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ENGINEERING INDUSTRIES IN AFRICA

(in three parts and an addendum to PART II)

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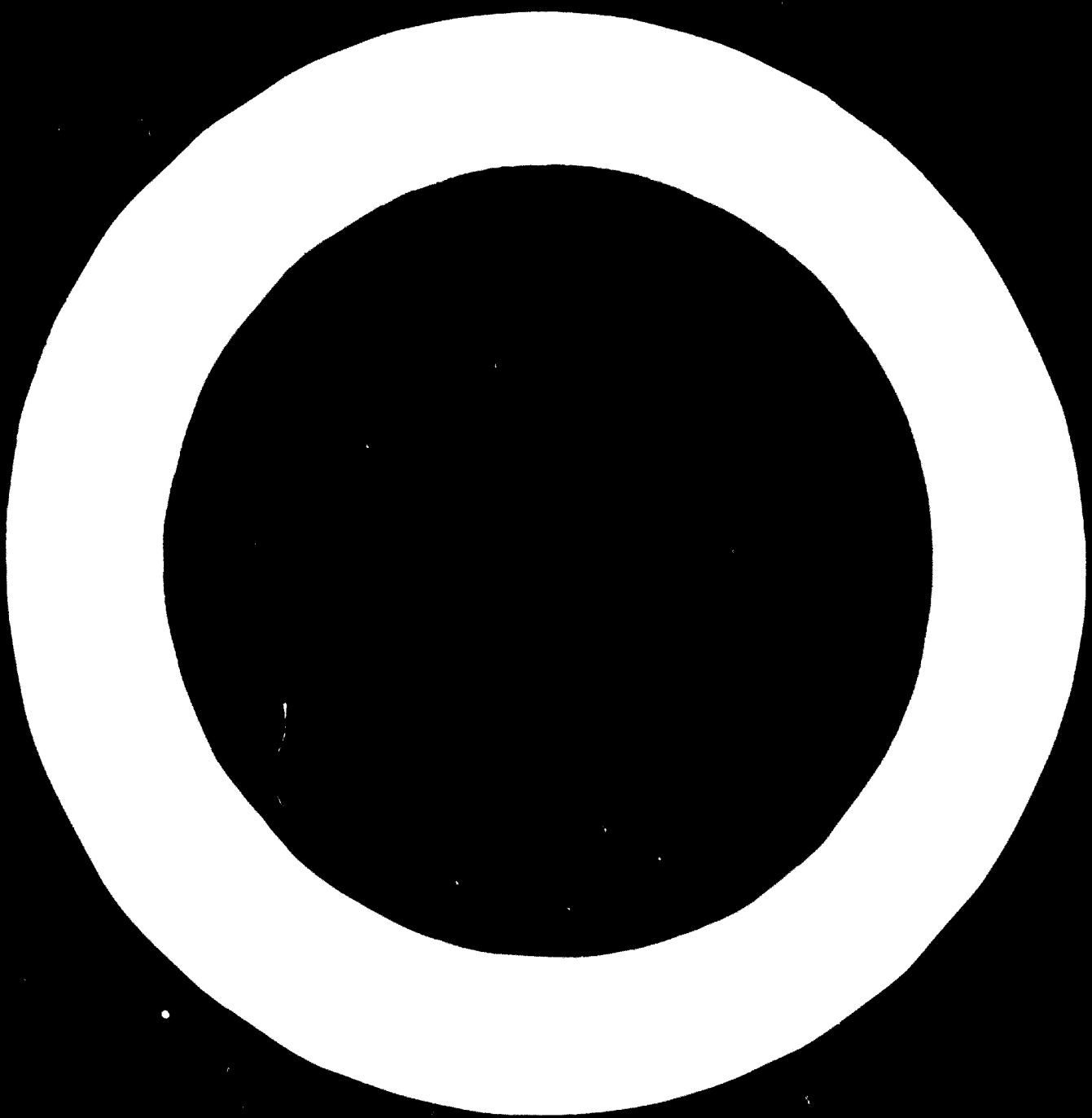

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CHAPTER I

INTRODUCTION

I.1 Objective

The objective of this study is to investigate the possibilities of industrial development of the countries of Africa in the field of engineering industries comprising the production of structural engineering and metal products, machinery other than electrical, transport equipment and electrical machinery, apparatus and appliances.

To enable this to be attempted it is necessary to survey existing engineering industries in the countries of the Region, the demand of each country of the various engineering commodities, its capabilities and the possibility of establishing plants for the production of such commodities for national markets, on an area basis (covering the needs of two or more adjacent countries), on a sub-regional or regional basis, or for such markets plus exports. The survey will necessarily touch upon infra-structure and some technological and cost aspects.

I.2 Background Information

Under this heading will be given some data relative to the individual countries of the Region and which affect their economic and industrial development and in turn the possibility of establishing engineering industries in them.

Reference should be made to the map of Africa given on page 1 and to Tables I.1 to I.4 given on pages 4 to 7 of PART II of the paper [1]. The tables give general indicators for the countries of the Region, arranged under the four Sub-regions to which the Region has been subdivided. The data are approximate and those relating to the East African

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1/ The map and some figures, tables and an annex have been used for this paper and for another paper on "Electrotechnical Engineering Industries in the East African Sub-region" and their numb rin, arranged to suit the two papers.

Sub-region are for the year 1963 while those relating to the other three sub-regions are for 1961, but they will serve the purpose for which they are intended.

I.2.1 The African Region

The African Region dealt with covers 40 countries, and has been subdivided on a geographic basis into four sub-regions:

(i) The East African Sub-region, comprising:

1. Ethiopia
2. French Somaliland
3. Somali Republic
4. Kenya
5. Uganda
6. Tanzania
7. Burundi
8. Rwanda
9. Malawi
10. Zambia
11. Rhodesia
12. Malagasy Republic
13. Mauritius
14. Reunion

(ii) The North African Sub-region, comprising:

1. Morocco
2. Algeria
3. Tunisia
4. Libya
5. The United Arab Republic
6. The Sudan

(iii) The West African Sub-region, comprising:

1. Nigeria
2. Togo
3. Ghana
4. Dahomey
5. Niger
6. Mali
7. Upper Volta
8. Ivory Coast
9. Guinea
10. Senegal
11. Mauritania
12. Sierra Leone
13. Liberia
14. Gambia

(iv) The Central African Sub-region, comprising:

1. Congo (D.R.)
2. Congo (Braz.)
3. Gabon
4. Central African Republic
5. Chad
6. Cameroon.

The total area of those 40 countries is 25.2 million square kilometers and their population in 1961 was about 235 million, giving an average population of 9.4 persons per sq.km. However, the population is very unevenly divided and vast areas are sparsely populated while others are densely populated. For example, the Maghreb countries occupy an area of 4.75 million sq.kms. and have a population of about 28 million, with an average of six persons per sq.km. But the greater part of these countries is desert, with the population concentrated in a small part of the area, which must be regarded as among the few parts of Africa where there is an over-population problem.

The following table, giving the sizes of population of individual countries in 1961, is indicative of sizes of national markets:

11	countries	had	populations	below	2 million
8	"	"	"	of 2-3	"
5	"	"	"	" 3-4	"
5	"	"	"	" 4-6	"
4	"	"	"	" 6-10	"
4	"	"	"	" 10-15	"
2	"	"	"	" 25-30	"
1	"	"	"	" about 36 million.	

Eleven countries are land-locked 1/. Their total area is 6.2 million square kilometers, and their population was about 40 million in 1961.

There are no absolute criteria for the delineation of the sub-regions, and no sub-region is a self-contained entity. In the West African Sub-region, some countries are nationally grouped together:

(i) Nigeria with Niger and Dahomey, as well as Chad in the Central African Sub-region;

(ii) Togo, Ghana, Ivory Coast and Upper Volta;

(iii) Liberia, Sierra Leone, Guinea, Senegal, Mali and Mauritius.

1/ Mali, Upper Volta, Niger, Chad, Central African Republic, Uganda, Rwanda, Burundi, Zambia, Malawi and Rhodesia.

Similarly, Morocco, Algiers, Tunisia and Libya in the North African Sub-region are nationally grouped together. In the case of the East African Sub-region, Ethiopia has perhaps closer ties with the Sudan and the U.A.R to the north than with countries to the south, while the south and east of Katanga (forming part of the Central African Sub-region) should, in many respects, be regarded as part of the East African Sub-region.

