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RUBBER

Recent World Market Trends in Relation  
to Stabilization Problems and Policies

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## RUBBER

### SITUATION, OUTLOOK AND MAIN PROBLEMS

During the first decade of the present century, before large-scale production of plantation rubber developed in the Far East, Africa supplied some 35 to 40 percent of the world's rubber. From the outbreak of the first world war until the mid-1930's, however, African output declined, and by 1934 Africa's share of world production had fallen to 0.3 percent. The foundations of the present industry were laid with the establishment of estates in Western and Central Africa in the years immediately preceding the second world war, and output expanded rapidly under the stimulus of war-time conditions. After a temporary decline in 1945-49, expansion was resumed during the Korean conflict, slowing down only in 1960-61. In the two decades following 1934-37, African production grew at an estimated rate of 12.6 percent per annum, against only 2.4 percent per annum for the world as a whole. Between 1950 and 1960, rubber production rose by nine percent annually in Africa, compared with 1.5 percent in the world as a whole. During the past three years, annual output from African plantations averaged 143,000 metric tons, and accounted for 7 percent of the world's natural rubber supplies.

The principal rubber-growing countries in Africa are Nigeria, Liberia and the Congo (Leopoldville) in that order: together, they produce 97 percent of the continent's output. The remainder comes mainly from Cameroun, Ghana and the Central African Republic. (Table 1). The Congo (Brazzaville), the Ivory Coast and Guinea are marginal producers. Unlike the main producing areas in the Far East, Africa grows the bulk of its rubber on estates. Smallholdings predominate only in Nigeria, where peasant production is encouraged as part of an overall scheme to diversify the economy. In 1954, Nigeria had only two estates, of which one was private and the other semi-private; since 1956, however, new estates have been established with the co-operation of the Regional Development Corporations, and 12 percent of the total planted area is now under estate rubber. In Liberia and the Congo 1/, on the other hand, estates predominate, but production from smallholdings has greatly expanded in recent years. In Cameroun and the Central African Republic, rubber is exclusively an estate crop. Ghana, with 20 percent of its trees on smallholdings, is attempting to attract foreign investors to the now unoccupied coastal area under its five-year plan.

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1/ Throughout the rest of this paper, the name "Congo", without any qualification, refers to the Congo (Léopoldville).

The principal element affecting the cost of growing rubber is the annual yield per hectare, and it has been shown in Malaya that doubling the yield per hectare can reduce tapping charges per pound of rubber produced by 35 percent, general charges by 60 percent, and cultivation costs by as much as 65 percent.<sup>1/</sup> Yields per hectare of mature rubber are exceptionally high in Africa, due to the low average age of trees, to the greater productivity of the stock used, and possibly to more advanced cultivation and tapping techniques. Rubber trees take seven to eight years to become productive, reaching full maturity at 15-17 years. After 25 years, their yield begins to decline, and they become due for replacement between 30 and 35 years, according to the relationship between replanting costs and current rubber prices. Whereas in the older producing areas of the Far East, a relatively high proportion of rubber trees is over 40 years old, only a few African plantations have reached the age of 30. Replanting has been more regular than elsewhere, and full use has been made of recently developed strains of budgrafted or clonal seedlings producing up to 2,250 kg/ha. against less than 650 kg/ha. from unselected stock.

Owners of estates generally tend to follow a regular routine of tapping, regardless of short-term price movements and to replant a certain proportion of their trees at given periods. Since they dispose of greater capital, they can afford to take a longer term view of production prospects, sacrificing present income for higher prospective gains. Consequently, they tend to replant with high-yielding material even without government assistance, e.g. in Liberia and the Congo. Smallholders, on the other hand, tend to alter their rate of tapping with changes in the prices of rubber or of food. They may over-tap, sometimes to the point of slaughter, in times of high rubber prices, when they can reap large gains, or in times of exceptionally low prices when they are compelled to avoid a serious decline in their cash incomes. Shortage of working capital may force them to postpone replanting and, if they do replant, they may have to fall back on unselected seedlings. Above all, they are generally unable to sacrifice current earnings for the possibility of future profits. Replanting with high-yielding material by smallholders has therefore proceeded much more slowly, and been confined to those countries (mainly Malaya and Ceylon) where government assistance is available to them. In Nigeria, government aid takes the form of technical assistance and long-term loans from general revenue; in Liberia and the Congo, estates co-operate with the government in helping peasant farmers.

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<sup>1/</sup> Report of the Mission of Enquiry into the Rubber Industry of Malaya, 1954.

