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REPORT OF THE ECA INDUSTRIAL CO-ORDINATION MISSION TO EAST AND CENTRAL AFRICA

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REPORT OF THE ECA INDUSTRIAL CO-ORDINATION MISSION TO EAST AND CENTRAL AFRICA

INTRODUCTION^{1/}

1. A United Nations Economic Commission mission visited East and Central Africa from 10 October to 3 December 1963, in accordance with a decision taken by the Standing Committee on Industry, Natural Resources and Transport at its first session, held in December 1962, and endorsed by the Commission at its fifth session held in February 1963. The text of this decision reads as follows:

"Assistance to governments in promoting sub-regional co-operation in the development of industries on the basis of international specialization and in the harmonization, where appropriate, of industrial development plans through studies and field investigations."

2. The terms of reference of the mission are derived from the decisions referred to above and are summarized below.

3. The principal objective has been to assess in concrete terms possibilities of industrial development over the next decade or so in East and Central Africa, with the primary emphasis on projects serving more than one country. It follows that special emphasis has been given to industries the minimal economic scale of output of which is beyond the likely market of any individual country in the sub-region. But the mission was not solely interested in large scale industry. It was also concerned with drawing attention to possibilities of import substitution by developing small and medium scale industries, e.g. the processing of food and other agricultural raw materials, including timber, and consumption good industries. Throughout, the investigations made have endeavoured to assess

^{1/} A provisional version of the report of the mission was presented to the Standing Committee on Industry, Natural Resources and Transport at its second session in December 1963. Although a definite decision has not yet been taken, it seems likely, in the light of the deliberations of this Committee, that a high-level meeting will be held towards the end of 1964 to discuss industrial co-ordination among East and Central African countries. The ECA secretariat intends to pursue in greater depth studies of individual industries which could be developed in the light of the findings of this report. Meanwhile, detailed comments on the present report from the governments of the sub-region would be greatly welcomed.

appropriate scales of output for different types of industry in the specific conditions of the territory covered and of appropriate technologies. It was not the purpose of the mission to make a general economic or industrial survey. The emphasis throughout has been on specific and concrete possibilities of industrial development. Trade and transport problems have been examined within the context of the promotion of industrial development.

4. It was not a specific objective of the mission to assess the scope for technical assistance or bilateral aid. However, attention has been drawn to further possibilities of action by the UN family and other interested bodies in this general context.

5. A major premise underlying the investigations of the mission has been the development of modern industries strategic for economic development, and the consequent necessity of sub-regional co-ordination of industrial development plans.^{1/} This in turn implies international specialization and division of labour at the sub-regional level and a conscious attempt to share out equitably new industries based on the processing of agricultural raw material, small and medium scale industries and large scale industries serving the sub-regional market, must go hand in hand.

6. The mission visited Burundi, Ethiopia, Kenya, Northern Rhodesia, Nyasaland, Rwanda, Somalia, Southern Rhodesia, Tanganyika and Uganda.^{2/} Places visited and the organizations and individuals consulted by some or all members of the mission are set out in annex II.

^{1/} See Industrial Growth in Africa, (E/CN.14/INR/1/Rev.1).

^{2/} In the time available it was not possible for all members of the mission to visit all the countries covered. However, the whole mission assembled together in Lusaka (Northern Rhodesia) to draw up its report. The composition of the mission is recorded in annex I. One member visited Madagascar. The main mission had also intended to do so, but it proved impossible to find a time convenient to the Government. The mission had hoped to visit Congo (Leopoldville) as well but this was not feasible. In a number of respects, the south and east of Katanga, Kivu and Ituri should be regarded as part of the East and Central African sub-region. There are possibilities in this part of the country for large-scale industries with export potentialities, e.g. fabrication of products from copper, chemicals and fertilizers particularly based on natural gas from Lake Kivu, pulp and paper, cement and textiles.

7. The report is in four parts. The first discusses briefly the economic setting in East and Central Africa, both by country and on a sub-regional basis. The second part deals with industrial development, with the main emphasis on concrete possibilities of developing large scale industries capable of serving more than one country in the sub-region. The third discusses small and medium scale industries. The fourth part offers some general conclusions and suggestions. To keep the report reasonably short, additional material is given in annexes. Furthermore, the mission collected an immense amount of data which can be drawn on for future investigations or to assist individual countries.

PART I

THE ECONOMIC SETTING IN EAST AND CENTRAL AFRICA^{1/}

Major economic indicators

8. The most heavily populated country in the sub-region, based on 1960 statistics, is Ethiopia with 20 million, followed by Tanganyika with rather less than half this figure. Kenya and Uganda have populations in the 6 and 7 million range while the three countries of the former Federation of Rhodesia and Nyasaland each have 2.5 to 3 million people. No accurate estimate is available of the population of Somalia, where the majority of people are nomadic, but a number of indicators point to a figure of 3 million. Rwanda and Burundi together have a population of just under 5 million. The countries of the East African Federation account for 40 per cent of the total sub-regional population of some 60 million people. Population densities vary greatly among the countries, but none can be said to be heavily populated in terms of available land, at least not in the sense of nations like India and Mainland China.

9. Population growth rates for the years 1950 to 1960 range from a high of 3.5 per cent per annum in Southern Rhodesia to a low of 1.7 per cent in Tanganyika. The sub-regional average is 2.3 per cent. Nyasaland, Ethiopia, Rwanda and Burundi tend towards the lower end of the scale while Kenya, Uganda and Northern Rhodesia have annual growth rates of 2.5 to 3 per cent. These various rates, with the exception of Southern Rhodesia, are not high in comparison, for example, with those being experienced by Latin American countries. In general, it would appear that the sub-region is not, at least at the present time, suffering serious pressure either from population growth rates or population densities.

10. Gross domestic product for the area as a whole amounted in 1960 to US\$3,900 million with Ethiopia and Southern Rhodesia each accounting for roughly 20 per cent of this total. Kenya and Northern Rhodesia follow

^{1/} Only limited data are available to indicate the patterns of economic growth over recent years of the countries of the sub-region. Annex IV presents in tabular form what information could be obtained on such major economic indicators as population, gross domestic product and national income per head.

with GDP's approximating US\$600 million each. Tanganyika and Uganda are in the US\$400-500 million range, with Nyasaland very much below at some US\$130 million. These gross domestic product figures contain imputations for the subsistence sectors in each country, in some instances, such as Ethiopia, a very substantial part of the total economy. Hence too much importance should not be attached to comparative levels. Income data are not available for Somalia, Rwanda or Burundi.

11. Gross domestic product has been increasing at 5.7 per cent per annum from 1954 to 1960 in the East and Central African region. The fastest growth has taken place in Southern Rhodesia, in excess of 8 per cent per annum, and the slowest in Uganda where GDP has been increasing only at a rate equal to that of population growth. Countries other than Southern Rhodesia with growth rates in excess of the sub-regional average are Kenya and Northern Rhodesia. While it is not possible to give gross domestic product estimates in real terms, it does not seem likely that price increases in the several countries have been so severe in recent years as to seriously distort the growth patterns of GDP analysed above.

12. Very great disparities exist among the countries of the sub-region in terms of national income per capita (strictly speaking gross domestic product per capita). The levels in Northern Rhodesia and Southern Rhodesia are four to five times those of all other countries except Kenya whose level is a little less than one-third that of the two Rhodesias. Lowest per capita incomes are found in Ethiopia and Nyasaland at less than US\$50 while Tanganyika and Uganda approximate US\$60. The sub-regional average is only US\$75, considerably below the all-Africa estimate of US\$110.^{1/}

13. Thus, the variations throughout the sub-region in population, GDP and income per head are marked, both in absolute terms and in growth rates. The most heavily populated nations, Ethiopia and Tanganyika, are

^{1/} See Industrial Growth in Africa, op. cit., Table 1.

at or close to the other end of the scale in terms of income per head. Two of the smallest countries in terms of population, Northern Rhodesia and Southern Rhodesia, are the wealthiest when income per capita is taken into account.

14. Too much reliance should not be placed on the figures when inter-country comparisons are being made, in view of the unreliability of much of the statistics. In the case of financial data, inflationary biases cannot be removed. It should also be remembered that the relatively high incomes per head in some countries accrue in large measure to the non-African population. Thus it seems unlikely that the income per head of the Africans in Kenya is significantly more than in Uganda or Tanganyika.

Trade

15. The trade pattern in East and Central Africa is similar to that of Africa as a whole, that is to say, the economies of the sub-region are oriented primarily towards world markets rather than towards markets within the continent. Of all African countries, only about one-tenth of their trade is among themselves.^{1/} In the case of the sub-regional countries for which trade statistics are available — Ethiopia, Somalia, Kenya, Tanganyika and Uganda and the countries of the Federation of Rhodesia and Nyasaland taken as one unit — the ratio in 1961 amounted to 8 per cent. Total exports were US\$995 million and trade among these countries totalled US\$81 million, as can be seen from the tables in Annexes V and VI. Intra-regional trade was probably considerably more than the level noted, for two reasons: first, there are no trade statistics for the individual territories of the former Federation of Rhodesia and Nyasaland and it is known, for example, that Southern Rhodesia exports to Nyasaland and Northern Rhodesia have been very substantial. Secondly, a significant volume of unrecorded trade occurs between Rwanda and Burundi on the one hand and neighbouring countries on the other, and the same may be to some extent the case elsewhere in the sub-region.

^{1/} See Background paper on the Establishment of an African Common Market, (E/CN.14/STS/20), 3 October 1963, page 11.

16. Where trade among the countries of East and Central Africa is concerned, the largest participant is Kenya which in 1961 exported US\$47 million worth of goods, mainly to its partners in the East African Federation. In fact, these three nations together account for some 91 per cent of the intra-regional trade although, as noted previously, data are not available on purchases and sales among members of the Federation of Rhodesia and Nyasaland. Uganda is the next largest intra-regional exporter at US\$19 million followed by Tanganyika and the Federation of Rhodesia and Nyasaland at US\$7.5 and 6.2 million respectively. Ethiopia sells over one million dollars worth of goods annually to these other countries, while Somalia's sales in this regard are very small.

17. From the point of view of purchases from other countries of the sub-region, Tanganyika ranks first in importance as a buyer, followed by Kenya and Uganda. Somalia buys annually over US\$2 million, slightly exceeding the purchases of the Rhodesia Federation while the imports of Ethiopia from these countries are relatively minor in importance.

18. The commodity composition of trade within the sub-region can be summarized briefly. Uganda sells tea to Somalia, fresh fish to Rwanda and Burundi, raw tobacco, cottonseed oil, unrefined sugar and cotton fabrics to Kenya and Tanganyika. Kenya exports butter to Burundi, Ethiopia, the Rhodesias and Rwanda, live animals to Burundi and Rwanda, vegetables to the Rhodesias, coffee to Somalia and the Rhodesias and tea to Somalia. The Federation of Rhodesia and Nyasaland (leaving aside trade within these three territories) sells tea to Kenya and Somalia, beans and peas to Kenya and Tanganyika, preserved vegetables and fruit to Tanganyika. The foregoing are no more than illustrations and leave out of account exports and imports by countries of the sub-region to and from the other African countries.

19. If the assumption is made that the general experience of Africa applies to the countries of the sub-region, then the broad proportions of present intra-trade are as follows: almost 60 per cent is accounted

extent political. From a purely geographical and economic point of view, the eastern part of the Congo, Angola and Mozambique seem to be part of the sub-region; possibly Bechuanaland and South West Africa might be included also. Economically, within the sub-region there are closer ties, e.g., the East African common market, common services and a common currency system; the links between Northern and Southern Rhodesia and Nyasaland which, while weakened by the dissolution of the Federation, will continue to be important; and the common currency between Burundi and Rwanda. There are also a number of other arrangements of lesser importance.

27. The basic mineral resources of the sub-region tend to make the national economies complementary to each other.^{1/} It is true that most, if not all, of the countries produce or are capable of producing similar agricultural products. However, ever-growing world commodity problems reinforce the need for a common policy.

28. There is some basic infrastructure in most of the countries of the sub-region, first of all the elements of a general educational system and some specialized industrial training facilities.

29. Although the sub-region has no oil and little natural gas, it is well endowed with oil refineries. There is a refinery at Mombasa (Kenya) with a capacity of one million tons per annum. Another exists in Umtali (Southern Rhodesia) with a capacity of 600,000 tons. One under construction at Dar-es-Salaam (Tanganyika) will have a capacity of 600,000 tons and another planned at Assab (Ethiopia) is scheduled to have a capacity 500,000 tons with provision for ultimate expansion to 1.2 million tons. The sub-region has ample reserves of high quality coal in Southern Rhodesia and also ample coal reserves in Northern Rhodesia and Tanganyika, though less accessible and of lower quality. Potentially, the area is well endowed with electric power. There are systems to 132 kV and above in Ethiopia, Kenya, Tanganyika, Uganda and the Federation of Rhodesia and Nyasaland. The Federal Power Board in Rhodesia and Nyasaland has

^{1/} See Annex XII.

extra HV lines, the voltage being 330 kV; these three territories have more than 5,000 km of transmission line. Kenya and Ethiopia have extensive high voltage networks. There is a multiple-frontier link between Uganda, Kenya and Tanganyika. In Uganda, the Owen Falls scheme is already producing more than immediate requirements, and a considerable amount of power is exported under a fifty year contract to Kenya. There are also substantial expansion schemes in Ethiopia and Kenya (the Seven Forks scheme will give a further 240 mW, together with a further 130 mW downstream). In Rhodesia, the Kariba scheme can eventually be expanded to 1700 mW and in Uganda the Owen Falls scheme to 150 mW, with further possibilities downstream. Victoria Falls has a capacity of 180 mW. There are schemes for development in Tanganyika. Apart from hydro schemes, there is still much thermal power produced in the sub-region. In general, rates are still rather high. In the case of hydro power this is a temporary phenomenon owing to high interest charges and heavy amortization payments. In the long run cheap hydro power can be available throughout the sub-region.

30. The east-west links of the transport system, road and rail, are relatively well developed. For present purposes air transport is left out of account, although here again relatively well developed systems exist and it seems reasonable to expect that as air freight becomes cheaper, existing airlines will respond effectively. What is lacking is the backbone, a principal north-south link. The natural routing of such an artery would be along the Rift Valley, Lakes Victoria, Tanganyika and Nyasa, thus providing cheap channels of communication across densely populated areas and linking eight countries with each other and two oceans in a single chain. The principal link would have to be supplemented with feeder connexions. Annex III contains some tentative suggestions.

31. Potentially there is considerable capital available. It is difficult to differentiate sharply between different sources, actual or potential, available for industrial development. Leaving aside for the

present the international financial institutions, there are five main sources: overseas governments, expatriate business established in East and Central Africa, overseas private investment, mainly European, the Asian business community resident in different parts of East Africa, and public investment by the governments of East and Central Africa.

32. Governments and private investors in the industrialized countries, particularly the United States, the United Kingdom, France, the Federal Republic of Germany, Japan, Italy, the USSR and some other European countries, are showing increasing interest in Africa. Governmental funds are normally channelled through development corporations, to some extent utilized to support budgets and also to build infrastructures. The European Common Market investment is virtually restricted to this last area.

33. Expatriate businessmen mainly from the former metropolitan powers have a stake in the countries in which they live and work. They are sensitive to short-term political and economic events, real or imaginary. Some have been through a period of uncertainty in several countries recently but there are now signs of a general regaining of confidence.

34. In East Africa a substantial Asian community is to be found, consisting of large family concerns, middle grade entrepreneurs engaged essentially in trade and finance and in small scale industries, and retailers. The large family concerns are on the whole imaginative and enterprising. Their members have played an important part in the development of the countries in which they live and work. Some of them are now nationals of these countries. They can be expected to play a still greater part in the future.^{1/} East and Central African governments normally confine their investment to infrastructure. The only country in the sub-region where the government wholly owns industries is Uganda, through the UDC, which is within the sub-region a unique institution.

35. Promising beginnings have been made in some of the East and Central African countries towards increased saving and investment and this can be a growing source of capital accumulation as incomes grow. Another form

^{1/} However, one disadvantage is that their concerns are still in the main of a family type. A lead from some of the important names in floating some of their companies to the public would attract much hoarded capital in East Africa and from Europe and India.

of African capital investment is the co-operative movement, especially in Northern Rhodesia, Tanganyika, Uganda and to some extent Rwanda. Co-operatives are of course mainly engaged in agriculture, but are beginning to be interested in other small scale industries. Yet another source is the produce marketing boards, such as coffee, cotton, maize, meat and dairy products which on occasion have surplus funds at their disposal.

36. Throughout East and Central Africa there is plenty of unskilled labour. In most of the countries, with the exception of densely populated Rwanda and Burundi, it is normal policy to build housing estates equipped with social amenities whenever a major industry is developed in a new area. General experience is to the effect that African unskilled labour can be trained quickly. Labour productivity in some industries is not much short of that of European unskilled labour and is higher than in the newly industrialized Asian countries. There is also, in a substantial range of industries, limited absenteeism and low turnover. In most East and Central African capitals and large towns, plenty of young people from secondary schools are eagerly looking for better jobs. Trained artisans in a number of industrial branches are added to the labour force every year. At the managerial and technical level, Europeans and Asians still have a virtual monopoly, a serious problem for the governments concerned.

37. Throughout East and Central Africa investment laws are in operation. Normally these rules and regulations define, although in ways that differ from country to country, pioneer or priority industries. The investment laws stipulate that foreign capital is welcome provided there is adherence to either the development plan or stated government policy. In some cases strategic areas of the economy are reserved for the government. In others the government is willing to embark on a priority project on a partnership basis with a foreign enterprise. Certain incentive features in the tax laws are to be found in almost all the countries in the sub-region, e.g. tax holidays, accelerated depreciation, measures allowing

expatriation of profits, etc. There is a basic similarity of approach in the legislation but differences in administration.

38. There are not yet clear and harmonized investment codes stating precise economic objectives, defining remittance of foreign capital, accelerated depreciation and income tax concessions. Moreover, although almost all the governments of the sub-region have made policy statements on nationalization, some of them lack clear-cut code or law which specifies equitable and fair treatment under national law, and legal machinery to deal equitably with proposals to abrogate contracts unilaterally and to nationalize enterprises. Furthermore, clear and satisfactory arbitration procedures have yet to be evolved. However, perhaps the main problem to be solved is the lack of harmonization of investment laws in the sub-region and still more the way in which they are administered.

39. It is beyond the scope of this report to analyse the development planning system in the sub-region, and particularly its limitations, both from the point of view of the drawing up of plans and the machinery for their execution. Fully worked-out and ambitious development plans are in the course of preparation in most countries of the sub-region providing for industrial development in more detail than has been the case in the past. There is also a growing recognition of the necessity, not only to co-ordinate industrial development policy among countries, but development plans themselves. At the level of implementation, the primary need is for more experienced staff. Within the context of co-ordinated industrial development, a variety of instruments are available; some are likely to be more useful in one part of the sub-region than another. Within East Africa, EACSO is an obvious starting point, and its Ministerial Committee may be expected to assume still wider functions. The industrial licensing system, despite the strains which it has undergone recently, would seem to be a potentially valuable instrument. In Central Africa such an approach may not be appropriate at the present time. In East Africa there is of course a common market and a common currency. A tariff and currency union exists between Burundi and Rwanda. The common currency in

the Rhodesias and Nyasaland will disappear with the dissolution of the Federation. It can be expected that trade negotiations between Northern and Southern Rhodesia will be initiated early in 1964.^{1/}

The approach to industrialization

40. In the foregoing paragraphs the characteristics of the countries of the sub-region have been reviewed briefly. These countries, like almost all others in Africa and indeed most under-developed countries, are faced with a basic economic dilemma so far as industrialization is concerned. Despite pockets of industry, the economies in the countries of the sub-region are over-whelmingly agricultural. Apart from subsistence agriculture, there is typically a heavy dependence on exports to unstable world markets of primary commodities. Incomes per head are low. Large numbers are living at the subsistence level and poverty is widespread. Although population is increasing rapidly, the land in most countries is far from being densely populated. Yet the annual increment in the prospective labour force is considerable. With potential independence throughout the sub-region a certainty in the very near future, naturally and inevitably the demand is widespread for higher standards of living also associated with the expansion of literacy and technical training.

41. The crucial problem, therefore, is how to increase the pace of economic development. Expansion of the agricultural sector, particularly in terms of a higher output per head, is vital and will naturally raise national incomes and purchasing power. But it will do little to solve the unemployment problem, since agricultural advance usually means a rapid increase in productivity of labour.