While it is recognized that for different aspects of development different groupings of countries are appropriate, the division of the Region into the four Sub-regions given above has been adopted in this study, for convenience.

I.2.2 Gross Domestic Product in the Countries of the Region

Tables I.1 to I.4 give data concerning the Gross Domestic Product in the various countries of the Region, which ranges from $ 25 million for French Somaliland and $ 57 million for Mauritania to $ 2,471 million for Algeria and $ 4,150 for the UAR.

Of the 34 countries for which the GDP is given in the tables, the per capita GDP was $ 50 or less for 6 countries, $ 51-100 for 15 countries, $ 101-200 for 8 countries and $ 200-250 for 4 countries.

Apart from the wide gap between expatriates and nationals in income, there are also marked differences of income among Africans, between rural and urban population and among different urban groups. In Cameroon the income of cocoa growers in the south is estimated at $ 177 p.a., that of cotton growers in the north at $ 108 p.a. and that of the inhabitants of the mountain regions at $ 24.a. In Kenya, 91% of Africans and 86% of Arabs and Somali are in the below $ 55 p.a. bracket while 92% of Europeans and 68% of Asians are in the over $ 1,000 p.a. bracket. Per capita monetary product ranges from $ 700 in Nairobi to $ 10 in the Northern Region of Kenya. The total per capita monetary product for the whole country is only $ 25 if Nairobi and Mombasa are excluded.

The result of the uneven distribution of wealth is that the majority of the population of the countries of the Region have an income much lower than the low per capita GDP indicated, being still in the subsistence economy and completely dependent on agriculture. This limits the markets even more, particularly for engineering commodities. As an example, of the 27 million people in the common market of Kenya, Uganda and Tanzania, only about 4 million have purchasing power for consumer goods.

The share of manufacturing in the Gross Domestic Product is very low indeed except for seven countries (Kenya, Congo (D.R.), Morocco, Algeria, Tunisia, Libya and the UAR) in which it ranged from 10 to 15%, Mauritius in which it was 19% and Rhodesia in which it reached 20.6%.

The economy of most of the countries of the Region is based on the extraction and export of their natural resources, in which minerals play a leading role, or on export of agricultural products. Ghana and Sierra Leone occupy second and third place among the world diamond producers. The bauxite deposits of Ghana have been assessed at 460 m. tons or about 20% of the known world reserves. Liberia and Gabon both have considerable reserves of good quality iron ore (63% Fe) and occupy leading places among iron ore exporting countries. Zambia occupies sixth place among world producers of copper (650,000 tons p.a.) and Congo (D.R.) is among the important producers of non-ferrous metals. Algeria and Libya export considerable quantities of crude petroleum.

I.2.3 Manpower

A major problem in industrialization in developing countries is manpower. Tables I.1 to I.4 show that except for the UAR, third level education in most countries of the Region is very inadequate. Moreover, the few educated persons usually prefer law, humanities and politics to science, engineering, applied economics and accounting, and they usually take up government administrative posts rather than go into trade or industry.

As far as labour is concerned, most of the countries of the Region have very few indigenous workmen in the skilled labour category and above, although unskilled labour is plentiful. The productivity of labour is very low except on repetitive work, and detracts much of the cost advantage of low labour wages.

I.2.4 Transport

Transport systems in Africa are not well developed and are mostly export oriented, working from the centres of production of exportable raw materials outwards towards the sea.

The railways have different gauges in the different countries of the Region, and in some cases even within the one country. The terrain to be covered is generally difficult, construction costs and railway charges are 2 to 3 times those in Europe, and many railways are single track. Chad and the Central African Republic have no railways as yet.

Roads are likewise costly to construct and maintain and the road networks are generally inadequate. The extreme case is Chad, which is ill-served by its road network and is virtually without a transport network for several months in the year.

The poor transport networks of most African countries result in further limitation of the markets.

I.2.5 Attainment of Independence and Change of Patterns

The last 10 years witnessed the attainment of independence by 31 African countries, of which 17 became independent in the year 1960 and 9 in the years 1961 to 1964.

Before independence, these countries were suppliers of primary commodities and open markets for manufactured goods.

The years immediately before and after independence were in the nature of a transition period during which imports and exports as well as economic and industrial development were seriously affected.

The attainment of independence has in all cases been accompanied by new approaches to social, economic and industrial development. Economic planning has become the major catalyst for independent economic growth. The African countries are increasingly interested in discovering and exploiting their natural resources and human potentialities, and current development plans are frequently first steps to channel scarce available resources towards strategic growing points: diversification of farm produce and of exports, import substitution, raising the rate of domestic capital formation, boosting the number of trained local personnel, setting up of new industries and the processing of local raw materials. Changing patterns are to be expected, and past developments cannot be taken as indicative of future trends.

CHAPTER II

THE AVAILABLE DATA

This Chapter covers the data which it has been possible to obtain within the limited time available relative to demand and local production of engineering commodities in the countries of the Region, and summarizes the findings and recommendations previously put forward as a result of the surveys of industrial development carried out by ECA Missions in the four Sub-regions and of the studies conducted concerning engineering industries in the East African Sub-region.

II.1 Data provided by the Economic Commission for Europe

The data provided by the ECE are as follows:

(i) The f.o.b. value of exports to the various countries of Africa in the years 1957, 1958, 1959 and 1960 from the USA, Japan, the United Kingdom, Western Germany, France, Italy, Sweden, Switzerland, Canada and the Netherlands, as being the major exporting countries of the West, figures of exports from the Eastern European countries and China not being available. The data are divided into those concerning Electrical Machinery, Apparatus and Appliances - Tables II.1 (1) to II.1 (5) - and those concerning Machinery other than Electrical - Tables II.1 (6) to II.1 (10). The data were given in detail for 12 individual countries of the Region and for three areas comprising 10 countries for which data were grouped together for each of the years in question (East Africa comprising Kenya, Uganda and Tanganyika - the Rhodesias and Nyasaland now Zambia, Rhodesia and Malawi - and the Equatorial Customs Union comprising Congo (Braz.), Gabon, the Central African Republic and Chad). Data were given in totals only for 6 individual countries and for 8 countries grouped together in the West African Customs Union (comprising Niger, Dahomey, Upper Volta, Ivory Coast, Mali, Guinea, Senegal and Mauritania). No data were given for French Somaliland and Cameroon, nor for Rwanda and Burundi as the statistics for these two countries were previously incorporated in those of the Congo (Leo.).

(ii) The ECE also gave the values of imports in each of the four years 1957 to 1960 as indicated by the countries themselves in their national statistics. These values are given c.i.f. except for the Rhodesias and Nyasaland, in which case they are given f.o.b. Only partial detail is given in some instances, and the total value of the items not detailed is considerable in relation to the total value of imports.

In some instances the values of total imports as reported in the national statistics are less than the exports from the 10 major exporting countries of the West for which figures have been given by the ECE. This may be due to differences in the timing of the statistical year, differences in statistical classification or inaccuracy. In the case of the Rhodesias and Nyasaland the imports as given by the statistics of the previous Federation are very much higher than the exports from the 10 major exporters of the West, due to the fact that considerable imports were obtained from South Africa.

Table II.1 (1) summarizes the data obtained from the ECE for the East African Sub-region relative to Electrical Machinery, Apparatus and Appliances, and Table II.1 (6) summarizes the data relative to Machinery other than Electric for the same Sub-region. They give the average yearly values over the years 1957 to 1960. Starting with Ethiopia, East Africa, the Rhodesias and Nyasaland and Madagascar (for which details are given for the exports from the 10 major exporting countries of the West) columns "A" give such exports in value and/or percentages; columns "B" give the imports as indicated by the national statistics or the "A" value plus an allowance to cover freight and insurance, whichever is the greater, with the sub-division made in the proportions of the percentages in columns "A". In the case of the Rhodesias and Nyasaland the values of imports as indicated by the countries f.o.b. similarly increased to give the value c.i.f. Sub-totals 1 give the totals for the 8 countries so covered.

Next come the countries for which exports from the 10 major exporters of the West are given in totals only, namely Somalia, Mauritius and Reunion. The "B" values are similarly obtained and are subdivided in the proportions of the percentages of the "B" values under Sub-total 1. A Sub-total 2 is obtained by the addition of the imports into these 3 countries to Sub-total 1.