African rubber is generally of very high quality, a large proportion being RSS no. 1 and 2. These grades make up some 85% of production in the Congo, and about 55% of exports from Liberia. In Nigeria, the quality of small-holders' rubber is lower, but improved techniques - and expansion in estate production - raised the ratio of grade I and II sheets to total exports from 2% in 1956 to 15% in 1959, and further improvements have undoubtedly taken place since then. It has been estimated that African rubber can be placed on world markets at 10-12 U.S. cents per lb. 1/, which is lower than estimated costs in Malaya even for estates with high-yielding trees, and compares very favourably with present levels of synthetic rubber prices 2/. African producers can therefore look forward to maintaining or increasing their share of the world elastomer market not only in competition with the principal natural rubber growing countries in the Far East, but also with the synthetic plants of Europe and North America, even if prices decline.

Except in Liberia, where the whole economy is based on rubber-growing and iron-mining, rubber plays a relatively small part in the African economy. Nevertheless, it is one of the mainstays of agriculture in the main producing countries, enabling them to diversify their farming or to reclaim tracts of land which would otherwise remain unproductive. At present, virtually all the rubber is produced for export. Only the Congo has a small industry making bicycle tubes, shoe soles and foam rubber articles for local consumption. Similar processing facilities are planned by the Western Nigerian Development Corporation and by the Government of Cameroun, but expansion in rubber manufacturing is likely to be slow. As an earner of foreign exchange, rubber is most important to the economy of Liberia, where it is the principal export. (Table 2). The value of Liberian rubber exports exceeds that of iron ore and industrial diamonds put together, and represents almost half of total exports. In none of the other producing countries, however, does rubber account for more than 10 percent of total export earnings, though it is generally among the main agricultural exports. In Nigeria, it follows oilseeds and cocoa, and its share of total exports has gradually risen from  $5\frac{1}{2}$  percent in 1957 to an estimated 10 percent in 1961. In the Congo, where mining is the principal export industry, rubber is the fourth agricultural export, after oilseeds and oils, coffee and cotton, but it accounts for less than 5 percent of the total value of all exports. In the minor producing countries, the proportion of rubber to total exports varies between 0.1 and 2.5 percent.

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1/ Phelps, D.M. "Rubber Developments in Latin America", 1957

2/ The New York price of S-type butadiene-styrene is 23 U.S. cents per lb.

On the basis of estimated income elasticities and population changes, world demand (outside the Sino-Soviet area) for natural and synthetic rubber in 1970 has been calculated at 181 percent of the 1957-59 level. World consumption outside the centrally planned countries is thus expected to increase by some 2.0 to 2.7 million tons, the greatest quantitative expansion being envisaged for the principal industrial areas, namely, North America, Japan, United Kingdom and EEC. This group of countries would in fact account for more than two-thirds of world expansion. 1/

During the past decade, synthetic rubber gradually captured a substantial share - now approaching one-half - of the world market for elastomers, partly owing to its technical properties, but chiefly on account of the stability and the low level of prices of synthetic as compared to natural rubber. This process has, up to the present, gone much further in North America than in Western Europe. Whereas the proportion of natural to total rubber consumption in the United States was down to 30 percent by 1960, it was still 60 percent in the United Kingdom and the EEC countries. Until large new synthetic plants began to operate in Western Europe in the period 1958-60, world demand for all rubbers expanded rapidly enough to absorb all the natural rubber grown, without bringing prices of natural and synthetic rubber into alignment. However, during the recession of 1958, and again since mid-1960, competition from the synthetic product has exerted a downward pressure on prices of natural rubber, and this may be expected to continue.

The relative importance of technological factors and price fluctuations in determining the proportion of natural rubber consumed has been estimated for the United States. A regression equation based on annual data for the period 1950-1960 shows a 10 percent rise in natural rubber prices has been associated, on the average, with a fall of 3.8 percent in the proportion of natural to total rubber consumption, superimposed on the overall downward trend in the proportion of natural processed. Using this regression equation, and assuming a decline of natural rubber prices to the level of synthetic prices, the proportion of natural to total rubber used in the United States has been estimated at some 25-37 percent in 1970, taking the probable development of stereo regular rubbers into account. In the United Kingdom and the EEC, the proportion of natural rubber used in 1970 has been estimated at

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1/ FAO Document CCP 62/5, "Agricultural Commodities - Projections for 1970".

