 | 1,324 | 1,179 | 576 |
| Printing and publishing | 1,835 | 953 | 1,244 | 1,194 | 1,728 | 2,059 | 2,482 | 4,368 | 10,581 |
| Pharmaceuticals and related products | 16,255 | 12,584 | 13,540 | 16,238 | 15,354 | 10,974 | 19,457 | 14,873 | 17,624 |
| Durable consumer goods | 20,801 | 16,189 | 16,496 | 12,672 | 14,251 | 12,344 | 31,163 | 26,313 | 21,981 |
| Furniture and fixtures | 736 | 33 | 105 | 133 | 409 | 159 | 169 | 138 | 158 |
| Rubber products | 1,922 | 3,491 | 3,744 | 3,556 | 4,076 | 2,460 | 4,169 | 2,631 | 4,108 |
| Ceramic products | 4,755 | 152 | 1,476 | 1,062 | 1,191 | 375 | 787 | 667 | 728 |
| Non-electrical appliances | 1,673 | - | 237 | 320 | 244 | 113 | - | - | 129 |
| Electrical appliances | 1,868 | 850 | 1,062 | 3,625 | 1,432 | 399 | 626 | 522 | 568 |
| Motor vehicles | 9,847 | 11,663 | 9,872 | 3,976 | 6,899 | 8,838 | 25,412 | 22,355 | 16,290 |
| Intermediate goods | 200,464 | 184,627 | 189,162 | 182,734 | 198,279 | 142,873 | 255,181 | 164,988 | 198,008 |
| Textiles | 26,916 | 4,170 | 5,902 | 5,555 | 6,291 | 5,977 | 8,520 | 6,217 | 4,409 |
| Wood and products | 1,266 | 1,459 | 555 | 262 | 132 | 181 | 260 | 228 | 304 |
| Paper and products | 15,851 | 25,055 | 24,982 | 20,729 | 20,505 | 20,215 | 29,799 | 22,187 | 25,349 |
| Leather and products | 935 | 164 | 142 | - | - | 216 | 275 | - | 14 |
| Chemicals other than pharmaceuticals | 36,133 | 64,169 | 72,890 | 78,616 | 79,568 | 61,155 | 122,126 | 71,809 | 94,429 |
| Petroleum and coal products | 31,453 | 14,133 | 17,361 | 13,385 | 10,833 | 6,051 | 7,799 | 7,070 | 5,187 |
| Non-metallic mineral products | 4,878 | 7,429 | 6,658 | 4,926 | 4,268 | 3,222 | 3,429 | 3,385 | 4,071 |
| Basic metals | 50,987 | 47,378 | 45,051 | 48,413 | 60,206 | 39,954 | 72,691 | 43,257 | 54,776 |
| Metal products | 32,045 | 20,670 | 15,621 | 10,848 | 16,476 | 5,902 | 10,282 | 10,835 | 9,343 |
| Capital goods | 206,002 | 209,670 | 220,201 | 170,556 | 249,192 | 196,650 | 234,348 | 205,231 | 276,727 |
| Mechanical machinery | 113,980 | 123,066 | 139,064 | 82,297 | 131,069 | 115,970 | 141,753 | 118,523 | 152,590 |
| Electrical machinery (except appliances) | 33,097 | 35,888 | 44,821 | 41,982 | 48,619 | 35,503 | 38,325 | 34,257 | 39,077 |
| Transport equipment (except motor vehicles) | 58,925 | 50,716 | 36,316 | 46,277 | 68,504 | 45,177 | 54,270 | 52,451 | 85,060 |
| Other | 16,490 | 14,709 | 16,729 | 16,289 | 15,784 | 9,128 | 16,351 | 11,787 | 15,601 |
| Total manufactured imports | 483,584 | 453,121 | 467,821 | 411,304 | 500,490 | 377,232 | 572,696 | 433,281 | 548,883 |
| Total imports | 544,548 | 518,585 | 540,475 | 506,022 | 586,291 | 453,501 | 674,146 | 496,862 | 643,259 |

Note: 1953 figures were converted to US dollars at the rate of 2.51 pesos per dollar for imports.

Source: 1953 and 1960: DANE, Anuario de Comercio Exterior, 1953 and 1960; 1962-1967: United Nations, Statistical Office, Commodity Trade Statistics-Series D; 1968: unpublished United Nations data.

Table 24: EXPORTS OF MANUFACTURED PRODUCTS
(thousand US\$)

| | 1953 | 1960 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <u>Non-durable consumer goods</u> | <u>762</u> | <u>560</u> | <u>1,232</u> | <u>1,347</u> | <u>2,054</u> | <u>2,113</u> | <u>2,045</u> | <u>2,252</u> | <u>6,039</u> |
| Food | 6 | 12 | - | - | 128 | - | - | - | 550 |
| Beverages | - | 1 | - | - | - | - | - | - | - |
| Tobacco products | 4 | 22 | - | - | - | - | - | - | - |
| Textiles | 76 | 12 | - | - | - | 176 | 166 | 111 | 119 |
| Clothing and footwear | 431 | 26 | - | - | 264 | 486 | 416 | 378 | 1,256 |
| Printing and publishing | 19 | 22 | 268 | 335 | 596 | 794 | 662 | 653 | 1,741 |
| Pharmaceuticals and related products | 226 | 465 | 964 | 1,012 | 2,066 | 1,657 | 1,801 | 1,817 | 2,373 |
| <u>Durable consumer goods</u> | <u>2</u> | <u>123</u> | <u>31</u> | <u>3</u> | <u>1,327</u> | <u>2,785</u> | <u>4,716</u> | <u>2,721</u> | <u>2,263</u> |
| Furniture and fixtures | 6 | 69 | 31 | 3 | - | 110 | - | 131 | 171 |
| Rubber products | - | 15 | - | - | - | 2,440 | 4,286 | 1,915 | 1,344 |
| Ceramic products | 3 | 6 | - | - | - | 114 | 199 | 481 | 1,241 |
| Non-electrical appliances | - | - | - | - | 517 | 121 | 177 | - | 100 |
| Electrical appliances | - | - | - | - | 806 | - | - | - | 107 |
| Motor vehicles | - | 33 | - | - | - | - | 114 | 194 | - |
| <u>Intermediate goods</u> | <u>3,580</u> | <u>11,288</u> | <u>25,468</u> | <u>18,390</u> | <u>29,706</u> | <u>34,740</u> | <u>41,744</u> | <u>45,878</u> | <u>57,085</u> |
| Textiles | 720 | 291 | 9,006 | 4,629 | 8,296 | 10,383 | 8,120 | 7,070 | 9,185 |
| Wood and products | 54 | 46 | 1,514 | 2,494 | 3,770 | 2,682 | 2,424 | 3,263 | 4,000 |
| Paper and products | 1 | 10 | - | - | - | 940 | 6,624 | 8,568 | 10,046 |
| Leather and products | 1,807 | 646 | 1,640 | 1,820 | 3,361 | 3,506 | 3,322 | 2,420 | 3,510 |
| Chemicals other than pharmaceuticals | 28 | 296 | 1,781 | 1,425 | 2,368 | 4,492 | 4,785 | 2,864 | 6,218 |
| Petroleum and coal products | 343 | 7,755 | 7,453 | 4,600 | 7,871 | 7,895 | 9,690 | 13,453 | 14,382 |
| Non-metallic mineral products | 646 | 2,016 | 4,031 | 3,373 | 3,574 | 2,961 | 4,375 | 5,724 | 7,781 |
| Basic metals | 12 | 10 | 43 | 51 | 159 | 573 | 895 | 735 | 392 |
| Metal products | 22 | 218 | - | - | 307 | 1,308 | 1,509 | 1,781 | 1,541 |
| <u>Capital goods</u> | <u>137</u> | <u>1,956</u> | <u>1,792</u> | <u>342</u> | <u>780</u> | <u>1,272</u> | <u>3,420</u> | <u>3,373</u> | <u>4,052</u> |
| Mechanical machinery | 133 | 1,855 | 1,792 | 143 | 678 | 1,809 | 2,604 | 2,821 | 3,064 |
| Electrical machinery (except appliances) | 4 | 63 | - | - | - | 170 | 875 | 552 | 736 |
| Transport equipment (except motor vehicles) | - | 38 | - | 206 | 102 | - | 11 | - | 259 |
| <u>Other</u> | <u>52</u> | <u>86</u> | <u>298</u> | <u>482</u> | <u>261</u> | <u>1,161</u> | <u>1,110</u> | <u>637</u> | <u>735</u> |
| <u>Total manufactured exports</u> | <u>4,531</u> | <u>14,013</u> | <u>28,821</u> | <u>20,578</u> | <u>35,828</u> | <u>43,778</u> | <u>54,105</u> | <u>55,568</u> | <u>70,831</u> |
| <u>Total exports</u> | <u>596,132</u> | <u>464,578</u> | <u>463,403</u> | <u>446,657</u> | <u>548,136</u> | <u>539,144</u> | <u>507,591</u> | <u>509,923</u> | <u>558,278</u> |

Note: 1953 figures were converted to US dollars at the rate of 2.50 pesos per dollar for exports.

Source: 1953 and 1960: DANE, Anuario de Comercio Exterior, 1953 and 1960; 1962-1967: United Nations, Statistical Office, Commodity Trade Statistics-Series D; 1968: unpublished United Nations data.

Table 25: COLOMBIAN EXPORTS OF MANUFACTURES TO THE ANDEAN GROUP AND LATIN AMERICAN FREE TRADE AREA
(in US\$)

| | <u>Ecuador</u> | <u>Peru</u> | <u>Chile</u> | <u>Bolivia</u> | <u>Venezuela</u> | <u>Paraguay</u> | <u>Mexico</u> | <u>Brazil</u> | <u>Argentina</u> | <u>Uruguay</u> | <u>Total Andean Group</u> | <u>Total LAFTA</u> |
|---|------------------|------------------|------------------|----------------|------------------|-----------------|------------------|----------------|------------------|----------------|-------------------------------|------------------------|
| <u>Non-durable Consumer Goods</u> | <u>1,830,455</u> | <u>281,901</u> | <u>18,680</u> | <u>32,338</u> | <u>195,147</u> | <u>36,557</u> | <u>76,246</u> | <u>156,441</u> | <u>16,743</u> | <u>815</u> | <u>2,358,521</u> | <u>2,645,323</u> |
| Food | - | 1,426 | 3,640 | 1,011 | - | - | 6,722 | 12,651 | - | - | 6,077 | 25,450 |
| Beverages | - | - | - | - | - | - | - | - | 1,709 | - | - | 1,709 |
| Tobacco products | - | 1,525 | - | - | - | - | - | - | - | - | 1,525 | 1,525 |
| Textiles | 32,812 | 11,792 | 2,021 | - | 12,989 | - | - | 23,542 | - | - | 59,613 | 83,155 |
| Clothing and footwear | 3,600 | - | - | 200 | 5,744 | - | 13,660 | 111,296 | - | - | 9,544 | 134,500 |
| Printing and publishing | 87,377 | 259,044 | 13,019 | 12,920 | 165,262 | 36,557 | 52,392 | 1,029 | 15,034 | 815 | 537,622 | 643,449 |
| Pharmaceuticals and related products | 1,706,666 | 8,115 | - | 18,207 | 11,152 | - | 3,472 | 7,923 | - | - | 1,744,140 | 1,755,535 |
| <u>Durable Consumer Goods</u> | <u>128,870</u> | <u>32,568</u> | <u>7,129</u> | <u>170,336</u> | <u>92,166</u> | <u>39,075</u> | <u>-</u> | <u>17,423</u> | <u>575,288</u> | <u>-</u> | <u>431,069</u> | <u>1,062,855</u> |
| Furniture and fixtures | 135 | 5,437 | - | - | 7,394 | - | - | 17,423 | - | - | 12,966 | 30,389 |
| Rubber products | 72,598 | 25,361 | 7,129 | 170,336 | 2,918 | 39,075 | - | - | 575,288 | - | 278,342 | 892,705 |
| Ceramic products | 36,774 | - | - | - | 2,936 | - | - | - | - | - | 38,710 | 39,710 |
| Non-electrical appliances | 2,064 | - | - | - | - | - | - | - | - | - | 2,064 | 2,064 |
| Electrical appliances | 17,299 | 1,770 | - | - | 78,918 | - | - | - | - | - | 97,987 | 97,987 |
| Motor vehicles | - | - | - | - | - | - | - | - | - | - | - | - |
| <u>Intermediate Goods</u> | <u>3,831,040</u> | <u>3,127,255</u> | <u>1,198,968</u> | <u>44,638</u> | <u>2,819,896</u> | <u>1,606</u> | <u>989,566</u> | <u>560,616</u> | <u>1,442,322</u> | <u>6,909</u> | <u>12,021,797</u> | <u>15,022,366</u> |
| Textiles | 1,314,271 | 1,020,215 | 815,612 | 20,127 | 1,894,174 | 1,606 | - | 350,344 | 719,717 | 368 | 5,064,399 | 6,136,434 |
| Wood products | 1,076 | 470 | - | - | 21,410 | - | - | - | - | - | 22,956 | 22,956 |
| Paper and products | 558,928 | 75,578 | 7,815 | 111 | 99,393 | - | 43,353 | 5,368 | - | 345 | 741,825 | 790,891 |
| Leather and products | 722 | 10 | 2,713 | - | 4,947 | - | - | 6,462 | 119,197 | - | 8,392 | 134,051 |
| Chemical products | 380,479 | 353,507 | 263,252 | 2,123 | 510,498 | - | 422,813 | 183,800 | 591,759 | 4,293 | 1,509,859 | 2,712,524 |
| Petroleum and coal products | 124,814 | 1,388,427 | 26,075 | - | 39,154 | - | 523,036 | - | - | - | 1,578,470 | 2,101,506 |
| Non-metallic mineral products | 974,744 | 53,441 | - | 8,267 | 598,370 | - | - | - | - | - | 1,634,822 | 1,634,822 |
| Basic metals | 115,150 | 4,680 | - | 402 | 5,435 | - | - | 302 | - | - | 125,667 | 125,969 |
| Metal products | 360,856 | 230,927 | 83,501 | 13,608 | 646,515 | - | 364 | 13,890 | 11,649 | 1,903 | 1,335,407 | 1,363,213 |
| <u>Capital Goods</u> | <u>420,491</u> | <u>40,960</u> | <u>448,600</u> | <u>24,473</u> | <u>686,865</u> | <u>-</u> | <u>4,764</u> | <u>69,631</u> | <u>117,523</u> | <u>-</u> | <u>1,621,389</u> | <u>1,743,676</u> |
| Mechanical machinery | 300,575 | 39,443 | 270,727 | 6,822 | 586,277 | - | 4,764 | - | 69,020 | - | 1,203,844 | 1,277,628 |
| Electrical machinery (except appliances) | 92,478 | 600 | 177,873 | 17,651 | 20,308 | - | - | 69,631 | 48,503 | - | 308,910 | 427,044 |
| Transport equipment (except motor vehicles) | 27,438 | 917 | - | - | 80,280 | - | - | - | - | - | 108,635 | 108,635 |
| <u>Other</u> | <u>38,680</u> | <u>28,318</u> | <u>62,639</u> | <u>40</u> | <u>167,462</u> | <u>-</u> | <u>48,227</u> | <u>-</u> | <u>15</u> | <u>-</u> | <u>297,139</u> | <u>345,381</u> |
| <u>Total</u> | <u>6,249,536</u> | <u>3,511,002</u> | <u>1,736,016</u> | <u>271,825</u> | <u>4,961,536</u> | <u>77,238</u> | <u>1,118,803</u> | <u>803,661</u> | <u>2,151,891</u> | <u>7,724</u> | <u>16,729,915</u> | <u>20,889,232</u> |

Source: DANE, Boletín Mensual de Estadística, Number 220.

Table 26

Average Nominal Tariff for Manufactured Products - 1970

| <u>Category</u> | |
|--|--------------|
| <u>NON-DURABLE CONSUMER GOODS</u> | <u>108.4</u> |
| <u>Food</u> | 82.2 |
| <u>Beverages</u> | 75.2 |
| <u>Tobacco Products</u> | 140.0 |
| <u>Articles of Textile other than Clothing</u> | 111.6 |
| <u>Clothing & Footwear</u> | 180.1 |
| Clothing | 213.0 |
| Footwear | 145.4 |
| Other wearing apparel | 181.8 |
| <u>Printing</u> | 65.9 |
| <u>Pharmaceuticals</u> | 33.9 |
| Pharmaceuticals | 23.6 |
| Other | 44.3 |
| <u>DURABLE CONSUMER GOODS</u> | <u>107.9</u> |
| <u>Furniture</u> | 119.6 |
| <u>Rubber Products</u> | 32.2 |
| Rubber plates, sheets, etc. | 54.5 |
| Rubber tires | 36.8 |
| Rubber manufactures | 65.4 |
| <u>Ceramic Products</u> | 125.0 |
| <u>Glassware</u> | 225.0 |
| <u>Non-Electrical Appliances</u> | 40.0 |
| <u>Electrical Appliances</u> | 42.6 |
| <u>Passenger Motor Vehicles</u> | 262.5 |
| <u>INTERMEDIATE GOODS</u> | <u>46.4</u> |
| <u>Textiles</u> | |
| <u>Wood and Products</u> | 73.8 |
| Wood | 48.2 |
| Veneer, plywood, reconst. wood | 60.0 |
| Wood products | 140.0 |
| Cork and products | 26.0 |
| Manufactures of straw | 95.0 |

Table 26 (Continued)

| <u>Category</u> | |
|--|-------------|
| <u>INTERMEDIATE GOODS (Continued)</u> | |
| <u>Paper and Products</u> | 62.2 |
| Pulp | 20.8 |
| Paper & paperboard in rolls | 50.7 |
| Paper & paperboard to size | 80.7 |
| Paper products | 96.5 |
| <u>Leather and Products</u> | 94.6 |
| Leather | 99.5 |
| Leather products | 89.8 |
| <u>Chemicals</u> | 39.3 |
| Fertilizers | 5.3 |
| Tanning materials | 36.6 |
| Essential oils, glues | 58.7 |
| Miscellaneous chemicals | 33.4 |
| Plastics | 62.6 |
| Fats and oils | 39.1 |
| <u>Petroleum and Products</u> | 21.7 |
| Coal | 27.7 |
| Petroleum products | 15.8 |
| <u>Non-Metallic Mineral Products</u> | 72.7 |
| Articles of stone, plastic, cement | 57.3 |
| Glass | 88.0 |
| <u>Basic Metals</u> | 25.9 |
| Iron and steel | 30.8 |
| Copper | 22.9 |
| Nickel | 25.1 |
| Aluminum | 28.4 |
| Lead | 23.6 |
| Zinc | 26.9 |
| Tin | 24.2 |
| <u>Metal Manufactures</u> | 66.2 |
| Tubes, pipes | 48.9 |
| Tool implements | 61.6 |
| Other | 88.1 |
| <u>CAPITAL GOODS</u> | <u>30.5</u> |
| <u>Mechanical Machinery</u> | 13.6 |
| Agricultural machinery | 9.7 |
| Mechanical machinery other than agricul. | 29.0 |
| Tractors | 2.0 |
| <u>Electrical Machinery</u> | 37.5 |

Table 26 (Continued)

| <u>Category</u> | |
|----------------------------------|-------|
| <u>CAPITAL GOODS (Continued)</u> | |
| <u>Transport</u> | 41.4 |
| Railroad | 24.0 |
| Buses, trucks, jeeps, etc. | 63.8 |
| Aircraft | 3.5 |
| Ships | 74.4 |
| | |
| <u>OTHER</u> | 72.5 |
| Optical photographic etc. | 43.5 |
| Musical instruments reconst. | 77.6 |
| Clocks | 40.3 |
| Other | 128.8 |
| | |
| <u>TOTAL</u> | |

Note: When more than one rate applies for a given category, an arithmetic average has been calculated.

Source: Legislacion Economica, Limitada, Nuevo Arancel de Aduanes de Colombia.

Table 27

Value of Global Licenses Approved - 1967-1969

(in thousand US\$)

| | <u>1967</u> | <u>1968</u> | <u>1969</u> |
|--|-----------------|-----------------|------------------|
| <u>Non-Durable Consumer Goods</u> | <u>18,763.4</u> | <u>12,429.5</u> | <u>25,836.4</u> |
| Food | (8,396.5 | (7,714.4 | (6,845.6 |
| Beverages | (| (| (|
| Tobacco Products | 97.7 | | |
| Textiles | 8,689.7 | 4,055.2 | 21,788.2 |
| Clothing and Footwear | 472.2 | 284.8 | 45.2 |
| Printing and Publishing | 782.2 | 267.0 | 272.8 |
| Pharmaceuticals, soap and related products | 325.1 | 108.1 | 125.0 |
| | | | |
| <u>Durable Consumer Goods</u> | <u>161.0</u> | | <u>55.2</u> |
| Furniture & Fixtures | | | |
| Rubber Products | 101.0 | | |
| Electrical Appliances | 60.0 | | 55.2 |
| Automotives | | | |
| | | | |
| <u>Intermediate Goods</u> | <u>22,775.9</u> | <u>35,702.2</u> | <u>39,981.5</u> |
| Wood Products | 940.4 | | 6,571.0 |
| Paper & Products | 384.2 | 709.1 | 3,252.1 |
| Leather Products | 541.0 | 296.8 | 45.7 |
| Chemicals | 900.3 | 15,086.1 | 12,263.3 |
| Petroleum & Coal Products | 13,439.8 | 19,305.9 | 7,877.7 |
| Non-metallic Mineral Products | 1,883.3 | 64.0 | 4,737.4 |
| Basic Metal Products | 2,219.7 | 123.9 | 1,886.4 |
| Metal Products | 2,467.2 | 116.4 | 3,347.9 |
| | | | |
| <u>Capital Goods</u> | <u>1,546.3</u> | <u>165.9</u> | <u>326.1</u> |
| Mechanical Machinery | 1,243.1 | 165.9 | 115.9 |
| Electrical Machinery | 303.2 | | 116.0 |
| Transport Equipment | | | 94.2 |
| | | | |
| <u>Miscellaneous</u> ^{/1} | <u>5,189.6</u> | <u>2,367.3</u> | <u>44,165.5</u> |
| | | | |
| <u>Total</u> | <u>48,436.2</u> | <u>50,664.9</u> | <u>110,364.7</u> |

^{/1} Refers mostly to investments in non-manufacturing activities.

Source: Unpublished INCOMEX data.

APPENDIX 2

NOTES ON COLOMBIAN MANUFACTURING STATISTICS

1. The main sources used in the preparation of this report are statistical series prepared by the National Statistical Office (Departamento Administrativo Nacional de Estadística-DANE), the Bank of the Republic (Banco de la República), and the Superintendency of Corporations (Superintendencia de Sociedades Anónimas-SUPERANONIMAS).

Manufacturing Industry Data

2. DANE, the national statistical office, is in charge of collecting manufacturing statistics. Data for the manufacturing sector were first collected in 1945, when the first economic census of Colombia was taken. Manufacturing statistics were again collected in 1953, at the time of the second census of manufactures. There has not been a complete census of the manufacturing sector since 1953, although a yearly sample survey of manufacturing based on the 1953 census has been taken since 1956. DANE hopes to take a third census of manufacturing industries in 1970; to this end special efforts are being made to insure the completeness and accuracy of the 1969 sample survey, which is being called a "pre-census."

3. 1967 is the last year for which data of the sample survey of manufactures is available, although the data for the 1968 sample survey are already being processed (March 1970) and the questionnaires for the 1969 survey are ready. As in the case with most sample surveys of manufactures, the accuracy of the data is difficult to determine on a year to year basis; a portion of the sample is estimated, and it is not clear just how the estimates have been made. Moreover, keeping the number of reporting firms updated is difficult on yearly samples. This affects all types of data such as employment and number of establishments not only value figures, where the large firms, which always report, weigh heavily in the total. Hence, although the DANE figures can generally be used for comparisons over time because there have been no drastic changes in definitions, year-to-year changes should be viewed with care because of the unavoidable changes in sampling from year to year.

4. The DANE sample survey covers firms employing more than five workers or producing more than 24,000 pesos of output. (Hereinafter, when reference is made to five workers it is meant to include firms which employ more than five workers or produce more than 24,000 pesos of output).

5. In the sample surveys, DANE has taken a census of the larger establishments and has made estimates for the smaller firms. The census-type coverage of larger firms has changed over time. From 1956 to 1961, DANE took a census of all establishments employing more than ten workers and made an estimate, on the basis of the 1953 census, of firms employing between five and ten workers. In 1952, a quasi census was taken, in that all firms employing more than five workers were included in the sample survey. For 1963, firms employing more than 15 workers were surveyed.

Between 1964 and 1967, all firms employing more than 15 workers were surveyed as well as all the firms in large cities which employ more than five workers.

6. It is not clear how the estimates for the smaller firms have been made over time. Since 1963, DANE has carried over the data for firms with less than 15 workers from the previous year. Hence, the 1963 figures include the data for the 1962 sample survey for firms with less than 15 workers. From 1964 to 1968, estimates for the five to 15 category based on the sample of large cities of the previous year have been included in the data. Table 1 gives an indication of the magnitude of the estimated values.

7. The sample surveys always include the following information: number of establishments, total employment, remunerated employment, wages and salaries earned, social benefits paid, gross value of production, gross value added, HP installed, and net investment. Data is available by size of establishments and by Departments. 1/

8. There are some difficulties with the DANE statistics. First, the coverage of smaller enterprises is probably inadequate. Since a census of manufactures has not been taken for the past 17 years, the Directory of Manufacturing Enterprises which DANE has is outdated and no systematic or adequate means of updating this Directory have been found. For 1967 and 1968, no updating whatsoever was done. Consequently, the 1967 survey shows a decline in the number of reporting establishments in all 20 industrial categories. At the present time, an attempt is being made to make a survey of enterprises. Secondly, the handicraft sector has not been covered since 1953. Moreover, the data in the sample survey includes a category of firms employing less than five workers, but which in 1953 had a value of production of more than 24,000 pesos which has not been revised since that time. Thus, the 3,500 firms which at that time fitted in this category, are still being included without any major updating (this is clearly seen in Table 1 below). Third, the method used to estimate the smaller firms is not clear. DANE is planning to include only plants with 14 or more workers in future sample surveys. While this has advantages, it is essential that past data be made comparable to the new survey and that manufacturing censuses be carried out more frequently. Fourth, there are difficulties with DANE definition of value-added and investment. DANE value added figures are overvalued. In calculating value-added, DANE deducts from the value of production figures the cost of raw material inputs

1/ In the past, sample survey figures have been published in DANE, Anuario Estadístico de Colombia, or Boletín Mensual de Estadística. The more detailed sample survey data have usually been published in the Boletín. Recently, there has been a change in the presentation of the Boletín and it is not clear as to how the sample survey figures will be published.

Table 1 - Breakdown of DANE Basic Industrial Statistics by Size

| | <u>Total</u> | <u>15 & more workers</u> (actuals) | <u>5-14 workers</u> (estimates) | <u>Less than 5 workers</u> <u>more than 24,000 pesos</u> (estimates) | <u>3/1</u> percent |
|---|--------------|---|------------------------------------|--|-----------------------|
| | 1 | 2 | 3 | 4 | |
| <u>Value of Output</u> (Mill. current pesos) | | | | | |
| 1963 | 19,955.2 | 18,043.0 | 1,619.7 | 292.5 | 8.1 |
| 1964 | 24,047.0 | 21,757.3 | 1,895.6 | 394.3 | 7.9 |
| 1965 | 27,746.0 | 25,113.3 | 2,171.0 | 461.7 | 7.8 |
| 1966 | 33,846.1 | 30,646.7 | 2,683.7 | 515.7 | 7.9 |
| 1967 | 37,402.1 | 34,024.7 | 2,690.9 | 686.5 | 7.2 |
| <u>Value Added</u> (Mill. current pesos) | | | | | |
| 1963 | 8,768.2 | 8,103.8 | 464.7 | 199.7 | 5.3 |
| 1964 | 10,101.3 | 9,436.7 | 542.1 | 122.5 | 5.4 |
| 1965 | 11,661.6 | 10,910.2 | 613.5 | 137.9 | 5.3 |
| 1966 | 13,823.7 | 12,967.5 | 701.5 | 154.7 | 5.4 |
| 1967 | 15,406.4 | 14,515.0 | 689.3 | 212.1 | 4.4 |
| <u>Establishments</u> | | | | | |
| 1963 | 11,296 | 2,718 | 5,073 | 3,505 | 4.5 |
| 1964 | 11,674 | 2,635 | 5,402 | 3,637 | 4.6 |
| 1965 | 11,959 | 2,585 | 5,647 | 3,727 | 4.7 |
| 1966 | 11,797 | 2,662 | 5,421 | 3,714 | 4.6 |
| 1967 | 10,873 | 2,973 | 4,354 | 3,546 | 4.0 |
| <u>Total Employment</u> | | | | | |
| 1963 | 280,520 | 299,143 | 41,117 | 10,260 | 14.7 |
| 1964 | 283,841 | 226,002 | 41,181 | 13,658 | 15.6 |
| 1965 | 294,221 | 230,766 | 46,670 | 16,785 | 15.9 |
| 1966 | 299,508 | 244,043 | 44,605 | 10,860 | 14.9 |
| 1967 | 293,825 | 248,754 | 34,090 | 10,981 | 11.6 |

Sources: Unpublished DANE data and Appendix Table 10.

and the cost of electricity consumed, but it does not deduct the cost of services rendered to the firms (such as freight costs, telephones, etc.). The net fixed investment figures given by DANE is not net of depreciation. The investment figure is, in fact, the value of equipment, land and buildings bought, less the value of equipment, land and buildings sold. Moreover, it is probable that there have been changes in the definition of net investment over time.

9. In the report, the Mission has used 1953, 1960 and 1967 as benchmark years. Although the 1967 figures are suspect, they are the last year for which data are available. The Mission felt that any difficulties arising out of changes in definition or estimating procedures would be largely cancelled out over the two seven-year spans and that these periods would better reflect actual growth trends than yearly fluctuations. In inter-industry comparisons for a given year the difficulties associated with the 1967 data - poor coverage of smaller enterprises - are of lesser importance.

10. In spite of the difficulties associated with the sample surveys, the Mission feels that, compared to other developing countries, DANE has made great efforts to present reliable and comparable statistics. The DANE staff, moreover, is well aware of the difficulties associated with sample surveys. One of the fundamental difficulties with the data is that a census of manufacturing has not been carried out for the last 17 years. Thus, a recent benchmark year from which to base estimates of growth is not available. The absence of a census for manufacturing, moreover, has affected the preparation of other economic indicators, such as the price indices. The Mission believes that a census of manufacturing and mining is necessary and would be of great use in better determining the present status and past growth of the manufacturing and mining sectors.

National Income Data

11. The Economics Department of the Bank of the Republic is in charge of preparing the national accounts data which include figures for value-added in manufacturing. The Bank of the Republic uses DANE data for the factory sector 1/, and makes estimates for the handicraft sector. The breakdown of the Bank of the Republic value-added estimates is shown in Table 2.

12. The first estimates of the factory sector data are based on a physical volume of production index, which is developed by the Bank of the Republic partly on the basis of data supplied by DANE and partly from the Bank's own survey of manufactures. The growth of the physical index is then applied to the constant price series of the factory sector and an

1/ Defined by the Bank of the Republic as firms employing more than five workers or producing more than 24,000 pesos which is the same as the dane definition.

estimate of the DANE current value-added figure made later, on the basis of a price index developed by the National Accounts Division of the Bank of the Republic.