For French Somaliland, Burundi and Rwanda, for which no figures have been given, the total values of imports c.i.f. are estimated (at $ 2.4 million). Within the approximation adopted in the last column for the total imports into the Sub-region, this figure can vary from $ 1.9 to 2.8 million. The total "B4" values are subdivided in the proportions of the percentages of the "B" values under Sub-total 1.

Tables II.1 (2) to II.1 (4) and II.1 (7) to II.1 (9) give the data relative to "Electrical Machinery, Apparatus and Appliances" and to "Machinery other than Electric" in the North, West and Central African Sub-regions respectively. The data are processed along similar lines to those adopted for Tables II.1 (1) and II.1 (6).

Tables II.1 (5) and II.1 (10) summarize respectively the c.i.f. values of imports of "Electrical Machinery, Apparatus and Appliances" and of "Machinery other than Electric" in the four Sub-regions and in the whole Region. Imports into South Africa, Angola and Mozambique are also given in these tables, for comparison.

II.2 Data obtained from the Countries of the Region

In April 1965 a questionnaire was circulated to the countries of the Region requesting information relative to engineering products divided into 4 main divisions:

1. Electrical Machinery, Apparatus and Appliances
2. Structural Engineering and Metal Products
3. Machinery other than Electrical
4. Transport Equipment.

For simplicity the questionnaire was prepared for the general case, of a country having some local production to supplement imports, with its factories working at more or less full output. Cases where considerable spare capacity exist were to be indicated by giving percentage plant utilization, on a weighted average for the individual plants. In cases where there was production for export, the amount exported was to be given to enable working out consumption. Countries which found it necessary to adopt somewhat different forms of reporting were requested to do so.

The questionnaire requested detailed information by commodity groups under each of the four main divisions given above. The countries were requested to give:

(i) Average values of imports per annum in the last three years for which information is available, indicating whether they represent normal years;

(ii) Local production, giving manufacture, assembly and maintenance and repair work separately - and showing exports, if any, and percentage plant utilization;

(iii) Estimated consumption (order of magnitude) in 1970 and 1975.

By mid-August, at which time PART II of the paper was completed, replies to the questionnaire had been received from 24 countries only. The data given is summarized in Tables II.2 (1) to II.2 (8) for imports and in Tables II.3 (1) to II.3 (10) for local production.

All reporting countries gave data on imports, some giving averages for three years (1960-62, 1961-63 or 1962-64) while others gave data for one year only (1963 or 1964). No abnormalities were reported.

Production figures were given by only 17 countries, 12 giving details of their local production under the 4 main divisions, 2 giving global values of their production and three indicating that they have no local production of engineering commodities to speak of. The UAR also gave estimates of production in 1970 and 1975. Tables II.3 (5) and II.3 (10) give the total values of local production of engineering commodities in reporting countries as well as the per capita local production.

II.3 Imports of Engineering Commodities into the Countries of the Region for the period 1956-1963

In order to attempt projections of demand for engineering commodities in the countries of the Region an effort has been made to obtain consumption figures from the year 1950 up to date so as to have a long enough period on which to base projections. However, the following factors have seriously affected the collection of data:

1. Most countries of the Region have recently attained their independence, and are still building up their statistical administrations and organizing their statistical work;
2. Little information is available prior to 1956 an the period for which it has been possible to obtain a reasonable amount of data is limited to the years 1956 to 1963;
3. The data available is not put in standardized form and is not given in sufficient detail to enable assessment of demand except for major commodity groups;
4. In the years in question some countries were grouped together and statistical data given for the group, e.g. Kenya, Uganda and Tanzania under East Africa, and Malawi, Zambia and Rhodesia under the Federation of the Rhodesias and Nyasaland in the East African Sub-region.

When attempting to project demand for electrical commodities in the East African Sub-region serious difficulties were encountered as will be mentioned in Chapter III. The effort was not repeated for the other divisions of engineering industries. However, data collected has been summarized in Table II.4 (1), giving imports of Electrical Machinery, Apparatus and Appliances into the Countries of the East African Sub-region, and in Tables 1 to 4 of the Addendum giving imports of Engineering Commodities into the East, North, West and Central African Sub-regions and Table 5 for all four Sub-regions together.

II.4 Findings and Recommendations of Previous Surveys and Studies

1. In the period August 1963 to January 1964 three ECA Missions visited the West and East African Sub-regions and Algeria, Libya, Morocco and Tunisia, with the objective of assessing possibilities of industrial development over the next decade or so, primary emphasis being made on projects serving more than one country. The findings and recommendations of these three Missions, as far as engineering industries are concerned, are summarized in Appendix I (PART III of the paper).

2. In April and May of 1965 an ECA Mission visited the Central African Sub-region with similar objectives, but of much wider scope. The findings and recommendations of this Mission concerning engineering industries are summarized in Appendix II.

3. In 1965 studies of Engineering Industries in the East African Sub-region were made and the findings presented in two papers to the Conference on the Harmonization of Industrial Development Programmes in East Africa held at Lusaka in the last quarter of 1965 (Document E/CN.14/INR/89 "Electrotechnical Engineering Industries in the East African Sub-region" and Document E/CN.14/INR/90 "The Development of Engineering Inustries in East Africa - Mechanical Engineering". These findings are summarized in Appendix III and Table II.5.

CHAPTER III

DEMAND FOR ENGINEERING COMMODITIES IN THE COUNTRIES OF THE REGION

III.1 Assessment and Projection of Demand

As mentioned in Chapter II an attempt has been made to assess and project demand for Electrical Machinery, Apparatus and Appliances in the East African Sub-region, on which more information is available than other divisions of engineering industries or sub-regions, and the result was unsatisfactory. We shall summarize briefly the approach made and the difficulties encountered, since they are applicable to other branches of engineering industries and to most countries of the Region.

(i) Imports of Electrical Machinery, Apparatus and Appliances into the countries of the Sub-region were taken as indicative of demand, except for Rhodesia which has a sizable local production;

(ii) The available data were insufficient to enable reasonably accurate assessment and projection of demand. Consequently only an order of magnitude was attempted;

(iii) In the case of Malawi, Zambia and Rhodesia, for which data had been grouped together under the Federation of the Rhodesias and Nyasaland, the years 1957 to 1961 witnessed the execution of the Kariba Hydro-Electric Project which cost about US$ 200 million. This was reflected in the values of imports in these years, as can be seen from Table II.4 (1). It has not been possible to separate the effect of the implementation of this project from the demand figures which were considerably swollen by its execution;

(iv) It was not possible to assess quantitatively the effect on the demand resulting from the change of pattern of the economy after independence;

(v) Based on data available for 1956 to 1960 linear trend projections of demand were made. These are plotted in Figure 1 (Page 2 of PART II of the paper). It will be noted that for the two major groups "Electric Power Machinery - SITC 722" and "Equipment for Distributing Electricity - SITC 723" the projections show a downward trend. This agrees with the fact that the earlier years of the period of observation witnessed the execution of the Kariba Hydro-Electric Project. With the industrial development drive taking place in the recently independent countries consumption of these two groups is bound to take an upward trend. A downward trend is also seen in the case of "Apparatus for Medical Purposes". Demand for these depends on social developments which were evidently slowed down during the transition period to independence and have not picked up sufficiently yet.

The growth rates represented in Figure 1 were applied to the demand indicated by the countries in their replies to the questionnaire to obtain projections of demand in 1970 and 1975, and these were entered in Table III;

(vi) Another approach to projection of demand was made, based on possible correlation between Per Capita GDP and per Capita Consumption. Some commodities showed reasonable correlation, such as insulated cables for which the relationship is given in Table II.4 (2) and Figure 2. It will be noted that the upper part of the curve, shown dotted, can only be a very rough guide to a possible Per Capita GDP and Per Capita Consumption relationship. And it is this dotted part of the curve on which projections are based. Other commodities, such as transformers, switchgear and rotating machinery did not show any correlation.

The graphs showing Per Capita G.D.P. and Per Capita Consumption for the commodities showing reasonable correlation, and the projections of population and of gross Domestic Product, were utilized to make projections of demand in 1970 and 1975. These were also entered in Table III;

(vii) It will be seen from Table III that projections of demand based on linear trend of consumption over the period 1956 to 1963 and those based on the relationship between Per Capita GDP and Per Capita Consumption agree, more or less, in some cases, but differ considerably and irregularly in others.