45-50 percent, and similar proportions have been calculated for Sweden, Australia, South Africa, and the principal consumers in Latin America. Elsewhere, natural rubber is likely to be displaced to a somewhat lesser extent.

World consumption of natural rubber outside the Sino-Soviet area and the natural rubber growing countries in 1970 can thus be expected to increase by about one-sixth to one-half over the 1957-59 level, EEC countries and Japan together accounting for two-thirds of this increase. Net import demand by the centrally-planned countries is also likely to rise, despite the probability of considerable expansion in synthetic production. Assuming this demand to reach some 350-500 thousand tons (compared to 396,000 tons in 1957-59), and assuming only a marginal increase in the consumption of rubber-growing countries, world consumption of natural rubber in 1970 is likely to be in the range of 2.3-2.9 million tons. This would compare with an estimated production of 2.25 to 2.50 million tons, and represent a 10-40 percent increase over 1957-59.

The elasticity of supply of natural rubber is relatively low. Estates follow a regular tapping policy, refraining from overtapping in times of rising prices and maintaining production in times of falling prices as long as they can cover their direct costs, while smallholders' output may actually vary inversely to the level of prices. Year to year fluctuations in the volume of world production are therefore rarely very wide. Since the Korean war, they have never exceeded five percent. Consequently, variations in demand are reflected mainly in changing price levels, and prices of natural rubber fluctuate very widely (Figures 1 and 2). An investigation into changes in the prices of 25 selected commodities between 1901 and 1951 showed that fluctuations in rubber prices were more severe than those in prices of any other commodity <sup>1/</sup>. It would seem, however, that the advent of synthetic rubber has had a moderating effect on the range of fluctuations, especially since 1955, and this tendency may be expected to continue with the development of the new stereo regular rubbers.

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<sup>1/</sup> United Nations Document E/2047/Rev. 1/ST/ECA/15: "Instability in Export Markets of Underdeveloped Countries", p.9, Table 4. Cf. also page 39, Table 26, and Blau, G. "Wool in the World Economy". Journal of the Royal Statistical Society, Vol. CIX, Part III, 1946, pp.33-37.

### NATIONAL PRICE SUPPORT, STABILIZATION AND OTHER MEASURES

None of the African producing countries operates an internal stabilization scheme for rubber, but a number of them enforce measures designed to encourage production and improve yields and quality. Nigerian smallholders' rubber is graded for export by the Regional Produce Inspection Services, and planting with high-yielding stock is promoted under the Rubber Improvement Campaign initiated in 1957. The Western Nigerian Government also provides technical assistance and long-term loans to peasant farmers cultivating rubber. In the Congo smallholders receive technical assistance not only from the Government, but from neighbouring estates, and occasionally process their latex on estate machinery; small farmers' cooperatives are encouraged, and State-controlled estates have recently been established. The Government of Liberia gives technical assistance and training to smallholders through the Rubber Advisory Service of the National Production Council, and conducts research on their behalf into the technical and economic problems connected with rubber cultivation.

### FORMS OF MARKET INTEGRATION BETWEEN EXPORTING AND IMPORTING COUNTRIES

Integration between the rubber exporting countries of Africa and their principal markets is confined to the private sector. It takes the most direct form in Liberia, where concession estates are owned exclusively by two United States rubber-manufacturing companies (Firestone and F.W. Goodrich). Consequently, 90-95 percent of Liberia's rubber exports go to the United States. In Nigeria, the majority of estates is run in partnership by Government agencies such as the Regional Development Corporations and by commercial companies with United Kingdom or Commonwealth connections. Half the rubber produced is shipped to the United Kingdom, and a further 20 percent to the United States; other important outlets include the Federal Republic of Germany and the Sino-Soviet area. Estates in the Congo are owned mainly by Belgian-controlled companies, and one-third of total exports go to Belgium, while another third finds a market in the rest of the EEC. The remainder is taken up by the United States, whose share in recent years has tended to increase, at the expense of the share going to Belgium. Nevertheless, the Congo remains the most important source of raw rubber imported into Belgium.