^{1/} It would seem right to expect free entry into Southern Rhodesia of all Northern Rhodesian goods in order to encourage more rapid development of industry in Northern Rhodesia. The latter can be expected to wish to reduce the old federal external tariff, but in the interests of continuing industrial co-operation between the two countries it may be assumed that Southern Rhodesia will wish to see external tariff remain at the present levels wherever it is selling on a significant scale in Northern Rhodesia.

42. There is another problem. Commodity exports, which are the main source of foreign exchange earning, are subject to great fluctuations in world markets, both in the quantities which can be sold and in price levels. There are exceptions at the present time at least, such as sisal and sugar, but in the longer run markets are approaching saturation for most commodities. In general, the prices of the export commodities of developing countries tend to be stable or to move downwards, while the prices of imported manufactured goods move steadily upwards.
43. There is a dual impetus to industrialization. First, it is natural to turn to import substitution to save foreign exchange. Secondly, the manufactures which can replace imports tend to be small and medium scale industries producing mainly consumer goods, creating at the same time new employment opportunities. Some of these industries are of appreciable size and the income elasticities of demand for their products are generally high. As incomes rise, people tend to spend a greater proportion of their income on newly available consumer goods provided by such industries. But this is not a process which continues indefinitely. One of the earliest sizeable consumer goods industries to be established in a developing country is textiles. Yet, despite the considerable growth possibilities still to be explored, the market for African textiles is no longer expanding rapidly. The nature of income elasticities of demand is such as to put a limit on the market opportunities for small and medium scale industries, well illustrated in the case of textiles. The same restraints do not apply to the products of larger scale industries if the experience in other more developed areas of the world is analysed.
44. Inevitably, as history shows, industrial growth proceeds from the manufacture of consumer goods through intermediate goods to capital goods such as machinery and equipment. This process is not pre-ordained, automatic or continuous. Growth points are necessary, industries which themselves stimulate the growth of other industries as users of their products. Such a role is beyond the scope of most small and medium scale industries. It is for this reason that the present enquiry has been largely

concerned with the establishment of large scale modern industries, strategic for economic development. The necessary conditions for the establishment of such industries are discussed at the beginning of the next part of this report.

45. With certain exceptions, it has not yet been possible to make detailed estimates of the likely growth of markets for the industries considered. Broadly speaking, however, the new industries suggested are envisaged in terms of the likely market foreseen in 1970 or thereabouts, assessed both by reference to over-all growth possibilities and the prospective markets for certain key products.

46. The sub-region will shortly consist of ten sovereign States with different histories and political backgrounds. The greater part of the population is still engaged in the subsistence sector, but the sub-region as a whole represents an increasing market for industrial goods. Furthermore, there are pockets throughout the area with relatively high incomes, which in turn considerably raises the market potential of the whole sub-region. The political problems to be solved in a movement towards the creation of an increasingly integrated economic unit are, of course, outside the scope of this report. The basic assumption made is that advantage can be taken of the fact that there is ample resource endowment and a total population of some 60 million people to move step by step towards such an economic unit, by a process of bilateral and multilateral negotiation and mutual give and take. By the 1970's the sub-region could be well on the road to industrialization and sustained economic growth, a unit comparable in economic power to South Africa.

PART II

INDUSTRIAL DEVELOPMENT: LARGE SCALE INDUSTRIES

47. In part I of this report a brief sketch is made of the present industrial situation in the countries of the sub-region and some account is given of the prospects for development as seen by the governments of the region and interested enterprises. In this part, suggestions are made for industrial development over the next few years within the framework of a deliberate policy of sub-regional co-ordination. These suggestions are made in the light of two basic economic principles: international specialization and division of labour, and the economies of scale appropriate for each industry. They are put forward in the light of economic and technical feasibilities. No assumptions are made concerning the kind of political arrangements which may emerge between Kenya, Tanganyika and Uganda, and at a later stage between these countries and others in the sub-region. Clearly, a network of inter-governmental agreements is required. The essential point is that what is put forward is economically and technically rational. Variations in this scheme are of course possible, but probably not too many.

48. In applying the principle of the economies of scale, account has been taken of the trend of technological advance, which in some industries now makes possible economically smaller scale production at lower capital cost than is current practice in North America, Western Europe and the USSR. But there should be no illusion that it is possible to produce economically at a significantly lower scale of output than those envisaged, and therefore to install new plants in all the territories. It is impossible to overstress the importance of a rational and fair distribution of industries throughout the sub-region, and therefore how important it is that a country which it is agreed should undertake one large industry to serve the bulk of the sub-regional market should abstain from attempting to lay down another large scale industry which agreement stipulates should be located somewhere

else. Technically, it is of course perfectly feasible for some of the industries considered to be located in more than one country. Economically, for a number of industries, if two or more countries try to produce, all are likely to fail. As a basis for discussion, some account is given of the technological processes which might be used in the different industries. Here, however, there is obviously room for discussion and need for further investigation; full technical details are not given.

Iron and steel

49. The total consumption of steel in 1962 in the East and Central African sub-region is estimated at 1,260,000 tons, of which 560,000 tons is indirect and 700,000 tons direct.^{1/} This market is forecast as 2,160,000 tons in 1970, of which 810,000 will be indirect and 1,350,000 tons direct.^{2/} For the purpose of estimating the market for steel in the sub-region, it is direct consumption which is primarily relevant. Furthermore, it is also necessary to estimate consumption by type of finished steel product.^{2/} It would not be economically feasible to produce in the sub-region, within the next decade, the whole range of finished steel products. Probably at least one-third of total consumption, particularly flat steel and heavy sections, will continue to be imported.

50. Outside the UAR and the Republic of South Africa, the only integrated iron and steel works at present operating in Africa is the Risco works at Que Que in Southern Rhodesia. This is based on local high grade ore, limestone in the vicinity of the works, and coal from Wankie, some 300 miles away, and conventional production techniques are used.

51. There are at present two small and one medium sized blast-furnaces. Present capacity and production of pig iron in the Southern Rhodesian plant are some 350,000 tons per annum. The steel plant consists of

^{1/} These estimates are inflated by the inclusion of Congo (Leopoldville, Angola, Mozambique, Sudan and Madagascar.

^{2/} For sources and methods see ECA, The Development of the Iron and Steel Industry in Africa, E/CN.14/INR/27.

an open-hearth and an electric furnace. Capacity is about 150,000 tons but at present the output is only half this level. The rolling mills produce medium sections, channels and rails, a variety of light sections, plate and sheet. Part of the steel is sold in the form of special steel billets. Pig iron costs are among the lowest in the world and the cost of steel (measured by billets) is also reasonable. Finished steel is more expensive, partly because of difficulties with the design of the mills and partly because of low through-put. The plant at present supplies all the finished steel consumed in the Federation in the products and sizes manufactured. Some is exported to Katanga and very small quantities sold to the East African market.

52. A substantial expansion of pig iron production to 1,350,000 tons is contemplated, much of it for sale on long-term contracts outside Africa. It would be logical to expand rolling facilities into a wider range of sections, particularly heavier sections, e.g., heavy rails, but the expansion of the market will take time. Furthermore, the transport costs involved by the long haul into the East African market, even if the new Northern Rhodesia-Tanganyika railway is constructed, inevitably places a limit on what can be sold.

53. Southern Rhodesia is also planning to move into wire rod, wire products, including fencing, and welded tubes, provided arrangements can be made to obtain a substantial part of the market of the sub-region. There would also seem to be a case for considering the installation of a modern narrow strip and skelp mill. There is a plan to produce tin plate by the hot dip method, using local tin. It is also planned to build up production of ferro-chrome to 120,000 tons per annum, both low and high carbon, largely for export to the United States. In the low carbon range around 0.1 per cent ferro-chrome is used to make chromium steels, of about 12 per cent chromium. This is used in machinery parts, turbines, pumps, etc. The chromium steels with a high carbon content, around 0.35 per cent, are used in cutlery. Ferro-nickel may also be produced locally. These steels have a very low coefficient of expansion. The market for

stainless steel billets is also being explored and may prove successful. Ferro-manganese and ferro-silicon seem doubtful propositions for some time to come.

54. In the circumstances there would seem to be a strong case for another, though smaller, iron and steel works in the sub-region. Northern Rhodesia has substantial reserves of high grade ore and also coal deposits, though of much lower quality than Wankie. It would seem more economic to concentrate on building up Que Que during the next few years. Northern Rhodesia could, however, produce steel balls, cast or forged, white and grey iron castings, special steel castings and phosphor bronze castings for bearings, forgings, pipes, tubes and fittings, including conduits, and wrought iron products, on the basis of iron and steel imported from Southern Rhodesia.

55. Tanganyika also has substantial ore reserves. One deposit, however, has 13 per cent titanium oxide, and another 6 per cent; this could be eliminated only at very high cost. This country has substantial coal reserves but of non-coking quality. Furthermore, serious transport problems would be encountered if a plant were to serve East Africa.

56. The natural location for an East African plant is Uganda. There is already a plant at Jinja with a theoretical rolling capacity of 30,000 tons, mainly reinforcing rods, and there are plans to diversify and produce light sections, rails and sleepers. The operation is based on the melting of scrap in an electric furnace. However, scrap supplies are not adequate for any significant expansion. Uganda has high grade ore at Kigezi, which if, as seems likely, sufficient tonnage is proved - at least ten million tons - would be a natural raw material. A feeder line would have to be put in from the mine to the Kasese railroad. Uganda has no coal and no coking coal easily accessible, but it has potentially very large quantities of cheap electric power. An appropriate process might consist of a pre-reduction rotary kiln and a 20,000 kVA electric melting furnace. The kiln would require about 60 per cent ore, low grade coal and local fluxes. Further study would be required as to whether it would

be more economic to convert the hot metal into steel by another electric furnace in line, or by an LD oxygen converter. Another possibility which should be studied is whether Tororo ore should also be used. There are proved reserves of ten million tons of magnetite ore. In situ, this ore contains less than 50 per cent magnetite and the average is variable, around 30 per cent. It is fine in nature, entrapping many particles, and the deposit could not be worked commercially for magnetite alone. The deposit is essentially a phosphate pyrochlore type with the magnetite being disposed as a tailing containing around 3 per cent P_2O_5 . Further re-cleaning could reduce this to about one per cent P_2O_5 and give an iron content of 62 per cent. At maximum production the quantity of magnetite available is 360,000 tons annually, sufficient for the requirements of a suggested local steel plant. At present the ore is separated in the first stage of the operation and dumped. If the Tororo ore were to be used, the appropriate steel melting process might be an LDAC converter in which powdered lime is injected to eliminate the phosphorus. For the treatment of pig iron made from the Tororo ore, a basic process is necessary to lower the phosphorous content. As is evident, the only fuel available is electric power and thus the electric arc furnace is most suitable. Indeed, this would be more desirable in using the high-phosphorous pig-iron feed as increased temperatures are independently possible in the arc furnace and thus more basic slags are utilized. Furthermore, there is no fuel contamination. A general procedure is first to use a basic oxidizing slag during the melting to remove carbon and phosphorus, and then to produce a reducing slag with lime (both of which are available locally) enabling excellent desulphurization and good deoxidation. At this stage oxygen lancing is now often used to remove carbon more quickly and also for the manufacture of stainless steel. Further study is clearly required but it would seem appropriate to envisage an initial production of the order of 200,000 tons in ingot equivalents and producing a wide range of light products.

57. There is a small steel plant at Akaki, Ethiopia, using an electric furnace for the production of reinforced rods from scrap. The foundry has a capacity of 10,000 tons per annum and the rolling mill 18,000 tons, but production is little more than 50 per cent capacity, due to present marketing difficulties.

Fabrication of non-ferrous metals

58. There is every prospect of starting a secondary copper industry in Northern Rhodesia, probably adjacent to one of the electrolytic refineries such as that at Kitwe. The first stage would be to install an extrusion press to produce basic rods tubes and sections which could then be partly exported and partly further processed for the local market. Bronze and copper alloys could also be produced for the sub-regional market as well as copper cables, switchgear and electrical parts. A well established copper cable company exists in Salisbury with scope for a second one, but no more. The Salisbury company manufactures a wide range of pvc covered cables and insulated wire and is planning to move into electric motors and generator winding wire. The Northern Rhodesia operation would concentrate on mining and trailing cables, lead cored and covered cables and high tension cables, a range more than sufficient to warrant a second plant. It should be noted that the present territories of the Federation import 700 tons per annum of copper in tube, sheet and rod form, 1,100 tons in cables and 500 tons in domestic appliances.

59. The minimum economic scale of output for a viable copper fabrication plant is approximately 8,000 tons per annum and it is therefore evident that even with the whole of the East and Central African market at the disposal of Southern and Northern Rhodesian producers, export markets outside Africa would have to be found. The best immediate prospect might be in the Far East, unless new arrangements can be negotiated in Europe. A capital of approximately US\$2 million would be required. Copper could be purchased from the refiners at approximately US \$60 per ton less than the price on the London metal market (accounted for by freight), and some

of the present royalties of approximately US \$56 per ton of copper exported would be saved.

60. Uganda is also an efficient copper producer. However, output is not such as to warrant further fabrication and there appears to be no room for two production centres in the sub-region where copper fabrication is concerned.^{1/}

61. In general, the prospect of further fabrication of non-ferrous metals in the sub-region other than copper is not at present too favourable.

Rwanda, Southern Rhodesia and Tanganyika are small tin producers, but normally the tin is exported as concentrates, since it is not economical to refine tin on a small scale. There are manganese deposits in Kenya and Southern Rhodesia. Those in Kenya are of low grade, too low even for the manufacture of manganese dioxide on an economic basis.

62. Lead sheet and pipe castings and flangings could be produced in Northern Rhodesia. It would also be possible to exploit Northern Rhodesia's cadmium to produce special alloys (e.g. with silver and lead) cadmium coated steel sheets and possibly batteries.

63. There are substantial deposits of bauxite in Nyassaland, but difficulties in transport and power supply would seem to preclude early development.

The engineering industries

64. Engineering output is both increasing and diversifying at the major growing points throughout the sub-region. In East Africa, Nairobi is so far in the lead, but other such points are Mombasa, Arusha, Dar-es-Salaam and Jinja. With the growth of iron and steel and chemical production, coupled with the existing advantages of concentrations of population, transport facilities (and the natural points of development of further transport facilities) and the external economies always associated with areas where industrialization has already started, there is a natural impetus

^{1/} This is subject to qualification if Katanga is taken into account. On the face of it, there are prospects of developing copper manufactures there of the same order as in Northern Rhodesia.

to the further development of larger scale engineering activities in these centres. The same is true of Salisbury, Bulawayo, Umtali and the Copper Belt in the Central African part of the sub-region.

65. Production of light machinery could be developed in Kenya and machine tools in Tanganyika; the manufacture of smaller sizes of electric motors and standard electric switchgear and transformer equipment, the last associated with cable manufacturing and coating, could be developed in Kenya; the production of electrical transmission equipment is a possibility for Uganda. Lathes, saws, smaller sizes of electric motors, standard electrical switchgear, transformer and transmission equipment could be developed on an agreed basis between Southern and Northern Rhodesia.

66. In Kenya the existing production range of simple agricultural tools could be widened. A sub-regional tractor assembly plant could probably be established at Jinja in Uganda, while light and medium agricultural machinery might be manufactured at Dar-es-Salaam where a small amount of such equipment is already produced. In Uganda, the maintenance workshop of the Mehta sugar mill at Lugazi is being expanded to service heavier mining machinery and will incorporate a general purpose foundry and a furniture shop, with essentially local needs in mind. However, a plant with its own sub-regional market might be better situated at Jinja. Such a plant might also manufacture welded portable gas containers. A considerable range of agricultural implements and simple machinery might be manufactured in Southern Rhodesia and, to a lesser extent, in Northern Rhodesia. Agricultural tractors, all but engines, could be produced in Southern Rhodesia. Some specialized mining machinery, including vibrating screens, complete conveyor assemblies (including the rollers), special drill steels and compressed air equipment could be made in Northern Rhodesia. Part of the plant and equipment for oil refining and nitrogenous fertilizers, e.g., structural steel, piping and heaters,

might be manufactured in Northern Rhodesia. Tanganyika is establishing an assembly plant for commercial vehicles which could serve a large part of the sub-region. There are four motor vehicle assembly plants in Southern Rhodesia and one in Northern Rhodesia which should be able to serve the needs of this part of the sub-region for a considerable time to come.

67. It is feasible to build up the production of bicycles in Southern Rhodesia to an output of between 200,000 and 300,000 a year, based on up to 80 per cent locally made parts. The manufacture of bicycles, mainly on an assembly basis, could be developed in other parts of the sub-region, e.g. in Tanganyika, perhaps based to some extent on parts made in Southern Rhodesia.

68. Motor vehicle tyres are manufactured in Southern Rhodesia and serve the western part of the sub-region. Another plant might be set up in Tanganyika.

69. There is a good case for setting up a plant for the manufacture of railway rolling stock, particularly since much of the rolling stock of the East African railway system comes up for renewal within the next few years. Dar-es-Salaam would be a logical centre, leaving the main railway repair shop in Kenya. Another plant concentrating on the simpler rolling stock for freight might be established in Northern Rhodesia, producing inter alia pre cars and cabooses. In addition, points, crossings and steel frogs for railways might also be produced in Northern Rhodesia.

70. Output of refrigerators and washing machines, including compressors and electric motors up to five HP, could be concentrated in Kenya and Southern Rhodesia.

71. Tanganyika possesses a razor-blade factory which again should, if it is to be viable, serve the whole sub-region.

72. The new Chandaria aluminium rolling mill in Dar-es-Salaam is designed to export to associated plants in Nyasaland, Rwanda, Burundi,

Kenya, Uganda, Ethiopia, Northern Rhodesia and the Congo (Leopoldville), where further processing will be carried out, mainly for the manufacture of aluminium hollow ware.

Chemicals

73. In the long run there are immense possibilities of developing chemical industries and chemical complexes in the sub-region. It is particularly essential in this industrial area to establish an economically rational programme covering the whole sub-region, on which attention should be concentrated over the next few years. In this field in particular there is real scope for exploring links between one country and another whereby the products of one industry feed the next in the chain, and more exploratory work is required before final answers can be obtained. Among the basic industries envisaged are coal distillation, leading in the first instance to coal tar, dyes, pharmaceuticals, and eventually plastics; soda ash, sodium sulphate, sodium silicate, caustic soda; acetic acid and methanol, from wood distillation; sodium, calcium and aluminium fluoride, fluoro carbons; alcohol from the fermentation of molasses, both for admixture with petrol as a motor fuel and for potable spirits; sulphuric acid. Production of fertilizers (nitrogen, phosphate and potash), although obviously linked with the development of chemical industries, is discussed in the next section.

74. There is scope for a coal distillation industry in Tanganyika. There are some 400 million tons of high-volatile bituminous coal at Ruhuhu, in the southern highlands of Tanganyika. As already pointed out, this is not of coking quality. Furthermore, the market for coal as coal, having regard to transport considerations, is not promising.

The coal should be distilled and the residue gasified and used as the basis for a steadily expanding chemical complex, working up to the use of 500,000 tons per annum. The sequence would be coal tar, leading next to drugs, dyes and pharmaceuticals, and at a later stage to plastics. The whole scheme is an ambitious one and should be thoroughly studied.

Both the further studies and the working up of the successive production stages deserve the support of the entire sub-region, and there would not be scope for another such industry for some time to come unless coal is required for thermal values elsewhere, in which case chemical values could first be extracted. A by-product would be coal-ash clinker, which could be used as aggregate to make concrete building blocks, and as road-making material.

75. Another chemical possibility in Tanganyika, though perhaps not an immediate one, is the manufacture of furfuraldehyde (furfural). This is used to manufacture a variety of hard and durable plastics wherever a dark colour can be tolerated. It is also one of the three standard sources for the manufacture of nylon. The raw materials are agricultural residues such as groundnut shells, rice husks, corn cobs, bagasse and coconut husks, which are plentiful in Tanganyika. The raw material is treated with acid, and the furfural is steamed out. Large quantities of steam are required and careful control is necessary. To be useful, an industry of this kind would have to have its outlets throughout the sub-region.