The conclusion drawn was that the two sets of projections can only give very rough orders of magnitude, and that equally acceptable 'guesstimates' can probably be obtained by multiplying the average annual consumption over the period 1957 - 1960 for the commodities for which the demand is not likely to increase rapidly by 1.5 and 2 to obtain the demand in 1970 and 1975 respectively. For commodities for which the demand increases rapidly, the multipliers suggested were 2.2 and 3.

The questionnaire requested the countries to give estimates of consumption in 1970 and 1975. Of the countries of the East African Sub-region only Rhodesia and Mauritius gave such estimates. Rhodesia based projections on a growth rate of 5% per annum. Mauritius gave estimates of consumption generally showing a much lower growth rate.

III.2 Estimation of Future Demand for Engineering Commodities

The data requested in the questionnaire circulated to the countries of the Region in April 1965 was intended to give a good picture of existing demand for individual commodity groups in the 4 main divisions of Engineering Commodities. However, up to mid-August, 1965, replies to the questionnaire giving such data were received from 24 countries only, and the information so obtained is given in Table II.2 (1) to II.2 (8). Replies were received from all 6 countries of the North African Sub-region, 11 out of 14 countries in the East African Sub-regions, 5 out of 14 countries in the West African Sub-region and only one out of 6 in the Central African Sub-region.

Other available data on demand are those provided by the Economic Commission for Europe for most countries of the Region relative to imports of Electrical Machinery and of Machinery other than Electrical in the period 1957-60 and given in Tables II.1 (1) to II.1 (10).

The following table gives the average annual values of imports into reporting countries over the period 1957-60 obtained from the data provided by the UNO, and the value of imports in 1963 or 1964 given by these countries, for Electrical Machinery, Apparatus and Appliances as well as Machinery Non-Electrical:

Value of Imports in 000 US $

Country	Elect. Machinery, Apparatus & Appliances		Machinery Non-Electrical	
	Annual Average 1957-60	1963 or 1964	Annual Average 1957-60	1963 or 1964
Ethiopia	2,300	4,300	5,300	8,400
Somalia	600	1,300	2,600	700
Kenya		8,400		27,000
Uganda	14,700	4,100	35,000	2,700
Tanzania		1,000		8,600
Malawi		...		...
Zambia	41,300	9,300	69,300	16,900
Rhodesia		13,300		41,400
Madagascar	5,000	4,800	9,400	5,800
Mauritius	3,700	4,000	4,400	6,300
Reunion	1,000	...	3,100	...
French Somaliland		...		...
Burundi	2,400	500	4,000	900
Rwanda				
Morocco	14,600	18,000	32,300	33,600
Algeria	54,100	68,200	107,100	111,500
Tunisia	6,100	10,600	13,600	17,200
Libya	5,600	16,400	19,300	38,300
UAR	26,300	30,700	43,900	59,600
Sudan	4,800	14,000	13,100	22,800
Nigeria	12,600	23,600	37,800	41,800
Togo	700	1,200	1,700	4,300
Ghana	8,600	19,700	23,000	23,200
Dahomey	...	1,000	...	100
Liberia	2,300	3,700	9,500	25,600
Gambia	400	600	400	500
Chad	...	...	...	600

The following will be noted:

1. That, as previously stated, figures for Malawi, Zambia and Rhodesia show the effect of the execution of the Kariba Hydro-Electric Project in the years 1957-60.

2. Imports into Algeria remained at a high level throughout, mainly due to the execution of projects connected with the recently discovered oil wealth. Libya was similarly affected.

3. Imports into the UAR of Machinery other than Electrical over the period 1962/64 averaged about 20% less than they were over the period 1957-60, as a result of increased local production.

4. With the exceptions mentioned in 1 and 3 above imports have increased in practically all cases between 1957/60 and 1963/64, but the percentage increase varies considerably from one country to the other. It also differs between Electrical Machinery and Machinery Non-electrical for the same country.

These findings strengthen the conclusion previously reached, that on the basis of the data available it is not possible to estimate with a reasonable degree of accuracy future demand for engineering commodities in the countries of the Region.

A possible course to follow is to adopt the proposal cited under III.1 para (vii) above in relation to 'guesstimates' of consumption in 1970 and 1975 of Electrical Machinery, Apparatus and Appliances in the East African sub-region to the other 3 sub-regions, applying the same multipliers therein suggested to the average consumptions over the period 1957-60 given in Tables II.1 (3) to II.1 (4). A similar approach can be made for estimating consumption in 1970 and 1975 of Machinery other than Electrical for all four sub-regions, by applying appropriate multipliers to the average 1957-60 consumptions given in Tables II.1 (5) to II.1 (9).

For Structural Engineering and Metal Products as well as Transport Equipment, the data on imports obtained in reply to the questionnaire and given in Tables II.2 (3), II.2 (4), II.2 (7) and II.2 (8), when completed after receipt of the remaining country replies, can be used with suitable multipliers.

CHAPTER IV

BASIC DATA ON ENGINEERING INDUSTRIES

This Chapter covers miscellaneous basic data useful in the study of engineering industries and in the choice of plants to be established for manufacturing engineering products.

IV.1 Data relative to production of electrical machinery in the United Kingdom

Table IV.1 gives an analysis, by size of enterprise, of the production of electrical machinery in the United Kingdom in 1958 for firms employing 25 or more persons, as obtained from the U.K. Board of Trade Report on the Census of Production for 1958, Part 56. It can be seen that the net output per person employed varies with the size of enterprise. It has two peak values, at the sizes of enterprise employing 100 to 199 and 400 to 499 persons, for which net output per person employed is $ 2,730 and $ 2,710 respectively. As the size increases beyond 400-499, the output per person employed falls to $ 2,360 for size 500-749, then rises continuously to reach $ 3,080 for enterprises employing 7,500 persons and over.

Table IV.2 gives similar information for the case of insulated wires and cables, obtained from Part 57 of the Report referred to above. It shows two pronounced peaks for the output per person employed, $ 3,250 for enterprises employing 50 to 99 persons and $ 4,020 for those employing 500 to 749 persons. Larger size enterprises have lower output per person employed.

The tables show that there can be more than one economic size of plant for an industrial enterprise, and that for some industries increase in size beyond a certain point may reduce output per person employed.

IV.2 Data relative to manufacturing operations in Europe

Table IV.3 (1) gives basic information regarding minimum economic sizes of plants for various branches of electrotechnical engineering industries, fixed capital requirements, labour force, floor area and electricity consumption, based on average European conditions in 1965.

Table IV.3 (2) gives similar information for various branches of engineering industries other than electrotechnical.

Column 3 in each table gives the minimum economic capacity of plant based on modern engineering practice in industrialized countries. For the countries of Africa, smaller plants are likely to be viable, depending on the particular branch of industry, transport conditions and the nature of the market. In the case of refrigerators and domestic washing machines the minimum economic size of 20,000 to 25,000 pieces per annum is intended to meet the severe competition in the European market.

Column 4 gives the maximum weight of piece to be lifted and this is needed for the design of buildings and lifting gear. Columns 5 and 6 give the fixed capital investment needed per unit of production per annum and the percentage of this investment which goes into buildings.

Columns 7 and 8 give the total working hours per ton of production and the percentage of this total which goes into machinery hours. Columns 9 and 10 give the output in tons per annum per production workman and the output per annum per square metre of production area on the basis of 2 shift operations. Column 11 gives the total floor area needed for the shops and shop offices (apart from other buildings for offices, stores etc.) related to the total labour force. Column 12 gives the production workmen as a percentage of the total labour force, and column 13 gives the production workmen as a percentage of the total number of employees. The last column, 14, gives the electrical energy consumption per ton of production.

The fixed capital investment is given for plants installed in Europe. For the African region addition of transport costs and [illegible] increased erection costs result in capital requirements [illegible] about 50% higher.