INTERNATIONAL STABILIZATION MEASURES

Since the second World War there has been no international regulation of rubber markets. An International Rubber Study Group was established following talks in 1944 and enlarged in 1947, with terms of reference which included inter alia the consideration of "how best to deal with any special difficulties which might exist or be expected to arise". In May 1952, when prices had fallen sharply from the high levels reached early in the Korean war, the Group established a working party to consider whether measures designed to prevent burdensome surpluses or serious shortages were necessary and practical and to prepare drafts of any agreements required to implement such measures. In May 1953 the Group had before it the report of the working party, including a draft buffer stock agreement, but were unable to agree regarding the need for international action. Despite further examination at a special meeting in October 1953, no agreement was reached by the Group at its meeting in 1954. However, prices of natural rubber continued to fluctuate and the Group paid special attention to this problem at its meetings in 1957, 1958 and 1960 and considered possibilities of international action but again without reaching any agreement. At its meeting in 1960 the Group expressed the view that in the long term the increasing production of the new stereo-regular rubbers would exercise an important stabilizing influence on prices of natural rubber.

More recently, in commenting on proposals for measures to compensate for fluctuations in commodity trade, the Management Committee of the International Rubber Study Group expressed the view that some form of compensatory financing, if found practicable and acceptable, would undoubtedly benefit natural rubber producing countries, since the existence of a large-scale synthetic rubber industry might make a conventional scheme for the stabilization of rubber prices impracticable 1/.

The International Rubber Agreement of 1934 in which the main producing countries participated, controlled world markets by means of restrictions on exports of natural rubber. With the growth of synthetic rubber production

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1/ See Appendix I to document FAO CCP 62/11 and UN E/CN 13/45 of 6 February 1962.

during and since the second World War, however, restrictions on the export of natural rubber alone were no longer likely to be effective. In 1952, world production of synthetic rubber outside the Sino-Soviet area was already equal to about half the world's natural rubber putput: in 1961, the production of synthetic was only a little less than that of natural. In confining its detailed examination of stabilization measures to the possibilities of a buffer stock the Study Group undoubtedly took very much into account not only the special technical and economic problems of natural rubber, for example the variety of grades and the existence of large non-commercial stocks <sup>1/</sup>, but also the increasing availability of synthetic rubber at relatively low and stable prices. Ordinary synthetic rubbers are not perfect substitutes for natural rubber, synthetic having technical advantages over natural in some uses, and natural over synthetic in others. Over a wide area of end uses, however, natural and ordinary synthetic are fairly close substitutes, and the proportion in which they are consumed is determined by relative prices. Consequently, competition from synthetic rubber would set an upper limit to the price at which a buffer stock could purchase natural rubber, any attempt to stabilize natural rubber prices at a higher level resulting in stock accumulation and in strain on the stock's financial resources.

The recent development of stereo regular rubbers - one of which, cis-polyisiprene, is chemically identical with natural rubber - is likely to lead to the production of much closer synthetic substitutes for natural rubber. Once these rubbers are in full commercial production, it will be difficult to envisage fluctuations in natural rubber prices of the order of those which have occurred in recent years.

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<sup>1/</sup> On 31 December 1961, the United States strategic stockpile included 1,110,000 metric tons of crude rubber, of which 348,000 tons were considered surplus.

Table 1 RUBBER: Production of natural rubber in Africa and in the main producing areas

	<u>Area Planted, 1960 or Nearest Year</u>			<u>P r o d u c t i o n</u>		
	<u>Estates</u>	<u>Small-holdings</u>	<u>Total</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
	.....Thousand hectares.....			Thousand metric tons		
Nigeria	13.76	102.79	116.55	42	54	59
Liberia	35.21	18.62	53.83	43	43	42
Congo (Leopoldville)	67.59	25.45	93.04	35	40	37
Cameroun	6.33	-	6.33	3.9	4.0	3.6
Ghana	1.50	-	1.50	0.4	0.6	0.8
Central African Republic	1.20	-	1.20	0.4	0.5	0.5
Other Countries	9.41	0.14	9.55	1.3	0.9	1.1
<u>Total Africa</u>	<u>135</u>	<u>147</u>	<u>282</u>	<u>126</u>	<u>143</u>	<u>144</u>
Malaya	786	600	1,386	673	708	720
Indonesia	493	1,302	1,795	678	705	640
Other Far East and Oceania	390	730	1,120	450	486	499
Latin America	...	...	22	27	29	30
<u>World Total</u>	<u>1,800</u>	<u>2,800</u>	<u>4,600</u>	<u>1,989</u>	<u>2,073</u>	<u>2,032</u>

Source: International Rubber Study Group.

Table 2: RUBBER: Relative Value of Rubber Exports to Total Exports,  
Selected African Countries, 1957-61

	<u>Percentage of Rubber to Total Exports</u>			
	<u>1957</u>	<u>1958</u>	<u>1959</u>	<u>1960</u>
	.....Percent.....			
NIGERIA	5.7	5.7	7.0	8.9
LIBERIA	49.4	48.6	45.9	49.1
CONGO (Leopoldville)	4.2	4.1	4.5	...
CAMEROUN	2.3	2.0	2.4	2.6
GHANA	-	-	-	-

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Source: National Trade Returns.