Table 2: BREAKDOWN OF BANK OF THE REPUBLIC VALUE ADDED

| | <u>Total Manufacturing</u> | <u>Factory Sector</u> | <u>Handicraft Sector</u> | <u>Share of Handicraft in Total</u> |
|------|--------------------------------|---------------------------|------------------------------|---|
| 1950 | 1,401.5 | 1,058.5 | 343.0 | 24.5 |
| 1951 | 1,485.1 | 1,113.1 | 372.0 | 25.0 |
| 1952 | 1,584.3 | 1,195.3 | 389.0 | 24.6 |
| 1953 | 1,743.0 | 1,340.0 | 403.0 | 23.1 |
| 1954 | 1,980.7 | 1,538.7 | 442.0 | 22.3 |
| 1955 | 2,252.7 | 1,803.7 | 449.0 | 19.9 |
| 1956 | 2,515.6 | 2,015.6 | 500.0 | 20.0 |
| 1957 | 3,092.9 | 2,470.9 | 622.0 | 20.1 |
| 1958 | 3,590.2 | 2,848.2 | 742.0 | 20.7 |
| 1959 | 4,152.1 | 3,322.1 | 830.0 | 20.0 |
| 1960 | 4,939.4 | 4,029.4 | 910.0 | 18.4 |
| 1961 | 5,655.2 | 4,675.2 | 980.0 | 17.3 |
| 1962 | 6,708.0 | 5,631.6 | 1,076.4 | 16.0 |
| 1963 | 9,050.0 | 7,624.2 | 1,425.8 | 15.8 |
| 1964 | 10,320.3 | 8,736.4 | 1,583.4 | 15.3 |
| 1965 | 11,966.4 | 10,181.5 | 1,784.9 | 14.9 |
| 1966 | 14,212.8 | 11,984.6 | 2,228.2 | 15.7 |
| 1967 | 15,661.7 | 13,182.0 | 2,479.7 | 15.8 |
| 1968 | 17,550.0 | 14,828.1 | 2,721.9 | 15.5 |

Note: Factory sector: firms employing more than five workers or producing more than 24,000 pesos.

Sources: Banco de la Republica, Cuentas Nacionales 1950-1967, and unpublished Banco de la Republica data.

13. A major difficulty with this method of arriving at value-added is that the physical volume of production index uses weights of 1957, when the intermediate goods industries were still in the process of growth. It is not clear how the National Accounts Division derives the price index used to convert the constant series to current prices. In arriving at a current price figure, the Bank revises its preliminary estimates when the DANE figures for the factory sector are published. The Bank deducts from the DANE figure on value-added their own estimate of non-material inputs. Table 3 shows the difference between DANE and Bank of the Republic estimates for value-added in the factory sector. Discrepancy between national accounts and sample survey figures is not unique to Colombia; it is quite common in developed as well as developing countries. The discrepancies in Colombian figures, moreover, are less marked than in many other countries.

14. Value-added in the handicraft sector is estimated on the basis of the 1953 census of manufactures. Growth has been projected by sub-sectors on the basis of such variables as population growth and the growth of textile production. On the basis of these estimates, the share of handicraft in total value-added has declined from about 25 percent in the early 1950s to 15 percent in 1967.

Trade Data

15. Colombia publishes its trade data in both dollars and pesos. The trade statistics have been published until 1965, and are available through 1968. Part of 1969 is already processed. The Mission has used Colombian data as published in United Nations, Statistical Office, Commodity Trade Statistics (Statistical Papers, Series D) for the years 1962-1968. Data for 1953 and 1960 were taken from the Trade Statistics of Colombia. For some years, the Mission has found inconsistencies between the Colombian data published in the United Nations publications and those published in the Trade Yearbook of Colombia.

Table 3: VALUE ADDED IN FACTORY SECTOR
(Million current pesos)

| | <u>DANE</u> | <u>Bank of Republic</u> | <u>DANE/Bank of Republic</u> |
|------|-------------|-------------------------|------------------------------|
| 1953 | 1,498.7 | 1,340.0 | 111.84 |
| 1958 | 3,233.9 | 2,848.2 | 113.54 |
| 1960 | 4,648.6 | 4,029.4 | 115.37 |
| 1961 | 5,414.8 | 4,675.2 | 115.82 |
| 1962 | 6,481.3 | 5,631.6 | 115.09 |
| 1963 | 8,768.7 | 7,624.2 | 115.01 |
| 1964 | 10,101.4 | 8,736.9 | 115.62 |
| 1965 | 11,661.8 | 10,181.5 | 114.54 |
| 1966 | 13,823.7 | 11,984.6 | 115.35 |
| 1967 | 15,406.4 | 13,182.0 | 116.87 |

Sources: Appendix Table 3 and Banco de la Republica, Cuentas Nacionales, 1950-1967.

Corporate Data

16. The Superintendency of Corporations collects financial data from all corporations in Colombia. These data are tabulated by sector (agriculture, manufacturing, mining, etc.) and are available yearly with about a 2-year lag. In manufacturing, the Superintendency has also prepared a detailed tabulation by individual manufacturing industries for the period 1963-67 for a fixed number of identical corporations. This data on sales, value added, depreciation, profits, balance sheet items and sources and uses of working capital should be a valuable tool in analyzing the trends in the affairs of large industries, particularly for the large corporations.

Deflators

17. The wholesale price index of the Bank of the Republic has been used to inflate manufacturing production figures to constant 1968 prices. IN the report, each industrial branch has been deflated by the appropriate wholesale price index; the deflator derived from dividing total current over total constant value of production, as given in Appendix Tables and , is therefore a derived deflator for manufacturing and not the general wholesale price deflator. Table 4 lists the deflators used.

18. The overall index consists of prices for about 270 items. This index has serious difficulties insofar as it uses weights of the early 1950s and the sample is probably relatively small. The difficulties associated with using old weights are of less importance for the component sub-sector price indices used as deflators in the report.

19. Wages have been deflated by the general cost of living index for workers published by the Bank of the Republic.

Exchange Rates

20. Whenever trade figures have had to be converted into dollars, the "principal selling rate" was used for imports and the "other export rate" for exports. To convert manufacturing industry data into dollars, the "principal selling rate" was used.

Table 4: WHOLESALE PRICE INDICES USED IN
MANUFACTURING INDUSTRY ANALYSIS

Non-Durable Consumer Goods

| | |
|------------------------|--|
| Food: | general good index |
| Beverages: | beverage index |
| Tobacco products: | index for tobacco and manufactures (this index includes raw tobacco as well) |
| Textiles: | index for yarn and textiles used for consumer and intermediate textiles |
| Clothing & footwear: | the clothing index and the footwear index as given in the Banco de la Republica statistics were combined by using the 1966 value added as weight |
| Printing & publishing: | for lack of a better index, the paper products index was used |
| Pharmaceuticals: | pharmaceutical index |

Table 4 (Continued)Non-Durable Consumer Goods

Soaps & related products: general chemicals index

Durable Consumer Goods

Furniture & fixtures: furniture index

Rubber products: index for rubber products

Ceramic manufactures: index for non-metallic mineral manufactures - this index does not include ceramic products, but it is the only one available

Non-electrical appliances: index for metal manufactures

Electrical appliances: general index for electrical machinery used. A precise index for electrical appliances cannot be derived from the indices given by the Banco de la Republica

Automotive industry: general index for transport equipment

Miscellaneous manufactures: since many of these products are scientific and professional equipment the electrical machinery index was used

Intermediate Goods

Wood products: wood products index

Paper & paper products: index for paper products was used. This index excludes prices for pulp.

Leather products: index for leather manufactures

Chemicals other than pharmaceuticals: general index for chemicals

Petroleum and coal products: fuel index

Table 4(Continued)

Intermediate Goods

Non-metallic mineral
manufactures other
than ceramics: general index for non-metallic mineral
manufactures

Basic metals: index for common metals

Metal manufactures: index for manufactured metals

Capital Goods

Mechanical manu-
factures: general index for non-electrical machinery

Electrical
machinery: general index for electrical machinery

Transport
equipment, other
than automotive: general index for transport equipment

Source: Banco de la Republica XLIV Informe Anual Del Gerente a la Junta Directiva, Segunda Parte and Revista del Banco de la Republica, December 1969.

THE MINING CODE 1/

HISTORICAL BACKGROUND

1. As a consequence of historical development, certain minerals have passed into private ownership in some areas (as unusual situation in Latin America); others are owned by the Government and administered on regalian principles.
2. During the colonial period and the first 40 years of independence, the regalian theory of title to the subsoil prevailed in Colombia. All mines belonged to the national state (Mining Ordinance of New Spain, 1763; Decree of Simon Bolivar, October 28, 1829). This principle was maintained until 1858, when the Republic was organized in Federal form. The Constitutions of 1858 and 1863 reserved only the emerald and rock-salt mines as property of the Nation; the federated states were free to legislate with respect to all other mineral substances and considerable state legislation followed. Most of these laws claimed ownership of gold, silver, platinum, and copper for the local state but left other minerals to be disposed of by the owner of the soil. Thus, there prevailed in Colombia a mixed system for minerals. The regalian theory, the theory of private titles, and one state, Cauca, granted all minerals to the landowner.
3. By Decree of October 28, 1873, the central government reserved for itself the title to all minerals that existed or that should be discovered in unappropriated lands.
4. In 1886 the country was reorganized in the form of a single central Republic, and by the constitution of that year the national recovered for itself the mineral rights that had belonged to the federated states, leaving unaffected, however, rights previously acquired by private owners. The minerals that have belonged to the nation since 1886 are:
 1. Emerald and rock salt.
 2. Deposits of petroleum, iron, coal, sulphur, asphalt, and, in general, all non-metallic minerals that exist in unappropriated lands or in lands wherein the surface title passed out of the ownership of the state after October 28, 1873 (Fiscal Code).
 3. Gold, silver, platinum, copper, and precious stones.

1/ This summary was prepared by Ely and Duncan, Counsellors-At-Law, in connection with their contract with the Bureau of Mines, U.S. Department of the Interior, for revision of Mr. Ely's book, "Summary of the Mining and Petroleum Laws of the World" published in 1961.

Mines that may belong to private owners are as follows:

1. In gold, silver, platinum, and copper when the owners hold adjudicated titles issued by the State;
2. In petroleum, iron, coal, sulphur, asphalt, and, in general, all non-metallic mineral deposits that exist in lands where the surface title passed out of ownership of the State before October 28, 1873 (Fiscal Code).

MINING LEGISLATION

5. The Mining Law of 1967, Law 60 of December 26, 1967, and the President's Decree 1163 of June 19, 1967, as modified by the recently passed Law No. 20 of December 11, 1969, are the major laws governing mining in Colombia. 1/ In addition, there are numerous older laws and decrees which remain in effect, subject to the provisions of the new laws. Mining of veins of precious metals and copper is governed by the Mining Code, Law 38 of 1887. Development of most other minerals is governed by Decree 805 of March 5, 1947, as amended by Decree 2419 of November 20, 1958. 2/ However, the recently passed Law No. 20 has cast doubt on validity of rights granted under these laws.

6. The new Mining Law of 1967, gives broad powers to the Ministry of Mines and Petroleum over concession grants, terms and production requirements for all State-owned mineral deposits except precious metals, rock-salt, and hydrocarbons.

7. Foreign corporations may carry on business through a domestic branch or subsidiary. Mining concerns pay only the basic tax on net profits under Law 81 of December 20, 1960 and subsequent regulations. Under Decree 262 of February 23, 1968 mineral exports after January 1, 1969 will be given a 15% tax credit.

1/ The President's Decree 1163, which now constitutes the regulations under the new law, was promulgated prior to the passage of Law 60 of December 26, 1967. It contains the details of the adjudication process for mining claims. Decree No. 3161 of December 26, 1968, reorganized the Ministry of Mines and Petroleum and provided for increased government assistance to mining research, exploration, and exploitation.

2/ Development of uranium is governed by Decree 2638 of 1955. Special regulations relating to emeralds are contained in Law 40 of 1905 and Law 185 of 1959 as supplemented by the following: (1) Decree 545 of May 4, 1960; (2) Decree 293 of February 14, 1964; (3) Decree 585 of 1955; and (4) Decree 912 of June 21, 1968.

Mining Code of 1887 - Gold, silver, and platinum, unless found in the beds or in the banks of navigable rivers, and copper minerals are adjudicable; that is, the central government can grant title and possession to applicants who comply with the formalities of the Mining Code of 1887. The discoverer of a mineral deposit notifies the chief administrative officer of the municipality where the deposit was found. Within 90 days he must denounce the property before the Governor of the department, who orders that it be surveyed and possession delivered to the discoverer, to whom the Governor then issues a "title of adjudication" in the name of the State.

8. In each claim or title that covers a vein or lode, the maximum area that may be included is a rectangle 1,800 meters long by 240 meters wide; in placer claims, a rectangle of 2 by 5 kilometers, or a square 3 kilometers on each side. Nevertheless, by means of separate notices, denouncements, and claims, one person can acquire an unlimited number of claims. To keep title, he must pay a small annual tax and do exploration or exploitation work.

9. The maximum area that can be included in each contract for mines of precious metals in the beds or in the banks of navigable rivers is 15 kilometers in length (along the river) by 2 kilometers in width. One person, using his right to enter into 5 contracts, may include a maximum area of 75 kilometers in length by 2 kilometers in width. The government requires a royalty varying between 2 and 20 percent of the crude production from this type of mine according to the richness of the deposit (Law 13 of 1937, Law 85 of 1945, Law 81 of 1946, Decree 805 of 1947). The industry of mining precious metals is exempt from the excess profits (patrimony) tax.

Decree 805 of 1943. Minerals not subject to the Code of 1887 but which belong to the State may be exploited by private parties under concession contracts with the Government. The maximum area for a claim that can be included in each contract for iron, sulphur, coal, asphalt, and other non-metallic minerals is 5,000 hectares. One person may enter into 5 contracts. Previously the government collected for the exploitation of mines of this type a royalty of 5 percent of the crude product, but Decree 2514 of 1952 reduced this royalty in order to encourage exploitation of this class of minerals.

10. The general features of these contracts can be summarized thus: The concession allows a period of exploration of 2 years, which can be extended for 6 months more; a period for installation of machinery of 1 year, which may be extended for 2 additional years; and finally a period of exploitation of 30 years, which may be extended for 10 years more. When the contract terminates at the expiration of its term or is voided, title to all the property that the contractor may have installed passes to the State, which is declared to have a rever-30 years from the date on which production begins, and be renewable for an additional 10 years if the lessee increases the royalties to the Government. The lessee is

under the following obligations: (1) to carry out exploration work for a period not exceeding 12 months; (2) to employ adequate economic and technical systems for extraction; (3) to carry out the stipulated amount of domestic processing; and (4) to pay as royalties at least 2%, but not more than 20% of the total annual production.

11. The choice of which system is to be adopted is in the discretion of the Ministry, which must consider which system would produce the most fiscal income and development. If given deposits are not suitable for adjudication by either of these methods, the Government at its discretion may adjudicate them in the regular manner in accordance with the existing law.

12. Decree 292 of March 1, 1968 gives the Ministry of Mines and Petroleum authority to set royalties on the mining of base metals. Operations which must pay royalties are those with an annual production level of: (1) 30,000 tons of native mercury ore; (2) 150,000 tons of iron ore, lateritic nickel, titanium or bauxite ore; and (3) 100,000 tons of other classes of metal ores including sulfurous mercury and nonlateritic nickel. Royalty rates range from 3 to 8% depending upon rate of production. The decree also concerns plans of development, amount of processing to be carried out locally, and preferential treatment to national needs.

13. As an incentive to development, the Colombian Government issued Decree 262, on February 23, 1968, which states that crude and processed mineral exports will receive a 15 percent tax credit after January 1, 1969, when prior permission is received from the National Economic Policy Council in consultation with the Ministry of Mines and Petroleum.

Law No. 20 of December 11, 1969. Law No. 20 establishes as its purpose the total utilization of all economically exploitable substances in Colombia and declares that all mines shall henceforth belong to the government. The mining industry is declared to be in the nature of a public utility, and the government is given broad expropriation authority.

14. Holders of present rights in mines are exempted from operation of the statute if: (1) within three years after the date of enactment of the statute they have begun and continue to carry out economic exploitation; or (2) if they have installed machinery and equipment with the capacity to exploit all the reserves in the mine within 50 years. To the extent that a person is deprived of any right under Law No. 20, he has priority over other persons in obtaining new rights in his previously held mine. The law does not affect rights granted to mines that are presently owned by the government and contemplates a continuation of existing licensing and concession provisions.

15. While Law No. 20 carries with it the potential to cause substantial dislocation of rights and changes in ownership patterns within the Colombian mining industry, it is too soon to judge the actual effect of the new law. The effect will depend upon interpretation placed upon certain exceptions in the law and the discretion exercised by the government in implementing it.

16. It is understood that a decree giving effect to the provisions of Law No. 20 will shortly be promulgated.

POTENTIAL MINING PROJECTS

1. A description of the more important mineral deposits and their possible method of exploitation, subdivided into projects of medium-term potential and those still requiring further development effort before exploitation can be contemplated, is given below.

MEDIUM-TERM POTENTIAL

Mineral Fuels

Cerrajon Coal Deposit, Guajira Department

2. A drilling program of this coal deposit, which is situated some 50 miles from the Caribbean coast, is currently in progress. About 8,000 feet of drilling has been accomplished to date with indicated reserves estimated at 30 million tons and good evidence that they can be extended considerably. Probably 1/3 to 1/2 of the present reserves can be extracted by open pit methods and the balance by underground mining. The coal is reported to be quite gassy, with a low sulfur content. If blended with a suitable hard coal, it is expected to be of metallurgical quality.

3. The present proposal is to initiate an export-oriented project of some 3 million tons per annum at an investment cost of about 40 million dollars. The drilling and studies, which IFI is undertaking, are expected to be finished in July, 1970. The implementation of the project is expected to require parallel investments in road and port facilities.

Non-Metallic Minerals

Phosphate Rock Deposits, Eastern Cordillera

4. As stated in the section entitled Mining Potential, indicated reserves of about 460 million tons of phosphate rock have been discovered in various deposits along the Eastern Cordillera. Most of these deposits have some economic potential, ranging from chemical processing to grinding for direct application. A tabulation of these reserves and their grade is shown below.

Indicated Phosphate Reserves

| <u>Location</u> | <u>Reserves</u> (million tons) | <u>Grade</u> percent P ₂ O ₅ |
|----------------------------|-----------------------------------|---|
| Azufrada, Santander | 168.3 | 15-20 |
| San Vicente, Santander | 18.75 | 23 |
| Sardinata, North Santander | 62.1 | 30 |
| Oru, North Santander | 140.0 | 25 |
| Gramalote, North Santander | 10.0 | 15-20 |
| San Andres, Santander | 7.0 | 25 |
| Turmeque, Boyaca | 4.8 | 20 |
| Iza-Tota, Boyaca | 43.75 | 25 |
| Tesalia, Huila | 9.0 | 14-18 |
| TOTAL | <u>463.7</u> | |

Source: Memorandum from the Ministry of Mines and Petroleum to Congress, 1968.

5. Considerable surface exploration has been carried out on the Sardinata deposits which are regarded as being the best from the point of view of location and quality for future development. Reserves are estimated at 62 million tons, including nearly 11 million tons of probable reserves suitable for open-pit mining. The remainder could be extracted by underground methods. A diamond drilling program is being initiated to determine the overall chemical characteristics of this deposit. It is expected that this will take about 2 years to complete.

6. The grade of the surface samples is close to 30 percent P₂O₅, but weathering may have dissolved associated calcite to result in surface enrichment. The deposit is situated within reasonable distance of the Maracaibo district of western Venezuela, where desulfurizing plants of crude oil are projected which could be an economic source of sulfur for acidulation.

7. Chevron Petroleum Company, which first discovered phosphate in this area while drilling for oil, applied for a concession contract for four blocks under Decree 805 of 1943. At a later stage, when the area had been declared a national mineral reserve, IFI applied for a concession contract for two blocks under Law 60 of 1967. Each enterprise appears to be willing to work with the other and prospects for some kind of joint venture agreement are therefore considered good. At this time a ruling from the Ministry of Mines and Petroleum on the legal basis on which the phosphate deposits may be exploited is awaited.

8. A feasibility study for a phosphoric acid and triple superphosphate facility, based on processing Sardinata phosphate, shows that the production costs of a plant with a capacity of 33,000 tons of P₂O₅ per annum would be fully competitive with those of a plant located on the Atlantic Coast based on imported phosphate rock.

9. A diamond drilling program is also being initiated on the Iza-Tota deposit where, in contrast to the Sardinata ore, weathering has probably resulted in a lower grade in the outcrop.

Campamento Asbestos Deposit, Antioquia Department

10. This deposit, which has been known for some time, has been thoroughly investigated by the Nicolet Asbestos Company. Some 10 million tons of reserves have been drilled out containing approximately 4 percent fiber and exploration for additional reserves continues. A project has been prepared for the extraction of 25,000 tons per annum of short chrysotile fiber, about 45 percent of which will be used domestically and the balance exported.

Limestone Deposit near Durania, Cesar Department

11. The recently published report on "The Mineral Resources of the Sierra Nevada de Santa Marta" has pointed out the existence of this large, good quality limestone deposit. A local group is presently considering the installation of a sizeable cement plant at this location to supply the lower Magdalena and Cesar Valley areas, and to export cement into the Caribbean basin. The site enjoys an excellent location, where railroad, road and barge transport is available as well as ample water and crude oil supplies.

Limestone Deposit near Villavicencio, Meta Department

12. The existence of a large deposit of limestone has been discovered close to the Llanos, where the soil is generally acidic. Equipment for the production of 500 tons per day of limestone for agricultural use is shortly expected to be placed on order.

Gypsum Deposit, Mesa de los Santos, Santander Department

13. The reserves in this gypsum deposit are placed at 10 million tons and could exceed 50 million tons. Diamond drilling to a depth of 1,000 to 1,500 feet is required to develop the reserves. The cost of opening up the mine, including the provision of the associated infrastructure, is estimated at about 1 million dollars.

Metallic Minerals

Lateritic Nickel Deposit at Cerro Matoso, Cordoba Department

14. This property was first discovered by the Chevron Petroleum Company in drilling for oil. Chevron subsequently brought in the Hanna Mining Company which carried out pilot scale tests on the ore and prepared a feasibility study for its extraction and smelting to ferro-nickel.

15. As presently conceived, the project is for the extraction of the lateritic nickel ore and its treatment in an electric smelter to produce 37.5 million lb. per annum of contained nickel in ferro-nickel.

16. The project would be the largest mining operation in Colombia and its cost, including the associated infrastructure, is estimated at around 100 million dollars equivalent. The construction period would be about 3 years.

17. Negotiations between the Ministry of Mines and Petroleum and Hanna and Chevron over the concession contract and joint-venture agreement with the prospective Colombian partners, IFI and ECOMINAS, have been going on intermittently for some considerable time. Compared with the earlier proposals, the project has been increased in capacity and now includes a smelter. Since the prospective concession contract would be the first to be approved under Mining Law 20 of 1969, it has been necessary to explore in detail the implications of the present mining legislation, which explains in part the time taken to reach the present position. It should be apparent to both sides, however, that further delay in getting the project under way could lead to its coming on stream shortly after the announced nickel projects in Canada, Australia, New Caledonia and elsewhere at a time when there may well be a temporary softening in price.

LONG-TERM POTENTIAL

Mineral Fuels

Coking Coal Deposit near Cucuta, North Santander Department

18. Carbones del Carare is understood to have the concession to exploit deposits containing an estimated 500 million tons of coking coal. Samples have been analyzed in the US and Germany with satisfactory results and a trial shipment of 2,000 tons has recently been sent to Japan. The major obstacle standing in the way of the exploitation of this deposit is its location, which is some 300 km. by road from the Magdalena River port of Gamarra, from where the coal would be transported by barge to the company's loading terminal in Cartagena Bay.

Coking Coal Deposit near Zipaquira, Cundinamarca Department

19. Unconfirmed reports indicate the existence of a large coking coal deposit near Zipaquira which has attracted Japanese and Venezuelan interests.

Non-Metallic Minerals

Sulfur

20. The domestic production of superphosphate fertilizer would sharply increase the demand for sulfur. Sour gas is a source of sulfur in many parts of the world, but the gas fields of Colombia do not contain significant amounts of sulfur. The most likely source for increased reserves and production of sulfur are the volcanic rocks in the southern part of the country. Although known reserves are small, a prospecting program in this region might prove valuable.

Metallic Minerals

Iron Sands, Atlantico Department

21. A deposit of titaniferous iron sand has been discovered between Barranquilla and Cartagena. Insufficient work has been done, however, to determine either the extent or grade of this deposit or whether it could be economically exploited.

Bauxite Deposits near Popayan, Valle and Cauca Departments

22. Drilling in this area, in which Kaiser Aluminum Company holds a number of claims, has been going on for some time. Indications are that a large deposit has been discovered, but that a number of technical problems will have to be resolved before exploitation can be contemplated.

Bauxite Deposit in the Llanos

23. A deposit with indicated reserves of upward of 100 million tons of 48 percent bauxite has reportedly been discovered in the Llanos. At first sight the remote location of this deposit makes it doubtful if it can be exploited economically.

PHOSPHATE DEPOSITS

OUTLOOK FOR MINING AND FERTILIZER PRODUCTION 1/

1. The soils in the arable areas of Colombia are largely acid Latosols that have been depleted of much of the nutrient necessary for plant growth by natural leaching coupled with many years of intensive farming. Increased farm production can be accomplished by the addition of fertilizer to the soil. Except for the basic slag, which is produced by Paz del Rio as a by-product, all phosphatic fertilizer has been imported. Consumption of fertilizer is extremely small in terms of need.
2. The discovery of the potentially large phosphate deposits changes the situation considerably. Certain of these deposits may be sufficiently extensive and high grade to supply the fertilizer demands of the country at a cost that probably would be much less than the cost of imported fertilizers.
3. In addition to the potential high-grade deposits, there are several deposits spread throughout the Eastern Cordillera that might be mined for local use in areas close to the mine. Although some of these deposits are probably too low grade to be economically processed to a high-analysis chemical fertilizer, they might still be mined and treated for direct application to the soil.
4. Whether these deposits are mined or not depends largely on the cost to the farmer of a delivered unit of P_2O_5 . The local material must also be competitive in delivered cost, with phosphate rock from foreign sources or with phosphate rock from the potential high-grade deposits at Sardinata in North Santander Department.
5. If the deposit at Sardinata is as high-grade as the initial sampling indicates and if it turns out to be an extensive deposit that can be mined by open-cut methods, then the mined material would have about the same P_2O_5 content as phosphate rock imported to the Caribbean port of Barranquilla.
6. In many parts of the country, local low-grade phosphate rock, even if it is only ground and used for direct application to the soil, would be cheaper per unit P_2O_5 than phosphate rock from an import source or high-grade fertilizer produced at Sardinata. All local sources of low-grade phosphate rock should therefore be carefully investigated to determine their value to agriculture as ground rock for direct application to the soil.

1/ Source: Phosphate Rock in Colombia - A Preliminary Report, U.S. Geological Survey Bulletin 1272-A, 1969.

PREINVESTMENT PROGRAM - STUDY DATA SHEET

No.: 4-1 (1)

| | | |
|--|----------------------|--|
| Area: South America | Country: Colombia | Sector(s): Industry |
| 1. NAME OF PROPOSED STUDY: Survey of the Iron and Steel Industry in Colombia | | |
| 2. PURPOSE: To evaluate the current status of the iron and steel industry and prepare an industry-wide development plan designed to increase local manufacturing capacity of steel products and reduce their prices on the domestic market. | | |
| 3. SCOPE: The study is to evaluate the present status of the sector, review the available data on local raw materials, prepare estimates of production costs, prepare a forecast of the demand for steel in Colombia and an assessment of export possibilities, review presently prepared expansion plans and recommend the most economical program of expansion of the sector. The study should highlight any special transport bottlenecks, whose removal would facilitate the distribution of steel to the major consumption centers from one or two large plants. The study should also include a discussion on the merits of Colombia's (Cont. on page 2, item 3) | | |
| 4. BACKGROUND: (a) Related Studies (b) Other Available Data (c) Expected Data Problems None (i) Feasibility studies for a cold rolling mill prepared by H. K. Ferguson and Sofresid, (ii) Market studies for cold mill products prepared by IFI and Paz del Rio and for all types of steel products prepared by IFI, (iii) Feasibility study for Siderurgica de la Sabana. | | |
| 5. TIMING: (a) Duration and Phasing of Study (b) Desired Starting Date 4 months 1970 | | |
| 6. COMMENT ON POTENTIAL STUDY SPONSORS: Planeacion (DNP) would appear to be the most suitable sponsor of this study, as its scope falls within DNP's field of operation. | | |
| 7. PROJECT(S) EXPECTED TO RESULT FROM STUDY (if known): (a) Description (b) Estimated Investment (US\$ equivalent) (i) New basic iron and steel complex, (i) \$40 million (ii) Better transportation facilities (c) Financing Need and Potential Source (i) IFI, suppliers credits, IBRD | | |
| 8. ORDER OF MAGNITUDE OF STUDY COST (US\$ equivalent): 250,000, see page (2), item 1. | | Sheet Prepared by: John W. P. Jaffe Dept. or Agency: IBRD/I.P.D. Date: June 22, 1970 |
| 9. STAFF'S COMMENT ON PRIORITY RANKING OF STUDY: High priority, because of number of expansion projects currently being planned or in course of implementation. | | Sheet Revised by: Item(s) Revised: Dept. or Agency: Date: |

APPENDIX 6

Form No. 386.01
(11-69)

INTERNATIONAL DEVELOPMENT
ASSOCIATION

INTERNATIONAL BANK FOR
RECONSTRUCTION AND DEVELOPMENT

INTERNATIONAL FINANCE
CORPORATION

PREINVESTMENT PROGRAM - STUDY DATA SUPPLEMENT
(to be filled in when possible)

No.: 4-1 (2)

| 1. TENTATIVE STAFFING | | Type of Specialist | Number on Team | Total Man-Months |
|---|-----------------------------------|--------------------|----------------|------------------|
| (a) Foreign Professional Staff: | | | | |
| | Marketing Consultant | | 1 | 4 |
| | Engineering Consultant | | 2 | 7 |
| | Industrial Engineering Consultant | | 2 | 7 |
| | Transportation Consultant | | 1 | 2 |
| | Financial Consultant | | 1 | 4 |
| | Total: | | 7 | 24 |
| (b) Local Professional Staff : | Marketing Consultant | | 1 | 4 |
| (c) Local Supporting Staff : | Interpreters, drivers, etc. | | 3 | 12 |
| 2. TENTATIVE STUDY BUDGET (US\$ equivalent) | | Foreign Currency | Local Currency | Total |
| (a) Professional Staff Costs : | | 150,000 | 50,000 | 200,000 |
| (b) Equipment : | | | | 50,000 |
| (c) Other (Travel, non-prof. staff, etc.): | | | | 50,000 |
| (d) Total : | | | | 250,000 |

3. OTHER COMMENTS (Continued from page (1), item 3)

(i) entering into a joint venture agreement with another LAFTA country for the production of semi-finished steel products in that country, (possibly using Colombian coking coal) and rolling them in Colombia;

(ii) constructing a single direct reduction plant to produce metallized pellets for the existing arc furnace plants.