4. [illegible] engineering industries with possibilities [illegible]

IV.3.1 USA Conditions, 1959/60

Table IV.4 (1) gives data relative to some electrotechnical engineering industries with possibilities for developing countries, and Table IV.4 (3) gives data relative to some such engineering industries other than electrotechnical. The data are based on USA small industry situation in 1959/60 as given in the Industry Fact Sheets published by the Department of State, Agency for International Development, Washington. They should be adapted realistically to suit individual countries, particularly as regards labour requirements, costs and inventories of raw materials and spares to be carried. The plants described are relatively small in their size by USA standards, but may be considered medium scale in some developing countries. They offer possibilities for local investment even where the capital market is still in the early stages of development, and for building up needed technical skills, creation of channels of distribution, saving of foreign exchange and gaining experience in management essential to broad-based economic growth.

Referring to the tables, column 1 gives the S.I.C. number of the Branch Industry given under column 2, for reference purposes. Column 3 gives the annual production capacity of the plant relative to which the data are given, on a one shift basis. After a period of operation on such a basis it may be found advisable to run two shifts per day if the market can absorb the increased output, in order to reduce costs.

Columns 4 to 8 give the capital requirements. Column 4, fixed capital, covers the cost of land, buildings and equipment, furniture and fixtures. Column 5 gives the working capital, which represents the initial payment that must be made before receipts from sales start to come in, for direct materials, direct labour, manufacturing overheads (supplies, fuel, water, truck operating costs if any, and indirect labour), administrative costs (interest, insurance, legal charges and audit charges), contingencies, sales costs (sales commissions, freight out, travel and advertisement) and labour training.

In most cases the allowance for direct materials, direct labour and manufacturing overhead is fixed at 60 days on the assumption that 30 days will be needed to build up an inventory of finished products and another 30 days will be allowed for collection of accounts. Deviations occur, depending on the time required to get delivery of materials and other factors. The allowance for administrative costs, contingencies and sales costs is based on 30 days in general, since most of these will not begin until sales have started, and time is usually allowed before payment becomes due. For training costs an estimate is made of the amount of labour time that will be non-productive or only partially productive, wastage of materials and non-productive use of items coming under manufacturing overhead. Variations in the allowances under this heading arise from variations in the training time needed. In some cases the work is of such a character that no allowance for training costs is needed (USA conditions).

Direct materials are the materials that go directly into the finished products and either constitute a part of such products, or are necessary for combining or containing the constituent parts. Supplies are the materials necessary for the maintenance and running of the machinery and equipment and for the performance of administrative and clerical operations.

As far as electric power is concerned, a few industries must have their own generating facilities as a stand-by in case of power failure, e.g. where continuous furnace operations are called for and where serious loss of materials or damage to equipment would result from a failure to maintain heating operations. In such cases the cost of the generating plant is included under equipment in the fixed capital requirements (Column 4).

Where an industry needs transport facilities of its own, the capital cost is included in the fixed capital and the annual running cost is included under manufacturing overheads.

As regards manpower, this is calculated on the basis of one shift operation. Where it is desirable to work more than one shift in order to make better use of the scarce investment funds, it will be necessary to increase the number of employees accordingly.

Depreciation has been calculated on the basis of the following life periods.

Buildings	20 years
Equipment, furniture and fixtures	10 years
Dies	5 years
Tools	3 years
Trucks	4 years

Column 6, total capital, is the sum of the fixed capital and the working capital. It is to be noted that financing of the two components of capital will be on different bases.

Column 7, foreign currency component of total capital, is taken as the cost of equipment, furniture and fixtures plus the component of working capital covering direct materials and supplies not locally available. Column 8 gives the remainder of the total capital.

Column 9, direct labour, covers the labour used directly in the manufacturing process itself. Column 10, the indirect labour, covers managerial, clerical and other labour not directly attributable to the manufacturing process, such as janitorial, maintenance and book-keeping personnel. Column 11 gives the total number of employees needed.

Column 12 gives the fixed capital investment per employee (Column 4 divided by Column 11) and Column 13 gives the annual gross sales revenue. Column 14 gives the total annual costs, including depreciation.

The gross annual profit is given in Column 15, and as percentages of total capital and of gross sales in Columns 16 and 17 respectively.

Column 18 gives the annual foreign currency requirements. These are taken as the cost of direct materials and supplies not locally available, plus an instalment to cover the foreign currency component of capital cost, assumed equal to 10% of this cost on the average. In the first years of operation additional foreign currency will be needed for expatriate management and other supervisory and technical staff. Column 19 gives the annual foreign currency saving, which is taken as the annual gross sales revenue assumed to be equal to the c.i.f. cost of the product minus the annual foreign currency requirements..

Column 20 gives the Value Added per annum. It is taken as the value of production or the gross sales revenue minus the value of material inputs. It includes the depreciation allowances. The Value added is given as a percentage of gross sales revenue in Column 21.

The last column, 22, gives the Capital Output Ratio, or the ratio of total capital (Column 7) to the Value Added (Column 20).

IV.3.2 Change to conditions in Africa, 1965

To change from American conditions in 1959/1960 to conditions in Africa in 1965 a number of factors must be taken into acount, and these vary from one African country to another. However, an average case is taken to produce Tables IV.4 (2) and II.4 (4), along the following lines:

Land Considering that the cost of land is only a small percentage of total expenditure, and in view of the fact that land for industrial purposes is scarce in Africa and therefore more expensive than ordinary land, the figures given for American conditions are used for African conditions.

Buildings The average costs used for USA conditions are US$ 3.5 to 4 per square foot, and these can be adopted for the Region.

Equipment, furniture and fixtures

1. Taking into account the increase in prices from 1959/1960 to 1965 and the difference in prices between Europe and the USA, the 1965 f.o.b. prices for Africa may be taken as the USA figures for 1959/1960 increased by 5%.

2. Add 12% to the f.o.b. prices to obtain average c.i.f. prices for the Region.

3. Inland Transport

(i) The weight of machinery and equipment may roughly be estimated on the basis of a price of US$ 1.0 per kilogramme;

(ii) Inland transport costs vary from one country to another. An approximate average of say US$ 20 per ton may be adopted;

(iii) An addition of 1% ad valorem should be made for inland insurance.

Taking these factors in consideration, an addition of 3% can be made to the c.i.f. value for inland transport.

4. Add 10% to meet increased erection costs.

The cost of machinery and equipment should therefore be increased by 30% over the USA figures.

Manpower

1. Indirect labour

(i) Manager will be an expatriate for the first few years in most instances, costing about 30 to 40% more than the USA figure. He will have an understudy who will take over from him within a few years, but in the meantime this will increase management costs. When the expatriate is no longer needed, costs will be nearly half the USA figure as long as there is scarcity of the higher level manpower in the developing country. For simplicity of calculation, the USA figures may be used as average over the next decade in the case of an average African country;

(ii) Office staff

Numbers to be doubled for lack of mechanization, etc., but pay per man would be about 30% of the corresponding USA figure until education is more general in Africa, so costs would be about 60% the USA costs;

(iii) Maintenance staff

Expatriates will be needed for some time in most African countries, but local staff can take over in a shorter period than in the case of the manager. Pay of the locals would be about 30% of the corresponding USA figure until the available local personnel are in much greater numbers. With the number of African maintenance staff about double the USA figures, the costs would be about 60% the USA costs.

2. Direct Labour

(i) For skilled workers the same number of operators would be needed, but costs would be half the USA costs. Production would be lower on non-repetitive work;

(ii) For semi-skilled workers, the number of operators would be increased 50 to 60%, each getting about 25% to 30% of the USA pay for his opposite number. Thus the cost would be about 40% the USA cost;

(iii) For unskilled workers, the numbers should be trebled, each getting one-tenth the pay of the USA unskilled worker, and so costs would be three-tenths of the USA costs.

Direct Materials and Supplies

Add about 15% to cover the freight and insurance costs of materials not locally available.

Power, Fuel and Water

For simplicity, double the USA costs.

Own Transport

Capital cost is included in the cost of equipment and dealt with accordingly. Annual operating and maintenance costs would be double the USA figures.

Depreciation

Although the life years taken as basis for the USA figures of cost are low by non-American standards, yet in view of the less capable handling and maintenance, and considering that the depreciation is not too large an item of costs relatively in most cases, the USA figures may be taken for simplicity.

Administrative Costs

The USA figures may be taken for simplicity.

Sales Expenses

Considering the large amount of advertisement normal in USA practice on the one hand, and in view of the lack of sales facilities in most African countries on the other hand, the costs in Africa may be taken at 50% the USA costs.