76. A major industry already installed in Kenya is soda ash, owned by the Magadi Soda Company, a subsidiary of ICI. Hitherto soda ash has been sold mainly to South Africa, and it now seems likely that markets outside Africa will have to be found, as well as a large share of the sub-regional market. A new outlet has already been found in Israel. The ex-works price must be less than the world market price by at least the shipping freight from Mombasa, and the rail freight from Magadi, which may be as much as 50 per cent of c.i.f. values. There is therefore a real cost advantage in consumption near the site, which is an impetus to such industries as paper pulp, glass and soap. The next step is the manufacture of caustic soda, the proportionate cost of transport of which may be less than for soda ash, even allowing for the need for

packing in steel drums and payment of "dangerous chemicals" rates by rail and ship, because caustic soda is so much more valuable.

77. Given that soda ash is already being supplied in Kenya and given other advantages, this is the natural area for development of the soda industry and also for production of caustic soda, and Kenya would appear to be the natural location for such a plant serving the sub-region. It is true that there are also large reserves of soda salts in Lake Natron and other saline lakes in Tanganyika. However, having regard to market outlets and communications, Kenya is better placed for this industry than Tanganyika, and there is not room for some time to come for production in both countries.

78. There is also scope for another soda ash industry, leading to caustic soda, in the western part of the sub-region. In Northern and Southern Rhodesia and Nyasaland, imports of caustic soda amount to nearly 4,000 tons a year and a doubling or trebling of this figure by the end of the decade can be envisaged. There are sodium chloride deposits in Bechuanaland containing soda ash, and it would be well worthwhile exploring the setting up of this industry in Northern Rhodesia. ^{1/} It would also be appropriate to produce hydro-chloric acid. Installation of these branches of the chemical industry in Northern Rhodesia and Kenya on the minimum economic scale would fully take care of the expanding needs of the sub-region for a number of years to come. It should also be pointed out that manufacture of caustic soda by electrolysis produces almost the equivalent tonnage of chlorine as a co-product. Apart from hydro-chloric acid, this means that there is also scope for manufacturing other products which would find a steadily growing market in the sub-region, such as polyvinyl chloride, plastics, DDT, bleaching agents, paint lacquers, etc.

79. A significant quantity of sodium fluoride is associated with the soda ash in the Lake Magadi deposits in Kenya. There is a considerable world demand for fluorides for refrigerators, plastics, cement water-

^{1/} Technically it would, of course, be feasible to set up a soda ash industry leading to caustic soda in Bechuanaland. But this was not visited by the mission and therefore no opinion can be given on the relative over-all economies of the two alternatives.

proofing and in medicine. It may well be worthwhile separating sodium fluoride on a commercial basis.^{1/}

80. There is already an industry in Kenya carbonizing over 100,000 tons of wood for charcoal. At present there is no recovery of by-products, but there is a potential market for thousands of tons of wood distillate. Kenya is the natural centre in the area for the development of forest resources and industries based thereon. Further study is required, but potentially production could be envisaged for the markets of the sub-region of gas, acetone, acetic acid, methanol and tar. If, as is suggested, Kenya is to be the development point for this type of chemical complex, it would not be economic to envisage similar development elsewhere in the sub-region.

81. There is much scope for the development of alcohol in East Africa from molasses and other fermentable materials. The sugar industry of Uganda at present discharges some 50,000 tons per annum of molasses into the drains. The Uganda Sugar Company already ferments part of its molasses and sells the distilled product to pharmacies, hardware stores and manufacturers of potable liquor. There is scope for development of the manufacture of gin, vodka and other spirits. It would be possible to substitute alcohol manufactured from molasses for 15 to 20 per cent of the petrol used as motor fuel. It is understood that legislation will shortly be passed in Uganda to make this compulsory. This is a practice already followed in a number of highly industrialized countries. It can be blended to the extent of 50 per cent or more with domestic kerosene for lighting and heating. The products of the fermenting of molasses can be used instead of natural citric acid for the manufacture of non-alcoholic drinks. Glycerine can also be produced by fermentation of molasses and might be used by the explosive industry to be developed in Northern Rhodesia. Many other fermentation products are quite economic. Since

^{1/} See B.H. Baker, Commissioner for Mines and Geology in Kenya, Geology of the Magadi Area, Geological Report No.42.

the prospects opened up by the fermentation of molasses are widespread, potential demand large, and the economic scale of output relatively low, there are similar possibilities elsewhere in the sub-region, for example, in Somalia, Ethiopia, Northern Rhodesia and Tanganyika.

82. Cheap alcohol leads to the economic production of goods such as polythene, PVC, acetate rayon, PETN explosives etc., which are in good demand

83. Sulphuric acid can be manufactured economically on a relatively small scale: 8,000 to 10,000 tons per annum. The smelter of the Kilembe copper mines at Jinja (Uganda) processes 65,000 tons of concentrates per annum, at 32 per cent of sulphur. This represents nearly 21,000 tons of sulphur or the equivalent of 63,000 tons of sulphuric acid. The sulphuric acid is turned out in the converters and is recoverable, just as in the Copperbelt of Northern Rhodesia, where 100,000 tons of sulphuric acid are recovered annually from the copper smelters. The Tororo phosphate fertilizer plant, if built up along the lines suggested, will be an increasingly large customer. There are other ready markets, e.g. textile finishing at Jinja, especially khaki cloth, manufacture of epsom salts, salt cake, hydrochloric acid and eventually chlorine and, depending on what other plants are put up in the sub-region, pickling black plate and wire, and in petroleum refineries at Dar-es-Salaam and Mombasa. In Kenya, the iron pyrites at Bukura near the shore of Lake Victoria was used to manufacture sulphuric acid in Nairobi during the Second World War. Production was subsequently discontinued, since the product was not competitive in peace-time conditions. As pointed out already, sulphuric acid is likely to be in growing demand and can be manufactured relatively easily. Therefore, it may be worthwhile investigating further possibilities of production in Kenya. There are also possibilities based on gypsum, which can be calcined with siliceous clay to a high grade of portland cement and sulphuric acid. This is possible in Somalia.

84. Sulphuric acid is also produced and can be built up further in both Southern and Northern Rhodesia, with a similar chain of possibilities.

85. The refined products produced by the oil refineries in the sub-region can lead to the production of elemental sulphur and further products. For example, carbon disulphide and eventually sulphite pulp and rayon can be envisaged in Southern Rhodesia, and sodium and potassium xanthate in Northern Rhodesia.

Fertilizers

86. In Uganda the Tororo Industrial Chemical and Fertilizer Company is at present manufacturing single super-phosphate from the apatite deposit at Sukulu, nearby. There are ample deposits of high grade phosphate rock and there should be scope for substantial exports outside Africa; production could be built up to as much as 400,000 tons per annum.^{1/} The plant also produces sulphuric acid at 98 per cent from imported elemental sulphur for use in processing and for other purposes. Hitherto triple super-phosphate has not been produced owing to high capital cost of plant and technical problems. One of the advantages of triple super-phosphate is saving of freight, and its production is warranted when the market is large. Thus a triple super-phosphate plant would normally operate at a minimum scale of output of 25,000 tons of acid (42-45 per cent P_2O_5).

87. The East African market alone has been estimated at potentially 80,000 tons by about 1970 and much of it is in Kenya.^{2/} Since there is a demand for triple super-phosphate, it would seem right to envisage manufacturing this product, as well as single phosphate. Ultimately, metaphosphoric acid, which contains nearly 90 per cent P_2O_5 might be envisaged, as also its derivatives, potassium or ammonium metaphosphates,

^{1/} Reference has been made earlier to the possible exploitation of the magnetite ore which is associated with the phosphate rock.

^{2/} It has not been proved possible to obtain systematic estimates of the likely growth of demand by 1970 for fertilizers of all types, and the balance between them. Such estimates are urgently needed before definite production plans for the whole sub-region can be drawn up.

which contain dual fertilizer values.

88. There is a phosphatic fertilizer plant with a capacity of 100,000 tons P_2O_5 in Southern Rhodesia, capable of supplying the whole market of that country, Northern Rhodesia and Nyasaland, which will be based progressively on domestic phosphate rock deposits. This plant should be expanded to meet growing needs. Given the importance of the economies of scale in this industry, however, it would be unwise to envisage more than two phosphate plants (Southern Rhodesia and Uganda) before 1970.

89. A major plant producing potassium chloride will start operations in Ethiopia early in 1964, with an ultimate capacity of 300,000 tons a year. This is aiming at overseas markets. However, it is also intended to produce potassium sulphate, which should serve the whole East African market and no doubt also markets to the north.

90. Given the distance to Central Africa, it would also, however, appear reasonable to envisage the production of potassium sulphate in Northern Rhodesia, based on potassium chloride deposits from Bechuanaland.

91. For the production of nitrogenous fertilizers economies of scale are important. Plans have been worked out and have indeed been hanging fire for some time to install a plant producing ammonium nitrate at Livingstone (Northern Rhodesia), based on the gasification of coal from Wankie (Southern Rhodesia) and low-cost power from the Third Gorge at Victoria Falls.^{1/} It has been estimated that ammonium nitrate could be produced for sale at less than US\$ per ton nitrogen f.o.r. Livingstone, only slightly more than half the current price of the imported product. This factory would serve the two Rhodesias, the southern half of the Congo (Leopoldville) and part of East Africa. A large part of the market would be in Southern Rhodesia and a firm agreement to supply fertilizers for the whole of this market would be necessary, and is envisaged. An

^{1/} There are alternative possibilities but this is clearly the most economical approach.

initial capacity of 35,000 tons of nitrogen is contemplated which the promoters consider to be the minimum economic scale of operation. However, if allowance is made for expansion of demand in the territories immediately in view and supply to other markets in the sub-region, it would seem that expansion will soon be necessary.

92. Low-cost ammonium nitrate for blasting would benefit the mining industry by lowering costs. Low-cost ammonia and nitric acid would open up the way for the manufacture of a large number of chemicals, in addition to fertilizers and explosives,^{1/} e.g. potassium nitrate for black powder, blasting fuses and fertilizer, sodium cyanide for extraction of minerals, and hydro-cyanic acid for acrylonitrile and acrylates, and ammonium chloride for dry-cell batteries.

93. There is no room for a further nitrate complex in the sub-region in the near future.^{2/}

Pulp and paper

94. The present demand for pulp and paper in the East and Central African regions is estimated at 45,000 tons and is expected to rise to about 80,000 tons by 1970. Present demand can be broken down by countries as follows (all in thousand tons):

Kenya	15.8
Tanganyika	4.2
Uganda	3.5
Southern Rhodesia	12.0
Northern Rhodesia	4.0
Nyasaland	1.0
Ethiopia	4.5

Figures are not available for Burundi, Rwanda and Somalia, but demand there is very small. Consumption in the three East African countries

^{1/} The maximum possible replacement of conventional explosives by ammonium nitrate might mean in the Northern Rhodesian Copperbelt alone an additional annual demand of 16,000 to 19,500 tons.

^{2/} This is also subject to qualification if the southern and eastern part of the Congo (Leopoldville) is taken into account. There is abundant methane gas capable of being extracted at low cost in Lake Kivu. There is also hydro-electric power available at Bukavu in large quantities and at low price. There are therefore possibilities of producing economically nitrogenous fertilizers. If the sub-region is widened in this way, there may well be scope for a plant here also.

is expected to rise to 44,000 tons and the bulk of the remaining increase would be in Northern and Southern Rhodesia.

95. In East Africa the most appropriate site would appear to be the Broderick Falls in Kenya, which has cheap timber and access to potentially cheaper power, in the first instance from Uganda and ultimately from its own resources. It can draw on cypresses and pines for kraft paper production. Uganda could concentrate on paper bags, probably at Jinja, where efforts in this direction are now being made, and Tanganyika could work up to the production of writing, good quality and specialist paper.^{1/} The East African market at 7000 tons does not at present justify a sulphate pulp plant the minimum capacity of which would be 20,000 tons annually.

96. The Kenya project at Broderick Falls is based on an output of 23,000 tons, at a capital cost of US\$ 4.5 million with provision for doubling capacity eventually. It is intended to serve the whole of East Africa.

97. In Ethiopia it is planned to build a plant to produce twenty five tons of pulp and paper per day. This is to be implemented in two stages: (a) paper and paper converting plant from imported pulp; and; (b) integrated plant. At the integrated plant stage, the pulp is to be produced from the bagasse from the Wonji and Shoa Sugar Cane Plantations and Refineries, which is estimated to amount to 100,000 tons per annum, sufficient to support a bleached bagasse pulp and paper mill of approximately 100 tons per day capacity.

98. An appropriate location for a second major plant in the sub-region would probably be Southern Rhodesia.^{2/} Assuming that a plant with a capacity of 40,000 tons is built in Kenya, there would be scope for another plant almost as large. Mechanical pulp can be produced near Umtali in Southern Rhodesia. The next step could be chemical pulp, i.e. sulphate pulp

^{1/} Tanganyika is considering the setting up of a plant to manufacture pulp only for export outside Africa, based partly on bamboo.

^{2/} A large scale project is under examination in Nyasaland but no report is as yet available. Export markets outside the sub-region seem to be in view. There are obvious transport problems, both to supply the raw materials and export pulp and paper.

from soft wood, for the manufacture of writing paper, paper bags, etc. A further stage would be sulphite pulp, leading to high quality papers. If magnesium sulphite or ammonium sulphite were used, there would be a possibility of a tanning industry based on monosulphite liquors. Further detailed investigation is required both of the raw materials for the manufacture of pulp and the appropriate chain of chemical processes.

Sugar

99. In Ethiopia cane sugar is grown. There are two white sugar factories, with a present output of about 58,000 tons. A third factory is expected to start operation in 1967. In Somalia a sugar factory has an output of 25,000 tons per annum and a second plant is planned with a capacity of between 30,000 and 50,000 tons per annum. In Kenya one factory is planned with an output of 90,000 tons of white sugar per annum and another with an output of 50,000 tons. This is in addition to two small factories already in operation with a combined production of between 30,000 and 40,000 tons per annum. In Tanganyika there is a factory with a capacity of 22,000 tons, and a second is planned. In Nyasaland, a factory with an output of 40,000 tons is expected to start operations in 1968. In Northern Rhodesia there is no sugar factory^{1/} but a refinery is in operation with an annual capacity of 20,000 tons of refined sugar. A brown sugar factory may be started, the sugar to be refined in the existing refinery. In Southern Rhodesia there are three sugar factories and two refineries. Present capacity is only 25,000 tons per annum but projected capacity is 265,000 tons. Uganda has two sugar plants with a combined capacity of about 100,000 tons per annum.

100. The background against which the plans of the sub-region should be assessed is the present fortunes of the large world producers. Sugar from Cuba is consumed largely by the USSR. Production in Java has fallen to the point that exports have disappeared. African consumption will continue to increase with the rise in per capita income. The cost of production of cane sugar is about one-third to one-fourth that of beet sugar, the latter being normally heavily protected. This means that there

^{1/} See part III under Northern Rhodesia.

may well be good prospects for expansion in world markets of cane sugar. Present prices are high and could fall without cutting too seriously into profits.

101. The conclusion is that, taking into account growing African consumption and world market prospects, there is a case for further expansion of sugar production in the East and Central African sub-region, bearing in mind that the foreign exchange earnings derived from 50,000 tons per annum, a reasonable economic size for a factory, is between US \$8 and 11 million per annum.

Cement

102. There are nine cement plants in the sub-region: two in Kenya, one in Uganda, one in Burundi, one in Northern Rhodesia, three in Southern Rhodesia, one in Nyasaland. There are three under construction, one in Tanganyika and two in Ethiopia. These plants are of varying capacities and most of them are working well below capacity. Moreover, those under construction will have a capacity higher than the national market of the countries concerned. The demand for cement can be expected to grow steadily throughout the sub-region, but it is evident that caution should be exercised before still more plants are installed.

103. In the specific case of Ethiopia a plant is operating with a present output of 36,000 tons but it is planned to increase capacity, by modernization, to 70,000 tons. A further plant is under construction at Addis Ababa with a capacity of 70,000 tons, which it is planned to expand after 1966 to a capacity of 140,000 tons. Construction is about to commence on a further plant in Massawa with a capacity of 70,000 tons.

Textiles ^{1/}

104. As a first approximation, the current textile market in the ten

^{1/} As will be shown in this section, there is scope for considerable development of a wide variety of textiles throughout the sub-region, with possibilities of one kind or another in all countries. Since textile production is established throughout the sub-region, development prospects and the proposals made have to be assessed in the light of what already exists. Contrary, therefore, to other industries, it has been necessary to give a fairly full account of the present position as a background for further expansion.

countries of the sub-region can be assessed at 717 million square yards, inclusive of cloth, clothing, hosiery and blankets. Some 493 million yards (70 per cent of the market) are accounted for by cotton at present, in contrast to a 97 per cent share in 1949. Rayon, the next fibre group in terms of importance, accounts for over 28 per cent of the market, with 202 million yards. Wool and synthetics, taken together, add up to less than 25 million yards, or about 1.5 per cent.

105. In country-wise terms, both in relation to per capita levels and aggregate markets, the breakdown of demand is broadly as follows (in million square yards):

TABLE I

<u>Country</u>	<u>Total market</u>	<u>Cotton</u>	<u>Rayon</u>	<u>Wool</u>	<u>Synthetics</u>
Ethiopia	145	115	25	5	-
Somalia	17	17	-	-	-
Kenya, Uganda, Tanganyika	310	220	83	5	2
Burindi and Rwanda	35	31	4	-	-
Northern Rhodesia, Southern Rhodesia and Nyasaland	210	110	90	5	5

106. The spectrum of per capita levels of cloth consumption indicates three broad groups: Somalia, Ethiopia, Burundi and Rwanda have levels ranging from less than six yards per year up to seven yards; Kenya, Uganda, Tanganyika (treated collectively) and Nyasaland range between twelve and thirteen yards; and finally, the two Rhodesias might be placed around twenty-six yards.

107. Six major changes have been at work in the textile situation, though in vastly varying degrees from one country to another. Very briefly, they are:

- (a) The emergence of rayon as a major fibre in the East and Central African textile markets;
- (b) The growing share of knitwear;
- (c) The shift to ready-made clothing has become sizeable in all markets other than Somalia, and to a smaller extent Ethiopia;

- (d) The market in greys has shrunk to a fraction of its previous size;
- (e) There has been a positive up-grading in the quality (and therefore, price per yard) of cloth demanded by the consumer which, among other factors, has tended to inhibit the quantitative response to income increases; and
- (f) Partly allied to the former, there has been a snift in favour of lighter fabrics, often accompanied by mixed fabrics, made from more than one basic raw material.

108. Production of textiles was confined in 1949 to small, isolated plants. At present, Ethiopia, Southern Rhodesia, Uganda and Tanganyika, in that broad order, have built up sizable textile industries; most of the other countries, with the exception of Rwanda and Somalia, have at least one or two well-organized ready-made garment plants. In Ethiopia, several vertically integrated cotton textile plants have come into existence, and plans are afoot to put up a staple fibre plant producing 15 to 20 tons a day. A rayon-weaving plant is also projected. In Southern Rhodesia, the industry has taken several forms: clothing (150 factories with a gross output in excess of US\$ 11 million); two spinning mills; four canvas and towel factories; five blanket manufacturing plants; four weaving plants working on drills, denims, calicoes etc., several knitting factories with an annual output of over 25 million square yards; five finishing factories, and a few independent doublers. In Uganda, one vertically integrated cotton spinning, weaving and finishing unit produces at present around 34 million yards of cloth. In Tanganyika, three cotton-weaving plants are supplemented by two rayon-weaving plants and a few knitting factories. Kenya has a few knitting factories, one of which also spins staple fibre yarn, and some production of woven rayon fabrics. Some clothing factories exist in both Kenya and Tanganyika, but most of these are very small. Larger clothing factories are also to be found in Burundi and Nyasaland. Blanket-making factories are found in half-a-dozen countries, including Burundi and Nyasaland.

109. At present the growth of the textile industries - with the significant exception of import-based clothing industries - has been primarily directed to the mass-end of the demand, and in several countries, particularly Ethiopia and Uganda, local industries have taken up the bulk of the demand in the sector. As a natural consequence of growth and of the shifts in demand patterns mentioned earlier, textile industries will now be entering the phase of producing finer fabrics, lighter fabrics and more complexly finished fabrics, but it needs to be borne in mind that local production is as yet a small part of the market. Thus, production of cloth in East and Central Africa, of all kinds of fabrics (including knitwear) does not at present exceed 190 million yards, or approximately 27 per cent of the total market in 1963.