The study should also make recommendations for the establishment of a reporting system to be employed by the basic steel producers to improve the quality of the statistical information on the sector which is presently available.

| | |
|-------------------------|------------------|
| Supplement Prepared by: | John W. P. Jaffe |
| Dept. or Agency: | IBRD/IDP |
| Date: | June 22, 1970 |

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| Supplement Revised by: | |
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| Item(s) Revised: | |
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| Dept. or Agency: | |
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| Date: | |
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PREINVESTMENT PROGRAM - STUDY DATA SHEET

No.: 4-2 (1)

| | | |
|--|--------------------------------------|--|
| Area: South America | Country: Colombia Andean Group | Sector(s): Industry |
| 1. NAME OF PROPOSED STUDY: Andean Group Petrochemical Development Survey | | |
| 2. PURPOSE: (a) to promote cooperative projects in petrochemicals in the Andean Group Countries (b) to determine the type and optimum size, location, and phasing of petrochemical production units over the next 10 years. | | |
| 3. SCOPE: The study should seek to recommend feasibility studies for specific petrochemical projects and to define their scope. It should be based on: (a) market projections, including a field survey of potential users in each country, (b) feed stock sources, particularly noting existing and planned refinery schemes, (c) existing production units and plans for their expansion, (d) freight rates including data from private and public carriers in each country, (e) financial requirements and sources of finance (f) present import restrictions and export subsidies derived from interviews with the relevant Government authorities. | | |
| 4. BACKGROUND: (a) Related Studies (b) Other Available Data (c) Expected Data Problems - Actualidad y Perspectivas de la Industria Petroquímica en Colombia en el Grupo Andio - Ecopetrol Noviembre de 1969. - Similar study recently conducted by ECAFE. Bibliography to first study mentioned in (a) indicates other sources. Market projections will be difficult because historical trends are little indication of what demand will be if an assured local source of product were available. | | |
| 5. TIMING: (a) Duration and Phasing of Study (b) Desired Starting Date Field work - 4 months Analysis and report- 6 months Total 10 months 1971 | | |
| 6. COMMENT ON POTENTIAL STUDY SPONSORS: The Government of the Andean Group countries, oil companies owned by them, and ECLA would probably welcome and sponsor such a study. They might also provide the local currency costs. But the study team should not include personnel nominated by the sponsors to insure maximum objective. The project should also be discussed with UNDP. | | |
| 7. PROJECT(S) EXPECTED TO RESULT FROM STUDY (if known): (a) Description (b) Estimated Investment (US\$ equivalent) (c) Financing Need and Potential Source 1. An olefins-based petrochemical complex. \$50-\$200 m over 10 years 2. Possibly additional aromatics capacity. Possibly 50% local, remainder from suppliers' credits, technical partners, international sources. 3. Downstream units based on these. 4. Plants not related to 1 and 2, e.g., petroleum coke. | | |
| 8. ORDER OF MAGNITUDE OF STUDY COST (US\$ equivalent): \$200,000 ± 25% | | Sheet Prepared by: Peter A. Glenshaw Dept. or Agency: IBRD/IPD Date: May 7, 1970 |
| 9. STAFF'S COMMENT ON PRIORITY RANKING OF STUDY: To avoid further investment in uneconomically sized units, this study is very important. | | Sheet Revised by: P. Engelmann |
| | | Item(s) Revised: 5(b) and 6 |
| | | Dept. or Agency: IBRD/O.D.P. |
| | | Date: October 20, 1970 |

PREINVESTMENT PROGRAM - STUDY DATA SUPPLEMENT
(to be filled in when possible)

No. : _____

| 1. TENTATIVE STAFFING | | Type of Specialist | Number on Team | Total Man-Months |
|--|-----------------------------|---|----------------|------------------|
| (a) Foreign Professional Staff: | | | | |
| | Market Researcher | | 3 | 27* |
| | Chemical Engineer | | 3 | 27* |
| | Transport Economist | | 1 | 9* |
| | Financial Analyst | | 1 | 9* |
| | Expert on Trade Regulations | | 1 | 9* |
| | Coordinator | | 1 | 9* |
| | | Total: | 10 | 90* |
| (b) Local Professional Staff : (included above) | | | | |
| (c) Local Supporting Staff : | | | | |
| 2. TENTATIVE STUDY BUDGET (US\$ equivalent) | | Foreign Currency | Local Currency | Total |
| (a) Professional Staff Costs : | | | (say) | 100,000* |
| (b) Equipment : | | | | |
| (c) Other (Travel, non-prof. staff, etc.): | | | | 100,000* |
| (d) Total : | | | | 200,000 |
| 3. OTHER COMMENTS | | *accuracy no better than plus-minus 25% | | |
| <p>3.1 The Andean Group presently has a number of small uneconomically sized petrochemical production plants. It also has substantial production of crude oil and a growing demand for the consumer products that are derived from petrochemicals. No one country is expected to have the market to support economically sized plants, and it would be a pity if the additional products were supplied from the multiplicity of small plants as is presently done.</p> <p>3.2 Preliminary studies have shown that there <u>is</u> sufficient market to support single economically-sized production units for most of the petrochemical intermediates, if the plants could supply the whole area.</p> <p>3.3 Colombia is already taking the initiative and has plans for the production of fiber intermediates which it will supply to the whole region and to Venezuela. It has also indicated that other prospects are possible.</p> <p>3.4 A particularly acute need will be the production of olefins (particularly ethylene) which are the building blocks for many petrochemical products. Chile and Colombia both have small ethylene plants which are uneconomical and which should be replaced in the future with a large full-sized unit. This study should be particularly biased towards defining the optimum size and location of the olefins plant with its attendant downstream units.</p> <p>3.5 In view of the intergovernmental agreement required for approval of this study, preparations should start immediately on this agreement so that the study will commence no later than early 1971.</p> | | | | |
| | | Supplement Prepared by: Peter A. Glenshaw | | |
| | | Dept. or Agency: IBRD/IDP | | |
| | | Date: May 7, 1970 | | |
| | | Supplement Revised by: | | |
| | | Item(s) Revised: | | |
| | | Dept. or Agency: | | |
| | | Date: | | |

CONTENTS

ANNEXES TO VOLUME IV

- ANNEX 1: Iron and Steel Industry Review
- ANNEX 2: Pulp and Paper Industry Review
- ANNEX 3: Synthetic Fibers Industry Reviews
- ANNEX 4: Chemical Industry Review
- ANNEX 5: Wood Processing Industry Review

ANNEX 1

Iron and Steel Industry Review

ANNEX I

THE IRON AND STEEL SECTOR

INTRODUCTION

This chapter discusses the present status and known development plans of the iron and steel sector, excluding foundries and forge plants, in Colombia. Existing basic production facilities consist of one integrated plant, Acerias Paz del Rio at Belencito, four arc furnace and rolling mill plants, including two capable of producing specification carbon and low-alloy steels, one reroller and one electrolytic tinplate line. All the principal producers are expanding or proposing to expand their facilities at the present time. The most important expansion project is for the installation of a cold reduction mill on the part of Paz del Rio. To guide the development of the sector along sound lines, an overall study of the iron and steel industry is recommended.

This annex is based on information obtained in meetings with the then Minister of Development, Dr. Hernando Gomez Otalora, the Economic Adviser to the President, Dr. Rodrigo Botero, Dr. Joaquin Prieto Isaza, Dr. Oliverio Phillips Michelsen, the UNIDO Adviser to the Ministry of Development, Dr. Peter Feldl, the staff of the Planning Department (DNP), the Industrial Development Institute (IFI), the National Association of Industrialists (ANDI), the Colombian Federation of Metallurgical Industries (FEDEMETAL) and the management and staff of all the leading steel producers referred to in paragraph 1 above, as well as on a review of published data on aspects of the iron and steel sector in Colombia.

CONTRIBUTION OF THE IRON AND STEEL SECTOR TO THE ECONOMY

The contribution of the iron and steel sector, including steel manufacturing enterprises, to gross value added in manufacturing in 1967, the last year for which census figures are available, was 300.6 million pesos or almost 2 percent. Acerias Paz del Rio alone accounted for approximately one half of this total. Gross value of production in the industry was around 800 million pesos of which Paz del Rio's share was slightly less than one-half.

The manufacturing sample survey figures show total employment in the sector as 4,386, but this total, which excludes workers engaged in Paz del Rio's iron ore and coal mining activities, seems unduly low and no conclusions will be drawn from it.

The only production figures for the sector published in Colombia are those relating to the tonnage of ingot steel produced by Paz del Rio. The best source of information on the sector is the Latin American Iron and Steel Institute (ILAFA), which publishes statistical yearbooks giving production apparent consumption figures for its member countries. Table 1 showing the apparent consumption, domestic production and imports of finished steel products for the period 1960-1968 is taken from this source.

Apparent consumption of rolled steel products in Colombia in 1967, the last year for which detailed data are available, was 375,000 tons of which about 59% was produced domestically. The apparent per capita consumption, which averaged 21.0, 24.3 and 27.5 kg in ingot equivalent in the 5-year periods 1951-1955, 1956-1960 and 1961-1965 respectively, rose to 36.7 kg in 1966 but fell back to 25.9 kg in 1967. Both figures are well below per capita consumption for the ILAFA countries as a whole, which averaged 53.5 kg in the period 1965-1967. For a comparison of apparent consumption of rolled steel products in the ILAFA countries in 1967 see Table 2.

STRUCTURE AND GROWTH

The modern iron and steel industry in Colombia is only about 20 years old as can be seen from Table 3, which shows domestic production of finished steel products in the period 1951-1966. It is entirely privately-owned, although Paz del Rio was originally created in the public sector. Like the rest of manufacturing industries, the iron and steel sector has developed along regional lines and its production facilities are fragmented. The largest producer is the integrated plant at Belencito, some 200 km. northeast of Bogota, where the majority of its products are consumer, and close to the mines and quarries from which the iron ore, coal and limestone required for its operation are derived. The four arc furnace plants are located near the market in the principal cities--Bogota, Medellin, Cali and Barranquilla, while the rerolling plant is located between Belencito, from where it obtains its inputs, and Bogota, the center of consumption of its products.

TABLE 1
APPARENT CONSUMPTION, DOMESTIC PRODUCTION AND IMPORTS
OF FINISHED STEEL PRODUCTS, 1960-1968
 (in thousand tons)

| | <u>1960</u> | <u>1961</u> | <u>1962</u> | <u>1963</u> | <u>1964</u> | <u>1965</u> | <u>1966</u> | <u>1967</u> | <u>1968*</u> |
|--|-----------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | <u>APPARENT CONSUMPTION</u> | | | | | | | | |
| <u>Bars, rods and shapes</u> | <u>151.0</u> | <u>164.7</u> | <u>161.2</u> | <u>194.0</u> | <u>256.2</u> | <u>211.9</u> | <u>276.8</u> | <u>284.1</u> | |
| Rails and heavy sections | 14.7 | 15.5 | 11.3 | 12.2 | 16.0 | 7.2 | 16.0 | 12.8 | |
| Bars and light sections | 83.1 | 124.5 | 121.2 | 108.3 | 144.5 | 128.9 | 113.7 | 188.5 | |
| Wire rod | 55.2 | 24.7 | 28.7 | 73.5 | 95.7 | 77.8 | 147.1 | 82.8 | |
| <u>Flat rolled products</u> | <u>137.8</u> | <u>129.0</u> | <u>130.5</u> | <u>157.7</u> | <u>204.2</u> | <u>118.6</u> | <u>224.1</u> | <u>90.9</u> | n.a. |
| Plates and sheets | 109.9 | 103.4 | 103.0 | 125.5 | 169.9 | 93.1 | 169.1 | 69.2 | |
| Tinplate | 27.9 | 25.6 | 27.5 | 32.2 | 34.3 | 25.5 | 55.0 | 21.7 | |
| <u>Total finished products</u> | <u>290.8</u> | <u>293.7</u> | <u>291.7</u> | <u>351.7</u> | <u>460.4</u> | <u>332.5</u> | <u>500.9</u> | <u>375.0</u> | |
| | <u>DOMESTIC PRODUCTION</u> | | | | | | | | |
| <u>Bars, rods and shapes</u> | <u>113.4</u> | <u>139.0</u> | <u>145.1</u> | <u>168.1</u> | <u>184.3</u> | <u>188.7</u> | <u>211.8</u> | <u>199.8</u> | <u>177.9</u> |
| Rails and heavy sections | 13.2 | 14.5 | 10.5 | 6.6 | 6.4 | 4.2 | 3.2 | 3.2 | 1.8 |
| Bars and light sections | 68.7 | 107.0 | 108.3 | 91.0 | 105.9 | 111.7 | 80.6 | 121.5 | 128.1 |
| Wire rod | 31.5 | 17.4 | 26.3 | 70.5 | 72.0 | 72.8 | 128.0 | 75.1 | 48.0 |
| <u>Flat rolled products</u> | - | - | - | <u>14.3</u> | <u>14.3</u> | <u>18.1</u> | <u>23.7</u> | <u>21.5</u> | <u>27.5</u> |
| Plates and sheets | - | - | - | 14.3 | 14.3 | 18.1 | 23.7 | 21.5 | 23.3 |
| Tinplate | - | - | - | - | - | - | - | - | 4.2 |
| <u>Total finished products</u> | <u>113.4</u> | <u>139.0</u> | <u>145.1</u> | <u>182.4</u> | <u>198.6</u> | <u>206.8</u> | <u>235.4</u> | <u>221.3</u> | <u>205.4</u> |
| <u>Domestic production as percentage of apparent consumption</u> | <u>38.9</u> | <u>47.3</u> | <u>49.7</u> | <u>51.8</u> | <u>43.1</u> | <u>62.1</u> | <u>46.9</u> | <u>59.0</u> | |
| | <u>IMPORTS</u> | | | | | | | | |
| <u>Bars, rods and shapes</u> | <u>39.6</u> | <u>25.7</u> | <u>16.1</u> | <u>25.9</u> | <u>72.0</u> | <u>25.3</u> | <u>65.0</u> | <u>84.3</u> | |
| Rails and heavy sections | 1.5 | 0.9 | 0.8 | 5.5 | 9.7 | 3.0 | 12.8 | 9.6 | |
| Bars and light sections | 14.4 | 17.5 | 12.9 | 17.3 | 38.6 | 17.2 | 33.1 | 67.0 | |
| Wire | 23.7 | 7.3 | 2.4 | 3.0 | 23.7 | 5.0 | 19.1 | 7.6 | n.a. |
| <u>Flat rolled products</u> | <u>137.8</u> | <u>129.0</u> | <u>130.5</u> | <u>143.3</u> | <u>189.8</u> | <u>100.5</u> | <u>200.4</u> | <u>69.4</u> | |
| Plates and sheets | 109.9 | 103.4 | 103.0 | 111.1 | 155.6 | 75.0 | 145.4 | 47.7 | |
| Tinplate | 27.9 | 25.6 | 27.5 | 32.2 | 34.3 | 25.5 | 55.0 | 21.7 | |
| <u>Total finished products</u> | <u>177.4</u> | <u>154.7</u> | <u>146.6</u> | <u>169.2</u> | <u>261.8</u> | <u>125.8</u> | <u>265.4</u> | <u>153.7</u> | |

Notes: * Preliminary figures
 n.a. - not available
 Totals may not add up because of rounding

Sources: IIAFA - Anuario Estadístico 1967, 1968 and 1969.

TABLE 2

APPARENT CONSUMPTION OF ROLLED STEEL
PRODUCTS IN THE ILAFA COUNTRIES IN 1967
(in thousands of tons and kg per
capita, ingot equivalents)

| | Total Consumption | Per Capita |
|-----------------|----------------------|-------------|
| Argentina | 1,719 | 100.3 |
| Bolivia | 44 | 15.7 |
| Brazil | 2,916 | 45.8 |
| Central America | 234 | 21.2 |
| Chile | 418 | 61.9 |
| Colombia | 375 | 25.9 |
| Ecuador | 85 | 20.6 |
| Mexico | 2,497 | 73.8 |
| Paraguay | 25 | 15.7 |
| Peru | 291 | 31.8 |
| Uruguay | 59 | 28.4 |
| Venezuela | 755 | 108.6 |
| TOTAL | <u>9,419</u> | <u>54.3</u> |

Source: ILAFA - Anuario Estadístico 1969.

TABLE 3
DOMESTIC PRODUCTION OF FINISHED STEEL PRODUCTS, 1951-1966
(in thousand tons)

| | <u>1951</u> | <u>1952</u> | <u>1953</u> | <u>1954</u> | <u>1955</u> | <u>1956</u> | <u>1957</u> | <u>1958</u> | <u>1959</u> | <u>1960</u> | <u>1961</u> | <u>1962</u> | <u>1963</u> | <u>1964</u> | <u>1965</u> | <u>1966</u> |
|--------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <u>Bars, rods and shapes</u> | <u>4.3</u> | <u>5.3</u> | <u>4.7</u> | <u>6.9</u> | <u>31.7</u> | <u>65.2</u> | <u>69.3</u> | <u>55.3</u> | <u>90.6</u> | <u>101.6</u> | <u>103.3</u> | <u>132.3</u> | <u>140.5</u> | <u>161.2</u> | <u>161.9</u> | <u>134.6</u> |
| Paz del Rio | - | - | - | - | 23.7 | 54.4 | 56.5 | 42.3 | 74.9 | 84.0 | 85.0 | 110.0 | 105.1 | 118.1 | 114.3 | 86.4 |
| Empresa Siderurgica | 4.3 | 5.3 | 4.7 | 6.9 | 8.0 | 10.8 | 12.8 | 12.7 | 13.0 | 13.4 | 13.8 | 16.9 | 18.9 | 18.3 | 19.0 | 16.3 |
| Sidelpa | - | - | - | - | - | - | - | - | - | - | - | - | 3.8 | 9.0 | 12.2 | 13.8 |
| Sid. Muna | - | - | - | - | - | - | - | 0.3 | 2.7 | 4.2 | 4.5 | 5.4 | 5.5 | 5.6 | 5.0 | 3.7 |
| Sid. Boyaca | - | - | - | - | - | - | - | - | - | - | - | - | 7.2 | 10.2 | 11.4 | 14.4 |
| <u>Flat rolled products</u> | - | - | - | - | - | - | - | - | - | - | - | - | <u>2.9</u> | <u>5.9</u> | <u>9.3</u> | <u>9.9</u> |
| Paz del Rio | - | - | - | - | - | - | - | - | - | - | - | - | 3.9 | 5.9 | 9.3 | 9.9 |
| <u>Wire products</u> | - | - | - | - | - | - | <u>8.0</u> | <u>8.4</u> | <u>17.2</u> | <u>19.7</u> | <u>18.7</u> | <u>26.3</u> | <u>32.0</u> | <u>34.6</u> | <u>36.3</u> | <u>33.8</u> |
| Paz del Rio | - | - | - | - | - | - | 7.8 | 8.0 | 16.3 | 19.3 | 17.9 | 22.5 | 22.6 | 22.9 | 23.2 | 20.3 |
| Others | - | - | - | - | - | - | 0.2 | 0.4 | 0.9 | 0.4 | 0.8 | 3.8 | 9.4 | 11.7 | 13.1 | 13.5 |
| <u>Total Finished Products</u> | <u>4.3</u> | <u>5.3</u> | <u>4.7</u> | <u>6.9</u> | <u>31.7</u> | <u>65.2</u> | <u>77.3</u> | <u>63.7</u> | <u>107.8</u> | <u>121.3</u> | <u>122.0</u> | <u>158.6</u> | <u>176.4</u> | <u>201.7</u> | <u>207.5</u> | <u>178.3</u> |

Source: Estudio sobre Acerias Paz del Rio, 1968.

This is a natural structure in the initial stage of development of the iron and steel sector, in which production is confined to merchant products--light sections, bars and rods--that can fairly economically be produced on a small scale. Each arc furnace plant obtains its scrap requirements from the city, in which it is located, and sells the majority of its production there also. As production capacity is expanded, however, to meet the growing demand, scrap requirements tend to exceed local scrap generation which then has to be supplemented by the importation of scrap in order to achieve full utilization of the equipment. In the case of Colombia, this involves in most cases high inland transport costs and drastically alters the economics of the operation.

At the same time, the diversification of steel production into more sophisticated product lines, such as flat rolled products, requires concentration of facilities in order to achieve economies of scale. This is especially true of Colombia, where demand is comparatively small and barely able to sustain a modern flat products facility. In the interest of efficiency, the sector should initially be served by one flat products mill and its location, vis-a-vis the source of its inputs and the geographical distribution of its market, will have an important bearing on the delivered price of its finished products. When the internal market for flat-rolled products grows beyond about 500,000 tons per annum, the question will arise as to whether to expand the capacity of the existing hot strip mill at Belencito or to put down a second strip mill complex in another location. This is unlikely for at least 12 years.

The iron and steel sector in Colombia has now reached the stage at which first, the theoretical scrap requirements of the existing electric arc furnaces of about 150,000 tons per annum exceed by approximately 100,000 tons per annum domestic scrap generation; and second, the newly completed Steckel mill at Belencito requires the installation of a complementary cold reduction mill to process the hot rolled coil into cold rolled coil and sheets and timplat stock for sale to domestic flat steel consuming industries.

Tables 3 and 1 show domestic production of finished steel products in the periods 1951 through 1966 and 1960 through 1963 respectively. It will be seen that before 1955, when Acerias Paz del Rio was started up, production was confined to Empresa Siderurgica de Medellin and was quite small. Subsequently there was a marked increase in domestic production, especially of merchant products, which in 1967 amounted to approximately 72% of apparent consumption respectively. This probably approached the maximum practical extent of import substitution of this product group, as certain sizes and qualities consumed in Colombia were outside the product range manufactured by the local steel producers. On the other hand domestic production of flat rolled products represented only a small proportion of apparent consumption and points up the need for additional domestic production capacity in this field.

Preliminary figures for 1968 indicate that domestic finished steel production amounted to 205,400 tons of which Paz del Rio's share may have been as high as 80%. Because of its dominant position, Paz del Rio is the price leader for the sector, with the other producers aligning their prices on Paz del Rio's.

CONSUMPTION AND TRADE

Table 1 shows the apparent consumption of finished steel products in the period 1960-1967. While domestic production increased at a fairly steady rate, apparent consumption varied extensively with the availability of foreign exchange for imports.

As previously stated, the iron and steel industry in Colombia is entirely privately-owned. This means that there is no industry-wide planning of the sector, in the sense that there is neither a unified market forecast nor a master program of expansion aimed at the most economical production of the country's steel requirements.

Demand projections are therefore the work of the individual steel producers with Paz del Rio, because of its dominant position, generally taking the lead. Paz del Rio's demand forecast for finished steel products for 1975 is shown in Table 4 below, where it is compared with the actual demand in 1967.

TABLE 4
Demand Forecast for 1975*

| | <u>1967 Actual</u> (in tons) | <u>1975 Projected</u> | <u>Growth Rate</u> % |
|--------------------------------|---------------------------------|-----------------------|-------------------------|
| <u>Bars, Rods and Shapes</u> | <u>201,300</u> | <u>332,900</u> | 6.5 |
| Bars and rods | | 233,400 | |
| Shapes | | 99,500 | |
| <u>Flat Rolled Products</u> | <u>90,900</u> | <u>286,600</u> | 15.4 |
| Hot rolled products | | 143,300 | |
| Cold rolled products | | 97,100 | |
| Tinplate | | 46,200 | |
| <u>Wire Products</u> | <u>82,800</u> | <u>70,310</u> | - |
| Bright wire | | 19,540 | |
| Special wire | | 8,930 | |
| Galvanized wire | | 14,420 | |
| Barbed wire | | 27,420 | |
| <u>Total Finished Products</u> | <u>375,000</u> | <u>689,810</u> | 7.9 |

*Excluding rails and alloy steels

SOURCE: Estudio Sobre Acerias Paz del Rio, S.A., January 1968.

In the event, demand in the past two years is thought to have increased more rapidly than expected when this forecast was prepared. According to Paz del Rio's market survey for cold rolled products dated December 1969, the demand for cold rolled coil and sheets in 1976 is expected to be 215,000 tons and that for tinsplate stock 48,000 tons. This suggests that total demand for finished products in 1975 will probably be not less than 800,000 tons or over 1 million tons in ingot equivalent.

Paz del Rio's forecast appears to be based on more recent information than that prepared for IFI in October 1969, which uses the projections made by Paz del Rio in January 1968 shown in Table 4. The large discrepancy between these two forecasts, both prepared in the second half of last year, points up to the importance of a unified market forecast to permit a rational development of the sector.

As can be seen from Table 1 Colombia is a net importer of finished steel products. Statistics of the commercial trade balance for steel products are shown in Table 5. The principal import items are flat rolled products and tubes in that order, while tubes constitute practically the entire export of steel products.

TABLE 5

Trade in Semi-finished and Finished Steel Products

| <u>Year</u> | <u>Imports</u> c.i.f. | <u>Exports</u> f.o.b. | <u>Net Imports</u> |
|-------------|---------------------------|--------------------------|--------------------|
| | -----million dollars----- | | |
| 1960 | 34.88 | (a) | 34.88 |
| 1961 | 34.66 | 0.01 | 34.65 |
| 1962 | 32.56 | 0.01 | 32.55 |
| 1963 | 32.38 | (a) | 32.38 |
| 1964 | 42.66 | 0.08 | 42.58 |
| 1965 | 29.34 | 0.39 | 28.95 |
| 1966 | 51.78 | 0.43 | 51.35 |
| 1967 | 31.42 | 0.47 | 30.95 |
| 1968 | 35.64 | 0.25 | 35.39 |
| (a) | less than 0.01 | | |

Source: External Trade of Minerals and Mineral Products, 1960-1968. Ministry of Mines and Petroleum, September 1969.

The data show that there has been no sustained increase in the value of net imports in the period 1960 to 1968. This is borne out by Table 1 from which it can be seen that the volume of steel imports in this period averaged around 180,000 tons per annum.

PRESENT PRODUCTION FACILITIES

As stated earlier, the sector consists essentially of one integrated plant, four arc furnace and rolling mill plants and one re-roller located in or near the four major centers of consumption. One of the arc furnace plants also has an electrolytic tinsplate line. Details of their capacities and production facilities are shown in Table 6. These plants are currently operating at a high level of capacity utilization and are all in the process of expanding or proposing to expand their facilities.

It will be noted that the reversing hot strip mill (Steckel mill) at Paz del Rio is not yet operational. The reason for this is twofold. First, there is insufficient power available at the present time and secondly, in the absence of a cold mill, the demand for hot rolled coil and sheets as such in Colombia would not justify the operation of this mill. Paz del Rio proposes to put the Steckel mill on stream when construction of the proposed cold reduction mill is well advanced.

COMPETITIVENESS AND PRICE

In terms of quality domestically produced steel products are generally comparable with imports. The principal exceptions are the hot and cold rolled sheets produced by Paz del Rio which, because they are rolled on a hand mill, are not up to the standard of imported hot and cold rolled products. This tends to limit the use of Paz del Rio sheets to applications where finish is not of prime importance.

Imported iron and steel products generally are subject to an ad valorem tariff ranging from 5 to 65 percent and prior deposits ranging from 30 to 130 percent. For the products manufactured in Colombia the specific rates of duty and prior deposit are shown in Table 7.

TABLE 6

DETAILS OF PRODUCTION FACILITIES OF THE PRINCIPAL PRODUCERS

| <u>Name of Company</u> | <u>Location</u> | <u>Hot Rolled Products Capacity (tons/annum)</u> | <u>Iron Making Facilities</u> | <u>Steel Making Facilities</u> | <u>Holling Facilities</u> | <u>Finishing Facilities</u> |
|---|-----------------|--|---|---|---|--|
| Acerias Paz del Rio | Belencito | 200,000 | Ore bedding system, One 1200 tons/day sinter plant, One battery of 51 coke ovens, One 19'-6" diameter blast furnace with a daily iron make of 670 tons | One 800-ton hot metal mixer, Three 22-ton Thomas converters, One 20-ton electric arc furnace with a combined capacity of 200,000 ingot tons/annum | One combination slabbing/blooming mill, One 56" wide, 4-high reversing hot strip mill with a capacity of 450,000 tons/annum (not yet operational), One 3-stand billet and section mill, One merchant mill for light sections, bars and wire rod, One hand-sheet mill for hot and cold rolled sheets | One wire drawing plant for bright, galvanized and barbed wire with a capacity of 37,000 tons/annum |
| Empresa Siderurgica | Medellin | 50,000 | - | Electric arc furnaces with a capacity of 50,000 tons/annum of common and specification carbon steel | One merchant mill for light sections, plain and deformed bars and wire rod | One electrolytic tinplate with a capacity on 3-shift operation of 54,000 tons/annum, One electric resistance welding machine for tubes up to 4" diameter, One galvanising line |
| Siderurgica Muna (a subsidiary of Empresa Siderurgica) | Bogota | 20,000 | - | Two electric arc furnaces | One merchant mill for light sections and bars | - |
| Siderurgica del Pacifico (SIDELPA) | Cali | 50,000 | - | Two electric arc furnaces with a capacity of 30,000 ton/annum of common, specification carbon and low alloy steel | One new 5-stand mill and one older merchant mill, both for light sections and plain and deformed bars | Heat treatment ovens for for annealing specification carbon and low alloy steel |
| Corporacion de Acero (CORPACERO) | Barranquilla | 10,000 | - | Two electric arc furnaces with a capacity of 10,000 tons/annum | One merchant mill for light sections and bars | One hot-dip tinplate line, One electric resistance tube welding machine |
| Metalurgica Boyaca | Tunja | <u>18,000</u> | - | - | One merchant mill for light sections and bars | - |
| TOTAL HOT ROLLED PRODUCTS CAPACITY | | <u>318,000</u> | | | | |

Table 7

Rates of Duty and Prior Deposits on Imports
of Selected Steel Products
(Applicable as of May 14, 1970)

| <u>Description</u> | <u>Rate of Duty</u> (percent) | <u>Prior Deposit</u> |
|------------------------------|----------------------------------|----------------------|
| Wire rod | 25 | 70 |
| Bars and rods | 25 | 1 |
| Shapes and sections | 25 | 70 |
| Wire products | | |
| bright | 50 | 70 |
| galvanized | 55 | 70 |
| barbed wire | 65 | 130 |
| Flat rolled products | | |
| hot rolled plates and sheets | 28 | 70 |
| cold rolled sheets | 30 | 30 |
| tinplate | 25 | 30 |

Source: Acerias Paz del Rio

In addition imports of steel products are subject to prior licence, the issuance of which requires the production of proof on the part of the prospective importer that the local mills are unable to supply his requirements as to quality and delivery. At the present time domestically produced steel products are considerably cheaper than equivalent imports after duty and licence applications are therefore readily approved.

As stated in paragraph 12, Paz del Rio because of its dominant position is the price leader for the sector, with the other producers

aligning their prices on Paz del Rio's. There is no longer any price control on steel products, but the producers - essentially Paz del Rio - are required to furnish one month's advance notice of intended price increases, so that a judgment may be made whether the increase is reasonable and, if not, to provide an opportunity to negotiate a lower increase. Thus the list prices represent a compromise between the desire of Paz del Rio to maximize its profits and that of the authorities to hold down the prices of basic inputs.

Table 8 shows the movement of prices of some typical steel products, f.o.b. Belencito, for the period November 1963 - November 1969.

Table 8

Movement of Prices of Representative Steel Products
in the Period November 1963-November 1969

| | <u>3/8" dia.</u> <u>bars</u> | <u>3/4" dia.</u> <u>bars</u> | <u>5/16" dia.</u> <u>wire rod</u> | <u>Hot rolled</u> <u>sheets</u> | <u>Angles</u> |
|---------------|---|---------------------------------|--------------------------------------|------------------------------------|---------------|
| | (Current Pesos per ton, f.o.b. Belencito) | | | | |
| November 1963 | 1,740 | 1,555 | 1,930 | 1,950 | 2,070 |
| " 1964 | 1,645 | 1,420 | 1,995 | 1,985 | 1,965 |
| " 1965 | 1,645 | 1,420 | 1,995 | 1,985 | 1,965 |
| " 1966 | 2,040 | 1,935 | 2,245 | 2,190 | 2,260 |
| " 1967 | 2,040 | 1,935 | 2,245 | 2,190 | 3,000 |
| " 1968 | 2,504 | 2,405 | 2,705 | 2,975 | 2,805 |
| " 1969 | 3,240 | 3,100 | 3,480 | 3,760 | 3,960 |

Sources: Prices for 1963-1968 - ILAFA, Anuario Estadístico 1967, 1968 and 1969.
Prices for 1969 - Paz del Rio, Price List dated November 15, 1969.

It will be seen that there was a marked increase in prices during 1969, in line with the increase in export prices of the major steel producing countries. In consequence Paz del Rio achieved its best results in the year ended December 1969, when it made a profit of approximately 81.1 million pesos, equivalent to a margin of 425 pesos per ton of finished product. These figures compare with the previous year's profit of 54.5 million pesos and a margin of 330 pesos per ton and the profit for 1967 of 21.0 million pesos and a margin of 130 pesos per ton. In the same period SIDELPA's profit went up from 7.3 million pesos in 1967 to 13.7 million pesos in 1968 and an estimated 20.5 million pesos in 1969. The corresponding margins per ton of finished product were approximately 440, 635 and 705 pesos respectively, reflecting to some extent the higher profitability associated with the manufacture of special as compared with common steel.

Table 9 shows a comparison between recent European f.o.b. export prices, c.i.f. prices and delivered prices of imported steel products, before duty and taxes, in some of the major centres of consumption on the one hand and the ex-works prices of Paz del Rio and Empresa Siderurgica and the delivered prices of their products in Medellin and Bogota on the other. It is apparent from this table that the current delivered prices of domestically produced bars and rods in Bogota and Medellin are equal to or less than the prices, before duty, of equivalent imports while those of bright wire and hot rolled sheet are less than those of equivalent imports in Bogota, but on account of inland transport slightly higher (8-10 percent) in Medellin. In Bogota the excess cost of the domestic product over the equivalent import (protection requirement) for the remaining products ranges from 5.5 percent for barbed wire to 7.4 percent for tinsplate, 7.6 percent for channels and beams and 10.9 percent for galvanized wire. In Medellin the protection requirement is somewhat greater and ranges from 5.7 percent for tinsplate to 9.3 percent for barbed wire, 11.9 percent for galvanized wire and 16.0 percent for channels and beams. Thus on the basis of the current high price levels, the protection requirement of domestically produced steel products in Bogota and Medellin is not unduly high. In Barranquilla, however, the protection requirement ranges from zero for 3/8" diameter bars to 24.5 percent for channels and beams.