Working Capital

In the USA figures allowance for direct material is fixed at 30 to 60 days. In African conditions, materials not locally available take considerable time for delivery, and the allowance should be on the basis of 3 to 4 months. Direct labour, manufacturing overheads and other

components of working capital may be taken on the basis of 2 months except for training costs which may be taken as two to three times the USA figures.

Annual Sales Revenue

Landed costs in the Region in 1965 would, on the average, be about 15% higher than the USA figures for 1959/1960, but this may be balanced by lower output. However, sales revenues depend on the policies of the governments as regards industrialization, pricing and the assistance or protection given to industry. It would be safe to assume that an industry would be started if it can meet landed costs, and the USA figures may be taken for the annual sales revenue.

IV.3.3 Materials, Supplies, Electricity, Fuel and Water needed for the Engineering Industries covered in Tables IV.4 (1) to IV.4 (4)

The annual requirements of materials, supplies, electricity, fuel and water needed by the industrial plants with possibilities for developing countries covered in Tables IV.4 (1) to IV.4 (4) in order to meet the production figures given in these tables are given in detail in Annexes I and II.

CHAPTER V

OBSERVATIONS, CONCLUSIONS AND RECOMMENDATIONS

V.I. Foreword

As stated in Chapter I, the objective of this study was to investigate the possibilities of developing engineering industries in the countries of the African Region. As a first step towards this objective an effort was made to survey existing engineering industries in these countries, to assess their present demand for engineering commodities and to forecast their future demand. It was also necessary to form a general idea of the countries of the Region in certain respects which affect their economic and industrial development and in particular the possibility of establishing engineering industries in them.

CHAPTER I enumerates the countries under consideration and touches very briefly upon their gross **domestic** product, manpower situation and means of transport-all of which are factors which greatly affect their industrial growth.

The data which it has been possible to obtain is given in CHAPTER II, in the corresponding tables in PART II and the ADDENDUM and in the appendices in PART III. These summarize:-

1. The information provided by the ECA on imports of Electrical Machinery, Apparatus and Appliances and of Machinery other than electrical into the countries of the Region in the period 1957-60.
2. The data on imports and local production in recent years of Electrical Machinery, Apparatus and Appliances, Structural Engineering and Metal Products, Machinery other than Electrical and Transport Equipment received from reporting countries of the Region up to mid August 1965 in reply to the questionnaire circulated to them in April 1965.
3. The findings and recommendations of the ECA Survey Missions to the four sub-regions and of recent studies of engineering industries in the East African sub-region.

CHAPTER III summarizes an effort made to assess present demand in the countries of the Region for engineering commodities and to forecast future demand.

V.2 Observations on the available data and Conclusions drawn from them

Examination of the available data, supplemented by observations made during short visits paid to eight of the more industrially advanced countries of the Region 1/ reveal the following:-

1. The data available on local production of engineering commodities in the countries of the Region, a starting point in a study of the development of engineering industries in them, is inadequate in the case of most countries. Only a few of them have carried out a recent Census of Industrial Production, and published information does not give sufficient detail regarding individual or closely allied groups of engineering commodities. The attempt to obtain detailed information on local production by means of the questionnaire circulated to the countries of the Region did not produce the required results. This is understandable, for considerable effort and time are needed to make a detailed inventory of industrial establishment for so deserving a branch of industry as engineering industries. However, the response is encouraging, and it is hoped that the effort will be followed up to enable detailed inventories of engineering industries in the countries of the Region to be prepared.
2. The data available on imports, though much more than that available on local production, is likewise inadequate, and does not enable assessment of existing demand with reasonable accuracy or forecasting an order of magnitude of future demand on an acceptable basis.

In order to formulate proposals for the establishment of specific plants in certain countries or areas of the Region for the production of engineering commodities it is necessary to have detailed knowledge of existing local production of individual or closely allied groups

1/ Kenya, Uganda, Tanzania, Zambia, Rhodesia, Ghana, Nigeria and the United Arab Republic.

of engineering commodities and reasonably reliable estimates of future demand. In the absence of such knowledge, we shall first give a summary account of the structure of existing engineering industries in the countries of the Region and the factors inhibiting their growth.. This will be followed by some concluding remarks and recommendations.

V.3 Structure of the Existing Engineering Industries in the Region

The following remarks give a general idea of the structure and state of engineering industries in the Region:-

1. The countries of the Region are at different degrees of development as far as industry in general, and engineering industries in particular, are concerned. They follow the normal pattern of development of engineering industries, and can be subdivided into three groups representing the successive stages of development:

   (i) Countries with no engineering production to speak of, or with engineering production restricted to repairs and simple metal manufactures. This group comprises most countries of the Region, and includes (among reporting countries) such large countries in terms of area and population as Ethiopia and the Sudan, each of which has a total GDP on the comparatively higher side for the countries of the Region.

   (ii) An intermediate group of countries with engineering production at an initial stage, with structural engineering and metal products and repair and perhaps assembly of transport equipment forming most of their engineering production.

   (iii) A very few countries with already developed and diversified engineering production.

2. Engineering industries in most countries of the Region are heavily dependent on imported raw materials and semi-manufactures. In a number of cases factories are completely shut down or production curtailed due to lack or shortage of supply, particularly when foreign exchange difficulties are experienced.

3. These industries are also heavily dependent on expatriate management, technicians, foremen and supervisors, and this increases the costs of production.

4. The motor vehicle work which is done locally and which accounts for a considerable proportion of engineer output in many countries of the Region is mostly repair work in small ill-fitted shops, or assembly and body building in moderate size installations many of which are agent controlled.

5. Although some of the plants installed are quite up-to-date, they are the exemption and stand like something transplanted into the African Region, remaining in isolation from the majority of the factories whose equipment and layout leave much to be desired in the way of modernization and improvement.

6. Many of the enterprises work one shift only, with consequent high overhead costs.

7. Import substitution which has taken place has sometimes been achieved behind high tariff barriers which have fostered non-competitive industry.

8. Existing production of engineering commodities meets only a small fraction of demand even in the most industrialized countries of the Region.

V.4. Factors Inhibiting the Growth of Engineering Industries in the Region

The development of engineering industries in the countries of the Region is inhibited by the following factors which also affect other branches of industry in varying degrees:

1. Manpower

One of the greatest impediments to rapid industrial growth in general is the deficiency in high and intermediate level manpower such as entrepreneurs, managers, technologists, supervisors, foremen and even skilled workers. This affects engineering industries more than many other branches of industry since they need a greater proportion of such high level manpower in relation to total employment.

2. Size and Nature of the Market

Most countries of the Region have a limited population in a large territory or a small population in a small territory, with very low per capita incomes and a predominant traditional subsistence sector with low productivity, resulting in very limited national markets. The countries are heavily dependent on exports of primary commodities to unstable world markets, and fluctuations in world prices accentuate the smallness of the markets. A further handicap is the inadequate expensive transport and the high cost of distribution. Since engineering industries have to create markets for their products, they are affected more than other branches of industry and tend to develop around centres of population.

3. Raw Materials and Other Inputs

The economies of most countries of the Region having been based on the extraction and export of their natural resources and importation of manufactured goods, the majority of engineering industries established in the Region depend on imports of raw materials and semi-manufactures, as already remarked, and this raises production costs. Large inventories have to be kept in stock owing to distance from supply centres, increasing costs still further.

Other [illegible] is cheap power. Installed capacity [illegible] very small indeed in most countries of the Region, even those with considerable hydro-electric

potential, and transmission and distribution networks are of rather limited extent. As a result industry either generates its own motive power or purchases it at high cost.

4. Diversity of Engineering Commodities in use in the Countries of the Region

The countries of the Region depend on imports for meeting most of their requirements of engineering commodities. Unregulated imports and intense competition from large manufacturers supplying world markets have resulted in a very large variety of types and sizes of engineering goods being in use in any one African Country, in spite of its limited needs. The excessively numerous types of tractors in use in the common market of Kenya, Uganda, and Tanzania, is a case in point. Another obvious case is the large number of makes and types of motor vechicles to be seen in any country of the Region. This makes it necessary to carry a large inventory of spare parts for maintenance and repair work and to train personnel in operating and repairing the various types in use. It also makes it more difficult to manufacture spare parts locally.