110. Major expansions are under way in several countries and in more textile fields. The proposal in Ethiopia to put up a staple fibre plant may involve an investment of around US \$15 million. In Somalia, the first Development Plan postulates a textile mill in co-operation with the Federal Republic of Germany. In Kenya, Uganda and Tanganyika, some 134 million yards of production capacity have already been licensed, and further applications are pending. No significant developments have so far emerged, however, in Burundi, Nyasaland, Rwanda and Northern Rhodesia.

111. In one sense, the present gap between the levels of "home" production and the size of demand - 540 million yards - indicates the immediate scope for growth, actually for a near-tripling of the current output. In another sense, it is clear that the total East and Central African market, provided incomes continue to improve, will explode into a larger dimension over the next twelve years. It should be remembered that almost half the number of people in the region today have seven yards and less per capita, a level at which income increases can be expected to have more than proportionate reflection in per capita yardages. When combined with the natural increases of population, this could imply, purely as an order of magnitude, a jump in the size of the market from 717 million yards to 1,260 million yards. Even more tentatively, a breakdown of country-wise

market might be attempted, as follows:

TABLE 2
Rough extrapolations of the textile market

Country	Population in 1975 (33.3% above 1962)	Current <u>per capita</u> consumption	Approximate <u>per capita</u> level 1975	Total market 1975 (2 x 4)
1	2	3	4	5
Somalia Ethiopia Burundi and Rwanda	40 mn.	less than 6 yds. 6.5 yds. 7.0 yds.	10 yds.	400 mn.yds.
Nyasaland	4 mn.	13 yds.	16 yds.	64 yds.
Northern Rhodesia	3.3 mn.	26 yds.	30 yds.	99 yds.
Southern Rhodesia	3.2 mn.	26 yds.	30 yds.	156 yds.
Kenya, Uganda and Tanganyika	36 mn.	12 yds.	15 yds.	540 yds.
Sub-regional total or average	88.5 mn.	11.3 yds.	14.2 yds.	1,259 yds.

112. In terms of the immediate scope available for import substitution and in view of the demonstrated record of textile growth over the last fifteen years, the opportunities for further growth are schematically reviewed in the following chart:

TABLE 3

Branch of textile industries	Ethiopia	Burundi Rwanda	Kenya Uganda Tanganyika	Northern Rhodesia	Nyasaland	Southern Rhodesia	Somalia
Clothing factories	x		x	x		x	x
Knitting	x		x	x	x		
Blanket	x		x				
Narrow fabrics	x		x	x		x	
Fish nets	x						
Spinning(cotton)	x	x	x	x	x	x	x
Weaving (cotton)	x	x	x	x	x	x	x
Finishing (cotton/ rayon)	x	x	x	x	x	x	x
Weaving(rayon)	x		x	x	x	x	
Production of rayon } staple	x					x	
Production of rayon } filament yarn	x		x			x	

113. The multiplicity of positive x's against some of the countries is a reflection of the larger size of the market therein and also of the fact that minimum economic size is frequently small (although the unavoidable use of relatively high-paid expatriate staff will call for a larger minimum size than prevalent in countries like India).

114. A co-ordinated sub-regional approach in the case of textiles is obviously necessary in the case of the capital-intensive production of rayon staple and of rayon filament yarn. Thus there is considerable saving of initial investment per ton of capacity if the plant size is bigger. While the saving in current costs of production is not a very important consideration, the burdens of expatriate salaries and wages, both of which are bound to be large for many years in an industry like this one, are probably better spread over the output of a bigger plant. The current demand for rayon, in either form, comes to 202 million yards, i.e., somewhere between 20,000 and 25,000 tons. The demand has of course to be broken down into acetate, viscose and cupramonium and further into staple and filament, and still further into denier groups. This has to be a detailed assessment, but nonetheless it is clear that there is room for at least two plants

of 25 tons per day (350 working days in the year), and possibly three plants. Tentative suggestions for these locations- apart from Ethiopia - are Southern Rhodesia and, in the event of a third plant being deemed feasible, one of the three countries of the East African common market, perhaps Tanganyika.

115. The heterogeneity of the textile markets implies virtual incapacity to specialize in every product in every branch of the industry, even in the present common market in East Africa. This applies, in particular, to the production of the highest qualities of fabrics on the one hand, and to the roller-printing industry on the other. The runs on the latter would be too big for many an individual market, and shorter runs would be cost-raising.

116. In conclusion, it will be seen that a well-conceived textile development programme will have to go considerably beyond spinning and weaving of cotton textiles; cognizance has to be taken of the possibilities in other fibres - rayon, wool and synthetics - at both the yarn-making and weaving ends. To a large extent, this might have to be connected with either growing the range of cottons needed specifically for the textile industries and looking closely into the feasibility of either a rayon-grade wood pulp plant or a plant based on linter pulp. The reaching back at the raw material end will have its counterpart, in the dynamic context of the changes in East and Central African textile markets, in the post-weaving state as garment-making turns textile mills increasingly into producers of intermediate materials for other, subsequent producers, rather than manufacturers of goods directly sold to the consumer.

117. It is not possible to work out detailed estimates of investment needed by each branch of the textile industry; indeed, the picture itself is incomplete. But judging broadly by the "fabric-equivalent yardage" and applying thereto the investment requirements experienced at present in East and Central Africa, the investment in fixed capital (land, buildings, plant and machinery) would have to amount to US \$300 million. If some of the most capital-intensive methods of textile production primarily

evolved to match the high wage levels in Europe and the United States are utilized - and they have been used, more or less, in several factories in East and Central Africa - capital requirements could rise perhaps to US \$500 to 600 million. On the other hand, if machinery patterns and methods of operation broadly similar to those used in Japan, Pakistan, India and Hongkong could be utilized, requirements of fixed capital could be as low as US \$200 million. As things stand now, African textile industries seem to be adopting methods almost all along the spectrum.

PART III

THE DEVELOPMENT OF SMALL AND MEDIUM SCALE INDUSTRIES

118. The terms of reference of the mission stated quite clearly the main objective to be an assessment of the feasibility of large scale industry in the East and Central African sub-region. This is not to say that the mission was totally unconcerned with the development of small and medium scale plants. A good deal of information was gathered which, it is felt, should be placed at the disposal of the governments concerned through devoting one section of this report to industries of this size range.^{1/}

119. Small and medium scale industries quite evidently have an important role to play in the industrial development of any country or sub-region. For one thing, judging by the experience of the industrialized nations, the small establishments of to-day are often the large ones of tomorrow. Again, in some industries, like certain types of food processing for example, the most economic size of plant may well be small in terms of the capital investment required or the annual production. Not all industries are like iron and steel where technological considerations preclude efficient production below a certain level of output. Furthermore, smaller plants are frequently labour-intensive as opposed to the larger capital-intensive plants, an important point in the sub-region where unemployment and under-employment are widespread.

120. The strategic industries, which tend to be the large scale ones, usually have a decided and favourable impact on the growth of small and medium sized plants - hence the term strategic. Often the smaller projects get underway either to supply the large scale plant or to further process its products. An idea of the possible impact of a few such key industries can be gained from annex XI. Obviously big plants cannot be studied in a vacuum completely separated from consideration of small plants.

^{1/} This is of course no more than a summary account of the situation and possibilities. It is mainly based on the material collected by the FAO and ILO members of the mission who are preparing detailed reports for their organizations.

121. An additional factor is that for some of the economies of the sub-region large scale industrial undertakings will be few if any for some time to come. Other sections of this report indicate that the prospects for plants of this size, for example in Rwanda, in Rurundi and in Somalia, are not bright. For such countries industrialization will take the form of a widening group of industries producing in limited quantity for local consumption.

122. In the circumstances, the mission could not properly ignore the possibilities for the creation in each one of these countries of national scale industries. At the same time, the mission was obliged by its terms of reference to concentrate its main attention on the viability of large scale plants. In each country visited, an attempt was made to assess the immediate possibilities for small and medium scale plants as suggested either by the large size plants proposed, by the availability of local raw materials, by the opportunities for import substitution or by the presence of increasing and appreciable domestic demand for the products of smaller industries. Wherever possible, estimates were prepared as to the annual capacity, capital investment required and employment opportunities provided.

123. It is noteworthy that even the relatively small group of smaller scale projects analyzed in this report would require a total capital investment of about US\$21 million and would provide jobs for roughly 9,000 workers.^{1/} Thus, the role of such plants in the industrial development of the sub-region should not be underestimated. This does not take into account any expansion in the textile field, which is treated separately in part II.

Forest-based industries

124. A somewhat different approach than that outlined above has been taken with respect to small and medium size projects among the forest-based industries. The forests are one of the principal potential industrial resources in almost every country in the sub-region. While large scale pulp or paper

^{1/} It should be stressed once more that these are some immediate possibilities; clearly there are many more which can be revealed by further investigations.

plants will necessarily be few, for technological reasons,^{1/} it seems probable that the future will see a considerable number of large scale plants producing composition board, plywood, expensive furniture, reclaimed paper, lumber, safety matches, etc. for sale at the national level. Investment and minimum output requirements are sufficiently modest in many cases as to put some or perhaps all such industries within the reach of individual countries in East and Central Africa. Hence it seems quite unnecessary in the present report to attempt to specify locations for the small and medium sized forest-based industries.

125. An additional reason for treating timber processing separately is that many of the opportunities are long range and depend very much on steps taken in the near future by governments with regard to establishing forestry plantations. The small scale projects analyzed in other industrial sectors are likely to be much more immediate in their viability.

126. The following are typical small or medium scale plants, in the forest industries group, one or more of which seem likely to be needed in the sub-region within the next fifteen years.

127. A composition board plant could produce flake board from sawn waste and wattlewood waste as well as board for the furniture and building trades. Capacity is 50 tons a day, investment one million dollars with employment for 150 persons.

128. A plywood and veneer ply plant of the minimum economic size produces ten million square feet annually, would cost in the neighbourhood of US\$2.5 million and employ as many as 1,100 workers.

129. An undertaking designed to sell in the world market as well as in the sub-region would be a high quality furniture plant producing 3,000 tons a year, employing 200 workers and costing about US\$120,000. Probably a number of such plants are viable.

^{1/} See part II.

130. A factory making bleached papers from imported pulp and waste paper would operate at 20 tons a day, employ 100 workers and require a capital investment of US\$1.5 million.

131. In the small scale range, additional saw mills seem likely to be required. The minimum economic size of a mechanized saw mill and joinery is an output of 20 tons per day; such a plant employs 150 people and costs about US\$130,000.

132. Finally, a number of safety match plants might supplement those already in operation. Each one would employ some 200 workers and require a capital investment of US\$150,000.

133. It is difficult to estimate the investment and employment requirements of such small and medium size industries based on the forest resources of the sub-region because in time one or more of them will probably be established in each country. Even on the very unlikely assumption that only one plant of each type comes into being, the capital investment would be approximately US\$5.4 million and employment provided for some 1,900 workers.

A country by country analysis

(a) Burundi

134. Burundi, while more industrialized than its customs union partner Rwanda, is still a predominantly agricultural country at an early stage of industrialization. The country has a relatively high population density in terms of the general sub-regional situation. Like in Rwanda, the economy is based mainly on the revenues from two cash crops, namely coffee and cotton. Existing industries include those manufacturing washing soap, shoes, furniture, nails, boats, beer and soft drinks. There are also metal works, a cotton ginnery and oil crushing plants. The two local cement factories were not in operation at the time of the visit of the mission.

135. Given the present state of industrial development in Burundi, a number of opportunities for small scale industry exist, based more on the idea of rising domestic demand than on the availability of raw materials. Such plants would be assumed to have access to the remaining part of the customs union, that is Rwanda. The industrial possibilities are for toilet soap, tyre retreading, small agricultural implements, metal furniture, crown corks and glass bottles, the latter two plants to supply the breweries in both countries, existing soft drink plants and the milk factory.

136. Capital investment for this range of small and medium scale industries would approximate US\$0.5 million and it is estimated that employment opportunities would number about 90, as can be seen in the following table:

TABLE 4

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Toilet soap	200 tons	60	15
Tyre retreading	1,000 auto tyres 1,500 truck tyres	50	16
Small agricultural implements	1,000 tons	250	12
Metal furniture	-	35	16
Crown corks	12 million units	85	12
Glass bottles	1 million units	65	18
Total		545	89

(b) Ethiopia

137. While basically an agricultural country, Ethiopia is making determined strides towards the development of manufacturing industry, as is evident in annex VIII on the characteristics of manufacturing establishments in the countries of the sub-region. The Ethiopian Government has prepared an elaborate development plan which lists over 100 industrial projects. A detailed examination of the viability of all such projects was obviously an impossibility for the mission. A number of them were studied and the details are given below, as a cross-section of the many projects now under consideration in this country.

138. Opportunities are evident for the production of tannin extract, edible oil processing, sisal and jute bags, umbrellas, ready-made clothes, one or possibly more tanneries, clay bricks, soap, paints and varnishes. Various plants are under construction such as a second meat slaughtering and canning plant, paper converting, a rubber and canvas shoe factory, etc.

139. Establishment of the small and medium scale industries noted above would involve capital expenditure in the order of US\$ 3.6 million. Estimates of employment opportunities are not available. The majority of the projects would be based on the presence locally of raw materials.

TABLE 5

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Tannin extract	4,000 tons	260	
Edible oil and margarine	6,000 tons	1,000	
Sisal and jute bags	2,000 tons	600	
Umbrellas	100,000 units	100	
Ready-made clothing	200,000 units	320	
Tannery	2,000 tons	650	
Bricks	3 million units	60	
Soap	6,000 tons	400	
Paint and varnishes		200	
Total		3,590	

(c) Kenya

140. In the case of Kenya, fewer small scale industrial possibilities were noted than in some other countries. This is not to say that the Kenya economy does not afford great opportunities for plants of smaller size. Rather, in this country the attention of the mission tended to be concentrated on the viability of a number of large scale projects.

141. Small scale industry possibilities examined include paper products, glue, ready-made clothing, polythene bags and PVC tubes, bricks, roof and floor tiles, umbrellas, component parts for hurricane lamps, kerosene stoves. A cottage industry which might be developed is the weaving of sisal which would employ as many as fifty workers. A rather larger scale operation, with as many as four plants, is the possibility of producing bags and cordage. The capital investment in this case would be approximately US\$500,000 with 3,000 people being employed. With a number of these industries, the justification would not be availability of raw materials, but rather a rising domestic demand indicating the desirability of import substitution.

142. The processing of fruit and vegetables constitutes still another possibility, provided an adequate experimental laboratory is established prior to the creation of the factories themselves.

143. In more detail the production, investment and employment figures, roughly estimated, are to be found in the following table indicating total investment needs of US\$ 1.2 million and employment provided for over 3,000 persons.

TABLE 6

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Paper products	1,000 tons	50	5
Glue	200 tons glue		
	750 tons bone meal	95	6
Ready-made garments	100,000 pieces	200	20
Polythene bags, etc.	600 tons	70	6
Bricks, roof and floor tiles	12 million bricks) 8 million roof tiles) 5 million sq.ft. floor tiles)	115	40
Sisal weaving	-	-	50
Umbrellas	100,000 units	700	25
Kerosene lamp parts	-	30	12
Kerosene stoves	5,000 units	30	8
Bags and cordages	50,000 bags 10,000 tons of binder twine	550	3,000
Total		1,240	3,172

(d) Northern Rhodesia

144. The break-up of the Federation of Rhodesia and Nyasaland should provide a great many industrial opportunities in Northern Rhodesia, a market previously served largely by Southern Rhodesian plants. With one of the highest per capita income levels in Africa, and a deliberate drive by the new Government towards industrialization, the future will undoubtedly see the creation of a wide range of new industries in Northern Rhodesia. Other sections of this report have pointed out the feasibility of a number of large scale plants to be located in this country and supplying the sub-regional market. Such plants will stimulate the growth of various small and medium size industries, but the present size and nature of the domestic market is sufficient to make a variety of new lesser scale plants appear viable at once.

145. Such industries of small and medium size include bricks, roof and floor tiles, laundry and toilet soap, agricultural implements, cook stoves, fishing nets, ready-made garments, umbrellas, paper production, metal doors and windows, metal utensils and pressed board from groundnut shells. Several sheet metal plants might be set up. In most of these cases availability of local raw materials is not the most important factor. Rather the industrial possibilities arise from increasing internal demand and opportunities for import substitution.

146. Two further medium size plants would appear worthy of serious consideration if the large scale plants suggested for the sub-region develop, particularly in the iron and steel field. As is noted in annex X there should be room for a Northern Rhodesian plant producing pipes, tubes and fittings of iron and steel and another making wrought and cast iron products, all for the local market.

147. Agricultural processing plants constitute still another opportunity for Northern Rhodesia. These might include a groundnut roasting factory, a bag and cordage plant, and dairy products, especially milk. Depending upon development elsewhere in the sub-region, a 50,000 ton sugar factory might be feasible with a capital investment of US\$11 million and employing 500 persons. New factories for meat processing, biscuits, dehydrated yeast and edible oils are now under construction. The Northern Rhodesia Industrial Development Corporation has carried out feasibility studies in a wide range of possible industries, both large and small, including oil milling, cassava processing and bag manufacture from palmleaves, the latter involving an estimated capital investment of some two million dollars. The production process would be similar to that now used in a plant located in Asmara, Ethiopia - the only doum bag plant in the world.

148. These various small and medium scale industries, excluding sugar and a number of possibilities for which financial capacity and employment figures are not at present available, would require capital to the extent of US\$3.5 million and would provide approximately 1,550 job opportunities, as can be seen from the following table.

TABLE 7

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Bricks, roof and floor tiles	12 million bricks 8 million roof tiles 0.5 million sq.ft. floor tiles	390	40
Laundry and toilet soap	300 tons	80	25
Agricultural implements	1,000 tons	250	12
Sheet metal work	600 tons	40	24
Cooking stoves	5,000 units	30	10
Fishing nets	60,000 units	85	10
Ready-made garments	100,000 units	200	20
Umbrellas	100,000 units	100	25
Paper products	10,000 tons	50	4
Metal doors and windows	15,000 tons	75	35
Metal utensils	250 tons	100	25
Pressed board from groundnut shells	2,000 tons	55	15
Groundnut roasting	5,000 tons	55	15
Bag and cordage	30,000 bags	200	1,000
Dairy products	300,000 tons	30	100
Steel pipes, tubes and fittings	10,000 tons	850	100
Wrought and cast iron products	5,000	500	100
Total		3,320	1,557

(e) Nyasaland

149. In this country, while the economy is predominantly agricultural, the opportunities for small and medium-scale industries appear to lie only partly in products based on the processing of agricultural commodities. Viable projects can be found also on the basis of rising internal demand and import substitution. Where agricultural-based industries are concerned, the present tendency for certain projects in Nyasaland's case is to regard them as warranting study in terms of larger scale plants, e.g. sugar and pulp paper. The results of these studies have still to be made known and there seems little point in suggesting smaller scale operations in these fields, at least for the moment.

150. A number of other projects in the small and medium size range appear viable. These include a tannery, a shoe factory, the manufacture of metal utensils, a plant producing garden tools and one or possibly two assembly plants for bicycles and transistor radios. There are agricultural processing opportunities in terms of such fruits as mangoes and peaches.

151. The capacity, investment and employment aspects of most of these projects are to be found in the table below. Capital requirements are some US\$0.7 million while 220 or more jobs would result.

TABLE 8

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Tanning	0.5 million sq.ft.	125	40
Shoes	75,000 pairs	300	80
Metal utensils	250 tons	100	25
Garden tools	600 tons	85	12
Assembly plant for bicycles and radios	20,000 bicycles 6,000 radios	60	45
Fruit juices	1,500 tons	50	20
Total		720	222

(f) Rwanda

152. This country, while relatively poor and under-developed, has the highest population density in the entire sub-region. The economy is essentially agricultural and there is only one industrial plant of any size, a brewery. Some 30 to 35 other existing industrial establishments can be classed as small scale. The availability of local raw materials would indicate that opportunities are present for another tannery besides the one now in operation, for shoe manufacture, for a banana fibre extraction plant and for a number of small factories, perhaps as many as five, with a total of 50 looms, making carpets from banana fibre. Rwanda is rich in bananas, but there seems little likelihood of a successful export operation and hence this raw material might be put to use in the form of banana fibre. Another small scale industry, with a ready market and apparently justified as an import substitute, is the manufacture of hoes. These plants would presumably also serve Burundi, the other partner in the customs union. The industries studied would require a capital investment of some US\$0.5 million and could provide about 300 jobs.