On the other hand steel is a low value product which enjoys natural protection in the interior of the country because of the incidence of high inland transport costs on the price of imported steel. In fact, ocean freight and inland transport add approximately 40 percent to the current f.o.b. export price of steel products. The leading producer, Paz del Rio, is handicapped by the low quality of its iron ore and coal which results in a high pig iron cost. With better inputs and a high standard of operation and maintenance the direct operating costs of Thomas ingots

TABLE 9

Price Comparison Between Domestically
Produced and Imported Steel Products
(US\$1 = Col\$18.30)

| | ----- Imported Steel ----- | | | | | ----- Domestic Steel ----- | | | |
|------------------------------------|----------------------------|---------------------------------|-----------|-------|-------|----------------------------|-----------------|-----------|-------|
| | FOB Antwerp US\$/ton | CIF Barranquilla | Delivered | | | FOB Belencito | FOB Medellin | Delivered | |
| | | Pesos/ton (before duty and tax) | | | | | Medellin | Bogota | |
| | | | | | | | | | |
| 1/4" dia. wire rod | 151.50 | 3,149 | 3,648 | 3,848 | 3,908 | 3,480 | | 3,660 | 3,545 |
| 3/8" dia. bars | 153.00 | 3,176 | 3,679 | 3,879 | 3,939 | 3,240 | | 3,420 | 3,305 |
| 3/4" dia. bars | 128.00 | 2,719 | 3,050 | 3,250 | 3,310 | 3,100 | | 3,280 | 3,165 |
| Channels and beams | 138.00 | 2,902 | 3,370 | 3,570 | 3,630 | 3,960 | n.a. | 4,140 | 4,025 |
| 9 gauge bright wire | 148.00 | 3,085 | 3,577 | 3,777 | 3,837 | 3,740 | | 3,920 | 3,805 |
| 8 gauge galvanized wire | 167.20 | 3,436 | 3,973 | 4,173 | 4,233 | 4,490 | | 4,670 | 4,555 |
| Galvanized barbed wire | 186.80 | 3,795 | 4,521 | 4,721 | 4,781 | 4,980 | | 5,160 | 5,045 |
| 16 gauge hot rolled sheet | 152.00 | 3,158 | 3,659 | 3,859 | 3,919 | 3,760 | | 3,940 | 3,825 |
| Electrolytic tinplate (107 lb.) | 220.00 | 4,400 | 4,900 | 5,100 | 5,160 | - | 5,390 | 5,390 | 5,540 |

Source: Acerias Pas del Rio,
Current Price List.

Empresa Siderurgica de Medellin,
Recent (but possibly not the latest) Price List.

Continental Iron and Steel Trade Reports, April 21, 1970,
Export Prices.

La Superintendencia de Regulacion Economica,
Resolution No. 0334, September 6, 1963.

June 9, 1970

could probably be reduced by some 200 pesos per ton (15 percent) with proportionate reductions for the finished products. An expansion of Paz del Rio's iron and steel making capacity to meet the entire demand for bars, rods and wire products in the interior of Colombia would reduce the capital cost per annual ton of installed capacity and thus the capital charges - amortization and interest - per ton of finished product.

The challenge facing the sector, therefore, is how to develop and expand its production facilities so that the price of finished steel products to the consumer will gradually approach the level prevailing in the industrialized countries. This question will be discussed in the section dealing with recommendations.

FUTURE DEVELOPMENT PLANS

As stated under Consumption and Trade, total demand for finished steel products is expected to approach 1 million tons by 1975. Consequently, all the principal producers referred to above are in the course of expanding their production facilities or have reasonably firm expansion plans. In the absence of a master development plan for the sector, these expansion projects have not been coordinated. If implemented, they would accentuate the present shortfall of domestic scrap generation and result in further fragmentation of production facilities.

As already stated, Paz del Rio's next expansion phase consists of the installation of a cold rolling mill at Belencito to complement the recently completed reversing hot strip mill. This mill which would have a rated capacity of some 250,000 tons of cold rolled coil and sheet and tinplate stock per annum, is scheduled to be in operation by the beginning of 1973.

There is no question that a cold mill is needed in Colombia, as the demand for hot mill products as such is too small to justify the operation of Paz del Rio's Steckel mill. In fact, the Steckel mill should not have been installed without a cold mill to process the hot rolled coil into cold rolled products - coil, sheet and tinplate stock. The cold mill should therefore be viewed as the second, integral part of the flat rolled products facility, of which the Steckel mill forms the first part. However, Thomas steel, which constitutes about 85 percent of the ingot steel produced by Paz del Rio, is unsuitable for cold rolling. The serious choice facing Paz del Rio is therefore whether in the long term to run its hot and cold mills on imported strip mill slabs or convert the Thomas plant to a BOF plant, capable of producing ingots of the requisite quality. The relative economics of these alternatives have not been examined.

An associated question is whether, having regard to the low quality of Paz del Rio's iron ore and coal, basic iron and steel making capacity in Colombia should be expanded by the installation of a second blast furnace at Belencito or alternatively by putting down a semi-finished

products plant at a coastal location based on the use of high grade imported ore and coal from the Cerrejon deposit in Guajira. It is understood that this question will be studied jointly by Paz del Rio and IFI.

Paz del Rio's decision to install the cold rolling mill at Belencito is based on the belief that any attempt at this stage to investigate the economics of a coastal location, in conjunction with the proposed blast furnace study, would result in such delays as to vitiate any potential savings due to lower inland transportation costs.

Of the smaller steel producers Empresa Siderurgica, Medellin, is currently in the process of expanding its steel making capacity to approximately 100,000 tons per annum by the installation of a 30-ton arc furnace and construction a new 5-stand merchant mill for light sections, bars and rods. SIDELPA, Cali, expects to install a second 12-ton electric arc furnace during the second half of this year thereby increasing its steel making capacity, principally for specification carbon and low alloy steel, to about 50,000 tons per annum. CORPACERO, Barranquilla, is contemplating the installation of a third electric arc furnace and additional rolling equipment to raise its capacity to 20,000 tons per annum. Metalurgica Boyaca, Tunja, has ambitious expansion plans, which envision the installation of an 8 to 10-ton arc furnace in stage I and of a 40,000 tons per annum blast furnace and LD-steel making plant, with a continuous casting machine, in state II.

In addition the recently created Siderurgica de la Sabana (SIDESA), in which IFI has an interest, is believed to be on the point of placing orders for a 30,000 tons per annum pig iron plant at Tipito, on the altiplano some 100 km northwest of Bogota. It proposed to use the locally occurring iron ore, coking coal and limestone deposits and expects to be able to sell its pig iron mainly to the foundry industry at the price of equivalent imports.

CONCLUSIONS AND RECOMMENDATIONS

As stated under Structure and Growth, the sector is now at the point where scrap requirements exceed domestic scrap generation by about 100,000 tons per annum and the manufacture of flat-rolled and possibly other sophisticated steel products requires concentration of production facilities to achieve minimum economies of scale. It follows that a proliferation of new arc furnace capacity would merely aggravate the present shortfall of domestic scrap arisings and result in an increasing proportion of high-cost imported scrap and at best a maintenance of present selling prices for finished products.

Agreement in principle between Paz del Rio and IFTI has already been reached on a joint sectorwide study to select the optimum location for the next blast furnace to be put down in Colombia. This shows an awareness of the importance of planning the growth of the iron and steel sector on a country-wide basis, especially since the high freight costs in Colombia may invalidate some of the solutions found in other countries.

It would require but one more step to extend the scope of this study to its logical conclusion and make it an all-embracing survey of the iron and steel sector in Colombia, coupled with an evaluation of the various possibilities for expansion of capacity and diversification of product lines. It is therefore recommended that the Government of Colombia commission a comprehensive study of the iron and steel sector which should broadly cover the following points:

- (i) carry out a technical audit of present production capacity,
- (ii) review the availability of raw materials, both domestic and imported, determine realistic freight costs and estimate the availability and present and probable future costs of services, particularly power and water,
- (iii) prepare estimates of production costs for the larger plants,
- (iv) review and evaluate the recent estimates of the demand for steel prepared by IFTI and Paz del Rio, including a long-range forecast for the year 1980, having regard to the likely impact of the Andean Group and LAFTA integration on the pattern of demand and the availability of semi-finished products,
- (v) prepare estimates of the differences between projected demand and capacity for groups of products on a yearly basis,
- (vi) review and evaluate both the existing proposal for installing a cold rolling mill at Belencito and the study by Sofresid now in course of preparation for installing a cold mill on the Atlantic coast,
- (vii) review and evaluate other defined proposals for expansion in the industry,
- (viii) after making allowance for the continued importation of items that cannot be economically produced in Colombia, recommend the most economical program of expansion of the industry which would produce the remaining range and tonnage of products, and indicate likely selling prices in the major consumption centers,

- (ix) identify any special transportation bottlenecks whose removal would facilitate the importation of raw materials and/or semi-finished products to and the distribution of finished products from the plants recommended in (viii) above.

Since the results of the study will be influenced by the cost of transport and of foreign exchange, it is suggested that a sensitivity analysis be carried out for the plausible range of values of these two variables.

In view of the number of expansion projects, for which it is understood equipment orders are shortly to be placed, the proposed study should be initiated without delay. It should preferably be undertaken by consultants of worldwide repute, drawing to the fullest possible extent on the data and skills available in Colombia. Pending completion of this study no further expansion projects for the sector should be approved or import licences for equipment issued.

Once the study has been completed it is expected to form the basis of the Planning Department's (DNP) evaluation of expansion and diversification projects in the sector and of INCOMEX's issuance of import licences. In this way the growth of the sector would be guided along lines aimed at increasing its efficiency and bringing about an all-round reduction in the selling prices of finished steel products. This, in turn, would benefit the entire economy, because the steel consuming industries should be able to pass on a proportion of these price reductions to their customers and at the same time improve their export potential.

ANNEX 2

Pulp and Paper Industry

PULP AND PAPER INDUSTRY

INTRODUCTION

The pulp and paper industry in Colombia has undergone substantial growth and now supplies virtually all internal demand (except mainly for newsprint). As the industry appears to be competitive on an international basis, there may be scope for enlarging its exports in the future. Another area of future interest is the possible development of local raw materials to replace imports, particularly of long fiber pulp.

Due to pressure of time, the mission was, unfortunately, not able to study this sector in the depth it deserves, particularly regarding interesting developments for the immediate future. However, the following brief review gives the main characteristics of the subsector and points to areas which should be followed up.

This review is based primarily on interviews with and plant visits to the two major producers of paper in Colombia. This information was supplemented by desk study of a report published in November 1969 by the Universidad del Valle on "Production, Apparent Demand, and Projection of Consumption of Paper and Paperboard in Colombia." This report was prepared for the Instituto de Fomento Industrial (IFI), the Cali Financiera, and El Ingenio Riopaila (a sugar milling concern).

HISTORY AND DEVELOPMENT

There has been some production of paper products in Colombia since the beginning of the industrial era there. However, the foundation for modern paper making was laid in 1944, when the Container Corporation of America formed "Carton de Colombia." This company initially established a paper converting unit, to produce boxes from imported kraft board; and then integrated backwards, as the volume of business warranted. By 1953, it had installed its first kraft paper machine at Cali, based on imported pulp. Subsequently, it installed three more paper machines, a pulp plant based on local hardwood, and four converting plants, at Barranquilla, Bogota, Medellin and Turbo.

In 1961, writing and printing papers were produced for the first time, using bagasse for raw material, by Productora de Papel (Propal). This company was established by W.R. Grace and the International Paper Corporation, both of the U.S.A. The plant was built at Cali, near the Carton de Colombia facility; and is conveniently located in relation to the sugar-growing area of the Cauca Valley. Today Colombia is practically self-sufficient in writing and printing papers, with the exception of newsprint, all of which is still imported.

There are two other small companies which may be regarded as integrated producers but their combined output is about one-tenth that of the two major companies.

PRESENT STRUCTURE OF THE INDUSTRY

The total installed capacity of paper factories in Colombia is about 240,000 tons per year. Production in 1969 amounted to 203,000 tons, indicating a utilization factor of 85%. Installed capacity for pulp manufacture amounts to about 133,000 tons per year; actual production in 1968 amounted to about 85,000 tons, indicating a utilization factor of about 64%.

Carton de Colombia S.A. is owned 60% by Container Corporation of America and 40% by about 350 Colombian shareholders. The largest local shareholder (3%) is an insurance company. The management of the company is largely in Colombian hands, the U.S. interest being represented by two members on a Board of five Directors.

The company does not own any forests; but it has cutting rights in various forest areas; and it operates a re-afforestation program. The principal plants of the company are located at Yumbo, 15 km from Cali. The location was chosen for its proximity to the major forests from which hardwood is extracted for pulping and to an adequate supply of water. The pulp plant is actually owned by a separate company, Celulosa y Papel de Colombia S.A. (Pulpapel), which was originally a joint enterprise of Carton de Colombia and IFI. After it was working at a profit, IFI sold its shares to Carton de Colombia. This plant is perhaps the only one of its kind in the world, producing pulp for papers from tropical hardwoods.

The company operates 4 paper machines and converting and printing machines for production of cartons and has a capacity of 130,000 tons/yr of paper products. In 1969 the company produced 115,000 tons of various paper items, including box boards, container boards, wrapping, and kraft papers, liners, grocery bags, and clay coated, white patent coated and solid fiber papers. About 50% of the output (by weight) consisted of mill products, i.e. rolls of paper and standard size boards, and the other half consisted of fabricated products, e.g. printed containers, bags, tubes, etc. The company supplied about 40 customers with mill products, and 1,800 customers with fabricated products.

Total employment in the company amounts to 1,800 persons, of whom about 400 are salaried staff, 1,000 are skilled workers and 400 unskilled workers. The company also employs about 5,000 workers on contract for forestry operations.

Productora de Papel S.A. (Propal), the second largest paper producer, is owned entirely by U.S. interests, 50% by International Paper Corporation and 50% by W.R. Grace and Company. Management is largely Colombian; but there are some Americans in top management positions, including the Financial Director.

Propal's plant is also located at Yumbo. This is an integrated facility using sugar-cane bagasse for production of rolled and cut writing and printing paper products. Bagasse is purchased from 10 sugar mills located within a 35 km radius. The company's consumption of bagasse in 1969 was about 300,000 tons per year, yielding approximately 57,000 tons of paper.

This output is achieved from 3 paper-making machines with a capacity of 70,000 tons/year of paper. A fourth machine is to be added, in order to raise capacity to 100,000 tons per year. The principal products of the company are bond, offset, ledger, duplicator, manifold, manila, wrapping, and bag papers, and napkin, toilet and sulfite tissues.

The company employs about 700 persons, of whom 150 are salaried employees.

Both companies rely almost entirely on road transport to draw their raw material supplies to the plants and to deliver their products. The total incoming load is about 700,000 tons, and the outgoing load about 175,000 tons per year.

Both companies depend on Planta de Soda, Bogota, for supplies of caustic soda and chlorine. Caustic soda is transported in rubber pillows on ordinary flat-bed trucks; and the vehicles can use 80% of their capacity for back-hauling paper to Bogota, losing only 20% of their capacity for the rolled up pillows. Chlorine is transported in special tank trucks which have to return empty.

Compared with the two main producers with combined production of 172,000 tons per year, eleven other small producers in 1969 had a total production of about 31,000 tons, with the largest producing about 7,000 tons per year, and the smallest less than 400 tons.

Fabrica Nacional de Carton Ltd., also located in Cali, and using bagasse as raw material, produces largely chip board, liner board, box board, hard board, and album paper. Its total capacity is about 7,000 tons.

Papeles Nacionales S.A., located at Pereira, produces about 4,600 tons per year of toilet, napkin and facial tissues.

The other nine companies together produce less than 10,000 tons of paper and paper products annually. Their operations were not examined individually.

SUPPLY AND DEMAND

Pulp

Colombian pulp mills have to depend upon hardwood forests and sugar-cane bagasse for their fiber requirements. No softwood resources of any economic significance have been located or developed so far. Waste paper, both domestic and imported, is used to supplement fresh pulp for paper making, on a considerable scale.

In 1968 the total quantity of raw materials, - pulp and waste paper, - used in Colombia for paper making amounted to about 192,000 tons. The breakdown of this figure, by varieties and sources, is indicated in the following table:

| <u>Type of Raw Material</u> | <u>Unit: Metric tons</u> | |
|--|--------------------------|-------------------|
| | <u>Quantity</u> | <u>Percentage</u> |
| (a) Domestic, total | <u>147,289</u> | <u>76.4</u> |
| (i) Chemical and semi-chemical pulp from hardwood | 39,792 | 20.8 |
| (ii) Pulp from bagasse | 45,140 | 23.5 |
| (iii) Waste paper | 62,357 | 32.1 |
| (b) Imported, total | <u>45,380</u> | <u>23.6</u> |
| (i) Chemical and semi-chemical long- fiber pulp | 37,610 | 19.6 |
| (ii) Mechanical pulp | 1,886 | 1.0 |
| (iii) Waste paper | 5,884 | 3.0 |
| | <hr/> | <hr/> |
| Total a + b | <u>192,669</u> | <u>100.0</u> |
| | <hr/> <hr/> | <hr/> <hr/> |

It will be noticed that waste paper, domestic and imported, constituted over 35% of the total raw material supply.

Turning to the local pulp supply - which is all short fiber pulp - the Universidad del Valle study projected the following pattern for the growth of installed capacity and demand:

Supply and Demand for Short Fiber Pulp in Colombia

| <u>Year</u> | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>1973</u> | <u>1974</u> | <u>1975</u> |
|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Installed Capacity | 133 | 185.1 | 185.1 | 190.0 | 197.1 | 197.1 |
| Demand | 103.3 | 116.8 | 130.3 | 146.8 | 160.6 | 175.4 |
| Surplus | 30 | 68.3 | 54.8 | 43.2 | 36.5 | 21.7 |
| Demand as % of Capacity | 79 | 63 | 70 | 77 | 81 | 94 |

The increase of capacity between 1970 and 1971 will be caused by a number of smaller bagasse mills coming on stream.

The study concludes that the surplus of local pulp capacity shown to exist through 1975 precludes any immediate prospect for promoting a new pulp project based on local pulping species. On the other hand, with its present surplus Colombia should be in a favorable position to supply other Andean countries, especially if pulp is included in the Andean Group accords. The prime customers would be the smaller non-integrated paper mills.

Paper

Local paper supply meets most of the demand but imports are still required to meet demands for the higher quality papers. In 1968 imports amounted to some 28,000 tons, but these were more than balanced on a weight basis by exports of 42,000 tons. The balance of the value of this trade is not known.

Newsprint imports are not included in the above figures. Colombia had a demand of 52,000 tons of newsprint in 1966, and this is expected to increase to 65,000 tons in 1970 and 87,000 tons in 1975. As all newsprint is imported this large potential demand should provide an added incentive for examining projects to produce long fiber pulp in Colombia, as this is the necessary raw material for producing newsprint.

The Universidad del Valle study examined the demand for other papers for each of the main categories and compared this with expansion plans of the suppliers for the period 1970-1979. This showed that there would be a short-fall of printing papers and cardboard and a surplus of kraft paper. These would about balance one another so that the overall supply and demand of paper would be in balance. This points to the need for rationalizing the expansion plans of the industry to try to insure that all needs are met adequately without unnecessary surpluses developing.

PRICES AND COSTS

The principal manufacturers of pulp, papers and boards in Colombia claim cost competitiveness within South America, and a reasonably competitive position vis-a-vis imports from elsewhere. The two largest manufacturers supplied data regarding average prices of their own products and comparable imports in 1969 as indicated below:

| <u>Average Selling Price^{1/} of Papers</u> | | | | |
|---|----------------|-----------------|----------------|--|
| <u>(per ton)</u> | | | | |
| <u>Carton de Colombia</u> | | <u>Propal</u> | | <u>Comparable Imports^{2/}</u> |
| <u>in Pesos</u> | <u>in US\$</u> | <u>in Pesos</u> | <u>in US\$</u> | <u>in US\$</u> |
| 4,020 | 230 | 5,000 | 285 | 250 |

^{1/} The average selling price is the total sales value divided by the total tonnage of papers of all types for each company.

^{2/} For "cultural" papers only; price mentioned is F.O.B. port of origin in U.S.A.

Not too much significance should be attached to these average figures of prices because they combine a multitude of prices, varieties, and specifications, without appropriate weights. It appears, however, that the comparative status indicated is borne out by some specific prices. For instance, the Universidad del Valle study indicates that in 1965, prices of kraft liner, kraft paper for bags, and printing paper were lower in Colombia than in Chile by 20-90%; and they were lower than in Peru by 40-90%. Subsequently the position changed further in Colombia's favor, because of the considerable inflation in Chile and Peru.

There is only a very small market for domestic pulp in Colombia as the bulk of output is used within the integrated manufacturing facilities. However, Propal indicated sales of about 2,500 tons in 1968 at a price of Pesos 2,640 per metric ton (= US\$150.85). Comparable grades of pulp were not imported in Colombia, but long fiber pulps were imported at prices indicated below:

| <u>Type of Pulp</u> | <u>Price: C.I.F. in US\$</u> |
|---------------------|------------------------------|
| Bleached kraft | 165 |
| Semi-bleached kraft | 166 |
| Unbleached kraft | 134 |

These reported prices are in line with prices for similar varieties quoted in trade journals.

The two major companies gave the following breakdown of their production costs in 1969:

| <u>Item</u> | <u>Carton de Colombia</u> | <u>Propal</u> |
|---|---------------------------|---------------|
| Production cost including) pesos | 3,750 ^{3/} | 3,250 |
| depreciation per metric) | | |
| ton ^{1/}) US\$ ^{2/} | 214 | 186 |
| % of cost attributable to raw materials | 50% | 30% |
| % of raw material imported | 50% | 25-30% |

^{1/} Total cost divided by total tonnage of output.

^{2/} Conversion rate 1 US\$ = 17.5 pesos.

^{3/} Includes taxes.

When these costs are compared with the selling prices it can be seen that a large margin exists in the case of the cultural paper (34% after allowing for taxes at 36% on gross profit) but there is not much profit margin for the

industrial papers (7%). Carton de Colombia in fact said that 80% of their corporate profit is generated in the pulp production of the subsidiary company Pulpapel. Both companies claim that their production costs are not out of line with international costs.

It can also be seen from the table that a large percentage of the production costs is attributable to imported materials, most of which consist of long fiber pulp.

OUTLOOK FOR THE FUTURE

Long Fiber Production

As has been mentioned several times in this report, Colombia is deficient in long fiber pulp for producing quality papers for which there is a demand, and which can tolerate only minimum amounts of short fiber content. For instance, newsprint, high-quality cardboard, liner board and first-class packaging paper cannot have any short fiber components. On the other hand, paper for journals and good books can tolerate up to 60% of short fiber. A table showing the tolerance of short fiber in various papers is given in Annex 2(a).

Colombia therefore imports long fiber pulp, all its newsprint, and much of its liner board requirements, as well as long fiber waste paper. These imports are currently costing Colombia \$16 million per year, a figure expected to reach \$24 million by 1975.

The lack of long fiber in Colombia has been known for many years and although many studies have been made to investigate means of supplying it, nothing specific has developed. Half of these studies have concentrated on producing long fiber pulp from local tropical wood species of which the so-called cecropia tree appears to offer the most promise. The other half of the studies have been aimed at developing commercial forests of northern hemisphere pine species in Colombia. Both types of studies have been mostly theoretical and lacked follow-through such as pilot plant pulp tests of local species or attempts to commercialize the existing stands of pine, such as those in the Antioquia area. These stands are owned by smallholders who exploit the timber only for its value as building material for which it commands a high price.

Since long fiber pulp is readily available from international sources, there is no commercial pressure to push forward such studies. However, the broader implications for the economy justify government initiative. IFI has recognized these problems and has recently signed a contract with a Canadian and a local engineering company for a practical study of the feasibility of an integrated pulp and paper plant utilizing the cecropia timber of Colombia. This will also involve the planting of an experimental stand of trees and pilot plant tests to determine the suitability of using this timber in conjunction with the local pine timber for the production of paper. It is envisaged that it will take one year to set up the study and a further five years for the planting and experimental work.

This study merits attention as its significance goes well beyond import substitution in Colombia only. Not only will it investigate the development of a forest resource presently untapped there and possibly in other tropical countries, but also the commercialization of imported tree species which can be grown on land not able to be used at present.

Expansion Plans of Existing Companies

Both of the major companies have active investment and expansion programs. The following specific projects were mentioned during the mission:

Propal

The most immediate project is one for \$2.2 million to produce coated papers. It will require \$1.2 million in foreign currency, and Propal will be approaching the Financiera de Valle shortly with this project. It is aimed at producing 8-9,000 metric tons per year of coated papers for substituting imports and Propal is also looking to some export possibilities.

Propal expects to start production on a fourth paper machine by 1974. It would have a capacity of 100-200 tons per day and the project would require at least one year for a feasibility study, which is expected to be undertaken early next year.

Another medium-term project is for approximately \$8.5 million for a chemical recovery plant. At present Propal disposes its waste chemicals into the Cacao River, creating both a pollution hazard and increasing the cost of pulp production. No definitive timing was given for this project although it is pressing especially because of the pollution problems.

Carton de Colombia

This company has an ambitious set of projects defined through 1972 which will cost some \$22 million. In addition the company feels it would need a general increase in working capital of some \$2.2 million. The projects can be summarized as follows:

| <u>Project</u> | <u>Investment in Million \$</u> | | | |
|--|---------------------------------|-------------|-------------|--------------|
| | <u>1970</u> | <u>1971</u> | <u>1972</u> | <u>Total</u> |
| Expand existing mills | 2.0 | 1.2 | 3.5 | 6.7 |
| Expand existing fabricating plants | 1.0 | 1.5 | 0.2 | 2.7 |
| Expand pulp mill | 0.5 | 0.9 | 4.1 | 5.5 |
| New pulp & paper plant at Barranquilla (100 T/D) | 6.1 | - | - | 6.1 |
| Other small items | 0.5 | 0.7 | 0.2 | 1.4 |
| | — | — | — | — |
| Total | 10.1 | 4.3 | 8.0 | 22.4 |
| | == | == | == | == |

The above total includes the working capital needs for each particular project, but as mentioned above, a general cash increase of some \$2.2 million is needed, making total financial needs of \$24.6 million. Of the total, some \$13 million is expected to be required in foreign exchange.

Development of Magdalena Valley Forests

IFI and INDERENA (Instituto de Desarrollo de Los Recursos Naturales Renovables) are making a major effort with the assistance of FAO to study and to invite foreign interest in the development of the forest resources of the Magdalena and Sinu Valleys. This effort started in 1967 when one of the studies of local production of kraft and newsprint pointed to the advantages of Barranca/Bermeja as a plant location. This town has a nucleus of skilled labor because of its extensive oil activities. It is also in the center of the Magdalena forest resources and would seem to be ideal for locating a timber processing plant.

A study has therefore been in progress under IFI/INDERENA/FAO auspices by the Finnish firm, Jaakko Poyry, to investigate these possibilities. Following encouraging results of the first part of the study, the promoting committee appointed by IFI and INDERENA has now written to some 100 concerns around the world to invite their participation in the further development of this large project. The letters have gone to the major timber and paper companies in the countries which are predominant in these activities and to international organizations (including the World Bank). The first step would be to develop the necessary infrastructure (roads, power, water) to support logging operations. This would be followed by sawn wood and plywood production with pulp production based on the by-products and unsuitable species.

Percent Short Fiber Content Tolerable in Various Grades of Paper

| <u>Type</u> | <u>%</u> |
|--|----------|
| <u>Cultural Papers</u> | |
| Newsprint | 0 |
| Paper for journals and first class books | 60 |
| Paper for 2nd class books | 70 |
| Fine paper, 1st class | 70 |
| Fine paper, 2nd class | 70-85 |
| <u>Industrial Papers</u> | |
| Packaging paper, 1st class | 0 |
| Packaging paper, 2nd class | 20-50 |
| Packaging paper, 3rd class | 70 |
| Cardboard for food packages | 0 |
| Liner board | 0 |
| Corrugating medium | 80-95 |
| Ordinary cardboard | 0 |
| Waxed paper | 50 |
| Sanitary paper - bleached | 90-100 |
| - unbleached and undyed | 15 |

Sources: CEPAL/FAO/UN Forestry Study;
data from paper makers

ANNEX 3

Synthetic Fibers Industry

SYNTHETIC FIBER INDUSTRYINTRODUCTION

The mission visited all the five companies who produce synthetic fibers in Colombia; in addition it utilized data from reports prepared in connection with two investments that the International Finance Corporation made in Enka de Colombia and from the Bank's lending to this sector through the Colombian Financiereas. The Bank is therefore quite familiar with the past history, present position and prospects of this branch of Colombian industry.

HISTORY AND DEVELOPMENT TRENDS

Synthetic fiber production in Colombia started in 1939. First came the manufacture of viscose fiber (rayon) from imported dissolving pulp at a plant in Barranquilla, majority owned by the U.S. Celanese Corporation. This plant was extensively modernized in 1949 at which time Celanese also began the production of cellulose acetate at Cali. Manufacture of nylon yarn started in the early 1960's and polyester followed in 1964. Acrylic fibers are not yet produced in Colombia.

Historically, the Colombian textile industry had been based on local cotton and wool fibers. Annex 3 (a) shows the percentage distribution by weight in the consumption of various textile fibers in Colombia over the past two decades and indicates the continued predominance of cotton which has kept its rank as the major fiber at close to 90% of total fiber consumption. The graph also shows the share of both cellulose and wool that has been displaced since 1960 by the rapid rise in consumption of non-cellulosic synthetics, i.e. the petrochemical based fibers such as nylon and polyester. It is interesting to compare these data with the trend of world production of fibers given in Annex 3 (b). World production of non-cellulosic synthetics has experienced a similar rapid rise starting, however, in the mid-1950's rather than the mid-1960's as in the case of Colombia. The graph also shows that, worldwide, synthetics have primarily replaced cotton fibers rather than cellulose and wool as in Colombia. This is probably due to the different relationships between prices of various fibers in Colombia as compared to many other parts of the world.

At present, synthetic fiber prices in Colombia are considerably higher than international prices due mostly to duties on imported inputs and production in a number of relatively small units with corresponding loss of economy of scale. This is discussed in more detail later. Colombian cotton prices are currently at the international level and hence, synthetics are at a price disadvantage compared to cotton.

There has been some reduction in synthetic fiber prices since 1968 and it is possible that in future the larger producers will be able to make additional price reduction by bringing down costs. However, Colombian prices are not expected to match international levels before 1975, at the earliest. One may assume therefore that the growth of synthetic fibers in Colombia in the near-term future will be stimulated mostly because of

the particular physical properties of these fibers rather than because of any price advantage.

STRUCTURE OF INDUSTRY

The Colombian synthetic fiber industry came into existence to fulfill the changing needs of the local textile industry. There are five synthetic fiber producers; all are privately owned and the shares of some of them are traded at the Bogota stock exchange. Production is concentrated either at Medellin - the center of the textile industry - or at Barranquilla where imported raw materials, on which most of the industry still depends, arrive. The exception is Celanese which has established two of its three units (cellulose acetate and polyester) at Cali with the rayon unit at Barranquilla. Celanese may have been encouraged to locate at Cali, as were many other foreign companies, because of tax and land price incentives offered in the early days in the Yumbo area, and its more equitable climate and receptiveness to foreigners.

Although due to the relatively high value of the final product, transportation considerations are of secondary consideration, there are obvious mutual advantages in locating the fiber industry where the textile customers have long been established.

Some ownership data are shown in Table 1.