5. Competition from Imports

Engineering commodities are produced on massive scales by international enterprises that have long held the market in most countries of the Region. Many of these commodities are high value articles which can bear high transport costs, and foreign products can therefore compete with local production, particularly in its first stages, making it difficult for the industry to be established without subsidy or protection. Another factor favouring imported products is their high quality as compared with local production. In the case of electrical goods this brings into the picture additional considerations of safety.

V.5. Concluding Remarks and Recommendations

V.5.1. The Place of Engineering Industries in Economic and Industrial Development

1. The main criteria in comparing the various branches of industry from the point of view of the national economy are based or related to the impact on the resources to be devoted to investment, on foreign exchange expenditure and earnings and on available manpower. In these respects:

(i) The capital /output ratio of the average engineering industry is near the average of total manufacturing, being lower than that of metal producing or chemical industries and higher than that of most light industries.

(ii) The foreign exchange effect depends largely on the proportion of domestic inputs (raw materials, intermediate products and labour) to total value. This favours resource oriented engineering industries such as those based on copper for Zambia, Aluminium for Ghana and non-ferrous metals for Congo (D.R.). It also suggests that advanced engineering industries needing semi-manufactures and high skills be left to a later stage of industrial development.

(iii) Engineering industries are labour intensive compared with the average manufacturing industries in terms of capital/labour ratio, output/labour ratio and the share of labour costs in total costs. This advantage for developing countries is counterbalanced by the high requirements of skills needed in the labour force. However, while engineering industries utilize an important portion of the qualified and trained personnel, they also generate skills and have a strong impact on the level of technological development in industry.

2. In the industrial development of developed and semideveloped countries a number of industrial pillars are recognizable, such as iron and steel, textiles, chemicals and fibres, cement and the engineering industries. Together with the chemical industries the engineering industries are the most dynamic among all manufacturing industrial branches, not only in

volume of production but also in scientific and technological development. Some of the pillar industries lend themselves more easily to definite suggestion of size, location etc. such as iron and steel. Other do not, like textiles and the engineering industries.

Developing countries must, therefore, give the establishment and development of engine ring industries due importance in their efforts for development. Their existing engineering industries are insignificant in relation to what they should aim at, and they should benefit by the experiences of other countries that have made progress in the development of their engineering industries, specially those whose circumstances have been similar to their own, such as the Romanian People's Republic and the United Arab Republic.

3. Another point to consider is the two way relationship between engineering industries and various branches of the economy. Development of agriculture, transportation, building construction, mining and generation of electricity all give an impetus to the establishment of engineering industries. In their turn, these industries, once established, are a great asset to further development of those branches of the economy. In the case of building construction the reciprocal beneficial effect is increased by the fact that 30 to 40 per cent of fixed capital needed for most branches of engineering industries goes into buildings.

4. In view of the importance of the engineering industries and their complexity, their development cannot be approached lightly. It is for these reasons that this paper does not recommend specific plants for establishment in definite location, and contents itself with general data and recommendations which it is hoped will be of some use to the majority of the countries of the Region in their efforts to develop their engineering industries.

V.5.2. Remedying of Factors Inhibiting the Growth of Engineering Industries in the Region

The development of engineering industries in the countries of the Region calls for the remedying of the factors inhibiting their growth, of which we spoke in section V.4.

V.5.2.1. Manpower Development

The first step to be taken regarding manpower development is to make a manpower survey to assess the available manpower resources at the different levels and to estimate future needs in the light of the proposed development of the economy of the country. To meet these needs it will be necessary to speed up education and remodel its pattern, to expand secondary education as a basis for providing high level professionals and technologists, and to increase the numbers of technical schools as a step towards meeting the needs for skilled workers, foremen, and supervisors. For the lower levels training schemes should be provided in large measure, and governments shall insist on in-training schemes within industry and even provide incentives to encourage training of workers in greater numbers than are needed by the particular enterprise and stocking such training.

V.5.2.2. Development of Material Inputs

1. The Region of Africa is well endowed with mineral resources, but these have not been sufficiently investigated or developed to meet the needs of an expanding engineering industry. Mining operations are export oriented in almost all the countries of the Region.

Geological surveys should be intensified to enable rapid assessment of available mineral wealth. The production of metals should be established to provide material base for engineering industries, and rolling mills installed to supply the semi-finished products such as bars, sheets and sections. It is to be noted that production of metals and semi-finished products should be established in the countries where the raw materials are found, and that in spite of the fact that technical advance now makes possible economically smaller scale production at lower capital cost than before, the minimum economic size of plant is still beyond the needs of the national markets of practically all the countries of the region.

2. Some engineering industries need items such as ball bearings and electric motors and at present these have to be imported. An effort should be made to produce such items in the more industrially advanced countries of the Region.

3. Finally we come to motive power. The search for coal deposits and petroleum reserves and investigation of the considerable hydro-electric potential in some countries of the Region should be vigorously proceeded with. Available resources should be developed rapidly and generation and distribution of electric energy given due priority.

V.5.2.3. Regional Co-operation to overcome Market Limitation

The small size of the national market in most countries of the Region does not create sufficient demand to justify local production of most engineering commodities, particularly the more advanced ones. A solution to this problem is to be found in regional co-operation. An example of such co-operation is that of Kenya, Uganda and Tanzania, who have agreed to maintain the common market approach to industrial development. The Kampala Agreement, by virtue of which the three countries have each been allotted industries to be established in it for supplying the needs of the whole of the Common Market, is worth the time and efforts spent in making it and offers an example to be followed by other countries of the Region.

In the poorer and less industrially developed countries there will be few immediate opportunities for sub-regional industries and the industries to be proceeded with will be those designed to serve domestic markets. But generally the wide range of engineering industries will enable each member of a group of co-operating countries to be allotted industries for which it is most suited. The more industrially advanced countries can be charged with the establishment of the more complex engineering industries on a sub-regional or regional basis.

In this respect one word of warning is necessary. Regional co-operation must be approached with great care. Each country must feel that its interests are fully appreciated and that it has been given a fair deal. Once an agreement is reached, all the countries involved must abide by its terms very strictly.

V.[illegible].[illegible]4. Standardization

The [illegible] variety of types and sizes of engineering goods in use in any [illegible] country is a definite drawback in many respects, and the situation must be corrected. Turkey adopted such a measure when it reduced the 1[illegible] types of tractors which were in use in the country to 9 types only, with considerable benefit to the economy.

The countries of the region should establish agreed essential industrial standards applicable to the manufactured goods exchanged. They [illegible] ions, specifications of materials, designs machinery and equipment, voltages and frequency. As far as final products are concerned there should be as few types as possible within each category of product. There should also be minimum quality standards, preferably based on existing international standards.

Standardization can take the form of in-plant standardization, special industry-wide standardization, national standardization and regional standardization. All these forms have scale increasing effects. The first reduces the variety of similar parts and components within one plant; the second has the same effect within a whole industry, and the third reduces diversity of final products. Due to the large number and variety of parts and components utilized in machine buildings, industry-[illegible] standardization has the most important impact on the economies of scale of the industry as a whole.

The need to standardize is more urgent when it concerns precision parts which must be interchangeable and therefore demand specific equipment, tools and jigs, such as brake drums, motor parts and axles. The incidence of amortization of equipment on cost price is such that multiplying production 10 times can lower the cost price by 40 to 50 per cent.

[illegible].[illegible].3. Prospects of Developing Engineering Industries in the Countries of the [illegible] Region.

1. [illegible] for engineering commodities [illegible] yet it [illegible] that demand

is of considerable size, as can be seen from the following table which summarizes data on imports detailed in Tables II 1 (1) to II 1 (10) and II 2 (1) to II 2 (8)

	Annual imports into the Sub-regions in Million US Dollars				
	East	Central	West	North	Total
1957-60 average for:					
Electrical Machinery Apparatus and Appliances	71.0	18.0	47.0	112.0	248.0
Machinery Non-Electric	134.0	46.5	105.5	259.5	546.0
1963-64					
Electrical Machinery Apparatus and Appliances	54.0	...	...	155.5	of which into Algeria 1/ 68.0
Machinery Non-Electric	119.0	...	...	283.0	111.5
Structural Engineering and Metal Products	44.0	...	...	445.0	381.5
Transport Equipment.	134.5	...	...	330.0	143.5

There is considerable scope for import substitution in a rapidly developing market, in all four divisions of engineering industries. It is to be noted, however, that given the material base, only about 70 to 80 per cent of imports of consumption goods are likely to be replaced by local production in the next decade, due to lack of technical knowledge and labour and management skills and on account of market limitations. As far as capital goods are concerned, only about 20 to 30 per cent of imports are likely to be replaced by local production by 1975, for the same reasons.