TABLE 9

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Tannery	0.5 million sq.ft.	125	40
Shoe manufacture	75,000 pairs	300	80
Shoe manufacture	600 tons	80	12
Banana fibre extraction	300 tons	25	10
Carpet making from banana fibre	-	-	150
Total		530	292

(g) Somalia

153. In Somalia, a relatively poor agricultural country, there appear to be opportunities for a considerable number of small and medium scale industries, based principally on either the availability of basic raw materials or an increasing internal demand. The industrial possibilities which warrant further study with a view to their establishment at an early date are: paints, varnishes and lacquers; leather footwear; laundry and toilet soap; concrete blocks; tyre retreading; bone meal; bricks, roof and floor tiles. As can be seen from table 10, the capital investment required would be in the neighbourhood of one million dollars with employment opportunities for over 200 persons.

154. There are also a number of small and medium scale industry possibilities more directly related to the predominantly agricultural nature of the Somalian economy. These include rice, banana powder or flakes, dates, the culturing of pearls, canning of turtles, kenaf plantations, jute bag manufacture, meerscham pipes and the production of compressed blocks of charcoal. Two further projects might be a sugar factory and a meat slaughtering and canning plant. While the former, at 50,000 tons capacity, a capital investment of US\$11 million dollars and a labour force of 500 people, should be regarded as a large scale industry with an eye to world markets, the meat plant can be classified as a small or medium scale operation in view of the investment and employment requirements and the fact that production would be for domestic consumption. In any case, the agricultural processing industries noted immediately above would require another one million dollar investment and could provide employment for another 200 workers.

155. For most of these industries, tentative estimates of annual capacity, capital investment required and employment provided are shown in the table.

TABLE 10

Industry	Annual capacity	Capital investment in '000 US \$	Employment provided
Paints	25,000 gallons	50	15
Footwear	75,000 pairs	300	80
Laundry and toilet soap	100 tons laundry) 200 tons toilet)	80	25
Concrete blocks.	500,000 units	100	20
Tyre retreading	1,500 auto tyres 2,000 truck tyres	55	25
Bone meal	3,500 tons	35	5
Bricks, roof and floor tiles	12 million clay bricks 8 million roof tiles 5 million sq.ft. floor tiles	390	40
Meat and meat canning	30,000 tons	450	60
Rice mills	25,000 tons	55	30
Banana meal	1,000 tons	380	50
Pearl culture	10,000 units (after two years)	4	20
Merscham pipes	10,000 units	3	20
Total		1,902	390

(h) Southern Rhodesia

156. Southern Rhodesia is by far the most industrialized nation in East and Central Africa. Obviously in such an economy there are likely to be very considerable opportunities for the expansion of small and medium scale industries. Given the prospect of developing large sub-regional industry, the mission devoted little time to investigation of the many other possibilities.

157. Two opportunities for medium scale industry should be noted. One is a 30,000 ton meat canning operation requiring a capital investment of US\$ 450,000 and employing 60 people. The other is a dairy products plant costing US\$ 180,000 and producing employment for 90 workers. US\$ 630,000 would be required for capital investment and 150 new jobs would be created. But it must be emphasized again that there are many other opportunities for small and medium scale industries in Southern Rhodesia and the two noted above are no more than illustrations. An area in which much seems feasible is processed fruits and vegetables; imports of these products at present exceed US\$.4 million per year.

(i) Tanganyika

158. In Tanganyika considerable opportunities exist for industries of small and medium size, as has been pointed out in studies such as that prepared recently by the Arthur D. Little consulting group. Such industries include building hardware, glass bottles, laundry and toilet soap, a tannery, several metal-working plants, terazzo tiles and as many as ten transportable lemon-grass distillery plants. Also rope and twine might be manufactured in a number of small plants, possibly using Japanese machinery. Basketware, brooms and brushes could be produced on a cottage industry basis in rural parts of Tanganyika. Expansion of the existing fruit and vegetable processing industry would require considerable mechanical investigation and an increased degree of government regulation in such matters as quality standards.

159. Establishing these industries would involve an estimated capital investment of \$0.5 million and provide employment for almost 400 persons, as can be seen from table 11. No mention is made of the cashew nut industry since it is understood that a plant is to be set up in Dar-es-Salaam processing 9,000 tons of raw cashew nuts a year, using a labour force in excess of 1,000 persons. Capital investment in this factory is expected to be approximately one million dollars.

TABLE 11

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Building hardware	3,000 tons	35	12
Glass bottles	1 million units	65	18
Laundry and toilet soap	200 tons laundry 400 tons toilet	115	45
Tannery	2 million sq. ft.	250	100
Metal works	600 tons	40	25
Rope and twine	} cottage industries	5	20
Basketware			50
Brooms and brushes			50
Terazzo tiles	300,000 units	25	16
Transportable lemon- grass distillery plant	20,000 kilos	20	50
Total		550	386

(j) Uganda

160. A number of opportunities appear evident in Uganda for the creation of smaller industries based principally upon agricultural raw materials and supplying the local market, with moderate surpluses for export, either within the sub-region or to world markets. In food processing, for example, the Uganda Development Corporation is interested in half a dozen projects, including additional sugar estates, meat canning, grain milling, the production of soluble tea and coffee and the manufacture of alcohol.

161. As has been noted elsewhere in this report, Uganda appears to be the logical site for certain new or expanded large scale industries serving the sub-region. Such plants should stimulate the growth of smaller plants. A case in point is the suggested iron and steel plant in Uganda and the related general foundry, referred to in annex X, which might also make gas containers and similar fabricated metal products.

162. Apart from the UDC projects, small and medium size industries appear feasible for gurmaonof, banana meal, board from papyrus and a tea factory. These plants would involve a capital investment of \$2.3 million and provide jobs for an estimated 700 or more people, as shown in table 12. All would be the single unit type of operation, except gurmaonof which lends itself to very small production units, and as many as 100 units might be envisaged.

TABLE 12

Industry	Annual capacity	Capital investment in '000 US\$	Employment provided
Gurmaonof	2,000 tons	70	300
Banana meal	1,000 tons	400	50
Board from papyrus	20,000 tons	1,400	100
Tea factory	20,000 lb.	225	200
General foundry gas containers metal fabrication	900 tons	250	80
Total		2,345	730

PART IV

SOME GENERAL CONCLUSIONS

163. The essence of this report is to be found in part II, which propounds an outline of a scheme for industrial development for the sub-region on a co-ordinated basis. In this final part some general considerations or conclusions are set out. Many of them have wider implications, and a full discussion would be beyond the scope of the present report.

164. There is danger of duplication of investment, which is particularly wasteful when domestic capital or public foreign aid is involved. Promotion of competition is desirable, but for some time to come the primary consideration is efficient utilization of scarce investment funds of all kinds.

165. Real industrial growth depends primarily on stimulating activity at a number of key growth points. This means the installing now of modern industries strategic for economic development, with their growth effects.

166. It has been shown that such industries are mainly large scale with a minimum size which, although smaller than is the case in the industrialized countries, is still considerable and beyond the scope of existing or immediately foreseeable national markets. Hence there is an imperative case for sub-regional co-ordination of industrial development.

167. The main proposals put forward need be referred to here only briefly: the building-up of the integrated iron and steel plant in Southern Rhodesia, supplemented by a relatively small integrated iron and steel plant in Uganda; the development of copper manufactures in Northern Rhodesia; production of phosphatic fertilizers in Southern Rhodesia and Uganda, nitrogenous fertilizers in Northern Rhodesia, potassium sulphate in Ethiopia; development of a coal distillation chemical complex in Tanganyika; production of sulphuric acid in Uganda, Northern and Southern Rhodesia; production of acetone, acetic acid and methane from wood distillation in Kenya; production of alcohol by fermentation of molasses in several countries; production of pulp and paper in Ethiopia, Kenya and Southern Rhodesia; the carefully co-ordinated

development of engineering industries around key growth centres: Jinja, Nairobi, Mombasa, Arusha, Dar-es-Salaam, Asmara, Salisbury, Bulawayo, Umtali, Ndola and the Copperbelt; and co-ordinated development of textiles and clothing throughout the sub-region.

168. The implementation of this programme requires development of road, rail and lake transport facilities, including a new east-west link in the form of a railway from Northern Rhodesia to Dar-es-Salaam and new north-south links, road and rail. It also requires a co-ordinated energy development policy, particularly electric power.

169. Given this industrial programme and the related transport development, the direction of expansion of trade follows logically and is indeed the counterpart of the whole exercise. There is already a common market in the three East African territories and the movement towards the expansion of this common market must follow. The development of each sub-regional industry requires precise agreements between the countries concerned for free trade in the appropriate products and a common external tariff. Eventually, however, success depends on the simultaneous negotiation of a series of such agreements.^{1/}

170. There is undoubtedly a real desire on the part of all the governments of the sub-region to tackle industrial development along the lines suggested, and a realization, indeed, that without such an approach real industrial development is impossible. At the same time, it would be foolish to underestimate the problems which have to be solved. There is a natural tendency within a common market for development to be fastest at the most developed points and for the poorer areas to stagnate or at best grow slowly. One natural reaction is for the poorer countries to try and set up new industries even though the market is too limited and the sub-region as a whole

^{1/} The arrangements envisaged are essentially along the lines of J. Ilett "Designated Product Common Markets", East African Economics Review, Vol. IX, No 2, December 1962.

already adequately supplied by existing plants. The strains set up are bound to be disruptive of the common market itself.^{1/} The basic assumption underlying the proposals in this report is that there should be no interference in the industries which already exist even though there is, as in the case of cement, excess capacity in the sub-region as a whole. The same problem arises in the setting up of new industries and expansion of existing industries. Thus detailed working out of the whole plan must mean a conscious and sustained effort to push industrialization wherever reasonably economic in the poorer countries of the sub-region. It will be evident that in the poorer countries there are few immediate opportunities for "sub-regional" industries and that therefore the kind of industrialization required is primarily that designed to serve domestic markets.

171. Throughout most countries in the sub-region there are mixed economies. Generally it is public policy and there is clearly scope for a combination of government and private enterprise, including foreign enterprises. There is much to be done to develop appropriate government policies and above all the co-ordination of such policies. Throughout the sub-region, economic planning, both the drawing up of over-all development plans and their execution, is in its infancy. In East Africa in the industrial field there are already more than the elements of machinery for inter-governmental consultation. There have been strains on the established system of industrial licensing, where this instrument is clearly a crucial one. Again, in East Africa there is the framework of a common incentive policy in the spheres of tariffs and the execution of tariff policy, fiscal policy, and industrial legislation. But there is still more shopping around by foreign investors for special concessions than seems desirable. More could be done to harmonize policies in detail and the expectation is that as a

^{1/} This whole process is analyzed in detail with particular reference to East Africa by Peter Mwanja in a paper presented to the Second Conference on Economic Policy sponsored by the University of East Africa, held in Nairobi from 24 to 30 November 1963, entitled "Customs Union and Co-ordinated Planning in East Africa."

co-ordinated policy of industrial development proceeds throughout the sub-region, efforts will be made to build upon and adapt what already exists in East Africa to the whole area.

172. Capital is scarce, yet the real bottleneck is really well worked out investment projects, and this means particularly projects of sub-regional interest. Moreover, foreign financial participation in the larger scale projects is essential, but the governments of the sub-region are rightly concerned that such enterprises should not be under outside control. Hence it is important to attract more and more African capital, public and private. In some of the sub-regional schemes it would seem desirable for several governments to subscribe to the equity and to be represented on the boards of management.

173. There are considerable financial implications involved in carrying through the suggestions for industrial development included in this report. In the time available it has not of course been possible to make precise estimates of capital requirements. However, if the large scale industries envisaged are to be established and in operation by 1970, together with the small and medium scale industries referred to in part III, capital investment requirements would be of the order of US \$700 million. Iron and steel, non-ferrous metal manufactures and engineering industries would account for some \$240 million, chemicals some \$120 million, pulp and paper \$25 million, sugar \$10 million, textiles \$300 million and small and medium scale industries \$20 million. This last is obviously an underestimate since the present report has given no more than sample possibilities. The capital financing would thus be of the order of 130 million a year, perhaps starting at 50 million and rising to 200 million towards the end of the period. Probably three-quarters of this sum would require expenditure of foreign exchange. It is evident that substantial capital inflows from abroad, both public and private, will be needed.

174. There is no conflict between a policy of setting up large scale industries on a sub-regional basis and pushing hard the development of both agriculture and small and medium industries mainly for national markets.

Furthermore, the smaller industries have the additional value of stimulating African entrepreneurship. Encouragement to entrepreneurship is important.

175. In applying the policies suggested in this report, there is no need to wait for federation. But the whole process of industrialization should be viewed in the context of a steady move towards the harmonization of development plans and eventually a common market for the whole sub-region. Moreover, the concept of a common market for the whole sub-region is not inconsistent with the wider aim of an eventually all-African common market. There are natural contact points with other sub-regional common markets, for example, prospects of developing further trade between Uganda, Rwanda, Burundi and Congo (Leopoldville); between Northern and Southern Rhodesia and the Congo; and between East Africa and Ethiopia and Sudan, and thus with the countries to the North.

176. The facilities offered by the United Nations, and in particular the Economic Commission for Africa, are available, if the governments concerned so wish, to follow up the proposals made in this report. These facilities take a number of forms:

- (a) If there is agreement on the general principles underlying the proposals for the establishment of large scale sub-regional industries, the next step must be detailed feasibility studies. One possibility would be applications by the governments directly concerned to the United Nations Special Fund. A second would be to endeavour to interest, through the governments concerned and the ECA secretariat, teams from potential investors outside Africa including the International Bank and its affiliates. A third which might be applicable where rapid action is required, would be for the ECA secretariat to endeavour, with the aid of outside consultants as required, to carry out the work. An example of a project where an application to the Special Fund might be envisaged is the proposed coal distillation chemical complex in Tanganyika. One where the services of ECA, together

with outside consultants, might be drawn upon is the proposed iron and steel plant in Uganda.

- (b) In other cases a government may well feel able to develop a project with some outside assistance from the United Nations. In such cases the appropriate approach would be a request for an expert under the United Nations Expanded Technical Assistance Programme. Sometimes, where short-term immediate assistance is required, a request for the services of an expert from the ECA secretariat or its regional advisers, or from the United Nations Industrial Development Centre, might be more appropriate. Where food or timber processing are involved, the Food and Agriculture Organization is the appropriate body, and in the case of handicraft industries, the International Labour Organization.
- (c) In other cases a government may require advice on a range of industries, in which case the appropriate approach would be a request either for experts on a short-term basis or, preferably, a small team from the ECA secretariat and the Industrial Development Centre (or FAO and ILO in their fields of competence) or, on a longer term basis, through the United Nations Expanded Technical Assistance Programme.
- (d) The ECA possesses machinery for bringing together governments to discuss and negotiate the setting-up of new industries or transport facilities, this is available for the following up of the recommendations in this report. It will be strengthened when the sub-regional office in Lusaka for East and Central Africa is in full operation. Established inter-governmental machinery to do this kind of work already exists in East Africa. It is to be hoped that a conference of ministers of industry from the whole sub-region may be called at an early stage and the services of ECA are available to help in making the necessary economic and technical preparations, as a follow up to this report.

ANNEX I

MEMBERS OF THE MISSION

Mr. A. F. Ewing	- ECA - Chief of the Mission
Mr Adrian F. Alle	- ECA - Metals and machinery
Mr E.A.M. Asselbergs	- FAO - Food processing
Mr M.A. Azam	- ILO - Handicraft and small-scale industries
Mr S.S.J. Bahadur	- FAO - Timber industries
Mr W.C. Bedding	- FAO - Agro-industries
Mrs E. Blackburn	- ECA - Secretary
Mr V.A. Jibidar	- ECA - Economist and secretary to the mission
Mr L.E. Lukacs	- ECA - Investment evaluation and transport
Mr S.D.Mehta	- ECA - Textiles
Mr Joseph C. Mills	- ECA - Economist
Mr E.B. Thiagarajan	- UN Headquarters, Centre for Industrial Development - Chemicals.

ANNEX II

LIST OF PERSONS INTERVIEWED BY MISSION MEMBERS

Burundi

S. E. M. Libakare Ildephonse, Ministre de l'economie
S.E. M. H. Ruramwira, Ministre de l'agriculture
Mr. A. M. Abdul Rahman, UN Fiscal Adviser, Government of Burundi
Mr. L. Aerts, Conseiller, Commissariat au plan
Mr. P. Castelet, UN Economic Adviser, Government of Burundi
Mr. M. G. Ferlin, Expert bilatéral français, Commissariat au plan
Mr. K. H. Hansner, Embassy of the Federal Republic of Germany
Mr. Albert Israel, D. & H. Israel (soap manufacturers)
Mr. P. Kabura, Directeur general du ministère de l'agriculture
Chambre du commerce et de l'industrie du Burundi
Dr. J. Lucas, UNTAB Resident Representative in Rwanda and Burundi
Mr. P. A. Marteau, FAO Fisheries Development Specialist
Miss C.M. Matters, Assistant Resident Representative, UNTAB
Mr. Nsengiyumva, Chef de cabinet du Premier Ministre
Mr. Pontien Ntimenze, Directeur general, ministère de l'economie
Dr. F. Plasil, UNTAB Office, Economic Adviser to the Governments of
Burundi and Rwanda
Mr. J. Ramirez, Head FAO Mission to Rwanda and Burundi
Mr. A. Roux, President, Banque d'commission du Rwanda et du Burundi
Mr. P. D. Sam, FAO, Agricultural Extension Specialist
Mr. Shabu Dean S. Alibhai, SHABU
Mr. Sinvura, Chef de cabinet, Ministère des finances
Mr. L. Stanger, Counsellor, US Embassy
Dr. E. Otto

Ethiopia

H.E. Lij Endalkatchew Makonnen, Minister of Commerce and Industry
Mr. Worku Habte Wold, Assistant Minister, Executive Secretary of the
Planning Board
Assistant Engineer, Adviser to the Planning Board
Mr. Abdullah Mohamed Hakim, Director of Nazareth Nail Manufacturing Co.
Nazareth
Mr. Abdul Rahman Ali Bay, Ministry of Commerce and Industry, Asmara
AMAP, Match Factory, Asmara
ARICE, Paper Factory, Asmara
Dr. G. Biasolo, Cement Factory (Krupp) Asmara
Dr. Boettcher, Second Secretary of German Embassy
Dr. Criswicz, Economic Adviser to the State Bank of Ethiopia
Casciani and De Nadai Ltd., Fruit Juice Factory, Asmara
Mr. Coates, Acting General Manager of Ethiopian Meat Corporation
Mr. Daniells, Programme Officer, US Aid
Mr. Dury Mohamed, Lecturer on the Economy of Ethiopia, Haile Selassie I
University
Mr. J. Dakya, Consultant, Industry Sector, Ministry of Commerce and
Industry, Asmara
H.E. Fitawrary Demissie, Assistant Governor General, Harar Province
Mr. Darakdjian, Director of Darmar Shoe and Darmar Tanning Factories
Mr. Deneke Teklewold, Director of the Empress Menen Handicrafts School,
Addis Ababa
Mr. Dittl, Chief of Administration, Cotton Company of Ethiopia, Dire Dawa
Mr. S. Enav, Co-director of INCODE Meat Plant, Asmara
Mr. Friscike, Adviser to the Planning Board
Mr. Fogstad, Director of Fogstad Woodworks Co., Addis Ababa
Fruit and Vegetables Company, Mangue Wondo
Mr. Z. Goldberg, Co-director of INCODE Meat Plant, Asmara
Mr. Getye Teklemanuel, Acting Chief of Dire Dawa Branch of Ministry of
Commerce and Industry
Dr. Eng. Hamsla, Adviser at the Ministry of Mines and State Domains
Mr. Habte-ab Birou, Head of the Technical Agency
Mr. Hrkarlovic, Technical Adviser to the Ministry of Commerce and Industry

Mr. Hunt, Manager of Cerealia Ltd. (Flour, Biscuits and Macaroni) Akaki
Mr. Hamilton, Manager of Abattoirs, Malgue Wondo
ISA Palm Sack Factory, Asmara
Indo-Ethiopian Textile Co., Akaki
Mr. Jones, ILO Adviser on Labour Administration to the Ministry of
Community Development
Mr. G. Malogeratos, Oil Seed Co., Dire Dawa
Mr. J. R. Leusis, Chief Accountant and Acting General Manager of the
Ethiopian Cement Corporation, Dire Dawa
LAZARIDIS Cotton Mills Akaki
Mr. Lorenz, US Aid
Mr. Mak, Manager of Estates, HVA Sugar Corporation, Wonji and Shoa
Shah Rammiklal Motichand, Manager of Tigray Agricultural and Industrial
Development Co., Harar
Mr. Meinecke, Director of US Aid
Mr. I. Miller, Chief of Statistics Section, US Aid
Mr. Mulugetta, Chief of Agricultural Section, Development Bank
Malgue Wondo Agricultural Estates (Meat Canning, Tomatoes, Peas, Coffee)
MAGNOTTI Nail Factory, Asmara
Mr. R. Mangani, Eritrean Chamber of Commerce, Industry and Agriculture
"Nafni" Flour and Macaroni Co., Nazareth
Mr. Panel, Chief of Engineering Department, US Aid,
Perrone Tannery, Asmara
Mr. Rihtman, Adviser to the Ministry of Commerce and Industry
Mr. Rizzo, Director of Ethioplastic Co. Addis Ababa and
Director of Iron and Steel Co. Akaki
Mr. Stanley, Head of Economics Department of the University
Mr. Sigholt, Head of the Industrial Section of the Development Bank
SAVA, Glass Bottle Factory, Asmara
Mr. Teklehaimanoth, Director General of the Ministry of Commerce and
Industry
Mr. G. Triandafillou, Manager of Chandris Africa Ltd., Dire Dawa Meat
Factory
Mr. Tefera Degaffe, General Manager of the State Bank of Ethiopia

United Oil Mills, Addis Ababa

VALENDIS and Bros., Coffee Cleaning, Dire Dawa

Mr. Wung, Technical Adviser to the Central Statistical Office

Mr. Wold, Manager of Mosvold Woodworks Co., Addis Ababa

Mr. Wardburton, Technical Manager of the Cotton Co. of Ethiopia, Dire Dawa

Mr. Zergavich, Adviser to the Ministry of Commerce and Industry

Federation of Rhodesia and Nyasaland

Hon. J. Clark, Federal Minister of Commerce and Industry

Mr. S. Davies, Federal Department of External Affairs

Mr. A. Emmanuel, Federal Department of External Affairs

Mr. L. Hawkins, Federal Department of External Affairs

Mr. L. S. Hawkins, Federal Department of External Affairs

Mr. N. McNally, Federal Department of External Affairs

Mr. J. Mitchell, Federal Ministry of Commerce and Industry

Dr. Myburgh, Central Statistical Office

Mr. T. Osborne, Central Statistical Officer

Mr. Ruskmere, Federal Ministry of Commerce and Industry

Mr. G. Walker, Federal Ministry of Commerce and Industry

Mr. Wetmore, Federal Department of External Affairs.