Table 1

Ownership of Synthetic Fiber Producers in Colombia

| <u>Local Shareholders</u> | | <u>Foreign Shareholders</u> | | |
|-------------------------------------|------------------|-----------------------------|--|----------------|
| <u>Company</u> | <u>% held</u> | <u>% held</u> | <u>Name</u> | <u>Country</u> |
| Celanese Colombiana, S.A. | 18 | 82 | Celanese Corporation | U.S.A. |
| Enka de Colombia | 49 ^{1/} | 51 | AKZU, Carolina N.V., IFC | Holland |
| Polimeros Colombia- nos | 50 ^{2/} | 50 | United Merchants & Manufacturers | U.S.A. |
| Nylon Colombiana, S.A. | 64 ^{3/} | 36 | Didier Werke, Deutsche Entwickl. Ges. | Germany |
| Fabrica de Hilazas Varylon, S.A. | 0 | 100 | Chemstrand | U.S.A. |

1/ Held by Financieras and local textile makers

2/ Held by Coltejir

3/ 32% held by Corp. Fin. de Colombia

Fiber producers usually sell directly to textile mills and thus have a limited number of customers; in some instances textile companies have taken an equity position in the fiber producing entity.

The managements interviewed during the mission were mostly young men, highly trained and well versed in their specialties whether technical, marketing or financial. There appeared to be excellent rapport between the Colombian and expatriate employees. All plants are largely run by Colombian managements with the exception of a few key position. Production facilities are generally modern and well maintained. Because of the high degree of skill required to operate the equipment efficiently, labor has been carefully selected and trained.

Table 2 gives some data on the range of synthetic fiber production in Colombia; the companies that produce them; installed capacity and its utilization; as well as data on fiber exports and imports.

Table 2

Present Production, Capacity Utilization and
Export/Imports of Synthetic Fibers in Colombia

| <u>Product</u> | <u>Producers</u> | <u>Capacity^{1/} December 1968 (mill. tons/yr.)</u> | <u>Estimated Production in 1969 (mill. tons)</u> | <u>Apparent Capacity Utilization</u> | <u>Net Exports (Net Imports) in 1968 (mill. tons)</u> |
|----------------------|---|---|--|--|---|
| Nylon filament | Varylon) Nylon de) Colombia) Enka) | 3,629 ^{2/} | 3,439 ^{2/} | 94% | - |
| Nylon tire yarn | Enka | 1,800 ^{2/} | 1,586 ^{2/} | 88% | (1,400) |
| Polyester filament | Enka) Polimeros) | 728 ^{2/} | 473 ^{2/} | 65% ^{3/} | |
| Polyester staple | Enka) Celanese) Polimeros) | 4,960 ^{2/} | 4,454 ^{2/} | 90% | |
| Polyester tow tops | Celanese) Polimeros) | 500 | 150 | 30% ^{3/} | |
| Acetate filament | Celanese | 3,185 | 2,666 | 84% | 239 |
| Acetate fiber | Celanese | 596 | 281 | 48% | - |
| Cigarette filter tow | Celanese | 1,609 | 1,151 | 72% | 514 |

Table 2 (Continuation)

| <u>Product</u> | <u>Producers</u> | <u>Capacity^{1/} December 1968 (mill. tons/yr.)</u> | <u>Estimated Production in 1969 (mill. tons)</u> | <u>Apparent Capacity Utilization</u> | <u>Net Exports (Net Imports) in 1968 (mill. tons)</u> |
|---------------------|------------------|---|--|--|---|
| Viscose filament | Celanese | 2,038 | 2,078 | 103% | 658 |
| Viscose fibers | Celanese | 5,736 | 4,828 | 85% | 2,287 |
| Acrylic fibers | - | - | - | - | (1,025) |
| Cellophane | Celanese | 3,553 | 3,134 | 88% | (35) |

1/ Based on 3 shifts, showing total available capacity

2/ Figures are for 1969

3/ Under utilization is due to the capacity not being available for the full year.

It can be seen that with a few exceptions, the industry is operating at a high degree of capacity utilization and - as will be discussed later - is now expanding further. The table also indicates that the still relatively small market for nylon filament (for textile yarn) and polyester staple and filaments is shared by more than one producer. The industry exported about 15% of its 1968/69 volume of production, somewhat more than was imported during the same period. Imports consisted primarily of nylon tire yarn and acrylic fibers; these may be expected to decline, as Enka is expanding its production of tire yarn and an Italian company is exploring the possibility of starting the manufacture of acrylic fibers in 1972.

The following table shows the 1969 sales and employment figures of each of the companies and gives an idea about their relative size.

Table 3

Sales and Employment of
Synthetic Fiber Companies in Colombia

| <u>Company</u> | <u>1969 Sales (Col\$ million)</u> | <u>No. of Employees</u> |
|----------------|---------------------------------------|-----------------------------|
| Celanese | 358 | 1,676 |
| Enka | 216 | 656 |
| Varylon | 87* | 456 |

*1968 sales

Table 3 (Continuation)

| <u>Company</u> | <u>1969 Sales (Col\$ million)</u> | <u>No. of Employees</u> |
|----------------|---------------------------------------|-----------------------------|
| Polimeros | 70 | 238 |
| Colnylon | <u>62</u> | <u>180</u> |
| Total | 793 | 3,206 |

Total sales amounted to Col\$793 million (U.S.\$ million). They are compared in Table 4 to some other financial parameters for this branch of industry.

Table 4

Financial Data for All Synthetic Fiber Companies
in Colombia (1969)

| | <u>Col\$ Million</u> | |
|---------------------------|----------------------|------------------------------|
| Sales | 793 | |
| Net Profit | 79 | |
| Equity | 499 | |
| Assets Employed | 1,077 | |
| (of which, Fixed Assets) | 325 | |
| | <u>Ratios</u> | <u>Ave. %</u> <u>Range %</u> |
| Net Profit/Sales | 9.9 | 6.2-14.3% |
| Net Profit/Equity | 15.8 | 14.6-28.6% |
| Equity/Assets Employed | 46 | 22 -77 |
| Fixed Assets/Total Assets | 30 | 20 -50 |

Table 4 shows that the industry is rather capital intensive; that it operates with a reasonable - but by no means high - margin of profit and that it requires considerable working capital.

The average level of profitability of 15.8% on equity is not out of line with that of other manufacturing industries in Colombia. Since average profits are 10% of sales, sales prices could, on the whole, not drop much more than the 10% before profits would disappear. There is therefore little margin for price reductions at present production costs and any future price reductions can only come as the plants expand and thus reduce their overhead and/or some of the principal cost outputs can be decreased such as cost of raw materials (including import duties) and power. The competitive position vis. a vis. imports at present and in the future of one of the producers is discussed later.

FUTURE GROWTH OF DEMAND AND EXPANSION PLANS OF THE INDUSTRY

1. Nylon and Polyester

The mission obtained from the five producers their estimates of the demand growth in Colombia for nylon and polyester and their expansion plans. Table 5 reflects these growth expectations up to 1974 and the capacities which the industry has already firmly planned for completion through 1972.

Table 5

Expected Demand Growth and Capacity Expansion for
Nylon and Polyester
(metric tons)

| | Nylon | | Polyester | | Total |
|--|---------------------|---------------|---------------|----------------|----------------|
| | Textile Filament | Tire Cord | Filament | Staple | |
| Production in 1965 | 1,269 | 0 | 0 | 720 | 3,470 |
| Demand in 1969 | 3,440 | 1,590 | 470 | 4,450 | 11,060 |
| Average Growth Rate between 1965/69 | 28% | - | - | 58% | 34% |
| Estimated Demand in 1974 | 8,500 | 3,100 | 5,000 | 11,200 | 27,800 |
| | to | to | to | to | to |
| | 9,600 | 4,200 | 6,000 | 16,500 | 36,300 |
| Growth Rate between 1969/74 | Min. 20 | Min. 14 | Min. 61 | Min. 20 | Min. 20 |
| | Max. 23 | Max. 21 | Max. 67 | Max. 30 | Max. 27 |
| Estimated Capacity at end of 1969 | 3,630 | 1,800 | 740 | 4,960 | 11,130 |
| Firm Expansion Projects due for Completion by end of 1972 | 3,470 | 2,000 | 2,380 | 1,170 | 9,020 |
| Total Capacity end of 1972 | 7,100 | 3,800 | 3,120 | 6,130 | 20,150 |
| Additional Capacity required to meet 1974 Demand Expec- tations from Domes- tic Production | Min. 1,400 | Min. (700) | Min. 1,880 | Min. 5,070 | Min. 7,650 |
| | Max. 2,500 | Max. 400 | Max. 2,880 | Max. 10,270 | Max. 16,150 |

Table 5 shows that the rapid growth in these two fibers over the last four years of an average of 34% annually is expected to fall off to a more modest growth of between 20% and 22% per year. However, the expected rates of increase of each of the four main products are considerably more varied than the average would indicate, ranging from 64% per year for polyester filament to a very modest 7% for tire cord.

The mission generally concurs with the favorable outlook for growth as seen by the industrialists. However, it also recognized from trends in other countries which have started the use of synthetics earlier than Colombia, that the growth rates of the individual products are tending to level off after a number of years of rapid rise following their initial introduction; also these demand projections were made by companies that are involved in that industry to such an extent that the projections might more reflect their hopes than the market's actual potential. This is particularly true with polyester, where a high growth rate from an already high base is predicted.

There might therefore be some advantage in an independent examination of the market prospects for these two fibers (nylon and polyester) in order to help forestall any overambitious plans for expansion of capacity. As Table 5 shows, the demand estimates reflect a wide range of expectations. In the case of polyester staple, either 5,000 tons or 10,000 tons of new annual capacity appear necessary by 1974. This is too wide a range upon which to judge the economic merits of investment decisions. The same is true - though to a lesser extent - for nylon yarn and polyester filament.

According to the industry's firm expansion plans, each of the five producers will have the following estimated plant capacities at the end of 1972. (See Table 6).

Table 6

Estimated Plant Capacities for
Nylon and Polyester at end of 1972
(million tons/year)

| | <u>Nylon</u> | <u>Polyester</u> | <u>Total</u> |
|-----------------------|--------------|------------------|--------------|
| Celanese* | - | 2,810 | 2,810 |
| Enka | 5,300 | 3,400 | 8,700 |
| Nylon de Colombia | 2,400 | - | 2,400 |
| Polimeros Colombianos | - | 3,170 | 3,170 |
| Vanylon | 3,200 | - | 3,200 |
| | 10,900 | 9,380 | 20,280 |

*Celanese also has 16,700 mt/year of other fiber capacity - 5,380 at Cali and 11,200 at Barranquilla.

At present all the producers have very small capacities by international standards and only Celanese and Enka are moving towards a competitive size after completion of the current round of expansion. Although the actual nylon or polyester capacity of Celanese and Enka is not much more than that of the other three producers, Enka and Celanese can enjoy economies of scale because each of their overall plant capacities is approaching competitive international size.

Another conclusion that can be drawn from Table 6 is that any further expansion should be executed among the existing plants rather than encourage still another uneconomically sized producer to enter the field.

2. Acetate and Viscose

No further expansion of capacity appears to be envisaged for the time being, except for cellophane which is presently being increased (by 2,212 tons/year) from about 3,553 tons/year to 5,765 tons. The project is expected to be completed in 1970.

3. Acrylics

To satisfy increasing demand which is now met by imports, the establishment of a plant (possibly in Cali) to produce about 4,000 tons annually of acrylic fibers is being considered.

There have been reports that the Italian company, Societa Italiana de Rsine (SIR) is investigating the possibility of building this plant in collaboration with IFI in such a way that the majority of the equity eventually would be Colombian. An agreement would also be reached with another acrylics plant in Peru, whereby the Peruvian plant would market in the southern part and the Colombian plant in the northern part of the Andean common market. Nevertheless, it is doubtful, whether, even with such sharing of markets outside of Colombia the plant capacity initially envisaged would permit production at internationally competitive prices.

RAW MATERIALS

At present all raw materials for the production in Colombia of synthetic fibers are being imported. The Colombian fiber producers, therefore, are essentially converting plants using the following bulk materials:

| <u>Fiber</u> | <u>Bulk Imported Materials</u> |
|--------------|--------------------------------|
| Rayon | Dissolving Pulp |
| Acetate | Cellulose Acetate |
| Nylon | Caprolactam |
| Polyester | Polyester Chips (from DMT) |

Because there is no local wood suitable for making rayon grade pulp, there are no plans to produce this item in Colombia. However, there are plans to produce caprolactam and DMT.

A caprolactam plant of 16,500 tons per year capacity is under construction, and IFI has prepared a feasibility report proposing the construction of a DMT plant with a capacity of 24,000 tons per year. Both of these plants would have more capacity than is required for Colombia and initially some 40% of the caprolactam and 60% of the DMT will have to be

exported, mostly to the Andean Group countries under the Andean pact. The feedstocks for the plants - cyclohexane for caprolactam and para-xylene for DMT - will be derived from the Government's oil company, Ecopetrol.

The feasibility studies for the two projects indicated that prices for domestically produced caprolactam and DMT would be no greater than those presently paid for equivalent imported materials plus duty (40%). It is hoped that the projects could at least meet this goal although there is some cause to suspect that they will not be able to do so.

As mentioned before, the feedstocks are expected to be supplied by Ecopetrol and at international prices. However, the small size of the DMT and caprolactam plants (24,000 and 16,500 tons per year respectively) will be their major handicap to low cost production.

In the case of caprolactam an alleviating factor is that fertilizer is a co-product of its manufacture, and that it might be possible for the fertilizer production to "subsidize" the caprolactam price. On the other hand, it is also acknowledged that the caprolactam plant is undersized to meet the needs of the Andean region. As a matter of fact plans are already being made to increase the plant's capacity. As matters stand, however, this can only be done by the addition of another small, uneconomic sized unit; the plant will, therefore, contain two such units rather than a single large-sized one which might have had economic proportions.

In the case of DMT, the problem of potentially high cost will be aggravated if the DMT is converted to chips in separate plants by each of the three polyester producers -- as is presently planned -- rather than by the DMT plant in one combined operation. While this might be an unavoidable situation since the polyester producers insist that they must have chips formulated to meet their specific requirements of quality and acceptability in their spinning machinery, it would appear nevertheless worthwhile to investigate the possibility of producing chips in a single plant, thereby affecting some economy of scale.

In addition, the export portion of the output will have to be sold at international prices, i.e. below domestic prices and the domestic price will have to support the export price. However, it is doubtful that present import duties on DMT will be adequate for this purpose.

In establishing the feasibility of the two plants insufficient attention appears to have been given to producing at competitive prices, instead current internal selling prices (including duty) seem to have "a priori" been assumed as the starting base for economic evaluation. Although it is too late to correct the situation with regard to caprolactam a reassessment should still be possible for DMT. Any such reassessment would have to focus on production cost, taking into account size of unit, present and future expectation for feedstock price, as well as the effect of exporting the major proportion of the product at international prices.

COMPETITIVE POSITION VIS-A-VIS IMPORTS

As mentioned before, Colombian prices of nylon and polyester are higher than - but those of celluloseics not much different from - international prices. This is illustrated in Table 7.

Table 7

Comparison of Synthetic Fiber Prices
Colombia - International

| | <u>Price in US ¢ Equivalent/Pound^{1/}</u> | <u>Price Basis for^{2/}</u> | <u>International</u> |
|--------------------------|--|-------------------------------------|---------------------------|
| <u>Quoted Price in</u> | <u>Assessing</u> | <u>Import Duties, Etc.</u> | <u>Price^{3/}</u> |
| <u>Colombia</u> | | | |
| <u>Cellulosics</u> | | | |
| Acetate Filament | 80 - 96 | 77 - 105 | 74 (150 den) |
| 200 den - 75 den | | | |
| Viscose Filament | 71 - 89 | 90 - 170 | 89 (150 den) |
| 300 den - 100 den | | | |
| Acetate Staple | 59 | 44 | - |
| Viscose Staple | 34 | 30 | 28 |
| <u>Non-cellulosics</u> | | | |
| Polyester Filament | 193 | - | 72 |
| Semi matte 135/48 | | | |
| Plyester staple, 1.5 den | 108 | 66.5 | 61 |
| Nylon yarn, 70 den | 149 | - | 60 |

1/ Conversion factors: 18 Peso = \$1, 1 Kg = 2.2 lb

2/ CIF price officially recognized in Colombia

3/ A synthesis from a number of sources of an "average international trading price"

Nylon and Polyester

A closer examination of the competitive price situation of these two fibers is contained in the following discussion. Annex 3(c) compares prices of nylon and polyester fibers (as quoted by the Colombian producers in early 1970), with prices in other countries using information from a variety of sources. The comparison shows that there are considerable differences in the prices of synthetic fibers even of equal quality. For example, the listed wholesale prices for fibers in the U.S.A., Europe and Japan tend to be nearly twice as high as trading prices obtained in these countries. This illustrates a common problem in trying to make price comparisons; list prices bear little relationship to the actual prices at which products change hands. This is particularly well demonstrated with regard to polyester fiber in the U.S.A., where brand-name polyester staple such as Dacron and Kodol, was quoted for sale at 61 ¢/lb at a time when the actual trading price was 46 ¢/lb, and the export price as low as 41 to 42 ¢/lb.

Although normally the export price (often one which is based on marginal costing) of an industrialized country is compared with the quoted price in the developing country, it is also interesting to compare the quoted prices in each place. Quoted prices in industrialized countries represent the price for small trading lots which are probably of the same size as the lots normally sold in the developing country. On the other hand, the non-listed trading prices are for special deals involving large quantities, long term contracts or special producer/consumer relationships. The data in Annex 3(c) show that Colombian list prices compare well with, and in some cases are lower than, list prices in the U.S.A. and Europe.

On the other hand, the developing countries can receive export goods from the industrialized countries at prices considerably lower than the quoted prices and - it can be argued - the c.i.f. price of these goods is therefore the only relevant basis for comparison.

An attempt has therefore been made to compare the landed cost in Medellin of four synthetic fibers with the domestic prices for 1969 and those anticipated for 1975. This calculation is summarized in Annex 3(d) and is taken from the Appraisal Report for the second IFC investment in Enka de Colombia (Investment 156-CO).

The weighted average of Enka sales prices is compared with that for similar imports. The import duty of raw materials is deducted from the Enka sales price and the import duty and interest on "prior deposit" is deducted from the price of the imported goods. Comparing the adjusted Enka price with the import price shows that at present Enka requires a nominal protection of 33% (the current duty rate is 35%), but that by 1975 it should require only 3% nominal protection.

In arriving at the above prices for 1975 it was assumed that international polyester filament and staple prices will decrease by 22% and 29% respectively below present levels and that nylon prices would remain constant. All Enka prices for 1975 have been assumed to decrease by 23% below present levels. These are reasonable predictions and show the extent to which production costs can be expected to decrease as output increases.

SUMMARY AND CONCLUSION

The first synthetic fiber produced in Colombia was rayon, in 1939. However, the modern petrochemical based fibers (nylon and polyester) were introduced in 1960 and have tended to displace the cellulose - rayon and acetate - during a rapid rise in their production since the mid-60's. The synthetic fiber producers are all privately owned with the major shareholdings in foreign hands. The plants are mostly located in Medellin, the center of the textile industry, although one is located in Barranquilla and another in Cali. The production facilities are modern and well maintained and managed by highly trained and competent personnel.

In 1969 the industry had total sales of nearly Col \$800 million and employed over 3,000 workers. It showed an average profit of 10% on sales or 16% on invested capital, these levels of profitability comparing favourably with other manufacturing industries.

This sector is still experiencing rapid growth, particularly in nylon and polyester. Based on information provided by the companies, the production of the two fibers grew at 34% per year since 1965, a growth rate which is expected to drop off to 22% per year through 1974. Although this seems reasonable, some inconsistencies are apparent, for instance the production forecasts for polyester staple and filament show a need for considerably more capacity than is presently being planned by the producers. It would, therefore, appear prudent to have an independent check made of the market potential for these fibers, to forestall either over or under capacity arising in the future.

Another conclusion arising from the company's plans for expansion is that only Celanese and Enka will have production capacities that would be marginally comparable with large modern plants. It would, therefore, seem imperative that all further expansion in this field should be executed among the existing producers rather than encouraging still another producer to enter that field. In this regard, preliminary investigations are being made for the establishment for 4,000 tons of acrylic fiber capacity, thus it would appear advantageous to associate the acrylic production with one of the existing fiber producers. There are no plans to increase the acetate and rayon capacity.

All raw materials for this sector are presently being imported, but there are active plans to supply the petrochemical materials completely from local resources. A caprolactam plant is under construction and a pre-investment report has been prepared for a DMP plant. Both these plants will export about one-half their production initially, but even so they will be small compared with plants in industrial countries. The production costs, therefore, are expected to be high and the domestic selling prices might be higher than the present cost of imports including duty. It is too late to correct the situation for the caprolactam plant but the DMT project should be carefully examined on this point.

Synthetic fiber prices in Colombia compare well with the listed prices in industrial countries. However, they are about twice as high as the current prices for imported non-cellulosic fibers. Imports are allowed only under prior license and carry a 35% advalorem duty. The delivered cost of an average mix of imported nylon and polyester fibers, including the cost for transportation and other handling charges, would be 33% lower than the current Colombian selling price for such a mix. By 1975 the international prices for polyester are expected to decrease by about 25% but stay about the same for nylon. If Colombia prices for both fibers could decrease by about 23% the Colombian price for the average mix of fibers would just about equal the delivered cost of imports. Price reductions will probably only be achieved through reducing production costs, as it seems unlikely that producers could reduce their profits below the present levels.

RECOMMENDATIONS

The following is a summary of the recommendations mentioned above and in the text:

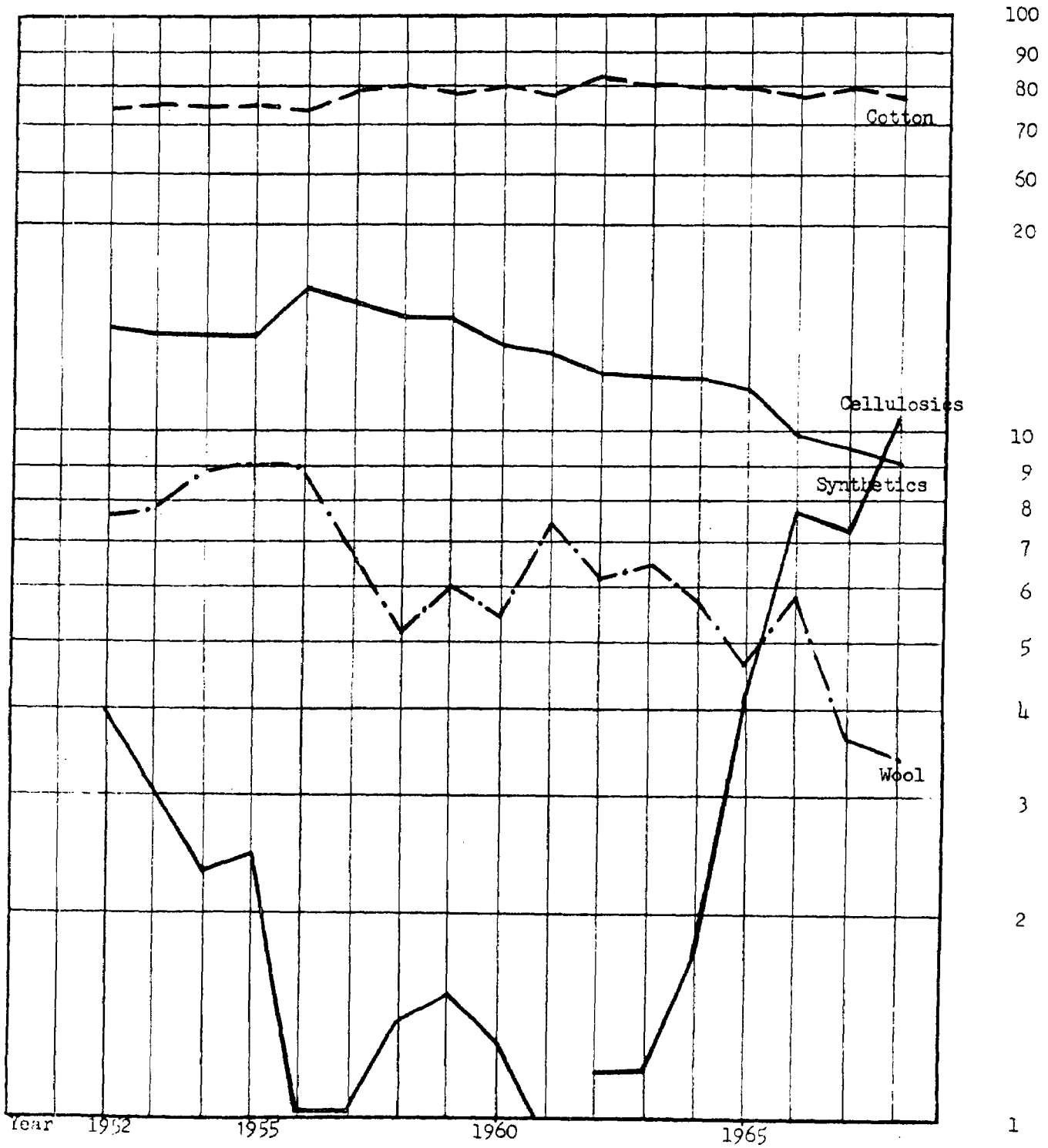
- a. An independent market survey of nylon and polyester fibers should be made before any new expansion plans are committed for these fibers.

b. Any further expansion in synthetic fibers should be confined to the existing producers to develop production units of competitive size.

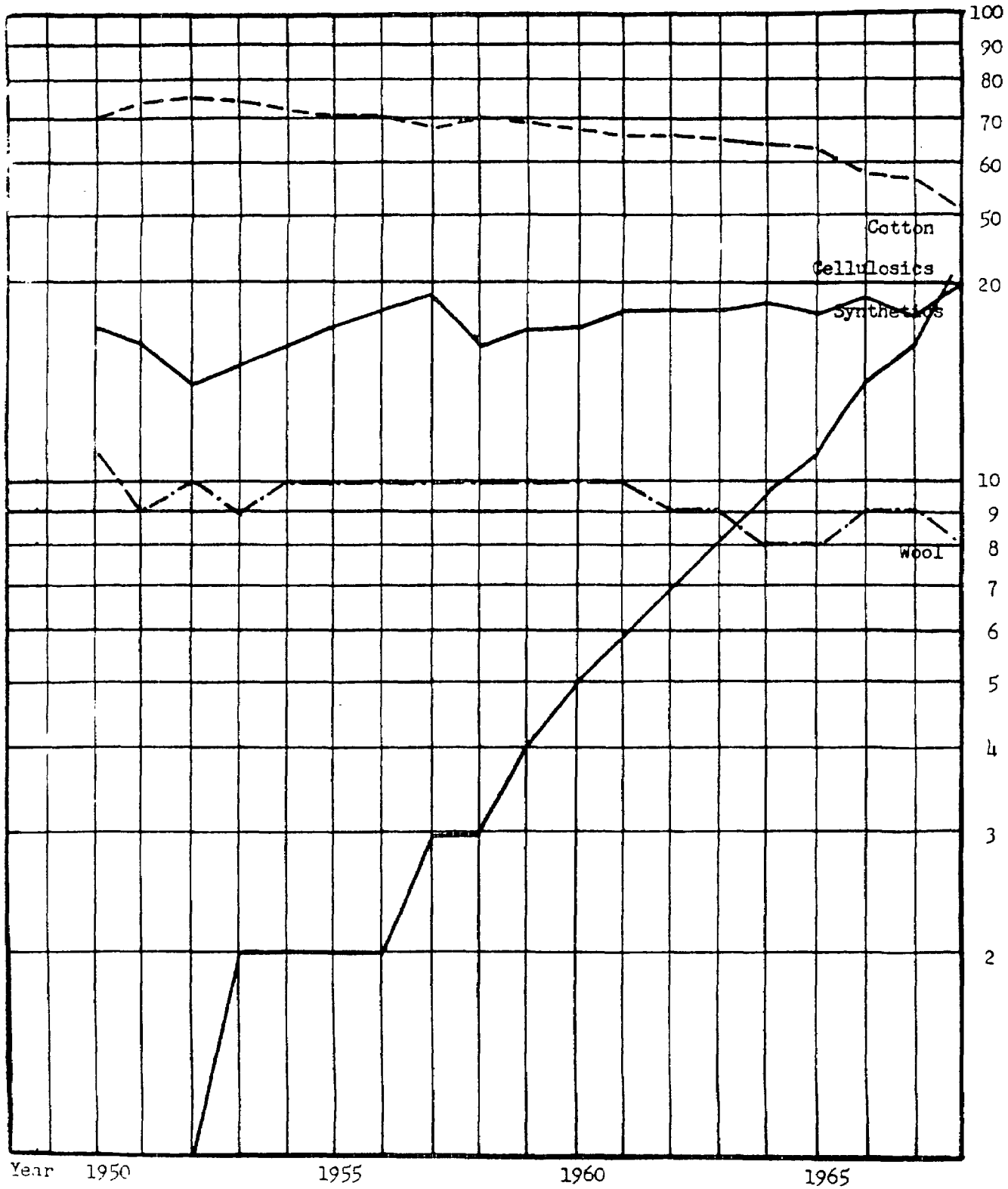
c. Acrylic fiber production might therefore be associated with one of the existing manufacturers.

d. The proposed DMT project should be examined carefully with respect to production costs.

PERCENTAGE DISTRIBUTION OF THE CONSUMPTION OF
TEXTILE FIBER IN COLOMBIA



PERCENTAGE COMPOSITION OF WORLD-WIDE PRODUCTION OF FIBERS



COMPARISON OF NYLON AND POLYESTER PRICES
INTERNATIONAL AND COLOMBIAN

Nylon Textile Fiber

| <u>Denier</u> | <u>Quality</u> | <u>Price Basis</u> | <u>Country</u> | <u>Source^{1/}</u> | <u>Price \$/lb</u> |
|----------------|--------------------------------|-----------------------|----------------|----------------------------|--------------------|
| 70 | ? | ex works | Colombia | Colnylon | 1.23 |
| 70/24 | ? | ex works | Colombia | Enka | 1.45 |
| 70 | ? | CIF Import port | Iran | IBRD | 0.66 |
| 70 | ? | ? | USA | Tex. Col. | 0.59 |
| 70 | ? | ? | Germany | Tex. Col. | 0.59 |
| 70 | ? | ? | Japan | Tex. Col. | 0.48 |
| 40 | ? | ex works | Colombia | Colnylon | 1.36 |
| 40 | ? | ex works | Switzerland | SBW | 1.98 |
| 40 | ? | CIF Import port | Iran | IBRD | 0.81 |
| 100 | ? | ex works | Colombia | Colnylon | 1.29 |
| 100/34 | 1/4-1 turn per inch bright | FOB shipping point | USA | SBW | 1.70 |
| 20 | ? | ex works | Colombia | Colnylon | 2.24 |
| 20 | ? | CIF Import port | Iran | IBRD | 1.20 |
| 20 | ? | ? | USA | Tex. Col. | 1.23 |
| 20 | ? | ? | Japan | Tex. Col. | 0.97 |
| 30/10 | 1/2 turn, semimatte | on spools | UK | SBW | 1.16 |
| 30/10 | 1/4-1 turn/inch, semi-matte | FOB shipping point | USA | SBW | 2.36 |
| Ave. denier | ? | ex works | Colombia | Vanylon | 1.45 |

Polyester Fiber

| | | | | | |
|----------|---|-----------------------|----------|-----------|-----------|
| Staple | ? | ex works | Colombia | Polimeros | 1.05 |
| Staple | ? | ex works | Colombia | Enka | 1.05 |
| Staple | Dacron, bright 2.25-6 den, 1.25 -4 inch | FOB shipping point | USA | SBW | 0.61 |
| Staple | Kodal, 3-4.5 den | " | USA | SBW | 0.68 |
| Staple | Tereylene, Viscose type 3 den | ? | UK | SBW | 0.67 |
| Filament | Untwisted | ex works | Colombia | Polimeros | 1.88-1.98 |
| Filament | 135/34, 45 den | ex works | Colombia | Enka | 1.92 |
| Filament | Dacron yarn, semi-matte 70/34 den | FOB shipping point | USA | SBW | 1.67 |
| Filament | 135 den | ? | USA | Tex. Col. | 0.77 |
| Filament | 135 den | ? | Germany | Tex. Col. | 0.77 |
| Filament | 135 den | ? | Japan | Tex. Col. | 0.67 |
| Filament | 20 den | ? | Germany | Tex. Col. | 1.18 |

- 1/ Source = source of information
In Colombia, name indicates name of company which disclosed prices during interviews.
- IBRD - Report No. SA-14, May 11, 1970 "Industrialization of Iran, the Record, The Problems and the Prospects" - Annex II
- SEW - Statistisches Bundesamt Wiesbaden, an official German publication which gathers up-to-date wholesale prices mostly from other official publications and trade journals.
- Tex Col - Appraisal Report by Finaceira de Caldas in support of a subproject loan application by Texturizadora Colombiana S.A.