Figure 1 - WORLD PRODUCTION OF NATURAL AND SYNTHETIC RUBBER AND RUBBER PRODUCTION IN AFRICA - 1920 - 1961

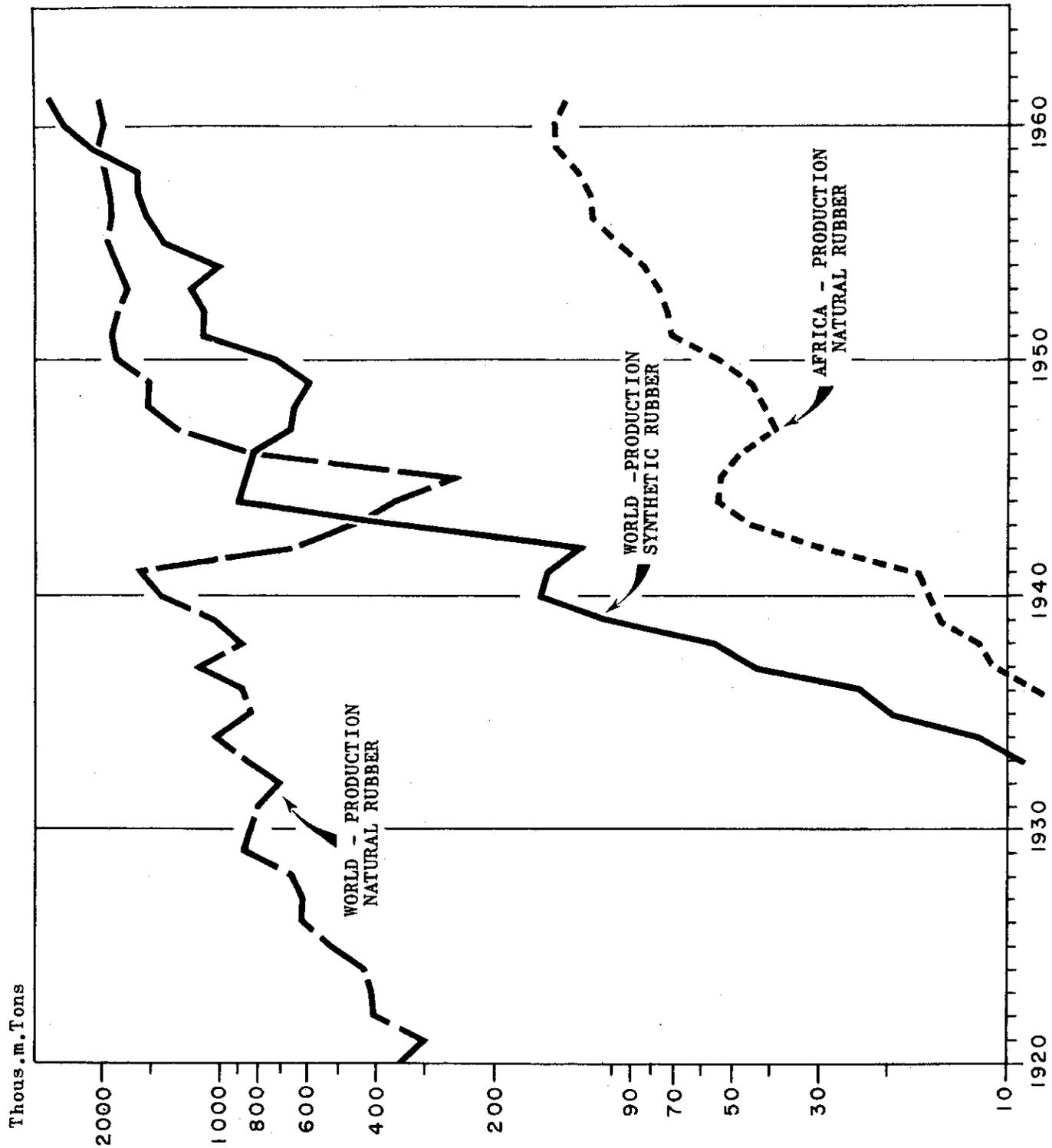


Figure 2 - PRICES OF NATURAL AND SYNTHETIC RUBBER, NEW YORK, 1920-1961