Kenya

Mr. A. Abdallah, Under Secretary

Mr. A. L. Adu, Secretary General - EACSO

Mr. H. Argyle, Chief Conservator of Forests

Mr. G. Bacs, Commonwealth Development Corporation

Mr. S. F. Bailey, Permanent Secretary, Ministry of Commerce and Industry

Mr. B. Baker, Commissioner of Mines and Geology

Mr. S. Blacker, Ministry of Finance and Economic Planning

Mr. A. Chandaria, Kenya Aluminium and Industrial Works Ltd.

Mr. D. P. Chandaria, Kenya Aluminium and Industrial Works Ltd.

Mr. M. Chandaria, Kenya Aluminium and Industrial Works Ltd.

Mr. P. Chandaria, Kenya Aluminium and Industrial Works Ltd.

Mr. K. C. Cheriyan, Economics and Statistics Development of the Treasury

Dr. B. T. G. Chidzero, Resident Representative, UNTAB in Kenya
Mr. J. Collery-Wright, East African Railways and Harbours
Mr. D. E. Cox, Senior Community Development Officer
Mr. A. R. Cross, US Aid
Mr. Pierre Lid, Technical Adviser (small scale and cottage industries)
Ministry of Commerce and Industry.
Mr. Geturo Geoffrey, Senior Supervisor, Starehe Boys' Centre
Mr. Gray, Ministry of Labour
Major I. R. Greenwood, Game Department
Mr. Geoffrey Griffin, Kenya Youth Adviser
Mr. Harris, Ministry of Commerce and Industry
Mr. F. D. Homan, Ministry of Natural Resources
The Kenya Chamber of Commerce and Industry Board
The Indian Chamber of Commerce
Mr. J. Keriri, Ministry of Finance and Economic Planning
Mr. Kesson, East African Railways and Harbours
Mr. C. S. Knowles, Ministry of Finance and Economic Planning
Mr. D. P. W. Logie, Forestry Department
Mr. G. Mac Kay, Eastern African Railways and Harbours
Mr. M. Mettrick, Ministry of Agriculture
Prof. Newman, EACSO, Economic Advisory Unit
Mr. D. N. Ndegwa, Ministry of Finance and Economic Planning
Mr. M. A. O. Ndisi, Ministry of Labour and Social Services
Mr. P. M. Rees, Ministry of Finance and Economic Planning
Mr. D. V. Peam, Ministry of Agriculture
The Nairobi Chamber of Commerce
Mr. L. D. Rice, US Aid
Mr. I. L. Roberts, Ministry of Natural Resources
Mr. M. Roemer, Ministry of Finance and Economic Planning
Mr. Saunders, Department of Geology
Mr. F. Sharratt, Acting Permanent Secretary, Ministry of Works and
Communications

Mr. A. G. Stanley, Kenya Road Authority

Mr. Tyrell Stanley, Association for the Promotion of Industries in
East Africa

Mr. A. H. Stoneham, Development Finance Co. of Kenya Ltd.

Mr. C. D. M. Vivian, Ministry of Natural Resources

Mr. F. K. Wambua, Ministry of Finance and Economic Planning

Mr. C. E. P. Watson, Ministry of Natural Resources

Mr. J. E. West, Acting Deputy Commissioner for Co-operative Development

Northern Rhodesia

The Hon. Kenneth Kaunda, Minister for Local Government

The Hon. Cousins, Minister of Lands and Forestry

The Hon. S. Kapewepwe, Minister of African Agriculture

The Hon. R. Kamanga, Minister of Labour and Mines

Mr. A. Wina, Parliamentary Secretary to the Minister of Finance

Mr. G. Zulu, Parliamentary Secretary to the Minister of Native Affairs

Mr. Allen, British South African Company

Mr. Betts, Assistant Mills Superintendent, Roan Antelope Mine

Mr. Bromley, The British South Africa Co. Ltd.

Mr. Brooking, D. L., Northern Rhodesia Industrial Development Corporation

Mr. Cadel, Smelter Manager, Roan Antelope Mine

Mr. T. Denning, Ministry of Finance

Mr. Desai, President, Northern Rhodesian Chamber of Commerce

Mr. T. V. Dessai, Desco Clothing Factory

Mr. Dick, Roan Antelope Mine

Mr. Dodgson, Secretary, Northern Rhodesia Industrial Development Corporation

Mr. Dudhia, Messrs. Dudhia and Company

Mr. Edgecombe, Director, Kafue Basin Survey

Mr. F. Ferguson, African Copper Industries Ltd.

Mr. G. Figgins, Nchanga Copper Mines

Mr. T. C. Gardner, Ministry of Finance

Mr. Geithner, US Aid

Mr. Gibson, The Rhodesian Brokenhill Development Co. Ltd.

Mr. Gleasley, Ministry of Commerce and Industry

Mr. Gldhill, Ministry of Lands and Forestry

Mr. C. Goodwin, Northern Rhodesian Industrial Development Corporation

Prof. G. Goundrey, Ministry of Finance

Mr. C. Gressley, Ministry of Commerce and Industry

Mr. E. Grolimund, Messrs. Rhodesian Motor Assemblers

Mr. O. Irwin, African Copper Industries Ltd.

Mr. Janes, Nchanga Mines

Mr. King, US Aid

Mr. Harley, Standard Bank, Lusaka

Mr. Hill, Roan Antelope Mine

Mr. Howie, Roan Antelope Mine

Mr. Lathwood, Rhodesian Motor Assemblers

Mr. Le Page, Chief Electrical Engineer

Mr. Levacks, Ministry of Agriculture

Mr. R. Loder, Manager, Anglo American Corporation, Lusaka

Mr. Mack, Anros Industries Ltd.

Mr. McIntosh, Roan Antelope Mine

Mr. Mudednda, Ministry of Agriculture

Mr. H. Pardey

Mr. Q. Peel, Managing Director, Anros Industries Ltd.

Mr. R. Philpott, Ministry of Labour and Mines

Mr. Saunders, Northern Rhodesian Industrial Development Corporation

Mr. S. Stone, Ministry of Finance

Mr. Thane, The British South Africa Co. Ltd.

Mr. Thomas, Acting Chief Secretary, Northern Rhodesia Government

Mr. A. E. Thompson, Acting Director, Department of Geology

Mr. H. Thomson, Ministry of Finance

Mr. O. Tobler, Barclays Bank, Lusaka.

Mr. A. Tow, Scow Tow Foundries Ltd.

Mr. H. Tow, Scow Tow Foundries Ltd.

Mr. Valentin, Assistant Mine Superintendent, Roan Antelope Mine

Mr. Walters, General Manager, The Rhodesian Broken Hill Development Co. Ltd.

Mr. H.J. Wedgewood, Acting Manager, Roan Antelope Mine

Nyasaland

Hon. H. K. Banda, MLA, Prime Minister
Mr. Foster, Deputy Governor (put in as a Minister)
Hon. J. D. Msonthi, Ministry of Trade and Industry
Hon. H. D. Phillips CMG, MLA, Ministry of Finance
Mr. R. J. Dewas, Ministry of Natural Resources
Mr. Gale, DH, MBE, Farmers Marketing Board
Mr. Gregory, United States Aid
Mr. Hodgson, Ministry of Transport and Communications
Mr. P. Howard, Booker Bros. Nyasaland
Mr. C. Johnson, Ministry of Natural Resources
Mr. Katengeza, D.R., Farmers Marketing Board
Mr. Latham, Ministry of Works and Housing (Water Development Department)
Mr. W. E. Lewis, Ministry of Natural Resources
Mr. A. Monk, Ministry of Trade and Industry
Mr. Mayne, Commonwealth Development Corporation
Mr. M. Mwambetania, Ministry of Finance
Mr. J. Penfold, Ministry of Trade and Industry
Mr. G. Percy, Lonrko Co.
Mr. W. J. P. Pincott, Ministry of Finance
The African Chamber of Commerce
The Indian Chamber of Commerce
The Nyasaland Chamber of Commerce
Mr. Will Watson, Ministry of Trade and Industry

Rwanda

Mr. J. de Lavallée, UN expert on small scale industries
Mr. P.J. Dingenen, Ecole technique Don Bosco
Mr. M. A. Fairon, Conseiller maison regideso, Kisenyi
Mr. Georges Vincent, ILO expert on labour administration
Mr. Ghulam Hussain A. Dhanani, Messrs. Dhanani and Fils
Mr. Gaspard Harerimana, Secrétaire general au Plan

Mr. Emmanuel Hitayezu, Secrétaire général, Ministère de l'agriculture
Mr. André Katabarwa, Secrétaire général, Ministère des travaux publics
Mr. J. J. Moes, UN Economic Adviser in Rwanda
Mr. Perin, Bralirma, Kisenyi
Mr. François Shumbusho, Ministère de l'économie
Mr. Martin Uzamugura, Secrétaire général aux affaires étrangères
Mr. J.J. Versière, Conseiller, Ministère du plan et de la coopération
Mr. Zuger, Deputy Resident Representative, UNTAB, Kigali

Somalia

Mr. Ali Essa, Ministry of Finance
Mr. Ali, Muhamaad Sheikh, Public Works Department
Dr. Amidjahir, President, SNAT
Mr. James Anthony, Ministry of Finance
Dr. Bartolucci Athos, INCII Director Somalia Fair
Mr. Avaretti, Messrs. Giohar
Mr. M. Azfar, Representative of the UN Secretary
Mr. Barbarosa, O. Baldasso, LLOYD Triestino
Dr. Baruffi, Giohar
Mr. Bavin, Shell Company, Somalia
Dr. Arne Bjorgung, Adviser, Ministry of Industries and Commerce
Mr. Ermele Borg, LLOYD Triestino
Mr. Tommaso Briata, SAIEMA
Mr. Gino Capone, Olivetti
Mr. Buby Cammenzind, Alitalia
Mr. Gianfranco Cenci, Legal Adviser, Government of Somalia
Mr. Cherri, Giohar
Comm. Genesio Ciccootti, Building Contractor
Mr. Robinson Copeland, Resident Representative, UNTAB
Mr. M. Cristofalo, AGIP
Mr. E. Crustarosa, Adviser, Ministry of Finance
Mr. Deeb, UN Mission in Somalia
Mr. Don Kruger, Credito Somalo

Dr. Alessandro Dutto, Director, FIAT
Mr. Edwardo, US Aid
Mr. Faillace, Hydrologist, Somalia Government
Mr. Filippini, SEIS-AMECO
Mr. Giannopoulos, Besse (Aden) Ltd.
Dr. Chirighin, FIAT
Mr. Hasan Mohamed Hasan, Ministry of Industries and Commerce
Mr. Hoefling, Zement Fabriken
Dr. W. Stiller Kurt, Ministry of Agriculture
Dr. Armando Labocetta, Director, Bank of Naples
Dr. Aldo Leschi, Director Bank of Rome
Dr. S. Liperi, Manager, Import, Export and Trading Company
Mr. Cavour Mahdi, President, Somalia Handicraft Union
Mr. Sheikh Guighe Mohamed, Department of Geology
Mr. Mohammed Omar Mohamed, Ministry of Industries and Commerce
Dr. Mugni, Ministry of Industries and Commerce
Dr. Angelo Muttoni, Local Manager, Lloyd Triestino
Dr. Naldoni, Giohar
Mr. G. Parmeggiani, Legal Adviser to the Government of Somalia
Mr. M. L. Quraishi, Economic Adviser to the Government of Somalia
Dr. Rogner, Research and Agricultural Training Expert
Mr. Richardo, US Aid
Dr. Stilner, UN Expert, Department of Agriculture
Mr. Giovanni Ferruzzi, Manager Shoe Factory
Mr. Tomaselli, Ministry of Finance
Dr. Youri Yacoub, Department Resident Representative, UNTAB
Mr. Young, Chief, Statistics Department

Southern Rhodesia

Hon. Winston Field, Prime Minister
Mr. H. Reedman, Parliamentary Secretary to the Prime Minister
Hon. G. Rudland, Southern Rhodesian Minister of Trade Industry and Development
Mr. Burnett, Bevel Brothers

Mr. Cawood, Ministry of Trade, Industry and Development
Mr. Collins, Ministry of Trade, Industry and Development
Mr. D. R. Cummings, Permanent Secretary, Ministry of Industry, Trade and Development
Mr. Drake, Rhodesian Iron and Steel Co. Ltd.
Mr. Dunn, Rhodesian Iron and Steel Co. Ltd.
Mr. Farija, Japan Consulting Institute
Mr. Harrower, Ford Assembly Plant
Mr. Henderson, Ministry of Industry, Trade and Development
Mr. M.D. Heyseme, Rhodesian Iron and Steel Co. Ltd.
Mr. Keighley, Lever Brothers
Mr. Napper, Rhodesian Selection Trust
Mr. A.E. Jones, Managing Director, Rhodesian Cables
Mr. Jones, Director, Harold Pool Ltd.
Mr. Playfair, Ford Motor Co.
Mr. Scott, Lever Brothers
Mr. Stanley, Geology Department
Mr. Stock, Managing Director, Metal Box Co. (CA) Ltd.
Dr. Worst, Geology Department

Tanganyika

Hon. Mr. Shai, Minister of Development Planning
Hon. Mr. Kahan, Minister of Commerce and Industry
Mr. A. Abramovici, Mwananchi Ocean Products Ltd.
Mr. V. J. Apanji, BP Shell Development Co. Ltd.
Mr. Bharmel, Managing Director, Tarmel Soap and Oil Mills
Mr. Catalano, General Manager, AGIP
Mr. Campbell-Mitchie, Ministry of Commerce and Industry
Mr. J. E. Carver, Metal Box Company
Mr. R. P. Chandaria, Aluminium Africa Ltd.
Mr. J. K. Chande, President, Tanganyika Association of Chambers of Commerce
Mr. M. Chu, Tanganyika Textile Industries Ltd.
Mr. M. M. Dovani, President, Merchants Chamber of Commerce

Mr. J. Dibbs, Fisheries Expert, FAO Office
Mr. A. H. Early, East African Railways and Harbours
Mr. Everett, Ministry of Commerce and Industry
Mr. J. Faudon, Director, Planning Division, Ministry of Development Planning
Mr. A. C. Faraji MP, Manager, Mwananchi Development Corporation
Mr. Graddock Turnbull, FAO expert
Mr. A. Holcomb, UNTAB Office
Mr. R. Harris, Benbros Motors
Mr. Jamal, United Knitting Factory
Mr. B. J. Jans, Tasini Textile Co. Ltd.
Mr. G. Karmiloff, Ministry of Development Planning
Mr. Jenkins, Tanganyika Development Corporation
Mr. Kelly, Sarantis and Payanatosopoulos
Mr. Z. Klinger, Tanganyika Tegry Plastics Ltd.
Mr. G. Koulischer, ILO Field Officer, East Africa
Mr. R. Landcastle, Commissioner of Mines
Mr. Lawton, Tanganyika Development Corporation
Mr. Lin, Standard Knitting Factory
Mr. A. Loren, Chief, US Aid Mission
Mr. A. C. Marriot, ILO expert
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Mr. Robin T. Miller, Deputy Resident Representative, UNTAB
Mr. Misha, Mwananchi Ocean Products
Mr. Singh Mohinder, Mohinder Singh and Palray
Mr. Mhutu, Ministry of Commerce and Industry
Mr. O. Mwanbangu, Ministry of Commerce and Industry
Mr. Mamfua, Ministry of Commerce and Industry
Mr. Nyi-Nyi, ILO expert
Mr. D. Orton, Car and General Company
Mr. D. B. Patel, Msasani Sisal Estates
Mr. J. C. Patel, Twiga Paper Products
Mr. Parry, US Aid

Mr. Peles, Mwananchi Development Corporation
Mr. J. Reindenbach, Ministry of Development Planning
Mr. J. M. Rowlands, Ministry of Commerce and Industry
Mr. G. Salim, Ministry of Commerce and Industry
Mr. J. G. Scott, Technical Assistance Adviser, Treasury
Mr. J. C. Skinner, Economist, Intelligence Unit Representative
Dr. T. Strong, Regional Representative, FAO
Mr. J. W. To Kolste
Mr. Voci, US, Aid
Dr. J. Von Natzmer, Ministry of Development Planning
Mr. R. Walker, ILO

Uganda

Hon. L. Kalule-Settala, Minister of Industries
Chief Beguma, Kilembero Copper Mines, Kasese
Mr. Blomstron, Ministry of Commerce, Technical Assistance expert
Mr. Caldwell, Uganda Development Corporation
Mr. P. Clark, East African Institute of Social Research
Mr. Cleave, Ministry of Agriculture
Mr. H. E. Cownie, Ministry of Industry and Communications
Mr. Dutt, Lugazi Sugar Company
Mr. Flay, Ministry of Finance
Mr. Gill, Skih Sawmills, Jinja
Mr. Halbe, Lugazi Sugar Company
Mr. J. Ilett, Technical Assistance Adviser, Ministry of Commerce
Mr. Jamnadas, Madhvani Sugar Factory, Katira
Mr. Jones, Secretary, Uganda Chamber of Commerce
Mr. Katera, Accountant, Tororo Government
Mr. Kropacek, Tororo Fertilizer Factory, Tororo
Mr. Labama, Chief, Government Statistician
Mr. Langerad, Kilembero Copper Mines, Kasese
Mr. MacDonald, Assistant Commissioner of Geology
Mr. Mackay, Lugazi Sugar Company

Mr. J. Madhvani, Managing Director, Madhvani Company
Mr. Martin, Uganda Cements
Mr. L. Matova, Acting Permanent Secretary, Ministry of Industry and Commerce
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Mr. Manning, Uganda Development Corporation
Mr. Mkumbi, Permanent Secretary, Ministry of Commerce and Industry
Mr. Mehta, Lugazi Sugar Co.
Mr. S. Musoka, Ministry of Commerce
Mr. L. Mwanga, Ministry of Industry and Communications
Mr. P. McLean, Permanent Secretary, Economic Planning Division, Prime
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Mr. J. B. Richardot, Resident Representative, UNTAB
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Mr. Rajdev, Madhvani Steel Works, Jinja
Mr. Roper, Permanent Secretary, Ministry of Minerals and Water Resources
Mr. J. T. Simpson, Uganda Development Corporation
Mr. Walker, Federation of Uganda Employers
Mr. Williams, Commissioner of Geology
Mr. Wright, Kilembero Mines Smelter, Jinji

ANNEX III

Suggestions for the development of Transport in
East and Central Africa

There are three main suggestions for the future development of transport in this sub-region.