ENKA DE COLOMBIAENKA PRICES AND INTERNATIONAL MARKET PRICES IN 1969 AND 1975

(in US\$/metric ton)

| | ----- 1969----- | | | | ----- 1975----- | | | |
|---|-----------------|----------------|---------------------|--------------|-----------------|----------------|---------------------|--------------|
| | NYLON | | POLYESTER | | NYLON | | POLYESTER | |
| | Textile Yarn | Tire Canvas | Filament | Staple | Textile Yarn | Tire Canvas | Filament | Staple |
| Price; f.o.b. Europe (\$/lb) | 0.77 | 0.82 | 1.44 | 0.33 | 0.77 | 0.81 | 1.13 | 0.38 |
| Price, f.o.b. Europe | 1,700 | 1,806 | 3,170 | 1,170 | 1,700 | 1,790 | 2,460 | 830 |
| Ocean Freight & Insurance | 127 | 127 | 120 | 120 | 127 | 127 | 120 | 120 |
| C.I.F. Barranquilla | 1,827 | 1,933 | 3,290 | 1,290 | 1,827 | 1,917 | 2,580 | 950 |
| Import Duty | 639 | 387 | 1,152 | 452 | 639 | 383 | 903 | 333 |
| Port & related Expenses | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| Consular Fees | 18 | 19 | 33 | 13 | 18 | 19 | 26 | 10 |
| Cost in Barranquilla | 2,507 | 2,362 | 4,498 | 1,778 | 2,507 | 2,342 | 3,532 | 1,316 |
| Freight & Insurance to Medellin | 100 | 77 | 100 | 77 | 100 | 77 | 100 | 77 |
| Interest Cost on "Prior Deposit" | 166 | - | 300 | 117 | 166 | - | 235 | 87 |
| Cost of Imported Products in Medellin Warehouse | <u>2,773</u> | <u>2,439</u> | <u>4,898</u> | <u>1,972</u> | <u>2,773</u> | <u>2,419</u> | <u>3,867</u> | <u>1,480</u> |
| <u>Weighted average cost/ton of imported products based on Enka's 1969 sales:</u> | | | | | | | | |
| (a) With import duties and with interest on "Prior Deposit" | | | 2,499 ^{1/} | | | | 2,499 ^{1/} | |
| (b) Without import duties and without interest on "Prior Deposit" | | | 1,869 | | | | 1,920 | |
| Enka's weighted average sales price, ex-plant | | | 2,700 | | | | 2,070 | |
| Import Duty on imported Raw Materials | | | (207) | | | | (96) | |
| Adjusted Enka Sales Price | | | <u>2,493</u> | | | | <u>1,974</u> | |
| Protection (2,493/1,869) | | | <u>33.3%</u> | | | | <u>2.8%</u> | |

Note: ^{1/} Figures are only accidentally identical.

ANNEX 4

Chemical Industry Review

THE CHEMICAL INDUSTRY

INTRODUCTION

This chapter is based on visits to most of the important chemical plants, and on interviews with the major producers of chemicals in Colombia including:

Planta Colombiana de Soda
Empresa Colombiana de Petroleos
Concesion de Salinas
Caja de Credito Agrario, Industrial y Minero
(the first three above are government-owned companies in basic chemicals, petroleum, and petrochemicals; the Caja, a government agricultural bank, is engaged in some fertilizer processing)
Monomeros Colombo-Venezolanos
Esso Colombiana
Petroquimica Colombiana
Dow Colombiana
Phillips Petroquimica
Abonos Colombianos
Fertilizantes Colombianos.

In addition, the following recent reports published in Colombia were consulted:

1. "Informe sobre Estudio de la Planta de Fertilizantes Colombianos, S.A.", by Oliverio Phillips Michelsen, Instituto de Fomento Industrial, December 1969.
2. "A Study of the Colombian Fertilizer Industry", by USAID Resident Mission, Colombia.
3. "Actualidad y Perspectivas de la Industria Petroquimica en Colombia y en el Grupo Andino", by Gilberto Salcedo E., Empresa Colombiana de Petroleos, November 1969.
4. "Antecedentes y Perspectivas de la Industria Quimica en Colombia", Asociacion Nacional de Industriales, December 1968.

HISTORY AND DEVELOPMENT

Although there has been some chemical production in Colombia since the middle of the 19th century, it was not until the Second World War that a modern chemical industry was established. Early during the War rayon production started, followed in 1941 by the manufacture of sulfuric acid, in 1943 by hydrochloric acid, and in 1945 two plants were established to produce industrial gases such as oxygen, and acetylene. In the mid 50's an additional boost was given to the industry when the salt deposits at Zipaquirá (famous for its salt cathedral) were exploited for their chemical value.

A fertilizer industry started in 1955 consisting of a small ammonia plant using natural gas and a government distribution network based on imported material. Also in the mid 50's, petrochemicals started in a small way with the importation of intermediate products that required one or two more processing steps to make them available for producing consumer goods. These converting plants were of a small size but laid the basis for backward integration in which the production of intermediates could be contemplated in Colombia.

The present structure of the industry consists mainly of 3 basic subsectors, viz;

1. A basic chemicals industry, producing mostly the inorganic materials such as soda ash, caustic soda, acids.
2. A fertilizer industry based primarily on conversion of petroleum derivatives but also incorporating conversion of imported phosphate rock and potash.
3. A petrochemical industry involving the conversion of petroleum to intermediate and finished products which are then converted to consumer goods.

This chapter deals with all of these subsectors, except for a portion of petrochemicals, viz. synthetic fibers, which are dealt with separately.

PRESENT STRUCTURE OF INDUSTRY

The plants producing chemical products are shown in detail in Annex 4(a) where they are listed by company, product, annual capacity, location, initial year of production, number of employees, value of production, and local and imported raw materials. The table has been divided to indicate the plants which are producing predominantly basic chemicals, those producing fertilizers and those in the petrochemical sector. Annex 4(b) shows the expansion projects which are firmly committed. As is common in most countries, the chemical producers are very interdependent; their interrelations are shown in the "flow diagram," in Annex 4(c).

There is a heavy predominance of foreign and government ownership in the chemical industry in Colombia. The foreign companies are involved mostly through their earlier positions in the petroleum business and through subsequent backward integration steps, but also because this industry is heavily dependent on foreign know-how. In many cases the foreign companies have a minor shareholding in exchange for their know-how and management contribution.

The Government has become involved in the petrochemical industry as an outgrowth of its takeover of the oil companies operations after the lapse of concessions. Also, it initiated the basic inorganic chemical industry when it decided to exploit its salt deposits for chemical use. No doubt it was motivated in doing this not only to keep this industry under its control, but also because the low profitability and heavy investment required discouraged private investment.

There is private Colombian ownership in small companies, none of which has shown a tendency to become a major factor in this industry.

Basic Chemicals

This sector is dominated by the two large government-owned enterprises, Planta de Soda and Concesion de Salinas, which are interdependent in that the Concesion de Salinas supplies the salt and raw material to the Planta de Soda for production of the basic soda alkali chemicals.

Concesion de Salinas has production facilities at Zipaquirá, about 35 miles north of Bogotá where it extracts salt by underground mining. The salt is dissolved at the pit head and transported as a brine to the Planta de Soda facilities 5 km. away. This salt mine has a production capacity of 250,000 tons per year. It reached this capacity within the last five years and has been in operation since colonial times. Because of the high cost of extracting salt by mining methods and the relatively large amount of impurities, it is unlikely that this facility will be expanded in the future.

Concesion de Salinas also produces salt by solar evaporation on the dry north coast of Colombia at Manaure, some 300 Km northeast of Cartagena. Its present production is 350,000 tons per year but it is just completing an expansion program which will raise the production to 705,000 tons per year. This area of Colombia is remarkable for the hot dry winds and long hours of sunshine that prevail most of the year. It is a semi-desert area and because of its low lying coast line, ideally suited to the production of salt by solar evaporation.

The salt is presently harvested half by mechanical means and half by some 2,000-3,000 Indian workers. The expanded capacity will be worked entirely by mechanical harvesting. A 700 meter wharf has been built at Manaure to load the three 1,600 ton ships owned by Planta de Soda which carry salt down to the latter's Cartagena plant. The ships return under ballast and make the round trip in about 10 days. Planta de Soda has ordered another three 2,000 ton vessels to handle the expanded salt supply.

Planta de Soda built its first plant at Betania, about 30 km north of Bogotá, to use the salt from the Zipaquirá deposit. The plant has been steadily expanded as the demands of the country increased.

In 1964 a new plant was built in Cartagena as it was realized that the cost of the solar salt would be much lower than that of the mined salt. The Cartagena plant has also been expanded as demand has increased and is currently undergoing a major construction program which will be completed in 1971.

Both chemical production facilities are characterized by a large number of small capacity production units. This defeats any possibility of their achieving economies of scale, in spite of the fact that their total capacity is well in line with the capacities of plants in industrial countries. It would have been preferable for the expansion steps to have been made in bigger, less frequent steps. To some extent, this policy was deliberately avoided in order to maximize the number of jobs that could be provided.

The production configuration of the two plants at present and as the Cartagena plant will be in 1971 is shown in the following table.

| PRODUCT | Daily Production (Metric Tons) | | |
|----------------------------|--------------------------------|-----------|------|
| | Betania | Cartagena | |
| | 1969 | 1969 | 1971 |
| Soda Ash | 100 | 250 | 750 |
| Caustic Soda | 32 | 70 | 140 |
| Caustic Soda (Rayon grade) | 38 | - | 120 |
| Chlorine | 35 | - | 108 |
| Sodium Bicarbonate | 10 | - | 80 |
| Hydrochloric Acid | 11 | - | 20 |
| Iodized Salt | 500 | - | 250 |
| Sodium Sulfate | 14 | - | - |

The plants provide their own power and water requirements. The following table indicates the large installed capacity of electric power as well as the raw material requirements.

| Raw Materials and Services | Daily requirements (Metric tons) | | |
|---|----------------------------------|-----------|--------|
| | Betania | Cartagena | |
| | 1969 | 1969 | 1971 |
| Salt | 730 | 500 | 1,500 |
| Limestone | 250 | 600 | 1,300 |
| Fresh Water | 4,800 | 10,000 | 19,000 |
| Steam (installed capacity) | 3,000 | 2,880 | 5,520 |
| Electric Power (KW of installed capacity) | 10,000 | 7,000 | 37,000 |

Water supply for the Cartagena plant will require a new facility, which will form the basis for expanding the water supplies for the Cartagena region in general.

The management of both of these government companies has been concerned for many years with maximizing employment and not necessarily profits. Both companies were nominally under the direction of the Banco de la Republica until recently. They have now been transferred to IFI, which will be responsible for their management and operation in the future. IFI will become the major shareholder in Planta de Soda when it is transformed into a stock company. It is not certain what corporate form Concesion de Salinas will assume, as its legal rights and charter date back to colonial times and are deeply entrenched in the national statutes. It would probably require an act of Government to change the company form to a more modern basis. There are indications that IFI will try to run the two enterprises on modern business lines and already a modern financial management system has been introduced in Planta de Soda. It is to be hoped that the operation of these two companies can be modernized and streamlined as they both are important factors in the chemical industry of Colombia.

Fertilizers

Of the three basic materials produced by the fertilizer industry: nitrogen (N), phosphate (P_2O_5), and Potash (K_2O)₃ Colombia has no resources of potash. A phosphate deposit is being investigated with a view to its economic exploitation. There is a modern ammonia/urea complex (the Amocar/Abocol facility) supplying a good portion of the nitrogen requirements and with the completion of the Monomeros plant, Colombia should be self-sufficient for its nitrogen requirements.

For the immediate future then, phosphates and potash will continue to be imported. These are presently imported either as raw materials, such as phosphate rock and straight potash, or as constituents of ready-mixed - either chemically or physically - fertilizers such as triple super-phosphate, diammonium phosphate, or even combined NPK fertilizers.

The raw materials are imported by Abocol at present and will be imported by Monomeros in the future. The already-mixed materials are imported by Caja Agraria and other small mixing and distributing companies. A comparison has been made of the demand for fertilizer in Colombia with the capacity for production in 1971 when the Monomeros plant will be complete. Unfortunately, this has been made on the basis of the number of gross tons of mixed fertilizer rather than the number of tons of nutrient (it is obvious that if the percentage of nutrient in a mixed fertilizer is increased, less gross tons are required to supply the same amount of nutrient). In spite of this shortcoming, the comparison does show the potential for over-capacity in the industry.

On the basis of the 8% growth rate that has prevailed from 1963 to 1968 for mixed fertilizer, it can be predicted that 450,000 tons would be demanded in 1971. In that year the total installed capacity for producing mixed fertilizer either from (imported phosphate rock and potash and local nitrogen) or from finished imported fertilizers (eg. DAP, TSP etc.,) will be 950,000 tons.

The capacity for producing mixed fertilizer only from local or imported raw materials would be about 500,000 tons. The over-capacity of 450,000 tons arises because the Caja Agraria and the other mixing companies have mixing, bagging and distribution equipment with which they presently process imported finished fertilizers.

These companies are already showing a tendency to use locally produced fertilizer for further mixing, bagging, and distribution, but it is by no means clear whether an extension of this step or a continuance of importing mixed fertilizer is the most economic way of meeting Colombia's future requirements. This is one of the reasons why a preinvestment study has been recommended for Colombia's fertilizer industry. More details are given about below.

The Amocar/Abocol facilities located at Cartagena are an operation of the Standard Oil Company (Esso). The ammonia plant is located on the site of the Esso refinery and it pipes the ammonia to the Abocol facilities about 2 km away. The Abocol plant consists of a urea, nitric acid, and a mixed fertilizer plant. The phosphate and potash raw materials are imported. The facilities were built in 1963 and are as modern as were obtainable at that time. They have been well maintained and modernized where possible and the management appears extremely efficient and capable.

In addition to its well run production facilities, Abocol also is developing a modern marketing department. It has relied on the distribution facilities of the Caja Agraria and the other mixers, but because of their lack of aggressive marketing, it has decided to develop its own marketing department. It has therefore hired 18 agronomists to provide extension services and recommended fertilizer use to the farmers.

The Monomeros facility is primarily a producer of caprolactam--a nylon intermediate. Its fertilizer production is a result of having to dispose of the ammonium sulfate by-product from the caprolactam process. Using the Dutch State Mines process, this can be accomplished with the production of high analysis complex fertilizers. Imports of phosphate rock and potash will be necessary for this process.

The Monomeros plant is expected to be in production in mid 1971. The company has all the elements to be a successful and competitive producer of fertilizer with its young modern management staff, its modern production facilities, and technical back-up from Dutch State Mines which has a 10% equity in the company.

The Caja Agraria is not a producer of nutrients, but merely mixes, blends, and distributes imported and domestically produced fertilizer materials. It has three mixing plants, the largest of which is near Bogota. It distributes the fertilizer through 12 regional warehouses and approximately 400 retail stores. These stores also supply other farm inputs such as seed, tools, fuel, clothing, etc, and are ideally suited to become centers for extension services. The Caja has not made use of this opportunity and the mission was not given any indication that it intends to modernize its facilities along these lines.

Ferticol is the only other producer of any importance in Colombia. Its situation has been very confused in recent years. Its production facilities were built in 1954 with an extremely low capacity, 60 tons per day ammonia, and apparently with no regard to the unit capital investment or production cost. It has therefore been in financial difficulty virtually since the start and has operated only sporadically. Ecopetrol and Caja Agraria have recently taken over the majority of the ownership of the company and the plant was recently rehabilitated and is now in good operating condition. It is claimed that it can break even on its production costs, but there is no clarity as to its financial situation. A study has been done about its future including the suggestion that its considerable infrastructure be used as the basis for building a new 600 tons per day ammonia unit. While this may be a long-term possibility, it would not seem to be presently appropriate in view of the over-capacity already existing in the Colombia fertilizer market.

As can be seen from the foregoing discussion of the fertilizer producers, most of the fertilizer is produced on the north coast. In fact, about 40% of all mixed fertilizers consumed in Colombia is produced in this region. From there it is shipped to the interior by barge, train, and truck. Before 1969 rail service was poor due to limited quantities of rolling stock and several months had to be allowed for delivery. The situation has improved and delivery is now possible within 3-7 weeks. Apparently, the transportation costs for fertilizer per ton-kilometer are much the same as those in the United States.

Petrochemicals

There are two centers of petrochemical production in Colombia which have developed naturally around the two oil refineries in Cartagena and Barranca Bermeja.

Cartagena area, known as Mamonal, is located about 10 km south of the city along the shore of the Cartagena bay. This is protected water and relatively deep so that Mamonal is ideally suited to export-oriented industries. At present there are 3 petrochemical plants in this area receiving feed stocks from the Intercol refinery. There are also 3 plants which at present depend on imported raw materials and which are really conversion plants, most of them producing polymers from imported monomer. A list of the plants with the invested capital and people employed is given below.

MAMONAL AREA

| <u>Company</u> | <u>Product</u> | <u>Investment</u> <u>\$ million</u> | <u>People</u> <u>Employed</u> |
|----------------|----------------|--|----------------------------------|
| Planta de Soda | Soda Alkali | 100 | 1,450 |
| Intercol | Refinery | 78 | 660 |
| Abocol | Fertilizer | 12.5 | 350 |
| Petroquimica | PVC | 8 | 100 |

| <u>Company</u> | <u>Product</u> | <u>Investment</u> <u>\$ million</u> | <u>People</u> <u>Employed</u> |
|----------------|---------------------|--|----------------------------------|
| Cabot | Carbon Black | 3 | 77 |
| Dow | Polystrene | 2 | 40 |
| Cyanamid | Formaldehyde Resins | 3 | 50 |
| | | <u>207</u> | <u>2,727</u> |

The Intercol refinery, built in 1958 when Esso had to give up its Barranca refinery, has a capacity for 48,000 barrels per day (B/d) crude oil with a catalytic cracking unit of 25,000 barrels per day. It is currently producing the following products.

| | |
|------------------|-------------------|
| LPG | 350 B/d |
| Jet fuel | 1,000 B/d |
| Kerosene | 4,500 B/d |
| Diesel oil | 7,000 B/d |
| Regular gasoline | 12,000 B/d |
| Premium gasoline | 3,000 B/d |
| Fuel oil | 13,000-18,000 B/d |
| Sulfur | 4.5 tons per day |

In addition to its refining activities, it is also a terminal for crude oil lines from the oil fields and has extensive bunkering and loading facilities. (Ecopetrol also has a terminal in this area.)

The facilities of Petroquimica Colombiana were originally established to receive imported vinyl chloride monomer from which polyvinyl chloride (PVC) was produced. In a typical backward integration step this plant will now take naphtha from the Intercol refinery and chlorine from the Planta de Soda to produce monomer from these local materials. Although its capacity is small - at present 17 million pounds per year PVC - the company will use a new process which is reputed to be adaptable to these small capacities. This so-called "Dianor" process produces small amounts of ethylene by cracking naphtha and immediately converting it to ethylene dichloride (EDC), without the need for purifying the ethylene which is normally done in large capacity processes. The EDC is then converted to monomer and then to PVC.

Petroquimica expects to be able to expand to 35 million pounds per year PVC and has also been able to conclude a 5-year export contract with Japan for 50 million pounds of EDC. This is a remarkable export breakthrough and speaks well for the entrepreneurship of the principals of this company. However, in exporting EDC the company will produce hydrochloric acid as a by-product. Only because Planta de Soda is able to accept the hydrochloric acid has the deal been possible. Petroquimica is also helping to develop export sales for both vinyl chloride and polymer.

The Dow plant produces polystyrene from imported styrene monomer. It has a capacity of 3,700 tons per year and is presently being expanded to 6,000 tons per year. The imported raw material is from a Dow plant on the U.S. Gulf Coast. Although the original plant took five years to reach its capacity, Dow has now developed export sales and feels justified in making its expansion. However, the future of styrene production is somewhat uncertain as styrene

has been allocated to Peru under the Andean Pact. This does not seem realistic as Peru has neither the facilities to produce styrene nor those to use it. Further discussion of styrene production is given in the Annex on petrochemicals in the Andean Group.

The Cabot carbon black plant receives its aromatic tar feed stock from the refinery and until recently was the only producer of carbon black in Colombia. A new plant has been built in Cali by Phillips and additional details on this industry are covered below in a discussion of that plant.

The other resin producer in Mamonal - Cyanamid - was not visited, but from the table in Annex 4(a) it can be seen that this is a small plant relying on imported raw materials. It is also apparent from this table that the three small formaldehyde plants do not have a combined capacity which is anywhere close to the size of modern formaldehyde plants which are typically in the 30,000-100,000 tons per year class.

Barrancabermeja

Although the Mamonal area is now the most developed center for petrochemicals, it will soon be overtaken by the construction of plants around the Ecopetrol refinery in Barrancabermeja. These facilities are all being developed by Ecopetrol either alone or in association with other companies and are forward integration steps rather than backward integration. In other words, the plant which has been predominantly a fuel supplier will be expanded to convert the fuels to petrochemical intermediates (and in some cases finished products) which will be shipped to other parts of the country for further processing.

The refinery has a capacity of 85,000 barrels per day of crude but a current expansion will increase this to 100,000 B/D. It started operations in 1930 as a plant of Intercol. In 1951 the operating concession expired, and Intercol continued running the refinery under a management contract until 1961. At that time Ecopetrol took over the complete operation. The plant consists of a number of production units which have resulted from the continual expansion of the facilities. The main units in the plant are crude distillation, catalytic cracking plants, an alkylation unit, an aviation gasoline plant. When the current round of expansion is completed, there will also be a lube oil plant, an aromatics unit, a paraffin wax plant, and a polyethylene plant.

Focusing on the petrochemical development, the most significant items are mentioned below.

The aromatics plant which is currently being completed will produce the following products.

| | <u>tons per annum</u> |
|---------------------|-----------------------|
| Benzene | 21,000 |
| Cyclohexane | 21,000 |
| Orthoxylene | 6,000 |
| Ethylbenzene | 9,500 |
| Meta and paraxylene | 29,000 |

These products are all destined for conversion in Colombia to caprolactam, dodecylbenzene (for detergent), phthallic anhydride, styrene, and DMT. Benzene will also be exported and will find minor other applications. The investment cost for the plant is \$15 million.

The polyethylene plant is being built in collaboration with Dow Chemical and will have a capacity of 15,000 tons per year of low density polyethylene. It will be based on ethylene produced from cracked gas streams in the refinery. This is an extremely small capacity (modern plants produce as much as 60,000 tons polyethylene and up to 500,000 tons ethylene). However, it will convert into a more useful product a gas stream which would otherwise be used as a fuel.

The paraffin wax plant is designed to produce 122 million pounds per year of different melting point waxes. Of the production, 45% will be for 125 - 129° Fahrenheit wax and 35% will be 133-135° Fahrenheit wax. It will also produce lube oil base materials which will enable Colombia to produce high grade lubricating oils. The plant cost will be about \$15 million and is expected to save \$6.8 million of present imports and generate \$10 million per year of exports. About 65% of paraffin and 50% of the lube basis will be exported.

The caprolactam and DMT projects are described in detail in the chapter on the synthetic fiber industry.

Other Petrochemical Plants

The other petrochemical plants shown in Annex 4(a) were not visited with the exception of the Phillips carbon black plant in Cali. As can be seen from their size, except for the Phillips plant they are not major factors in the petrochemical industry.

The Phillips plant is owned 100% by Phillips Petroleum Corporation of the U.S. and was completed in 1967. The plant has built up its production slowly as it has had to have its product accepted by the tire producers. As is normally the case, tire producers take about two years to thoroughly test and prove a new source of supply before they will accept it. The Phillips plant is therefore only now beginning to operate at its capacity. It has also started export sales and it expects in 1970 to export as much as 50% of its production. This will be mostly to Peru and Chile, which are both currently using about 8 million pounds per year. Ecuador, Bolivia, and Costa Rica together consume 4 million pounds per year and competition for the market there is between Colombia and Venezuela.

One of the biggest problems of the Phillips plant is the transportation of its raw material from the Ecopetrol refinery some 400 miles to the north. At present the aromatic tar is barged to Cartagena, then shipped by tanker via the Panama Canal to Buenaventura, and then delivered by rail tank car to Cali. This results in an increase in the price of 38.50 pesos per barrel at the refinery to 78.50 pesos per barrel by the time it is delivered. Phillips hopes that when the new west coast refinery is completed they will be supplied from it, thus doing away with transportation problems.

Miscellaneous

The Sucroquimica facilities near Cali were also visited. This is a plant based on fermentation of sugar with capacity to produce 1,500 tons per year of acetic acid, 400 tons/year of ethyl acetate, and 1,000 tons/year of citric acid. The acetic acid and ethyl acetate production has proceeded extremely well, but the citric acid plant has never really been able to operate. It is about to be scrapped and replaced with a plant based on another technology following the takeover of Sucroquimica by Miles Laboratories of the U.S. The Miles process has proved itself in Mexico, Israel, and the U.S. With citric acid prices of 20,000 pesos per ton at present in Colombia and some 1,500 tons being consumed in the Andean Group, it would appear possible that this plant can be rehabilitated and made viable.

COMPARISON OF COLOMBIAN AND INTERNATIONAL CHEMICAL PRICES

A comparison of prices in the chemical industry is quite difficult. This industry throughout the world has many levels of prices for the identical product, probably because there has been less elaboration of the middleman institutions than in other industry sectors. In chemicals, the production chain from primary raw materials to consumer goods started with integrated companies which control their own internal transfer prices to suit their own business. Participation of other companies at various points in the production chain is a relatively recent - of the last 10-15 years - phenomenon in this industry which itself is very new. The merchant prices for intermediate goods usually result from special deals. Only recently has the point been reached in a few items where sellers and buyers are numerous enough to make competition a major price determining factor.

This pricing problem which is already complicated within any one country becomes even more complicated when exports are considered. Traditionally, exports of intermediate chemicals have been unplanned surplus production which could not be disposed of in the domestic market and which was sold on a basis of marginal profits. This has resulted in international trading prices which are virtually dumping prices, so that exports are at a much lower price level than prevails within the exporting countries themselves.

These factors should be borne in mind in evaluating the specific prices below which were obtained during the course of the mission. The data give a rough indication of price levels in Colombia compared with other parts of the world, and therefore some idea of the efficiency of this sector of Colombian industry. (Colombian prices in pesos are converted to dollars at a rate of 18 to 1. All tons are metric tons).

Other Basic Chemicals

The following price comparison is based on the Planta de Soda price list and listed prices taken from chemical trade journals (U.S. cents per pound).

| <u>Product</u> | <u>Colombia Domestic</u> | <u>Colombia Export</u> | <u>USA</u> | <u>Germany</u> | <u>UK</u> | <u>France</u> |
|--------------------|------------------------------|----------------------------|------------|----------------|-----------|---------------|
| Caustic soda (45%) | 2.4 | - | - | - | - | - |

| <u>Product</u> | <u>Colombia Domestic</u> | <u>Colombia Export</u> | <u>USA</u> | <u>Germany</u> | <u>UK</u> | <u>France</u> |
|----------------------------|------------------------------|----------------------------|------------|----------------|-----------|---------------|
| Caustic soda (50%) | 2.7 | - | 3.3 | - | - | - |
| Caustic soda (73%) | 4.3 | - | 3.4 | - | - | - |
| Caustic soda (98%) | 5.7 | - | - | 4.6 | 4.3 | 3.1 |
| Caustic soda - flakes | 9.8 | - | 5.8 | - | - | - |
| Soda ash, dense, bulk | 2.9 | 1.8 | 1.7 | 2.5 | 1.5 | 1.7 |
| Soda ash, dense, in bags | 3.0 | 2.2 | 2.2 | - | - | - |
| Soda ash, light | 3.0 | 2.6 | 2.2 | - | - | - |
| Sodium bicarbonate | 3.2 | 3.1 | 3.4-4.0 | - | - | - |
| Chlorine water treatment | 2.1 | - | - | - | - | - |
| Chlorine, liquid | 2.9 | - | 3.8-7.6 | 3.5 | 3.5 | 3.4 |
| Hydrochloric acid, carboys | 2.0 | - | - | - | - | - |
| Hydrochloric acid, tanks | 1.8 | - | 1.0-1.8 | 1.6 | 1.5 | 1.1 |
| Sodium sulfide (62%) | 12.9 | 7.5 | 7.0 | - | - | 7.9 |

Polyethylene

The current selling price for imported polyethylene in Colombia is 10 pesos/kg, and the polyethylene project of Ecopetrol and Dow will sell its product at this price. This is equal to 25 US ¢ per lb, and compares with average selling prices in the US and Europe of 12 to 17¢ per lb. depending on the grade. The film grades are the cheaper quality, and price for any one grade would vary between 1 and 1½¢ per lb. between different manufacturers. Adding 25% to this price for freight and handling (a figure suggested by Colombians for this type of product) and at 40% duty one arrives at an average landed price for imports in Colombia of 20 to 28¢ per lb., on a cif price without duty of 15 to 21¢ per lb.

The feed stock of the ethylene plant is essentially fuel gas from the refinery which Ecopetrol values at 3 pesos per million BTU. This is equivalent to 16.5 US ¢ per million BTU which is considerably lower than the price paid by US Gulf Coast ethylene producers for their natural gas feed stocks of 20-40¢ per million BTUs. It is indicative of the un-economic size of the polyethylene plant that despite low cost inputs (50% of total cost), it has to sell its product at about 40% over the landed cost of product from plants which pay probably twice as much for their feed stock. Ecopetrol stated quite clearly that the biggest factor in the production cost of ethylene is the amortization of the capital cost of the plant.

Naphtha

The Ecopetrol aromatics plant has not yet started up and a price policy for the products has not yet been announced. They expect to sell at about the cif price of imported equivalents, and as the plant is of a reasonable size, this should be possible. In addition the feed stock - virgin naphtha - has a transfer price of $1/4 - 1/2$ ¢ per U.S. gallon. This would average \$15.6 per metric ton which is low in comparison with the average price of \$19-21 per metric ton paid in the industrialized countries for naphtha used for petrochemical feed stock.

PVC

The selling price for PVC in Colombia is claimed to be the lowest in Latin America at 20¢ per pound, compared with prices in Argentina, Peru and Mexico of 40¢ per lb. The U.S. selling price is between 13 and 15¢ per lb. Adding 25% to the U.S. price for freight and handling would give a cif value without duty of 17.5¢/lb; i.e., the Colombian selling price is 14% greater than this.

Carbon Black

The following prices for carbon black were given by Phillips Petroquimica, in US ¢ per pound on a cif basis.

| | |
|--------------------|-------|
| Colombian customer | 14.5 |
| Chile, Peru | 10-14 |
| Ecuador | 9-13 |

Freight costs in US cents for pound were given as:

| | |
|---------------------|------|
| Cali - Peru | 1.25 |
| Cali - Chile | 1.75 |
| Cali - Costa Rica | 2.5 |
| Cali - Buenaventura | 0.3 |
| Cali - Bogota | 1.0 |

On the basis of the above information, and taking into account trade discounts, it can be calculated that the average price FOB the Phillips plant is about 10.2¢ per lb.

Carbon black prices in the United States are quoted over a range from 5.75 to 10.75¢ per lb. depending on grade and whether the delivery is in bulk or in bags. These prices are on an FOB plant basis in car lot quantities. (Adding 25% for freight and handling would make the equivalent cif value of US carbon black in Colombia 7.2 to 13.4¢/lb., compared to the Colombian price of 10.2¢ per pound).

Caprolactam

Although the plant is not yet in operation the company projects that the selling price in the domestic market will be 10,200 pesos per metric ton, i.e. 25.6 US ¢ per lb. The price in the export market would be 7,200 pesos per metric ton or 18.2¢ per lb, i.e. 40% lower. Prices quoted in the US are currently 27¢ per lb in flakes or 24.5¢ per lb. for molten product for car lot loads ex works on a freight equalized basis. Thus caprolactam will be sold in Colombia at the level quoted for that product in the USA. It might also be noted that the difference between the proposed domestic and export selling prices for the Colombian product is 40%, which is the same as the import duty on the present imported supplies.

Fertilizer

Abocol claimed that they are selling fertilizer at domestic prices which are equivalent to prices in the USA when using an exchange rate of 18 pesos to the \$1. On the basis of their annual sales and annual production in 1968 their average selling price was 1,460 pesos per metric ton of product. This would be equal to US \$81 per ton. Abocol produces high analysis complex fertilizer grades.

Monomeros are planning to sell their complex fertilizer at 1,150 pesos per ton in the domestic market and 1,000 pesos per ton in the export market (initially they expect to export half of their production). These prices would be equivalent to US \$61 and US \$55 per ton respectively. Their grades will vary from 20:20:0 to 14:14:14, i.e. high analysis fertilizers. 1/ (next page)

The Caja Agraria claims that it sells fertilizer at the import cost plus duty, transportation and blending costs with a surcharge of 10% for administration and overhead costs. According to the AID study of the fertilizer industry, the principal grade produced by the Caja is 5:20:12 which was selling in Bogota in 1969 for 1,480 pesos per ton. This is a high price for a relatively low grade fertilizer and as it is the price setter in the Colombian fertilizer industry, it has distorted the selling prices of the other grades. A U.S. price for this grade of fertilizer varied from 1,330 in 1958 to 1,280 in 1967 and 1,000 in 1969.

In terms of current pesos, fertilizer prices have increased almost 50% since 1964, the year domestic production of fertilizer first became important. Using the wholesale price index as a deflator, the 1969 prices would be at about the same level as the 1964 prices. The deflated prices reached a peak in 1965 and have decreased since then, probably as a result of the increasing efficiency of the major Colombian producers, and the decrease in price of imports.

FUTURE PROSPECTS

The chemical industry appears to have run out of obvious opportunities for import substitution in Colombia. Furthermore, the growth of the internal market will probably not be sufficient to justify additional investment in economically-sized plants in the near future. The one exception to this overall expectation is the fertilizer industry, where there seems to be a potential for plants to process these raw materials which are now imported. Future imports of phosphates will depend on whether phosphate deposits at Sardinata in Northern Colombia can be exploited economically.

The best economic expectations, therefore, appear to be in export-oriented industries and indeed the more concrete proposals for future expansions are in this direction.

Basic Chemicals

When the current construction program of Planta de Soda is completed, Colombia will be well supplied with basic inorganic chemicals and will need to export considerable tonnages of soda ash (25,000 tons), chlorine (1,000 tons), sodium bicarbonate (25,000 tons), and sodium sulfate (800 tons). These exports would be made in the face of stiff international competition and would probably be profitable only on a marginal basis.

A most important future development is the large solar salt project being developed by Concesion de Salinas, for export. This would be located at Bahia Honda, which is practically the most northern point of Colombia. It would initially produce 1.4 - 1.8 million tons per year of salt. It could be expanded later to somewhere between 2-4 million tons per year. In the first stage the production cost is expected to be \$2.20 - \$2.50 per ton f.o.b. and after the expansion this could fall to something below \$2.00 per ton.

1/ The Abocol and Monomeros prices compare well with the manufacturing cost for equivalents based on international prices for N, P and K. Thus urea is selling FOB Europe and USA for \$50 per ton (range \$45-\$60). A 20:20:0 blend would cost \$58 per ton to produce and a 14:14:14 blend \$46 per ton. Freight costs to Colombia for these products would be \$10-20 per ton. These prices may be summarized as follows:

| | <u>Landed Price</u> <u>Imports</u> | (\$ ton) | <u>Colombian</u> <u>Prices</u> |
|----------|---------------------------------------|-------------------|-----------------------------------|
| Urea | 55-80 | Abocol Average | 81 |
| 20:20:0 | 68-78 | Monomeros Average | 51 Domestic |
| 14:14:14 | 56-66 | | 55 Export |

The construction cost for the first stage is expected to be about \$20 million including civil works, storage facilities, mechanical harvesting equipment, power plant, housing, and a wharf. The latter would be suitable for ships from 40-100,000 tons and the equipment on it and other service equipment would be sized to cater for the expansion.

As the project is necessarily export-oriented, Concesion de Salinas is holding preliminary discussions with potential buyers in an attempt to work out long-term purchase contracts.

The French firm Saline du Midi is preparing an engineering pre-investment study of the salt facility and a local engineering company has prepared a study on the port. This would be followed by a one-year field trial to test evaporation and seepage rates for the proposed evaporation ponds. It would then be possible for a complete appraisal to be made and if the project is approved, initial construction could be completed in one more year. Allowing a further year for the initial evaporation, the first products could be available 3-4 years from now.

Fertilizer Industry

The level of fertilizer use is low. In 1969 only 27% of the cultivated area was fertilized. Although this grew from 18% in 1963^{1/}, Colombia has not kept up the rest of South America in the use of fertilizer. An FAO study shows that between 1964 and 1968, Colombia's fertilizer use as a percentage for all South America fell from 15% to 7%.

From discussions with industry leaders it appears that the main reason for low fertilizer use is that neither the farmers, the Department of Agriculture, nor the fertilizer suppliers themselves have a clear understanding of the quantitative benefits of using fertilizer. The picture is clouded because there is insufficient reliable data on past crop response to fertilizer use, the best types of fertilizer to use or the optimum price levels.

A long-term, pre-investment study has therefore been proposed to make a country-wide review of the fertilizer industry. Its initial focus would be on the existing practice and results of fertilizer use. It would also examine the current distribution chain and the price/cost structure of getting fertilizer to the farmer. Then by determining cost/output ratios for farm production it would attempt to develop use projections for the future. This, together with a look at sources of raw materials and existing plants, would be a basis for proposing projects to supply additional fertilizer. These projects would hopefully be integrated schemes including production, distribution and transportation facilities. The study would also recommend needed institutional changes.

1/ See Annex 4(d) for a detailed breakdown of area cultivated to certain crops and % of this area being fertilized.

This is an ambitious program, but it hardly seems possible for rational decisions to be made for the future of the fertilizer industry without some study of this type. It will encounter many practical difficulties. One is that the determination of farm cost/output levels will necessarily take 2-3 years to complete in order to set up the study and observe the effect of fertilizer use over 2-3 crop cycles. During this period it would seem impractical to expect that the producers would not be exploring expansion plans on their own initiative. Particularly in the case of Abocol, success in its new marketing program could induce it to go ahead with expansion plans.

Another complication is the fact that a tentative agreement exists with Venezuela whereby Venezuela would supply ammonia to Colombia. This arose out of the development of the Monomeros project in which the Instituto Venezolano de Petroquímica (IVP) is a 45% shareholder. IVP was persuaded to invest in Monomeros on the basis that Monomeros would supply caprolactam to Venezuela and that Venezuela would supply ammonia to Colombia. The IVP ammonia project has not gone ahead as fast as the Monomeros project, probably because it was over-ambitious. Two large (1,000 tons per day) ammonia plants were proposed to be located near the natural gas fields of Lake Maracaibo. These plants would also produce urea and because of their large size and the low cost of the raw material, were expected to be able to supply not only Colombia but even the industrialized countries. With the slump in the world fertilizer business and because of internal difficulties in Venezuela, the construction of the plant is proceeding very slowly. It is not certain how firm the commitment is to Venezuela but if the price is reasonably low it would appear to be to Colombia's advantage to make use of this agreement.

In spite of these difficulties, it is urged that the study be started as soon as possible. As a first step the interested parties in Colombia could be invited to submit their own suggestions of what should be included in the study and how they could assist in its execution.

Petrochemical Industry

The future of the petrochemical industry in Colombia beyond the present expansion plans appears to be intimately connected with the development of the industry in the Andean Group. The negotiations for the establishment of this common market have reached the point where the first tariff reductions have been implemented and there are hopeful prospects that it will continue. This is particularly true with regard to petrochemicals in which considerable discussions and agreement in principle has been reached among the nations and particularly by their national oil companies. Because of the importance of this development, it is treated fully in Annex 4 where the background to the arrangements, a discussion of supply and demand in the Andean Group, and a proposal for a pre-investment study are given.

This shows that although the general directions are clear and even some allocations of specific products can be made now, there is no real basis currently available for rationally deciding how much and where the petrochemical products should be produced. It is for this reason that the pre-investment study is proposed. It would cover marketing projections, feed stock sources, existing production units, freight rates, and financial requirements. Its point of immediate focus would be the location of a petrochemical complex to be based on a large (100-200,000 tons per year) ethylene plant.

MAJOR CHEMICAL PLANTS IN COLOMBIA

ANNEX 4(a)

| <u>Company</u> | <u>Product</u> | <u>Annual Capacity</u> | | <u>Initial Year</u> <u>of Production</u> | <u>Employees</u> | <u>Value of</u> | <u>Raw Materials</u> | |
|---------------------------|-------------------------------------|------------------------|-----------------|---|------------------|----------------------------|-------------------------------|--------------------------|
| | | <u>1969 (in tons)</u> | <u>Location</u> | | | <u>Production 1969</u> | <u>Imported</u> | <u>Local</u> |
| | | | | | | in million \$ ¹ | | |
| <u>1. Basic Chemical</u> | | | | | | | | |
| Planta Colombiana de Soda | Soda Ash | 89,600 ² | Betania | 1953 | 925 | 3.2 | (| Salt |
| | Caustic Soda | 43,600) | and | (Betania) | (Betania) | 4.8 | (| Limestone |
| | Chlorine | 12,000) | Cartagena | 1964 | 1,397 | 0.5 | (| |
| | Sodium Bicarbonate | 2,200) | | (Cartagena) | (Cartagena) | 0.2 | (| |
| | Refined Salt | 193,000 | Betania | | 61 (Bogota) | 4.0 ³ | (| |
| Concesion de Salinas | Rock Salt | 250,000 | Zipaquira | Colonial Times | 400 | na | (| |
| | Solar Salt | 350,000 | Manauare | 1940 | 400 | na | (| |
| | Refined Salt | 193,000 | Betania | | (260 elsewhere) | 7.2 | (| |
| <u>2. Fertilizer</u> | | | | | | | | |
| Amocar | Amonia | 100,000 | Cartagena | 1963 | 40 | na | | Natural Gas |
| Abonos Colombianos | Urea | 75,000 | Cartagena | 1963 | 350 | 12.5 | Phosphate Rock | Ammonia |
| | Mixed Fertilizer | 125,000 | | | | | Potash | |
| Caja Agraria | Mixed Fertilizer | 300,000 | 3 Plants | 195 | 600 | 9.2 | | Various Fertilizers |
| Sulfacidos | Mixed Fertilizer and Sulphuric Acid | 100,000 | | na | na | na | Phosphate Rock | Sulphur |
| | Thomas Rock | 50,000 | Belencito | | 60 | na | (By product of blast furnace) | |
| Paz del Rio | Thomas Rock | 50,000 | Belencito | | 60 | na | | |
| Quin SA | Mixed Fertilizer | 25,000 | | na | na | na | | Sulphur |
| Vertilizantes Colombiana | Urea | 16,000 | Barranca | 1954 | 300 | na | | Natural Gas |
| | Ammonium Nitrate | 42,000 | | | | | | |
| Other Mixers | Mixed Fertilizer | 60,000 | Various | na | na | na | | Various Fertilizers |
| <u>3. Petrochemicals</u> | | | | | | | | |
| Cia Quimica Borcen | (| (| Cali | | | | (| |
| Cyanamid de Colombia | (Formaldehyde | (15,800 | Cartagena | | na | na | (Methanol | |
| Quimica Proco | (| (| Medellin | | | | (| |
| Cia Quimica Borcen | (Phenol-Formaldehyde | (| Cali | | | | (| (|
| Quimica Proco | (Resins | (4,000 ⁴ | Medellin | | na | na | (Phenol | (Formaldehyde |
| Cia Quimica Borcen | (Urea-Formaldehyde | (| Cali | | | | | (Urea and |
| Quimica Proco | (Resins | (5,300 ⁵ | Medellin | | na | na | | (Formaldehyde |
| Cyanamid | Melamin-Formaldehyde Resins | 800 ⁶ | Cartagena | | | | Melamine | Formaldehyde |
| Colcarbuos | Vinyl Chloride Monomer | 8,000 | Cajica | 1967 | na | na | | Acetylene and |
| Colcarbuos | PVC | 7,500 | Cajica | 1967 | na | na | | Hydrochloric Acid |
| Petroquimica Colombiana | PVC | 5,500 | Cartagena | 1965 | 100 | 2.6 | Vinyl Chloride | Vinyl Chloride Monomer |
| Dow Chemical | Polystyrene | 3,700 | Cartagena | 1965 | 40 | na | Styrene | |
| Carboquimica | Phthallic Anhydride | 2,500 | Bogota | 1962 | na | na | Naphthalene and | |
| Andarcol | Phthallic Anhydride | 1,800 | Medellin | 1968 | na | na | Orthoxylene | Naphthalene ⁸ |
| Phillips Negro de Hmo | Carbon Black | 10,000 | Cali | 1968 | 50 | 1.0 ⁹ | | Aromatic Oil |
| Cabot Colombianos | Carbon Black | 10,000 | Cartagena | 1965 | 77 | 2.0 | | Aromatic Oil |
| Several | Detergents | 55,000 | Several | - | na | na | DDB and TDB | |
| Econetrol | Sulphur | 10,000 | Barranca | 1967 | na | na | | Refinery Gases |
| Intercol | Sulphur | 4,000 | Cartagena | 1965 | na | na | | Refinery Gases |

Note: See Annex 4(b) for footnotes.

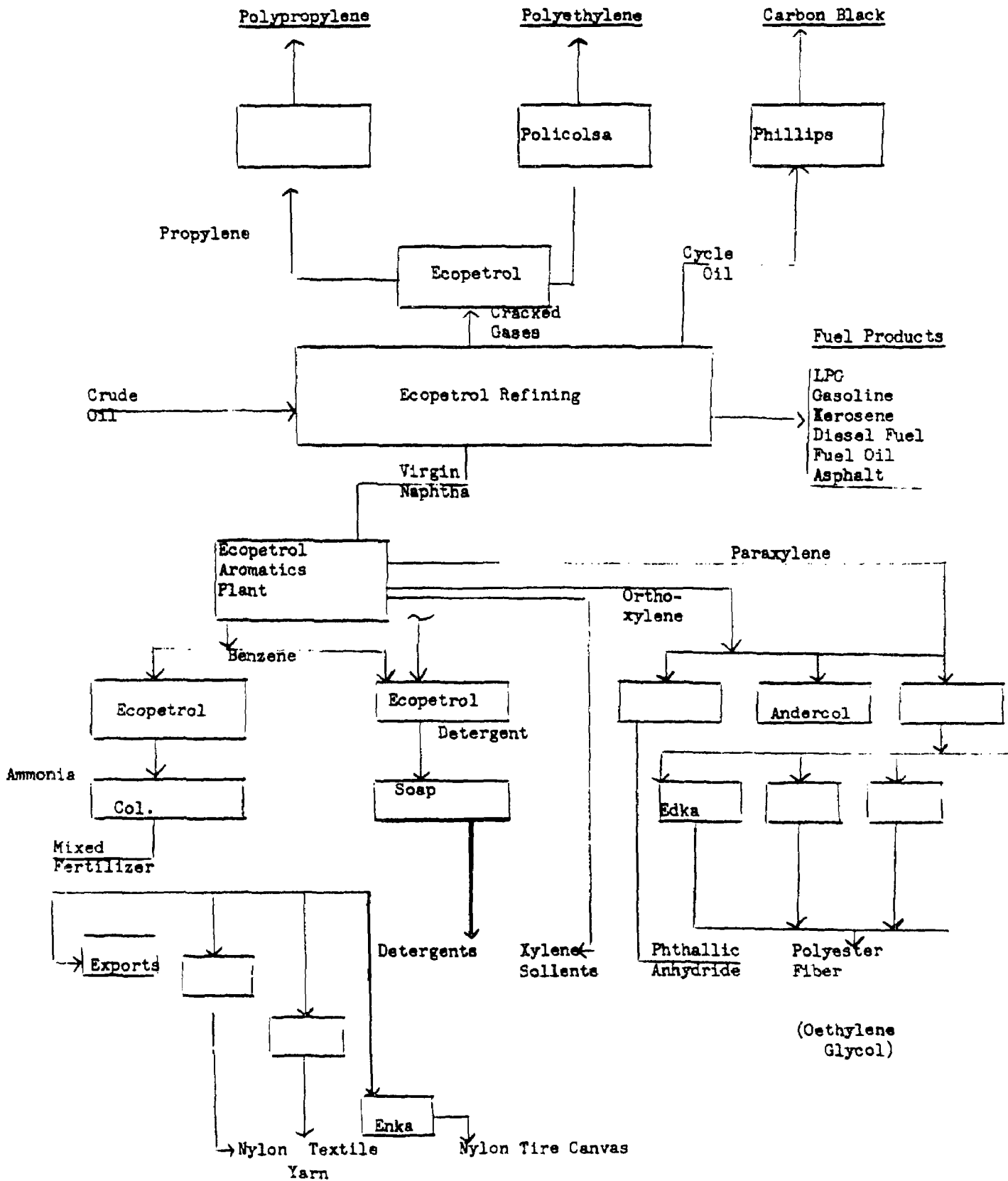
CHEMICAL EXPANSION PROJECTS

ANNEX II(C)

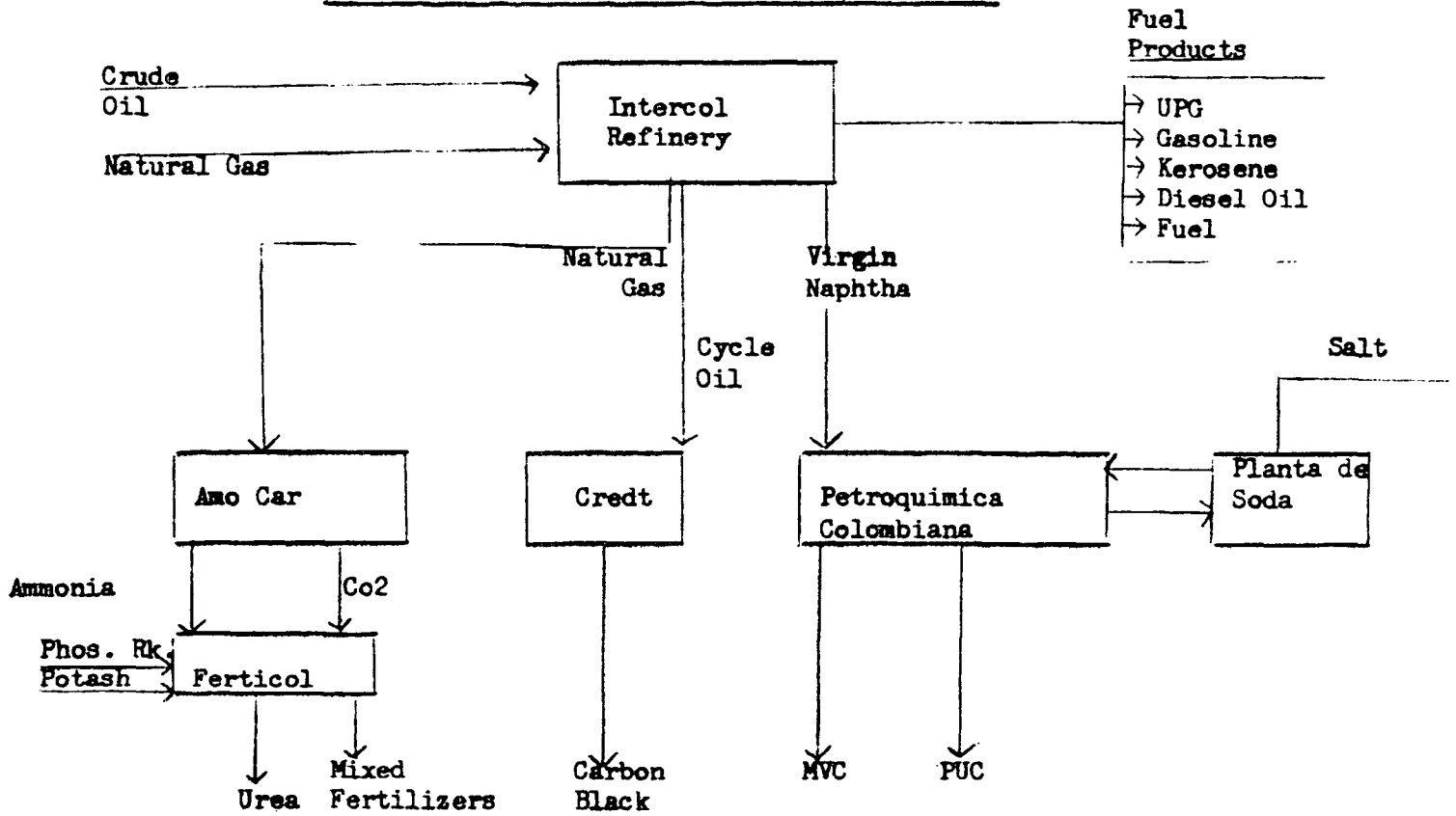
| <u>Company</u> | <u>Product</u> | <u>Annual Capacity (in tons)</u> | <u>Location</u> | <u>Year Completed</u> | <u>New Employees</u> | <u>Additional New Production in US\$ million</u> | <u>Raw Materials Imported</u> | <u>Local</u> | |
|--------------------------------|-----------------------------|--------------------------------------|-----------------|---------------------------|--------------------------|--|---|--|---------------|
| 1. Basic Chemicals | | | | | | | | | |
| Planta Colombiana de Soda | Soda Ash | 279,800 ^{11/}) | Cartagena | 1972) | 1100 | 6.0) | | Salt | |
| | Caustic Soda | 109,000 ^{11/}) | and | 1972) | | 6.9) | | Limestone | |
| | Chlorine | 49,720 ^{11/}) | Beranda | 1972) | | 1.3) | | | |
| | Sodium Bicarbonate | 33,600 ^{11/}) | | 1972) | | 2.1) | | | |
| | Sodium Sulfate | 2,800 ^{11/}) | | 1971) | | 0.5) | | | |
| | Refined Salt | 360,000 ^{11/}) | | 1975) | | 2.3 ^{12/}) | | | |
| | Solar Salt | 350,000 | Manure | 1971 | | n.a. | | | |
| | Solar Salt | 1.4-1.8 million | Santa Honda | 1974 | 100-200 | 4.3 (average) | | | |
| | Concesion de Salinas | | | | | | | | |
| | | Mixed fertilizer | 200,000 | 3 Quilla | 1971 | 375 ^{12/} | 17.5 ^{12/} | Ammonia, potash, phosphate rock | Cyclotriazane |
| 2. Fertilizers | | | | | | | | | |
| Mamaron Colimbo Ten. | | | | | | | | | |
| 3. Petrochemicals | | | | | | | | | |
| Ecopetrol | Ethylene | 20,000 | Barranca | 1969 | n.a. | n.a. | Refinery gases | | |
| Ecopetrol | Propylene | 10,000 | Barranca | 1969 | n.a. | n.a. | Refinery gases | | |
| Ecopetrol | Benzene | 40,000 | Barranca | 1970 | n.a. | n.a. | Virgin Naptha | | |
| Ecopetrol | Orthoxylene | 2,000 | Barranca | 1970 | n.a. | n.a. | Virgin Naptha | | |
| Ecopetrol | Paraxylene | 17,000 | Barranca | 1972 | n.a. | n.a. | Virgin Naptha | | |
| Ecopetrol | Mixed Xylenes | 16,000 | Barranca | 1970 | n.a. | 8.3 | Ethylene | | |
| Not defined | Polypethylene | 15,000 | Barranca | 1969 | - | - | Propylene | | |
| Ecopetrol | Cyclohexane | 10,000 | Barranca | 1970 | n.a. | n.a. | Benzene | | |
| Ecopetrol | Tetramer | 20,000 | Barranca | 1970 | n.a. | n.a. | Propylene | | |
| Ecopetrol | Detergent Alkylate | 16,000 | Barranca | 1970 | n.a. | n.a. | Tetramer & Benzene | | |
| Ecopetrol | Caprolactam | 15,000 | 3 Quilla | 1970 | 375 | 17.6 | Cyclohexane, sulphuric acid (and imported ammonia) | | |
| Monmeros Colombo Venoslanos | DMT | 24,000 | Not defined | 1972 | 145 | 14.0 | Paraxylene (and imported Hexanol) | | |
| Not defined | Phthalic Anhydride | 4,000 | 3 Quilla | 1971 | n.a. | n.a. | Orthoxylene | | |
| Carboquímica | Phthalic Anhydride | 2,500 | 3 Quilla | 1972 | n.a. | n.a. | Orthoxylene | | |
| Andercol | | | | | | | | | |

1. Conversion rate used, 13 pesos = \$1
2. Some 47,200 tons of soda ash are consumed by Planta de Soda itself to produce caustic soda and sodium bicarbonate.
3. This represents the "free" charged by Planta de Soda for refining salt to nutritional standard for sale by Concesion de Salinas.
4. The capacity consists of 2,200 tons liquid and 2,000 tons of molding powders.
5. The capacity consists of 4,300 tons of liquid resin and 1,300 tons of powder.
6. The capacity consists of 100 tons liquids and 400 tons solids.
7. Part of the naphthalene is imported.
8. Although the same capacity as the Sabot plant, Phillips produces at only 50% of capacity in 1969.
9. Indicates value of production when new capacity is fully utilized.
10. Indicates total capacity when expansion is complete.
11. Indicates total capacity when expansion is complete.
12. Figures are total for plant including fertilizers and caustic man.

FLOW SHEET OF PETROCHEMICAL INDUSTRY
BASED ON PRODUCTS FROM ECOPETROL REFINING



FLOW SHEET OF PETROCHEMICAL INDUSTRY
BASED ON PRODUCTS FROM THE INTERCOL REFINING



FERTILIZED AREA FOR
THE PRINCIPAL CROPS IN COLOMBIA

| | <u>1 9 6 3</u> | | <u>1 9 6 9</u> | |
|-------------|------------------------|-----------------------------|------------------------|-----------------------------|
| | <u>Area Fertilized</u> | <u>% of Cultivated Area</u> | <u>Area Fertilized</u> | <u>% of Cultivated Area</u> |
| Rice | 82,000 | 32 | 111,800 | 43 |
| Cotton | 49,000 | 30 | 121,500 | 45 |
| Banana | 19,000 | 30 | 24,000 | 80 |
| Sugar cane | 52,000 | 77 | 36,000 | 40 |
| Barley | 46,000 | 59 | 45,000 | 90 |
| Cana P. Pan | 7,000 | 2 | 11,000 | 5 |
| Kidney bean | 5,000 | 6 | 5,000 | 10 |
| Maize | 12,000 | 2 | 123,000 | 15 |
| Potato | 104,000 | 70 | 80,000 | 100 |
| Tobacco | 10,000 | 45 | 14,800 | 55 |
| Wheat | 62,000 | 52 | 35,000 | 70 |
| Coffee | 97,000 | 11 | 130,000 | 16 |
| Total | <u>545,000</u> | <u>18</u> | <u>737,000</u> | <u>27</u> |

Total use of
fertilizer

216,400 Tons

350,000 Tons

Source: Abocol

PETROCHEMICAL INDUSTRY

IN

THE ANDEAN GROUP

A. The Andean Group Petrochemical Accord

The Petrochemical Accord reached by the Andean Group countries has established a list of negotiable products, most of which are still in the process of being studied. Two products, carbon black from Colombia, and pentaerithrithol from Chile, are presently in commercialization under the terms of the Accord, and two others, caprolactam from Colombia, and acrylic fibre from Peru, are not yet in commercialization, but plants to produce them are presently under construction.

DMT has been defined as being within the terms of the Accord, and its production has been assigned to Colombia. A detailed feasibility study has been completed, and it is likely that a DMT project could be put together within the next 6-12 months.

The products so far defined under the Accord are thus products for which production plans were already well defined when the Accord was reached. The Accord, therefore, seems merely to have recognized these plans rather than determining from first principles that the amount, location and timing of this production would be beneficial to the Andean Group countries. The need for a more rational approach to the petrochemical future of the Andean Group is elaborated in Section D, and as further introduction the following sections examine briefly the supply/demand situation of petrochemicals in this area.

B. Demand and Supply of Petrochemicals in the Andean Group

Ecopetrol has made a preliminary study of the total demand for certain petrochemical products in the Andean Group. These products were selected on the basis that no one country would have sufficient demand to justify the construction of a plant of minimum economic size. A further condition was that each product could be made in a single plant which could supply the whole market in the subregion.

Information to make such a study in Colombia is well developed but there is a lack of reliable information in the other countries. In many cases, the demand projections in the other countries are based on the existing demand for consumer products which has been transformed into an equivalent demand for the corresponding intermediate and basic petrochemicals. The following table summarizes the Ecopetrol study.

ESTIMATED CONSUMPTION OF SELECTED PETROCHEMICAL PRODUCTS IN

THE ANDEAN GROUP

| | <u>Metric Tons</u> | |
|---------|--------------------|-------------|
| | <u>1968</u> | <u>1972</u> |
| Benzene | 30,000 | 50,000 |

| | <u>Metric Tons</u> | |
|---------------------|--------------------|-------------|
| | <u>1968</u> | <u>1972</u> |
| Cyclohexane | 18,000 | 27,000* |
| SBR Rubber | 16,000 | 26,800 |
| Detergent Alkylate | 13,000 | 26,600 |
| Caprolactam | 12,000 | 25,000* |
| Styrene | 12,000 | 21,200 |
| DMT | 8,700 | 18,100* |
| Methanol | 8,600 | 16,400 |
| Polystyrene | 7,600 | 13,000 |
| Phthallic Anhydride | 5,600 | 12,800 |
| Paraxylene | 5,900 | 12,200* |
| Orthoxylene | 4,200 | 12,200 |
| Naphthalene | 1,600 | 600 |

(*) Venezuela included

This table suggests that there is scope for the development of petrochemical projects in the Andean Group which could be of a minimum economic size. However, one must take into account the existing production, pending investment plans, and the possibilities of supplying the raw materials for these projects; this is discussed in the following notes for each product.

Aromatics

The benzene consumption of 50,000 tons in 1972 is based on the region's demand for cyclohexane, styrene, and detergent alkylate. If the cyclohexane is increased to provide more caprolactam (see below), an additional 16,000 tons of benzene would be needed for a total demand of 66,000 tons. Colombia could provide 40,000 tons which is the capacity of the Ecopetrol Aromatics Plant.

Orthoxylene demand in 1972 of 12,000 tons is mostly for phthallic anhydride and would be met with 8,300 tons from Ecopetrol with a shortfall therefore projected of some 4,000 tons in 1972.

Paraxylene demand would be 16,500 tons for the production of 24,000 tons of DMT. This would be available from the Ecopetrol Aromatic Plant which will have a capacity of 17,000 tons.

Caprolactam

A Caprolactam Plant is being constructed at Barranquilla with a capacity of 16,500 tons per year and should be in operation in mid 1971. According to the above projections, 25,000 tons per year of caprolactam will be demanded in the subregion, so that a short fall of 8,500 tons is envisaged. A study is presently under way to examine the feasibility of expanding the capacity by adding additional equipment to the plant presently being built.

This is a clear example of poor planning at the pre-investment stage. A plant of 16,500 tons capacity is below the minimum economic size, whereas one of 25,000 tons is just within the lower limits of the modern plants. Adding additional equipment to the 16,500 tons plant will clearly not improve its uneconomic situation. (See also discussion in chapter on Synthetic Fibre Industry)

Cyclohexane

The Ecopetrol Aromatics Plant has a capacity of 20,000 tons of cyclohexane per year which would be applied solely to the production of caprolactam. If the caprolactam plant is expanded as mentioned above, it would be necessary to increase the cyclohexane capacity to 35,000 tons. This would probably require duplication of the cyclohexane equipment as in the caprolactam case, again resulting in an uneconomic production unit. This shows the "ripple" effect of poor planning in this industry where one production step is very closely linked to the steps before it, and to those that succeed it.

Styrene and Synthetic Rubber

The projected styrene consumption (for polystyrene and SBR rubber) would indicate the possibility of building a small styrene plant which would just be of minimum size (25 to 30,000 tons per year). Styrene has been assigned to Bolivia in the Andean Accord, which is difficult to understand as neither of the raw materials - ethylene and benzene - is available there. While it might be marginally economic to transport benzene to Bolivia, it would not be economic to transport ethylene. No plans have been set for ethylene production, and when they are, this might well decide the location of the styrene plant. Generally it is considered more economic to have the styrene plant built alongside the ethylene plant, so that ethylene can be supplied by pipeline. Butadiene, which is the other raw material for producing the synthetic rubber, would have to be imported from outside the subregion, as the demand for it is well below the capacity of a minimum economically sized butadiene plant.