1. Railways and Inland waterways
2. Roads
3. Coastal shipping

1. Railways and Inland Waterways

- (1) The great lakes should be brought more fully into the transport system as complements to the railways rather than as self-contained entities.

This would have the effect of shifting the transport system westwards to the centre of population in East Africa. Of the 25 odd million people in the EACSO territories about 11 million live around the great lakes. Transport should move to them without undue delay. The suggestion is that the Kampala-Kasese railway in Uganda should be linked to Usumbura on lake Tanganyika, either along the western branch of the Rift Valley viz., Kasese-Kisenyi-Usumbura; or through lake Victoria viz., a new port or Bukoba on lake Victoria-Kigali(Rwanda), Usumbura (Burundi). The proposed railway waggon ferry on Lake Victoria would then link the new port (or Bukoba) to Mwanza (Tanganyika), Kisumu (Kenya) and Jinja (Uganda), the three main rail points on that lake. This would rationalize transport in the area and give Rwanda and the eastern and central Congo an outlet to the east coast, while serving all the currently known areas of mineral deposits and industrial centres.

- (2) The Uganda railway should be extended to link up with the Sudan railways via the Congo. The suggested route is Pakwach (Uganda), Mungbre (Congo), Juba. The Sudanese railways should be extended southwards, in the first instance, from Wau, to take

in the fertile lands near the Congo border, and then eastwards to Juba. A high-quality road should then link up Gulu (Uganda) to Juba. This suggestion would give the north-eastern Congo an outlet to the Indian ocean which is non-existent now and give a filling to the agricultural potential the region.

- (3) (a) The Northern Rhodesia railway system should be connected to the East African system either at Tunduma (Tanganyika border) or at Mpulungu (on lake Tanganyika). A railway should be built from Kapiri Mposhi to the border of Tanganyika. It should link up with the Tanganyika system at Tunduma or some way to the east, if that would enable the line to pass through less mountainous country. This would generate pent-up economic activity in the vast areas around the town of Mpika and provide a further outlet for the Ndola copper and enable the industrial centres to sell to the north and to Tanganyika, developing a common market.
- (b) Lakes Tanganyika and Nyasaland should then be connected with a line running from Mpulungu to Itungi or to Karonga (both on Lake Nyasa) as the case may be. This line should pass through the point of contact between the Tanganyika and Rhodesian rail systems.
- (c) The question of different gauges has been under study for sometime in East Africa. Every assistance should be given to the East African Railways and Harbours Administration to enable them to change with ease from the present metre gauge to the 1.067 metres used in Northern Rhodesia. It has been ascertained that nearly 74% of Africa's railway are in the 1.067 metres and East Africa has been planning for a change over to this gauge, perhaps by 1970, when the change over would cost the least (perhaps £10 million). It

is both wise and inevitable for East Africa to change to 1.067 m. and to do so early.

- (d) Waggon ferry services similar to that being built for Lake Victoria should be planned for lakes Tanganyika and Nyasa and appropriate parts built on Lake Nyasa.

2. Roads

- (a) In Rwanda, Kigali should be linked to Kisenyi with a good all weather road, and the road from Kigali to Kafunzo (Uganda) should be brought to all weather level to join the Mbarara road in Uganda.
- (b) In Burundi, Usumbura should be linked the rough Kitega to the Tanganyika road system at Mukafigere (Tanganyika) by an all weather road. The Usumbura-Kagali road should be brought to all weather standards.
- (c) Both Kisenyi and Usumbura should be connected to the Congo with good roads. The North-western Uganda should have another good road link with the Congo via Pakwash (Uganda).
- (e) The great North-road portion between Northern Rhodesia and Tanganyika should be brought to all weather standards, and the Nyeri-Moyale (Kenya) road should also be brought up to all weather standards.
- (f) On the Ethiopian side the Moyale-Addis Ababa road should be brought up to all weather standard. The next leg, Teseney (Ethiopia) to Khartoum (Sudan) through Kassala should be built up to all weather level.
- (g) Connexions between Mozambique and her neighbours are essential especially as outlets to the sea, and when the political situation improves a connection is necessary between Southern Tanganyika and Northern Mozambique.

- (h) The Addis Ababa-Mogadiscio-Nairobi roads should also be brought up to all weather condition.

3. Maritime and Coastal Shipping

- (a) A system should be worked out whereby the countries of the sub-region could co-operate in the building of one common coastal merchant shipping line serving ports along the Tanganyika, Kenya, Somali, Ethiopian and Sudan coasts. With such co-operation, a pooling of efforts and resources, the sub-region could build up in time a maritime fleet capable of carrying part of their overseas trade.
- (b) A nucleus of such a fleet already exists in the arrangements being made for the EACSO countries to run their own coastal shipping line, the Southern Line. Ethiopian maritime experience could be of much use in developing such a shipping line.
- (c) Such a fleet would assist in inter-state trade in the sub-region augmenting inland transport, and assist in the development of the sub-regional trade and common market.

ANNEX IV

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Annex IV

MAJOR ECONOMIC INDICATORS, EAST AND CENTRAL AFRICA SUB-REGION

	East & Central African sub-reg.	Tanga-nyika	Ugan-da	East African Federation	North-ern Rhod-esia	South-ern Rhod-esia	Nyasa-land	Fed. Rhod-esias & Nyasa-land	Ethi-opia	Soma-lia	Rwanda and Burundi
1. Population (000)											
1950	44,478	5,396	7,732	5,103	18,231	1,860	2,170	2,290	6,320	16,000	3,927
1960	59,295	7,131	9,238	6,677	23,046	2,420	3,070	2,830	8,320	20,000	4,929
Growth rate per annum %	2.3 ^{a/}	2.6	1.7	2.8	2.4	2.7	3.5	2.0	2.8	2.2	2.3
2. Gross Domestic Product (at factor cost in US\$ millions)											
1954	2,836	442	396	360	1,198	392	477	97	963	675	-
1960	3,881	628	521	425	1,574	585	768	132	1,484	823	-
Growth rate per annum %	5.7	6.0	4.7	2.9	4.6	6.9	8.2	5.3	7.5	3.4	-
3. GDP per capita											
1960 (in US\$)	75 ^{b/}	90	57	63	68	244	248	47	179	41	-

^{a/} Excluding Somalia^{b/} Excluding Somalia, Rwanda and Burundi

Note: - Not available

ANNEX V
INTRA-REGIONAL TRADE
EAST AND CENTRAL AFRICA, 1961 ^{a/}
(in US\$ '000)

Imports into Exports from	Federa- tion of Rhodesia & Nyasaland	Tanga- nyika	Uganda	Kenya	Somalia	Ethiopia	Total
Federation of Rhodesia and Nyasaland	C	2,181	272	3,768	-	7	6,228
Tanganyika	1,189	0	1,091	5,162	-	34	7,476
Uganda	93	4,770	0	14,424	-	42	19,329
Kenya	651	24,922	19,733	0	1,290	385	46,981
Somalia	-	7	-	51	0	48	106
Ethiopia	-	8	7	221	967	0	1,203
Total	1,933	31,888	21,103	23,626	2,257	516	81,323

^{a/} Based on official government trade statistics. Data are not available for Rwanda or Burundi or for individual territories of the Federation of Rhodesia and Nyasaland.

ANNEX VI

THE FIVE PRINCIPAL EXPORTS OF EAST AND CENTRAL
AFRICAN COUNTRIES, 1961

(in US\$ '000)

1. Federation of Rhodesia and Nyasaland

Copper	313,312
Tobacco, unmanufactured	117,510
Asbestos, crude, washed or ground	23,638
Maize, unmilled	12,709
Tea and mate	12,345

Total + 479,523

Total exports

560,535

Principal 5 as a per cent of total exports

85.5%

2. Kenya

Coffee, not roasted	29,705
Sisal and other agave fibres	11,737
Tea	11,211
Sodium carbonate	4,443
Meat and meat preparations	3,780

Total

60,876

Total exports

98,490

Principal 5 as a per cent of total exports

61.8%

3. Tanganyika

Sisal and other agave fibres	39,278
Raw cotton, other than linters	19,023
Coffee, not roasted	18,934
Diamonds, uncut	16,134
Fruit and vegetables	7,130

Total

100,499

Total exports

132,720

Principal 5 as a per cent of total exports

75.7

4. Uganda

Raw cotton, other than linters	46,805	
Coffee, not roasted	39,141	
Copper and alloys, unwrought	8,291	
Tea	4,122	
Oil seed cake and meal, etc.	3,956	
	<hr/>	
Total	102,315	
Total exports	109,732	
Principal 5 as a per cent of total exports		93.2%

5. Somalia

Bananas and plantations	12,637	
Hides, skins and fur skins	807	
Wood, charcoal	754	
Livestock	495	
Fish, salted, dried, smoked or preserved	476	
	<hr/>	
Total	15,169	
Total exports	18,665	
Principal 5 as a per cent of total exports		81.3%

6. Ethiopia

Coffee	37,770	
Lentils	4,206	
Chat	4,025	
Sheepskins	3,711	
Hides, raw	3,187	
	<hr/>	
Total	52,899	
Total exports	72,425	
Principal 5 as a per cent of total exports		73.1%

6. Rwanda and Burundi (combined data as of 1962)

Coffee, tea, mate and spices	12,487	
Metallic ores, slag and ash	4,176	
Cotton, raw and fabrics	891	
Oil seeds, miscellaneous grains, seeds and fruits, industrial and medicinal plants, straw and fodder	410	
Raw hides and skins and leather	335	
Total	18,299	
Total exports	19,398	
Principal 5 as per cent of total exports		94.3%

ANNEX VII

THE FIVE PRINCIPAL IMPORTS OF EAST AND CENTRAL
AFRICAN COUNTRIES, 1961

(in US\$ '000)

1. <u>Federation of Rhodesia and Nyasaland</u>		
Textile yarn, fabrics, etc.	13,198	
Transport equipment	10,686	
Chemicals	9,281	
Machinery, other than electric	8,223	
Electric Machinery, apparatus, appliances	6,141	
Total	47,529	
Total imports	434,017	
Principal 5 as a per cent of total imports		10.9%
2. <u>Kenya</u>		
Textiles, cotton and other fabrics and made-up textiles	24,853	
Petroleum products	20,549	
Chemicals	14,439	
Motor vehicles	13,110	
Iron and steel	10,612	
Total	83,563	
Total imports	193,012	
Principal 5 as a per cent of total imports		43.3%
3. <u>Tanganyika</u>		
Textiles, cotton and other fabrics and made-up textiles	23,344	
Machinery, other than electric	13,728	
Transport equipment	11,214	
Iron and steel	9,901	
Petroleum products	9,884	
Total	68,071	
Total imports	111,121	
Principal 5 as a per cent of total imports		61.3%

4. Uganda

Textiles, cotton and other fabrics and made-up textiles	19,802	
Machinery other than electric	7,538	
Road motor vehicles	6,303	
Chemicals	5,887	
Petroleum products	<u>5,838</u>	
Total	45,368	
Total imports	74,320	
Principal 5 as a per cent of total imports		61.1%

5. Ethiopia

Cotton piece goods	8,464	
Motor vehicles and parts including engines	8,106	
Industrial machinery and appliances	6,709	
Silk and artificial silk manufactures	4,987	
Cotton manufactures, other	<u>4,540</u>	
Total	<u>32,806</u>	
Total imports	91,955	
Principal 5 as a per cent of total imports		35.7%

6. Somalia

Textile yarn, fabrics, etc.	2,962	
Cereals and preparations	1,848	
Road motor vehicles	1,554	
Machinery, other than electric	1,426	
Chemicals	<u>1,402</u>	
Total	<u>9,192</u>	
Total imports	19,813	
Principal 5 as a per cent of total imports		46.5%

7. Rwanda and Burundi (combined, data as of 1962)

Products of the milling industry	3,921
Mineral fuel and products of other distillation	3,455
Cotton and cotton fabrics	3,079
Man-made fibres, discontinuous	2,979
Vehicles	1,757
Total	15,191

Total imports 32,414

Principal 5 as a per cent of total imports 46.9%

ANNEX VIII

CHARACTERISTICS OF MANUFACTURING ESTABLISHMENTS IN SELECTED AFRICAN COUNTRIES

Country	Period	Number of establishments	Number of persons engaged	Salaries and wages paid (US\$'000)	Net value of output (US\$'000)	Net val. of output per person engaged US\$	Net value of output per unit of salaries and wages	Field covered and other remarks including foot-notes
Ethiopia	1961	199	28.3	7.2	19.7	697	2.7	The survey covers about 200 establishments, about 90% of which employ on the average more than 10 persons in the year
Kenya	1957	1,038	53.8	26.0	47.9	893	1.8	Establishments with 5 or more engaged.
Swaziland	1959	98	11.4	3.4	9.0	784	2.6	Establishments with 6 or more persons engaged or installed power equipment or boilers.
Northern Rhodesia	1959	254	16.6	12.3	24.4	1,476	2	
Southern Rhodesia	1959	967	85.3	69.2	130.6	1,602	2	
Tanganyika	1960	941	17.1	0.22	19.63	-	-	
Uganda	1960	708	25.84	9.05	-	-	-	

Sources: National statistical publications, UN Statistical Year Book 1961.
The above data were compiled by the Statistics Division of ECA.

- 1/ Refers to African Employees only 3/ Factor cost
2/ Refers to wages paid during June 4/ Emp. for one period only
5/ Excludes payment in kind

ANNEX IX

THE CHEMICAL INDUSTRY: OUTPUT LABOUR AND INVESTMENT CALCULATIONS

Proposed Industry	Markets	Loca- tion	Annual Produc- tion long tons x1000	Annual value of pro- ducts \$x1000	Invest- ment re- quired \$x1000	Num- ber of work- ers	Typical products	Raw materials
Coal distillation	Regional-export	Tang.	50	5,000	10,000	300	drugs dyes (pharmaceuticals)	coal
Furfuraldehyde	Whole region	Tang.	5	5,000	4,000	200	Hard, dark colored (plastics)	Groundnut shells, corn cobs, bagasse
Caustic Soda(98%)	sub-region	Kenya	10	900	2,500	440		Soda ash & salt
Caustic soda(98%)	Sub-region	N.R.	7.5	675	2,000	330		Soda ash & salt
Soda ash	Sub-region	N.R.	20	740	810	100		Salt & limestone
Hydrochloric acid(28%)	Sub-region	N.R.	10	248	400	75	PVC phenolics, DDT glues	Salt on chlorine, and hydrogen gas
Hydrochloric Acid(28%)	Sub-region	Kenya	7.5	186	300	55	Bleaching Agents	from oil refinery or carbon materials
Sodium Fluoride	Regional	Kenya	Fluorine extraction plant details not yet available				Fluorine for phar- tics, medicines, refrigerators	Fluoride salts
Wood distillation	Regional	Kenya	60	4,000	2,000	400	Acetone, methanol Acetic acid	Wood
Alcohol	Regional	Ugand.	100	6,000	4,000	200	Spirits, glycerine, lighting power	Molasses
Explosives	Sub-regional	N.R.	Explosives plant details not yet available					Glycerine
Sulphuric Acid(100%)	Sub-regional	Uga.	10	270	500	50	Fertilizers epsom salts	Gypsum - or sul- phur from smelter
Sulphuric Acid(100%)	Sub-regional	Kenya	8	216	400	40	Bleaching agents salt cokes	or refinery gases
Sulphuric Acid(100%)	Sub-regional	N.R.	10	270	500	50	other basic chemi- cals	pyrites

(cont'd)

Proposed Industry	Markets	Local- tion	Annual Produc- tion long ton x1000	Annual value of pro- ducts x 1000	Invest- ment Re- quired	Num- ber of work- ers	Typical products	Raw materials
Carbon di-sulphide	Regional	S.R.	7	1,140	1,150	100		Lime and cheap elec- trical power
Sulphide pulp & rayon	Regional export	S.R. }	These plants are only very long term possibilities - no details are available at present					
Sodium & potassium xanthates (48% P ₂ O ₅)	Sub-regional	N.R. }						
Triple super phosphate (25% K ₂ O)	Regional	Ugand.	35	2,975	2,100	500	Fertilizers	Phosphate rock sulphuric acid phosphoric acid
Potassium chloride	Regional	N.R.	70	1,680	1,200	300	Fertilizers	Potassium salts
Ammonium nitrate	Regional	N.R.	50	4,800	5,000	740	Potassium nitrate sodium cyanide	Ammonia and nitric acid
Nitric acid	Sub-regional	N.R.	6	600	700	100	acrylates, methanol	
Ammonia (liquid)	Sub-regional	N.R.	5	470	1,300	60	Basic of many stra- tegic chemicals	Synthesis of hydrogen

COUNTRY SUMMARY
Proposed Chemical Industries

Country	Number of new plants	Investment value \$x1000	Production value \$x1000	Workers required
Northern Rhodesia	8	11,910	9,483	1,755
Southern Rhodesia	1	1,150	1,140	100
Tanganyika	2	14,000	10,000	1,000
Kenya	4	5,200	5,302	935
Uganda	3	6,600	9,245	750
Total	18	38,860	35,170	4,540

ANNEX X

IRON AND STEEL, Non-FERROUS METAL AND ENGINEERING INDUSTRIES:
OUTPUT, LABOUR AND INVESTMENT CALCULATIONS

Table I

Country	Number of new plants	Investment value US \$	Value of Production 1,000	Number of workers required
Northern Rhodesia	12	33,200	39,725	3,070
Southern Rhodesia	10	132,270	119,500	12,300
Tanganyika	5	9,530	11,070	1,140
Kenya	7	3,492	3,550	520
Uganda	6	28,700	41,750	5,310
Total	40	207,192	215,595	22,340

Table 2

Proposed Industry	Markets	Loca- tion	Annual Produc- tion (tons)	Annual Sales	Invest- ment	No. of work- ers	Wage out- put factor
1	2	3	4	5	6	7	8
Pig Iron Production (2 blast furnaces)	Regional-export	S.R.	1,000,000	70,000	78,000	8,200	10-1
Steel rolling mill-medium range	Regional	S.R.	200,000	26,600	30,000	1,400	16-1
Wire rods, fencing, steel wire products	Regional	S.R.	25,000	3,000	3,000	250	12-1
Steel pipes and tubes	Regional	S.R.	10,000	1,300	850	100	12-1
Small semi-continuous strip mill	Regional	S.R.	4,000	5,400	7,000	280	16-1
Tinplate (hot dip method)	Regional	S.R.	6,000	1,400	1,370	70	16-1
Steel, mill balls, liners, general castings	Regional-export	N.R.	10,000	1,200	1,000	200	10-1
Steel, & non-ferrous castings & forgings	Regional	N.R.	15,000	2,250	2,250	300	12-1
Pipes, tubes, fittings, of steel, iron	Local	N.R.	10,000	1,300	850	100	12-1
Wrought and cast iron products	Local	N.R.	5,000	700	500	100	12-1
Integrated Iron & steel plant (electric furnace) crude steel	Regional	Uganda	200,000	20,000	15,000	4,000	10-1
Steel rolling mill - light products	"	Uganda	150,000	20,000	12,000	1,000	16-1
Copper semi-fabrication, bars, tubes, sections	Regional-export	N.R.	8,000	10,000	6,400	300	25-1
Non-ferrous alloys, finished and crude	Regional-export	N.R.	5,000	5,500	3,500	400	14-1
Mining & frailing electric power cables	Regional-export	N.R.	6,000	8,400	6,000	360	12-1
General electrical switchgear	Regional	N.R.	—	200	150	50	—
Lead products, sheets flanges castings pipe	Regional	N.R.	2,000	675	1,030	50	12-1
Light machinery, lathes, drills, saws	Regional	Kenya	500	300	227	70	4-1
General machine tools	Regional	Tangan.	350	170	130	40	4-1

..//..