Detergent Alkylate

Ecopetrol is about to award a contract for the construction of a plant to produce 6,000 tons per year of dodecylbenzene and 9,000 tons per year of tridecylbenzene. Colombian consumption is projected for 1972 at 9,000 tons corresponding to the production of tridecylbenzene which is used in the locally produced detergents. The 6,000 tons of dodecylbenzene are intended for export to Chile and Peru where this product is used in detergents on account of the greater hardness of the water there. The demand projected for the Andean Group is 26,000 tons in 1972, indicating a shortfall of 11,000 tons. It is not known what existing capacity there is that could meet this shortfall, or what additions will be needed.

DMT

A DMT project is planned in Colombia, based on a capacity of 24,000 tons per year, which is at the low end of the economic size. The plant is expected to be in operation at the end of 1972. Although the capacity will exceed the demand at first, it is expected that the demand will catch up by the third year of operation.

Methanol

The projected demand of 16,000 tons in 1972 is mostly to supply the Chilean requirements for producing pentaerithrol. Even this demand is very small in comparison with the modern economic plants which would require a capacity of at least 50,000 tons.

Phthallic Anhydride

Since 1963 Colombia has had phthallic anhydride available from Carboquimica and in the last year Andercol started production in Medellin. Both plants have plans for expansion and with the availability of orthoxylyene (the raw materials) from the Ecopetrol Aromatic Plant vertical integration will be possible. No other country in the subregion produces phthallic anhydride and it would appear logical that the demand of 12,800 tons projected for 1972 could be most easily met by the construction of facilities in Colombia to make up a deficit of 8,500 tons.

C. Petrochemical Development in Venezuela

Venezuela with its large resources of crude oil, is reported to be planning a massive petrochemical project to be located at El Tablazo on Lake Maracaibo. It would be based on natural gas and the gas associated with the crude oil which is presently mostly flared. Although the planning has run into some internal difficulties, a project of one type or another seems certain to go ahead in the long run.

It has been said that the following production units are being considered for this complex:

Ethylene (based on ethane or propane) - 150,000 to 200,000 tons per year

Polyethylene - 50,000 tons per year

Vinyl Chloride, and PVC - ?

Urea - 2 x 1,000 tons/day

Ammonia - 2 x 1,000 tons/day

Methanol - 120,000 tons per year

Isoprene - 60,000 to 90,000 tons per year

Polyisoprene - 40,000 tons per year

The last three projects are all part of a Synthetic Rubber project to produce Polyisoprene Rubber, and apparently some commitments have been made to go ahead with this part of the complex.

The production from such a complex would, of course, be much larger than is required to meet the needs of Venezuela alone. Exports would be able to be made at competitive world prices, because of the sufficient size of the units and the fact that the raw material is available at reasonable cost. It is said that exports are aimed mostly at the USA and Europe where ready markets exist, but of course it would also be possible to move these materials to other South American countries as well.

The Venezuela project is by no means firmly committed, but future planning of petrochemicals in the Andean Group would have to take account of its possible implementation.

D. Proposal for Pre-investment Study

It is obvious from the foregoing discussion that the petrochemical situation in the Andean Group countries is anything but clearly defined even at present. The prospects for the future are even more cloudy, in particular the future market situation.

With the obvious potential for coordinated and rationalized production in the subregion, it is important that a thorough and objective study be made of the existing situation and its potential for expansion. This would be the basis for the promotion of specific projects.

For this reason a pre-investment study of the Andean Group petrochemical industry is recommended. The study is urgently needed, and from discussions with industry leaders in Colombia, there appears to be a will at least there to sponsor such a study.

In particular, the study would focus on the obvious need for expanded olefins production in the area. An olefins plant produces ethylene and its co-products, such as propylene, butadiene, and aromatics which are basic building blocks, not only for many of the products discussed above, but also for others that have not been mentioned, such as polyethylene and PVC.

At present there are two ethylene plants, one of 15,000 tons per year capacity in Colombia and one of 30,000 tons per year capacity in Chile, both of which are extremely small by world standards (200,000-500,000 tons per year). Rather than expand the two existing plants by further uneconomic increments, it would appear appropriate to plan for a single production unit for the whole region of minimum economic size, i.e., 150-200,000 tons. In this regard the unit said to be considered for Venezuela would be suitable. However, as neither the El Tablazo

project, nor Venezuela's entry into the Andean Group appears likely in the near future, the alternative of an olefins complex in one of the Andean Group countries themselves must be considered.

ANNEX 5

Wood Processing Industry Review

WOOD PROCESSING INDUSTRIES

INTRODUCTION

This review of wood processing industries covers principally the physical transformation of wood into semi-finished products, like sawn wood or plywood, and finished products like furniture; chemical transformation into pulp and paper is separately treated.

Official statistics have considerable time gaps, and it has been necessary to use data going as far back as 1966 or 1967 as the latest available in some cases.

A list of the official and semi-official institutions contacted by the mission is given in Annex 5(a). Annex 5(b) lists the number and types of wood processing plants visited by the mission.

SHARE IN MANUFACTURING ACTIVITY

Table 1 gives some general data on this subsector, in the context of total Colombian manufacturing industry.

It will be noticed that wood processing in Colombia is characterized by smaller average size of establishments, and lower value added and income per employee, than in the total manufacturing sector. The average wood processing enterprise, in 1967, employed 14 persons, when the average number of employees per enterprise for the manufacturing sector as a whole was 26. The subsector added only about 1.4% to the gross value of production of all manufacturing industry, although it employed 3.9% of the total number of persons employed, and 3.2% of the installed horsepower in all industry. Average income per employee in this subsector was only about 57.5% of the average for all manufacturing industry.

REGIONAL DISTRIBUTION

The Colombian wood processing industry is concentrated mainly in the five Departments of Cundinamarca, Antioquia, Atlantico, Valle, and Narino.

These Departments account for about 61% of all wood processing enterprises in Colombia, and for about 80% of all persons employed in this industry. (See Table 2.) Furthermore, almost 75% of all enterprises and 70% of all employees in wood processing industries in these five Departments are located within the five cities of Bogota, Medellin, Cali, Barranquilla, and Tumaco (See Table 3).

The wood processing industries in the first three cities are oriented mainly towards the domestic market. The wood processing industry

T A B L E 1

WOOD PROCESSING INDUSTRY COMPARED TO TOTAL MANUFACTURING IN COLOMBIA, 1967

| | <u>Number of Establishments</u> ^{1/} | <u>Persons Employed</u> | <u>Salaries, Wages and Social Benefits</u> (1968 pesos) Millions | <u>Gross Value of Production</u> (1968 pesos) Millions | <u>Gross Value Added</u> (1968 pesos) Millions | <u>Installed Horsepower</u> |
|---|---|-----------------------------|--|--|--|---------------------------------|
| Wood processing except furniture and fixtures | 406 | 6,366 | 73 | 358 | 163 | 32,564 |
| Production of furniture and fixtures | 390 | 5,177 | 59 | 194 | 98 | 7,981 |
| Total wood processing industry | 796 | 11,543 | 132 | 552 | 261 | 40,545 |
| Total manufacturing industry of country | 10,873 | 293,825 | 5,631 | 40,226 | 16,572 | 1,264,305 |
| Shares of wood processing in total industry (%) | 7.3 | 3.9 | 2.3 | 1.4 | 1.6 | 3.2 |

Source: Unpublished DANE data.

Notes: 1/ Employing 5 or more persons, or having annual production valued at more than Pesos 24,000 (U.S.\$1.300 approx.)

T A B L E . 2

DISTRIBUTION BY DEPARTMENTS OF THE WOOD PROCESSING INDUSTRY IN COLOMBIA, 1967

| <u>Departments</u> | Wood Processing except Furniture | | Furniture and Fixtures | | Total Wood Processing | |
|--|-------------------------------------|---|----------------------------------|---|----------------------------------|---|
| | <u>Number of Enterprises</u> | <u>Number of Persons Employed</u> | <u>Number of Enterprises</u> | <u>Number of Persons Employed</u> | <u>Number of Enterprises</u> | <u>Number of Persons Employed</u> |
| Cundinamarca | 81 | 1,109 | 87 | 2,124 | 168 | 3,233 |
| Antioquia | 41 | 748 | 65 | 688 | 106 | 1,436 |
| Atlantico | 35 | 1,157 | 25 | 463 | 60 | 1,620 |
| Valle | 60 | 1,235 | 51 | 561 | 111 | 1,796 |
| Narino | 34 | 1,044 | 10 | 95 | 44 | 1,139 |
| Total of 5 Departments | 251 | 5,293 | 238 | 3,931 | 489 | 9,224 |
| Others | 155 | 1,037 | 152 | 1,246 | 307 | 2,283 |
| Total Colombia | 406 | 6,330 | 390 | 5,177 | 796 | 11,507 |
| Share of the above 5 Departments in total Colombia (%) | 61.8 | 83.1 | 61.0 | 75.9 | 61.4 | 79.9 |

Source: Unpublished DANE data.

T A B L E 3

DISTRIBUTION BY CITIES OF THE WOOD PROCESSING INDUSTRY IN COLOMBIA, 1967

| | Wood Processing except Furniture | | Furniture and Fixtures | | Total Wood Processing | |
|---|-------------------------------------|----------------------------------|--------------------------|----------------------------------|--------------------------|----------------------------------|
| | Number of Enterprises | Number of Persons Employed | Number of Enterprises | Number of Persons Employed | Number of Enterprises | Number of Persons Employed |
| Bogota | 78 | 798 | 76 | 2,096 | 154 | 2,894 |
| Medellin | 33 | 507 | 45 | 589 | 78 | 1,096 |
| Barranquilla | 29 | 849 | 25 | 463 | 54 | 1,312 |
| Cali | 27 | 449 | 33 | 345 | 60 | 794 |
| Tumaco | 15 | 350 | 5 | 50 | 20 | 400 |
| Total of 5 cities | 182 | 2,953 | 184 | 3,543 | 366 | 6,496 |
| Total 5 Departments | 251 | 5,293 | 238 | 3,931 | 489 | 9,224 |
| Share of the 5 cities in the 5 Departments (%) | 72.5 | 55.8 | 77.3 | 90.1 | 74.9 | 70.4 |

Source: Unpublished DANE data.

in Barranquilla is supplying both domestic and foreign markets; and the principal sawmills at Tumaco are exporting almost their entire production.

RAW MATERIALS

About 60% of Colombia's land is covered with forests, an area of nearly 50 million hectares (ha.), of which between 20 and 30 million ha. are estimated to be accessible for economic exploitation. At present, the area of man-made forests is very small, and virtually all the exploitable area consists of natural forest. There are about 150 different species of trees in these forests, of which about 30 species are counted as commercial.

The volume of timber extracted for domestic processing and export has been estimated from official data regarding values that is available for 1966. This excludes the substantial, but uncontrolled and unrecorded, felling of trees in rural areas for miscellaneous uses. It appears that the volume of timber extracted in 1966 amounted to 700,000 m³ of which 600,000 m³ were used for domestic processing and 100,000 m³ were exported. It has not been possible to compile a historical series of figures, as comparable data are not consistently available.

As the volume and extent by varieties of the growing stock and patterns of growth for different varieties are not accurately known, it has not been possible to determine the potential of Colombian forests for economic use. It appears, however, that in 1969, 70 concessions were granted to timber extracting companies, for a total area of about 750,000 ha. only; and if these figures are viewed in the context of the area classified as commercial forests, - which is over 20 million ha., - it is obvious that very substantial increase in the volume of timber extraction can be achieved

Although the quantities of logs exported represent only a small part of the total volume of extraction, more reliable data are available for them. The following figures indicate the trend of exports of tropical wood logs during the past 10 years:

| | <u>Unit: m³, 000's</u> | | | | | | | |
|-----------------|-----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | <u>1961</u> | <u>1962</u> | <u>1963</u> | <u>1964</u> | <u>1965</u> | <u>1966</u> | <u>1967</u> | <u>1968</u> |
| Quantity of | | | | | | | | |
| Timber exported | 60 | 97 | 106 | 69 | 91 | 93 | 114 | 27 |

With effect from April 1970, export of unprocessed logs of the principal exportable varieties has been prohibited. However, some varieties have been exempted from the ban, and new investors in wood processing industries will be exempted from the restriction for some years, if they accept specific conditions regarding progressive manufacture within Colombia. In this context, it is estimated that export of timber could rise again, to about 50,000 m³ by 1975. This figure does not take into account the capability for export of sawn or processed timber, and wood products such as plywood, veneers, doors, frames, etc.

The main forest areas which are being exploited at present are located in:

- the Pacific coastal region (Choco valley and Narino district)
- the Magdalena valley (mainly the lower and upper parts)
- the eastern mountain chain of the Andes (southeastern slope)
- the northern plains near Monteria
- the northern plains near Valledupar.

For domestic marketing, several smaller forest areas are also exploited:

- near Bogota: the districts ("municipios") of Garna, Medina, and San Bernardo;
- near Medellin: the districts of Caceres, Ranedios, Amalfi, San Carlos, San Luis, Urraco and Huango;
- near Cali: the districts of Guapi, Tulua, Buenaventura, and Neiva.

Comparison of the principal locations of Colombia's wood processing industry with the locations of forests under exploitation shows that, in some cases, logs have to be transported over distances of up to 450 km. For example, logs are transported, not only from Tumaco to Buenaventura and from Turbo to Barranquilla by coastal shipping, but also from Monteria to Barranquilla, from Florencia to Cali, and from Neiva to Bogota, by truck.

As particular properties of each wood species render it suitable only for a limited number of uses, the wood processing industry at a given location cannot be supplied with all the varieties of timber needed from the forest areas nearest to it. Hence transport costs form a substantial proportion of the total value of timber.

Another problem is the lack of continuity of log supply for processing industries. Both water and road transport are frequently interrupted by unfavorable weather conditions. During the rainy seasons, unpaved roads become impassable for trucks. In the dry seasons, low-water level in channels and rivers hampers the floating of logs. Hence high levels of stocks are necessary wherever continuity of supply is essential; or higher cost has to be incurred on transport of logs from more distant locations.

The felling of trees and cutting them into logs is generally accomplished by men wielding hatchets. The transport of logs from felling sites to the collecting centers for further transport is frequently done

manually. This labor-intensive system of extraction is attributable only in part to the shortage of investment capital; in many areas, flood conditions or mountainous terrain make the use of heavy mechanical equipment difficult if not impossible. Often, the local population cut and transport the logs to collecting centers, where representatives of wood processing enterprises buy them. In such cases, further transport is the responsibility of the buyers.

Different means of transportation, appropriate for the geographic conditions of each area, are used. In the Pacific coastal regions, logs are first transported manually, or with very limited equipment to collection centers. From these, rivers and channels permit floating and rafting of logs; and finally if necessary, they are transported by coastal shipping. In the interior areas, logs or roughly trimmed planks are first transported by burros or horses to collecting centers. Trucks are then used for further transport.

These primitive methods of extraction are responsible for the considerable variations in quality, size and cost of logs. In addition, the quality of logs is affected by the conditions and time involved in felling and transport.

MAJOR PRODUCTS AND GROWTH

Table 4 shows the major products of Colombia's wood processing industry, based on the most recent available data on production value which relate to 1966.

Furniture and Fixtures

The value of output of furniture and fixtures increased through the years 1953-66 at an average rate of 4.9% per year; and value added increased by about 5.4% annually. Data for 1967 have not been included because they show a sharp decline, which distorts the long-term trend.

Employment increased by about 4.3% annually in 1953-1960, while there have been only insignificant variations in 1961-1967. The average number of employees per establishment, which was 8 in 1953, had risen to 12 by 1967.

Installed horsepower in the industry increased by about 10% per year during the years 1953-60; and by about 4.7% per year from 1961-67.

Semi-Finished Products

These consist principally of sawn wood, mouldings, including laths (tongued and grooved), panels, veneers, plywood, chipboard, block-board, battenboard, fiberboard, etc.

T A B L E 4

MAJOR PRODUCTS OF WOOD PROCESSING INDUSTRIES IN COLOMBIA, 1966

| <u>Item Produced</u> | <u>Value</u> (000 Pesos) | <u>Percentage</u> Share in Total Value |
|--|-----------------------------|---|
| <u>Semifinished Products</u> | | |
| Sawn wood | 74,529) | 17.9 |
| Planed wood | 16,674) | |
| Mouldings | 6,914 | 1.4 |
| Laths (tongued and grooved) ^{1/} | 11,491 | 2.3 |
| Wood-based panels | | |
| (a) decorative face veneer | 3,880 | 0.8 |
| (b) plywood incl. rotary veneer | 71,639 | 14.1 |
| (c) battenboard | 38,931 | 7.7 |
| <u>Finished Products</u> | | |
| Furniture | 176,515 | 34.8 |
| Doors | 19,336) | 4.2 |
| Window frames | 1,996) | |
| Packing cases and crates | 6,791 | 1.3 |
| Textile bobbins and shuttles | 2,358 | 0.5 |
| <u>Others</u> (including chipboard and fiberboard) | 76,425 | 15.0 |
| Total | <u>507,479</u> | <u>100.0</u> |

Source: -Industria Manufacturera Nacional 1966, DANE, Bogota, Colombia, Pages 14, 34 and 35.

-Unpublished DANE data.

^{1/} This product is used for covering walls and ceilings.

The annual rate of growth of gross value of output in this sector was about 6% during the period 1953-67. During the same period, employment increased by about 3.7% annually, and installed horsepower increased by about 7.3% annually.

Sawn timber and mouldings, including laths (tongued and grooved), are important export items. In 1968 about 93,000 m³ of sawn timber were exported; and a similar quantity was consumed domestically. Mouldings are produced almost entirely for export. The remaining items are produced principally for domestic markets.

A more detailed description and analysis of wood processing industries are contained in Annex 5(c).

FOREIGN TRADE

The value of exports of wood and wood products, including furniture, during the past several years is indicated below:

| | Unit: U.S.\$ 000's | | | | |
|--|--------------------|-------------|-------------|-------------|-------------|
| | <u>1960</u> | <u>1963</u> | <u>1965</u> | <u>1967</u> | <u>1968</u> |
| | 115 | 2,497 | 2,792 | 3,394 | 4,171 |

In 1967 and 1968, about 68% of the total value of exports was accounted for by sawn timber; a further 14% was contributed by export of logs, and about 8% by mouldings; furniture and fixtures, and doors and frames earned about 3% and 2.5% respectively.

The principal markets for Colombian wood and wood products are in the U.S.A., where quality plays an important part in price determination. Recent efforts by the Fondo de Promocion de Exportacion should help producers to maintain standards and obtain suitable prices. There is need for better organization and standardization at the producer's end.

PROSPECTS FOR GROWTH

Furniture and Fixtures

This sector of the wood processing industry caters principally to the domestic market. It is organized mainly in the form of small workshops, privately owned, operating for one shift per day or less, with a tradition of workmanship and close liaison between production and marketing at the unit level. While this structure has some advantages in flexibility, it also has disadvantages in export markets, which require highly skilled marketing, large volume, standardization of quality, and rigid performance standards.

Domestic markets are reasonably well served, and the industry has considerable underutilized capacity. For export markets, there would be need

for larger manufacturing units, which can take advantage of modern technology, use more efficient methods of production, utilize by-products, adhere to international standards of quality and performance. However, any move in this direction should be preceded by careful investigation of economic implications, in close liaison with marketing agencies.

Other Wood Processing Industries

The recent ban on export of logs has been mentioned earlier. The principal object of this ban is to encourage domestic processing of logs. The country already has wood sawing and plywood industries, catering to the domestic and export markets; but considered in the context of Colombia's timber resources, and the volume of world trade, it has very considerable scope for further development.

The recently organized government authority for administration of natural renewable resources, "INDERENA", is currently revising the concessions for exploitation of forests granted in the past. Existing concessionaires are, therefore, uncertain about the future, and would hesitate in taking any new decisions until the position is clarified. For more rapid growth, the industry would require more capital investment than it has attracted in recent years, as well as larger and more efficient operating units for timber extraction, transport, and processing.

SUMMARY AND CONCLUSIONS

Colombia's wood processing industry is characterized by numerous small scale enterprises. The regional distribution of the industry is mainly geared to the sales markets: export-oriented enterprises in the Pacific and Atlantic coastal regions (Tumaco, Buenaventura, Turbo, Barranquilla ^{1/}), and producers selling to the domestic markets near the big cities (Bogota, Medellin, Cali, etc.).

Although Colombia's natural forests cover an area of about 50 million ha., the great variety of growing species, and seasonally interrupted transport connections, are reasons for temporary shortage of logs of required species. The three main items produced in Colombian wood processing are sawn wood, plywood, and furniture, representing together about two-thirds of the total value of output.

Past growth of Colombia's wood processing industry during the years 1953-67 was about 5.3% per year, lower than for total manufacturing activity (6.4%). The probably substantial, but unrecorded, output of small scale enterprises in wood processing, including furniture production, is likely to be reduced to some extent by substitution of higher quality products from larger enterprises.

^{1/} The Barranquilla region also supplies the domestic market with plywood, fiberboard and chipboard.

Imports of wood products are very small, consisting mainly of cork and some cedar wood for pencil production. During recent years, until 1968, they varied between 10 and 20% of the value of exports of wood products.

The increasing value of exports, about US\$3 to 4 million annually during 1964-1968, includes mainly sawn wood, logs and mouldings; but since April 1970, the export of most logs from Colombia has been prohibited. This may lead to increased export of sawn and processed timber and wood products in due course.

In the field of wood processing - excluding furniture and fixtures - the formation of larger production units should be promoted. Conditions of financing of new projects and replacement of obsolescent machinery, and policy for new concessions, should be aimed at achieving amalgamation, or at least cooperation, among existing small enterprises, in order to avail of economies of scale.

Production of furniture requires considerable hand labor which cannot be mechanized. This is especially true for the high-quality furniture of different antique styles, with carving or inlays, produced in Colombia. To facilitate export of such furniture the better workshops could, with advantage, move from artisan type operations to more efficient factory type production methods, to reduce unit costs and improve volume and uniformity of output.

As the size of individual furniture firms is small, they would need a joint or cooperative organization for export promotion. A start in this direction has already been made by one private organization of a few manufacturers, and the official "Fondo de Promocion de las Exportaciones".

The mission contacted the following official or semi-official institutions:

- INDERENA (Instituto de Desarrollo de los Recursos Naturales Renovables)
- ACOPI (Asociacion Colombiana Popular de Industriales)
- ANDI (Asociacion Nacional de Industriales)
- Fondo de Promocion de las Exportaciones/Banco de la Republica
- IFI (Instituto de Fomento Industrial)
- Planeacion (Governmental planning office)
- DANE (Departamento Administrativo Nacional de Estadistica)
- CFC (Corporacion Financiera Colombiana)

The mission visited plants/offices of wood processing enterprises as indicated below:

- Sawn wood (3 enterprises of different sizes)
- Furniture (5 enterprises of different sizes)
- Plywood and blockboard (1 enterprise)
- Decorative face veneer (1 enterprise)
- Wooden doors, textile bobbins and shuttles (1 enterprise)
- Wooden toys (2 enterprises)
- Impregnated wood poles (1 enterprise)

SELECTED DETAILS ON WOOD PRODUCTSSawn Wood

Considerable waste occurs during the processing of logs into sawn wood. In the region of Narino, for example, the utilization factor for conversion of logs into sawn lumber is only about .32. The main reason for the relatively high percentage of waste is that logs are improperly sawn; circular saws with larger cuts are used instead of band saws with smaller cuts; and the quality of the cut is low in many sawmills; dimensional accuracy should be improved. Kiln drying of sawn wood is extremely rare; with very few exceptions, sawn lumber for export and local consumption is seasoned in the air to about 25% of humidity. As air drying takes more time and is less reliable than kiln drying, stocks in process are high, and the end product is less uniform. Working capital involved in the process is also somewhat excessive.

It has not been possible to obtain direct data regarding the volume of production of sawn wood in Colombia. Official statistics relate to current value of sales. Export figures indicate that the country has exported between 50,000 and 90,000 m³ per year during the past decade, without a clearly established trend. The mission estimates, on the basis of all available data, that annual production of sawn timber in Colombia amounted to about 185,000 m³ annually during the past several years, and was shared more or less equally between export and domestic markets.

Considering the estimated growth rates for both the construction and furniture industries, the average annual growth of local consumption may be projected to be about 7% per year from 1968 on. This would lead to domestic consumption of sawn wood in Colombia of about 145,000 m³ in 1975.

INDERENA has received several applications for new concessions from export-oriented firms. If sanctioned, these would be capable of producing about 200,000 m³ of sawn timber by 1975.

The total capacity for output of sawn timber in Colombia would then be about 385,000 m³. It has been mentioned that the domestic market would probably absorb about 145,000 m³; and about 245,000 m³ would be available for export. This appears to be a reasonable target for 1975, in the context of export of about 93,000 m³ in 1968.

Mouldings

Three larger enterprises are supplying mouldings for export mainly to the United States. In the past, local consumption of mouldings was negligible. In 1966, for example, about 96% of the mouldings produced in Colombia were exported. It may be assumed that future development in this field will depend on export prospects.

The larger producers offer about 10 or 12 types of mouldings for export. Between 1960 and 1966, production increased by 400% to 5.5 million meters.

One larger producer, who was interviewed, expects a further rapid increase of exports of mouldings. It appears that by 1975 the total annual output may increase to about 8 million m. per years.

Tongued and Grooved Laths

Almost the entire production is exported. Production decreased between 1960 and 1966 by about 25%, to 627,000 m².

Wood-Based Panels and Veneers

Table 5 gives some idea of the output of wood-based panels and veneers in recent years. These quantities may be regarded as domestic demand; there was only a negligible foreign trade in these items.

TABLE 5

LOCAL PRODUCTION OF WOOD-BASED PANELS (INCLUDING VENEER) IN COLOMBIA

| <u>Year</u> | <u>Decorative Face Veneer</u> 1,000 m ² | <u>Plywood</u> 1,000 m ² | <u>Chipboard & Particle Board</u> 1,000 m ² | <u>Blockboard & Battenboard</u> 1,000 m ² | <u>Fiberboard (Hard & Soft)</u> 1,000 m ³ |
|-------------|---|--|---|---|---|
| 1960 | | 3,336 | 154 | | 7 |
| 1961 | 21 | 3,560 | 106 | | 7 |
| 1962 | 26 | 3,319 | 48 | | 6 |
| 1963 | 12 | 4,775 | 425 | | 6 |
| 1964 | | | 477 | | 7 |
| 1965 | 46 | 2,700 ^{2/} | 530 | | 8 |
| 1966 | 82 | 3,507 | 638 | | 9 |
| 1967 | | | | | |
| 1968 | | | | | |
| 1969 | 2,000 ^{1/} | 4,000 ^{2/} | 650 | 175 | 10 |

Notes: ^{1/} Estimate by manufacturers.

^{2/} Estimate.

Decorative face veneer (sliced) is produced by only two firms in Colombia; the domestic market for face veneer is not yet developed. The quality produced is good, considering the age and condition of machinery and the quality of material used. There have been no possibilities for export until now, because there is not a sufficient supply of veneer logs of uniform color and texture for bulk production. Only about six species of wood in Colombia are considered suitable for production of sliced face veneer. The most famous and valuable are caoba (Colombian mahogany) and palo rosa (palisander).

Official statistics for the output of decorative face veneer indicate a production of about 20,000 m² in 1961, and about 82,000 m² in 1966; but these figures do not appear to be correct. There are three slicers in the country, and their 1969 output is estimated at about 2 million m².

The demand for high quality face veneer may not increase substantially in the near future. The three largest enterprises producing wooden furniture and radio and television cases already use face veneer. The processing of veneer requires, apart from knowhow, additional investment in new machinery. Therefore, the smaller furniture producers prefer to produce furniture out of solid wood and plywood.

An annual increase of 7% would result in a total consumption of face veneer by Colombian processors of about 3 million m² in 1975. Improvement of the present log extraction system would be required for a sufficient raw material supply for this volume of production.

Plywood and rotary-cut veneer for inner and outer layers are increasing in production. According to the information of INDERENA, plywood is produced by four large enterprises. Between 1960 and 1966, the recorded volume did not increase substantially from 3,500,000 m² annually.^{1/} Plywood of waterproof quality is used in Colombia mainly in shipbuilding and in the construction industry as concrete boarding. Non-waterproof varieties are supplied to the furniture industry. During the mission investigations, no complaints were heard about the quality of Colombian plywood.

Based on the trade estimate of a total production of 4 million m² of plywood in 1969, and assuming an annual average increase of demand by 7% it would appear that total production in 1975 should be about 6 million m².

Chipboard and particle board are produced at present by only one factory on the Atlantic Coast. From 1960 to 1966 the production rose four times from 154,000 m² to about 600,000 m² in 1966. This quantity was sold mainly in the Colombian market. Production for 1969 is estimated at about 650,000 m². Processors of this type of panel who were interviewed, appeared to be satisfied with the quality of production.

^{1/} Ref: Table 5

The majority of the small-scale artisan type enterprises, which are mainly experienced in the processing of solid wood, cannot presently use chipboard. This raw material has been introduced to the larger firms in the furniture industry during the past few years; the rate of increase in sales by about 10% per year during the years 1963-66 is not likely to be maintained for the future. A 5% average annual increase in domestic Colombian demand for the period 1967-75 would imply a demand for about 900,000 m² in 1975.

Blockboard and battenboard are wood-based panels of higher quality than chipboard; and they have processing properties that are similar to those of solid wood. There are no reliable data in official statistics to show the past production of these panels in Colombia. Considering existing production capacity for battenboard in Cali and small-scale production of blockboard in Medellin, the total volume of production in 1969 is estimated at about 175,000 m². If a 7% average annual increase of the future domestic demand for this panel is assumed, production may rise to about 260,000 m² in 1975.

Fiberboard production in Colombia reached an annual output of about 9,000 m³ in 1966, compared to 7,000 m³ in 1960. Since 1963 the annual increase of sales in the local market has been about 1,000 m³. The share of softboard in the total production in 1966 was about 10%.

A 1967 investigation by the FAO into the wood-based panel industry in Latin America projects a production volume of fiberboard in Colombia of about 11,000 m³ in 1970 and about 16,000 m³ in 1975. The 1969 output was about 10,000 m³, which shows a slower increase during the last 3 years than during the 1963-66 period; but an annual demand of 16,000 m³ in 1975 seems to be reasonable in view of further diversification of the Colombian manufacturing industry in the future.

Finished Products

The most important item in this group is furniture. Products of less importance produced in Colombia are doors, window-frames, boxes and crates for packing, and textile bobbins and shuttles. In addition, there is a very small production of wooden toys. Also, the production of pre-fabricated wooden houses was started some time ago. After some experience in adequate treatment of the wood to keep it resistant against climatic and vermin damage, this development could become important for low-cost housing programs.

Table 6 gives data on the trend of production of finished wood products, as far as these data are available from official statistics.

The major part of furniture production in Colombia comes from artisan type operations. Data available for 1967 show that 5 establishments (out of the total number of 384) with more than 100 employees each were producing about 34% of the total recorded gross value of output of furniture.

T A B L E 6

LOCAL PRODUCTION OF FURNITURE, DOORS, WINDOW FRAMES

| <u>Year</u> | <u>Furniture</u> | <u>Doors</u> | <u>Window frames</u> |
|-------------|-------------------------------------|--------------|----------------------|
| | <u>Index of Value of Production</u> | <u>Units</u> | <u>Units</u> |
| 1960 | 100 | 95,616 | 11,259 |
| 1961 | 104 | 173,319 | 15,771 |
| 1962 | 131 | 112,331 | 15,918 |
| 1963 | 114 | 128,005 | 9,603 |
| 1964 | | | |
| 1965 | 96 | 175,844 | 12,616 |
| 1966 | 111 | 143,411 | 14,212 |

Establishments with fewer than 20 persons employed (including the owners) account for more than 40% of the total employment in recorded furniture production. Organization and production methods were found inadequate for series production or introduction of a second shift, even in enterprises with 50-70 employees. Even these larger enterprises are more like artisan workshops than modern industrial enterprises.

Colombian furniture producers offer a great variety of products; for example, antique furniture in various styles, with and without carving and inlay, as well as modern furniture of different designs. The majority of furniture inspected in workshops and exhibitions for sale was of a good or very good quality and finish, except that the hardware used, which is locally produced, adversely affects the appearance of the product, a matter which all the furniture producers interviewed complained.