(Table 2 cont'd)

Proposed Industry	Markets	Loca- tion	Annual Produ- tion	Annual Sales	Invest- ment	No. of work- ers	Wage out- put factor	
1	2	3	tons (long)	4	5	6	7	8
Electric motors up to 10 H.P.	Regional	Kenya	400	300	400	60	4-1	
Standard light-medium electric switchgear	Regional	Kenya	250	250	150	40	6-1	
Transformers up to 2 K.V.A.	Regional	Kenya	-	200	140	40	4-1	
Electric copper cables - light	Regional	Kenya	750	1,000	700	80	12-1	
Transmission electric power equip. med.-heavy	Regional	Uganda	-	500	400	60	6-1	
Transformer and electric transmission equipment	Regional	N.R.	-	500	370	110	4-1	
Machinery, lathes, shapers, planers, millers, etc	Regional	S.R.	-	3,000	3,000	450	4-1	
Agricultural implements and hand tools	Regional	Kenya	3,000	500	625	80	8-1	
Tractor assembly plant	Regional	Uganda	200 units	700	850	130	4-1	
Agricultural machinery - light	Regional	Tanga.	600	500	400	150	4-1	
Mining machinery, pumps, gears drive units	Regional	Uganda	300	250	200	40	5-1	
General foundry, fabrication, gas containers	Local	Uganda	900	300	250	80	6-1	
Tractors, (part manufactured), agricultural mach.	Regional	S.R. (1,600	3,000	3,300	750	4-1	
Mining machinery, screens, conveyors, etc.	Regional	N.R.	2,500	3,000	3,900	500	5-1	
Bicycle manufacture	Regional	S.R.	100,000u	2,800	2,000	350	8-1	
Bicycle manufacture	Regional	Tang.	50,000u	1,400	1,000	175	8-1	
Motor tyres and tubes	Regional	Tang.	-	3,000	3,000	375	8-1	
Railway rolling stock	Regional	Tang.	-	4,000	5,000	400	8-1	
Railway mine stock and equipment	Regional	N.R.	-	6,000	7,250	600	8-1	
Refrigerators, Washing machines, domestic appli-	Regional	Kenya	-	1,000	1,250	150	5-1	
Refrigerator " " " " " " " " " "	Regional	S.R.	-	3,000	3,750	450	5-1	

ANNEX XI

THE RELATIONSHIP BETWEEN LARGE SCALE AND SMALL SCALE INDUSTRIES

1. The list of small and medium scale industries given below is not intended to be comprehensive, but merely mentions a few which it should be possible and practicable to establish in East and Central Africa, subject to each being submitted to a sound feasibility study, and assuming the creation of a number of large scale, strategic plants.
2. It should be borne in mind that most of the larger industries in the more developed countries have started originally in quite a small way and have grown steadily on sound foundations. It is particularly important in the less developed countries, where capital, markets and technical and management knowledge and experience are seriously restricted, that any programme for the introduction of large-scale and basic industries should be supported by a parallel programme of small and medium scale industries.
3. Not only can these serve as service industries to the larger industries and as an outlet for the products of the larger industries but they can provide a sound footing and a training ground for large scale requirements of technical and management "know-how".
4. While it will be appreciated that the report of the Central and East Africa mission is mainly devoted to the establishing of larger scale industries on a sub-regional marketing basis, no specific mention has been made of the possibility of establishing industrial estates for the housing and development of these industries at the same location as a number of satellite, auxiliary or subsidiary smaller scale industries. Industrial estates are at present the subject of intensive study by ECA.
5. Apart from other advantages of such a course, much capital investment can be saved by the common utilization of access and services roads, power, water, transport, housing and other services.

6. To give a few examples of how one large plant can lead to the growth of numerous smaller ones:

A. Cement industry (larger scale)

Allied industries:

- (a) Pre-cast concrete products: blocks for additional factory buildings on the estate, domestic buildings on the estate and in the locality, window-sills, steps, telephone poles, paving-stones, fencing and gate posts, etc.
- (b) Asbestos-cement products: pipes, roofing, etc. for purposes mentioned under (a).
- (c) Cement and mosaic tiles.
- (d) Road contracting.
- (e) Manufacture of multi-wall bags for the cement plant.

B. Cotton and other textiles (larger scale)

Allied industries:

- (a) Surgical gauzes, bandages, absorbent cotton wools, sanitary towels, etc.
- (b) Cotton waddings and shoulder pads (working in relation to an outerwear clothing factory).
- (c) Sheets, pillow cases, table cloths, handkerchiefs, napkins, etc.
- (d) Towels, towelling and diapers.
- (e) Cotton and woollen blankets.
- (f) Ready-made shirts, blouses, cotton skirts, pyjamas, etc.
- (g) Woven and knitted underwear for men, women and children, including socks and stockings.
- (h) Strings, twines, ropes, fishing and other nets.

- (i) Canvasses, tentings, awnings, waterproof sheetings, etc.
- (j) Shoelaces, braids, ribbons, elastics, webbings, lamp wicks and other narrow fabrics; developing from narrow fabrics could be slide (zip) fasteners.
- (k) Flags, banners, buntings, etc.
- (l) Men's and women's and children's light-weight outerwear.
- (m) Cotton and woollen mats, rugs.
- (n) Embroidery (hand and machine).
- (o) Sewing cottons and threads.
- (p) Industrial and protective clothing, aprons, etc.
- (q) Umbrella and sunshade covers.

As servicing industries, the following are worthy of consideration:

- (a) Manufacture of shuttles, bobbins, etc. and picker-sticks.
- (b) Jobbing foundry and machine shop for textile plant (and for other neighbouring plants on or off the estates), repair work and spare parts service.
- (c) Skips, baskets, etc. for textile and other neighbouring plants.
- (d) Card-clothing, roller-grinder re-covering, draft-roller re-covering.
- (e) Reeds and healds manufacture.

C. Iron and steel plant (larger scale)

Allied industries:

- (a) Window and door frames (from rolled angle-iron, etc.).
- (b) Fireproof safes, cupboards and boxes (when iron sheet production is commenced).
- (c) Wire drawing.
- (d) Following upon (c), wire nails, wire link fencing, barbed-wire, wire-netting.
- (e) Agricultural and other hand-tools and implements.
- (f) Jobbing engineering and repair service to many branches of local industry and transport.

- (g) Bale-iron and other strip for the baling of cotton and other goods.
- (h) Paper clips and pins; hair-grips.
- (i) Umbrella frame-wires.

D. Pulp and paper (larger scale)

Allied industries:

There are a number of subsidiary and auxiliary industries which could be established on a small to medium-scale when sub-regional paper plants are established. To mention a few:

- (a) Multi-wall bags for cement (see under "cement").
- (b) Wrapping papers and bags for sundry distribution purposes.
- (c) Commercial stationery and printings; envelopes.
- (d) Bookbinding.
- (e) Pulp containers for transport of fruits, eggs, bottles, etc.
- (f) Paper cups, plates, drinking straws, etc.
- (g) Papier-maché products.
- (h) Cardboard containers.

E. Sugar (larger scale)

Allied industries:

From the existing and projected sugar production in East and Central Africa there are several small or medium scale industries which could be established in conjunction, for example:

- (a) Commercial molasses for cattle and poultry feeds and for fertilizers.
- (b) Refined treacles and syrups for human consumption.
- (c) Sugar confectionery, including cakes, biscuits, etc.
- (d) Sweetened fruit juices and canned fruits.
- (e) Alcohols.
- (f) Jams, marmalades, jellies and similar goods.
- (g) Fruit cordials, squashes and essences.
- (h) Candied fruits and vegetables.

7. In addition to the above large scale or basic industries, there are other basic industries which can themselves be conducted on a large, medium or small scale basis. Examples of these are:

A. Timber (on a large or medium scale)

Allied industries:

- (a) Saw-milling.
- (b) Veneers and plywood manufacture.
- (c) Chipboards.
- (d) Furniture.
- (e) Cooperage.
- (f) Industrial equipment (wheel-barrows, trucks, pallets, ladders, step-ladders, bins, etc.).
- (g) Textile shuttles and bobbins (see under "textiles").
- (h) Wood turnery (industrial and domestic).
- (i) Boxes and crates (industrial, agricultural and domestic).
- (j) Sports equipment (on limited scale).
- (k) Prefabricated and sectional houses, sheds, huts, etc.
- (l) Small boats for use on the lakes, e.g. Langano, Awassa, Koka Dam.
- (m) General joinery.
- (n) Sundry domestic equipment and fancy ware.
- (o) Deck-chairs and garden furniture.
- (p) The manufacture of tannin extract for the tanning industry, using the vast resources of acacia wood in Ethiopia.
- (q) Brushes and brooms (wooden handles).

B. Animal, poultry and fish products

- (a) Frozen and canned meats, fish and poultry.
- (b) Processed meats, sausages, etc.
- (c) Sausage casings and gut.
- (d) Blood and bone meals and fish meal.

- (e) Fertilizers.
- (f) Pet foods.
- (g) Dried fish.
- (h) Dressed poultry.
- (i) Processed eggs.
- (j) Tanned hides and skins.
- (k) Leather products: boots and shoes, suitcases, handbags, wallets, briefcases, novelties, etc.
- (l) Saddlery and belts.
- (m) Gloves.
- (n) Animal and poultry rearing and feeding equipment.
- (o) Glues and gelatines.

6. It will also be noted that a number of small and medium scale industries are related to or emerge from the combination of two or more similar or different industries, whether they be on a large, medium or small scale basis. Examples of these are:

- Can-making.
- Wooden and cardboard containers.
- Paper, cotton and polythene bags and packages.
- Glass bottles and jars.
- Labels and printing.
- Corks and stoppers.
- Printing inks.
- Cold storage.
- Button manufacture.
- Nails and screws for packagings.
- Weighing equipment.
- Plastic containers.
- Packaging materials (wood-wool, etc.)

It will, therefore, be appreciated that industries, whether large, medium or small, are very much interdependent one of another, not only as suppliers of materials and services, and as product outlets but also in providing purchasing power within the whole range of industries involved, directly and indirectly.

10. ~~When considering the establishing~~ of large scale and/or basic industries they should not be considered in isolation but in conjunction with either large, medium or small scale allied industries. ~~Frequently~~ it is convenient to group the parent and allied industries in one location, preferably in the form of an industrial estate, for reasons already mentioned.

ANNEX XII

THE MINERALS OF THE SUB-REGION

Ethiopia

Gold has been Ethiopia's main mineral production to-date. The annual rate varies from US \$ 500,000 - \$1,000,000 most of which comes from the Adola goldfield, south of Addis Ababa. A two million dollar mechanization programme is being undertaken at present.

The Dallol potash deposit in Eritrea is probably the most important mineral occurrence on Ethiopian territory. The concession is held by the Ralph M. Parsons Co. and exports at the rate of 300,000 tpy are due to commence in 1964. The Dallol Depression is likely to contain valuable salts other than potash.

The Adi Rassy copper-gold deposit south of Asmara has been known for many years and is being studied once more at present. It is at best a very marginal project with limited ore reserve (10 million tons of one per cent copper) and cannot serve as basis for a copper industry unless a substantial tonnage of additional ore is found.

Iron-ore - The Agametta deposit in Eritrea has long been considered a potential mining project. The tonnage is three million of magnetite averaging 60 per cent Fe. The deposit has little value as an export project.

Another deposit is being prospected at present at Yubdo in western Ethiopia. The reserves are of the order of several million tons of 60 per cent Fe, also suitable for an iron and steel industry.

Manganese is being produced at the rate of several thousand tons per year from Enkafala south-west of Dallol within the Parsons concession. The ore is high-grade but the deposit appears to be small.

Limestone is plentiful around Addis Ababa and being mined for cement manufacture. Gypsum is found at Douanle near the border of French Somaliland.

At Assab and Massawa, respectively, salt is produced by seawater evaporation for export to Japan, Malaya and East Africa.

Good quality quartzite is used for glass manufacture at Asmara. Polished marble and tiles are also produced in that city.

Some ten brickmaking plants operate in Ethiopia at present with local clay deposits. About five million bricks are being produced annually.

Two coal occurrences are being investigated. The Nejo deposit has indicated reserves of ten million tons of semi-coking coal. The lignite deposit in Wollega province is also reported to run into several million tons.

Ethiopia's resources of base metals appear restricted. The raw materials for a small iron and steel industry are available but their locations are dispersed. The country is well endowed with building material.

The saline deposits along the Red Sea are the outstanding feature of Ethiopia's mineral resources and might at a later date give rise to important industrial operations.

Somalia

Somalia has no mineral production at present.

The gypsum deposit near Berbera is a potential producer; it has been examined by a UN engineer. Crude gypsum could be exported.

The only other known major deposit is an ironstone occurrence west of Mogadiscio. The indicated reserves are 100 million tons of 50 per cent Fe but under present world market conditions this deposit is of little economic value.

Minor deposits of feldspar and mica have been exploited in northern Somalia. A molybdenum occurrence is known in the Hargeisa area.

Kenya

1962 Mineral production (long tons)

Asbestos	189
Carbon Dioxide Gas (natural)	458
Cement	340,905
Copper (estimated)	2,190
Diatomite	2,863
Gold (troy oz.)	8,917
Gypsum	26,420
Kaolin	1,155
Pumice	1,110
Salt	18,568
Silver (troy oz.)	46,307
Soda ash	122,120

The total value of minerals produced in 1962 was estimated to ~~45,080,537~~. The bulk of this value is accounted for by non-metallic minerals.

Only a few of Kenya's minerals figure prominently as exports. They are trona, (as soda ash) diatomite, copper, gold and silver. Many other minerals such as salt, limestone, gypsum, kaolin, pumice, carbon dioxide, asbestos and meerschaum are being produced in important amounts for local consumption. The industries associated with some of these minerals show signs of a healthy growth. For example, a pipe industry has been developed from the meerschaum deposits of the Amboseli basin.

The sole source of copper is Macalder Nyanza Mines Ltd. The reserves are about one million tons of complex copper-gold-silver-zinc ore.

Cement production was from two factories, one near Mombasa and the other near Nairobi: resources of limestone are extensive. The Magadi Soda Co. produces soda ash, soda and salt from the trona deposits of Lake Magadi in the Rift Valley. Salt production is also undertaken near Nairobi and on the coast.

Deposits of iron ore have been prospected but are probably too small for production purposes. A pyritic lode at Bukara is estimated to contain 17 million tons: the hematite orebody at Homa Mountain has an estimated tonnage of ten million. An interesting deposit is known at Mrima Hill south of Mombasa: its reserves are reported to exceed 50 million tons of a complex ore containing 0.7 per cent niobium pentoxide, phosphates and rare earths. This orebody has great possibilities if an economic solution for the treatment of the ore can be found.

Kenya's mineral resources are eminently suitable for a variety of primary and secondary industries. Special products, e.g. light weight building material from pumice, could probably also be exported.

Uganda

Uganda's mineral outputs (long tons)

	<u>1961</u>	<u>1962</u>
Copper	13,163	15,331
Cement	61,925	a/
Beryl	1,615	923 ^{b/}
Tin ore concentrates	46	97.2
Lime	13,888	a/
Salt	6,493	a/
Gold (oz)	419	a/
Columbite/Tantalite concentrates	7 $\frac{1}{4}$	12.5 ^{b/}
Wolfram concentrates	115	10.9
Phosphates	395	a/
Bismuth concentrates	1 $\frac{1}{4}$	0.1
Amblygonite	23	50.0 ^{b/}
Mica	0.4	0.1

a/ Not yet to hand.

b/ Estimated.

Copper is the principal product and Kilembe Mine the sole producer which in 1962 sold blister copper worth £3,587,600. The deposits are approaching exhaustion and the mine's expected working life is around five years more unless new important discoveries are made in the meantime. The UN Special Fund survey which has just been completed may have helped in this respect.

Beryl production is exported to the US. The drop in production was due to a decline in world market prices.

The two phosphate mines have given rise to local or sub-regional industries. The apatite mined at Bukedi is treated with sulphuric acid to produce superphosphate. It is also proposed to produce pyrochlore concentrates and a 55 per cent niobium concentrate. The Bugisu deposit produces apatite for shipment to Kenya where it is converted into soda-phosphate.

The most important known iron ore occurrence is Tororo with ten million tons of proved reserves of magnetite averaging 60 per cent Fe and one per cent P. A possibly more promising deposit is at Kigezi near Portal in western Uganda: the ore is high grade and free from impurities. At present, no tonnage figures are available.

Uganda's mineral industry might be encouraged by local concentration and refining, and possibly transformation of some of its high priced products. The existing Katumba refinery in Northern Rwanda for example may be able to process some of Uganda's concentrates.

Tanganyika

Diamonds, gold and silver amounted to around 90 per cent of the country's mineral output during 1962, valued at just over £7 million. The other products were tin, mica, gypsum, gemstones and salt, together with insignificant tonnages of kaolin and lime.

The Ruhuhu coal fields represent a valuable reserve of coal; there has been no extraction to-date because of the remoteness from markets and

Nyasaland

Apart from limestone which is extracted for cement manufacture there is no mineral production at present in Nyasaland.

Present studies and mineral evaluations include the following:

- (a) Bauxite. A 60 million tons deposit is known in the Mlanje mountain range. The ore is impure but suitable for alumina manufacture.
- (b) Graphite. Very large reserves of good quality graphite flake averaging 7 per cent are indicated in the Dowa district of the Central Province.
- (c) Over half a million tons of cerium-rich monazite are indicated in the Mangankunde Hill in the Central Province. The monazite occurs with strontianite and this can be separated according to tests made in Britain.

Northern Rhodesia

The Copper Belt is now capable of producing 625,000 tons each year or some 13.5 per cent of the world output. The actual production for 1962 amounted to 426,448 l. tons of electrolytic copper and 111,946 l. tons of blister copper. The value of the copper production was £112 million or 96 per cent of the total mineral output for 1962.

The production of zinc in the territory improved in 1962 by almost a third to 39,800 tons. This increase followed the installation of a smelter at the Broken Hill mine, the principal high grade lead zinc ore deposit in the Rhodesia.

Northern Rhodesia is an important producer of cobalt and selenium; the first is associated with copper in the mineral deposits whilst the second is a by-product metal obtained from the electrolytic refining of blister copper.

Manganese concentrates and limestone complete the present mineral production picture of the territory.

Southern Rhodesia

Mineral output

(in 000 s. tons unless otherwise stated)		1962
Gold (000 oz)		554.6
Silver (000 oz)		83.5
Arsenic		1.2
Asbestos		142.2
Beryl		0.6
Chrome Ore		507.7
Coal raised		3,115.0
Copper		15.1
Corundum		3.3
Iron Ore		681.9
Iron pyrites		56.5
Limestone		678.4
Lithium ore		44.5
Mica		0.02
Tantalite ore		0.08
Tin (refined)		0.8

Southern Rhodesia is well endowed with base minerals which has enabled her to operate a number of primary industries. The country's reserves of iron ore, coking coal, limestone and refractories are considerable: only a minor portion of these resources are being converted at the Redcliff steelworks into pig iron and primary forms of steel.

Chromite production which still represented 13 per cent of the world output in 1961, has been falling steadily during the last five years because of the increased supply of lower priced Russian ore to the world markets. This has encouraged the local production of ferrochrome: one plant was started some years ago at Gwelo. The second producer moved on stream at Que Que early in 1963 and has an ultimate production goal of 20,000 tpy.

Some US \$ 4.2 million have been invested by foreign interests to develop the Pangani asbestos mine at Filabusi which will produce a grade of fibre suitable for export to cement manufacturers. This new producer is expected to increase the country's output by 50 per cent.

Mica is being mined north of Sincia: arrangements have been completed to establish an industry at Zawi to produce ground mica.

Southern Rhodesia supplies 6 per cent of the world's beryl production and nearly one-half of the mined output of lithium ore. The applications for beryllium are still highly specialized but lithium ore could perhaps be transformed locally into a more valuable product, e.g. lithium hydroxide or chloride.

The Wankie and West Sebungwe coal fields have proved reserves of coking coal in excess of 800 million tons: however the coal output is well below the productive capacity because of the increasing substitution of Kariba hydro-electric power for that produced by coal fired stations. Wankie is still primarily a coal and coke producer with bricks and tar a secondary product.