1/ The high imports into Algeria in 1963/64 were mainly due to the execution of projects connected with the recently discovered oil wealth.

1. Metal products of uncomplicated design and needing simple production processes are technically and economically feasible to produce with a relatively small output. The high cost of transport of articles fabricated mainly from sheets and sections as compared with the cost of transport of the raw materials gives local production of such articles a valuable cost advantage. For these reasons import substitution of engineering commodities should start with such articles as cans, tins, drums and door and window frames. Import substitution of articles like domestic refrigerators comes at a later phase of industrial development, and of capital goods only when engineering industries have reached a relatively developed stage.

2. Manufacturing of engineering commodities comprises the whole range of industry in term of size. There are opportunities for small, medium and large-scale industry to suit countries at different levels of industrial development. The small and medium scale industries have an important role to play in the industrial development of any country. They are usually a good starting point in countries where large scale engineering industries will be few, if any, for some time to come, and the small establishments of today grow to become the large ones of tomorrow. They are labour intensive as opposed to the larger capital intensive plants, an important point for most African countries with their widespread unemployment and under-employment. Their small size does not mean that they are second-rate or backward industries.

Small scale industrial concerns can operate with lower costs and produce better and more uniform quality articles than handicraft industries. By virtue of the better quality of their products they can enter markets in which the products of cottage industries are unsuitable, and their competition with handicraft industries in markets where transport and distribution costs are not prohibitive will have a beneficial effect on these industries because they will have to improve the quality of their products to hold their share of the market.

3. There is opportunity in almost every country of the Region for the manufacture of a wide range of engineering and metal products which can be readily manufactured given the material base, such as door and window frames, beds, cans, tins, drums, tanks, metal furniture, iron products, kitchen utensils, wire products, some agricultural implements, stoves, light structures and bodies for motor vehicles. Products which can be produced on an assembly or partial assembly basis include bicycles, sewing machines, and electrical goods such as switchgear, transformers, radios and domestic electrical appliances.

4. Another starting point is repair work of imported machinery and transport equipment, which is necessary from the earliest stages of development. The railway repair shops are usually the largest engineering establishments in countries at the threshold of industrial development, and motor vehicle repair shops among the most numerous. But the former should be utilized to give opportunities of training workers in greater numbers than required for their own needs, and the latter should be modernized and provided with the necessary equipment to improve the quality of their work and reduce its cost.

5. In almost every country of the Region there are substantial imports of motor vehicles and transport equipment, and many countries go into the production of such goods. It should be noted, however, that assembly of motor vehicles on the basis of imported components is of little value to the economy. The Value Added is a very small component of total cost, and such an industry will create a constant demand on foreign exchange. The task should be to set up local factories capable of producing most of the components. It should also be noted that considerable reduction in the cost of production can be achieved by increasing the scale of output. With small output the specialization of workers on one or a limited number of operations is impossible, time is lost changing from one operation to another as the vehicle proceeds down the assembly line and tools have to be continually changed. With larger output this can be avoided and productivity increased. Besides, the cost of specific tools required can be spread and fixed costs lowered.

6. In most African countries considerable expansion of textile industries is contemplated. A recent study of these industries in the East African Sub-region estimated the value of textile machinery to be installed in the Sub-region by 1975 to be about US $ 200 million. The production of such machinery is relatively simple and not too precise. It should be possible to establish in the more industrially developed countries of the Region factories for producing cotton conditioning machinery, spinning machinery and looms, automatic and semi-automatic. About three-quarters of the machinery is iron castings.

7. The manufacture of spare parts is a good possibility in many countries. Motor vehicle spares immediately come to mind. Wear and tear of processing machinery is rapid and there is continuous and considerable need for certain spare parts. In textile machinery the spindles have to be changed every about 2,000 hours.

8. In machine building in general, some of the special equipment needed, e.g. machine tools producing large and heavy parts, are never fully utilized when operating for one factory only. This equipment is often very expensive to purchase and takes highly skilled workers to operate. Co-operation of different factories through a system of sub-contracting will ensure effective utilization of such plant facilities and skills.

9. Engineering industries need good foundries and well equipped forges for supplying cast iron, steel and non-ferrous castings as well as forged parts. The casting and forging techniques must be well advanced, foundries mechanized and forging shops well equipped for die forging and hot stamping to supply high quality semi-finished products. Such foundries and forging shops require considerable investments and the amount of work needed to make them economically feasible is much more than the requirements of a single factory. It is therefore necessary to concentrate on a few of them serving a large number of factories.

10. The more complex engineering products require advanced technical skills and long experience to enable manufacture of a high quality product. Their production in industrially advanced countries is

entrusted to highly experienced personnel and backed by research, experimentation and prototype work involving very large expenditure. A good approach to the production of such complex articles is co-operation with some producers in industrially advanced countries, who would provide know-how and train personnel.

In transferring technology an effort should be made to adapt product design and production methods to local conditions. Mixed technology will generally give good results. This requires the use of advanced machinery only for those operations which determine the competitive quality of the product. All other operations should preferably be in the form of cheap hand operation.

11. Increase of the scale of production is the most important means of increasing productivity and reducing costs. The economies of scale do not result mainly from an increase in the volume of production if this is achieved by a proportionate increase in the diversity of production, though several overhead costs will thereby be decreased. Economies of scale result much more from a shift from individual to serial production, by the increase of seriality and by a shift from serial to mass production. This means an increase of identical or similar items produced or operations performed at a time on the same machine or equipment, with the same tools or instruments, according to the same design.

Scale of production can be increased through standardization, co-operation between different factories and concentration on the production of widely utilized parts.

12. Developing countries with their limited financial resources would be well advised to consider the use of second-hand equipment for the establishment of some engineering industries. Second-hand reconditioned equipment in good condition is available at reasonable cost. It is generally more labour intensive than modern equipment, this being the main reason why the use of such second-hand equipment has been discontinued. It is usually of smaller size than new equipment and therefore suits most countries of the region better. And it does not require as large a rate of amortization as new equipment.

13. The production of [illegible] engineering commodities in most countries of the Region is practically all destined for local consumption. A few African countries produce for local markets with a comparatively limited share of production for exports to neighbouring countries in the Region. Exports to countries outside the Region are few in numbers and small in proportion to total production[1]. This state of affairs is likely to continue for some time in the case of the majority of the countries of the Region, whose efforts will at first be directed towards local production for import substitution with exports to neighbouring countries accelerated by regional co-ordination and allocation of industries to countries most suited for them. In view of the severe international competition in engineering commodities and the various factors affecting their manufacture, only the few most industrially advanced countries of the Region are likely to succeed in capturing markets outside the Region. In this respect it should be noted that besides manufacturing to international standards and at competitive costs, it will be necessary to establish marketing facilities and to pay attention to other forms of export promotion.

14. The establishment of new industrial enterprises will cover new engineering products not previously manufactured as well as products already being produced. In either case they have an impact on existing industries, which are generally characterized by low productivity and relatively inferior product quality. The existing engineering industries should be modernized and expanded. Some should be refitted with new equipment, and others should undergo complete conversion. Factories utilized to partial capacity should be fully utilized, and those operating on a one shift basis should be operated two shifts when market conditions permit, and eventually three shifts.

15. The foregoing recommendations will, it is hoped, help the less industrially developed countries of the Region in their efforts to [illegible] production [illegible] engineering commodities. The engineering

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1 [illegible] exception.

industries mentioned are but a few that come to mind from the large list of industries that may be established. It is assumed that each country will make detailed pre-investment and feasibility studies to test the viability of individual projects and set their priorities before implementation, whether for the national market or for an area or a sub-regional or regional market in agreement with other countries. To assist these countries in such an effort data are given in CHAPTER IV section 2 and Tables IV 3 (1) and IV 3 (2) relative to minimum economic sizes of plants, fixed capital requirements, labour force, floor area and electricity consumption for various engineering industries which may be considered for implementation, mostly on an area basis covering more than one country. In section 3, Tables IV 4 (1) to IV 4 (4) and annexes 1 and 2 data are given relative to engineering industries with possibilities for the developing countries of the African Region, mostly for national markets.

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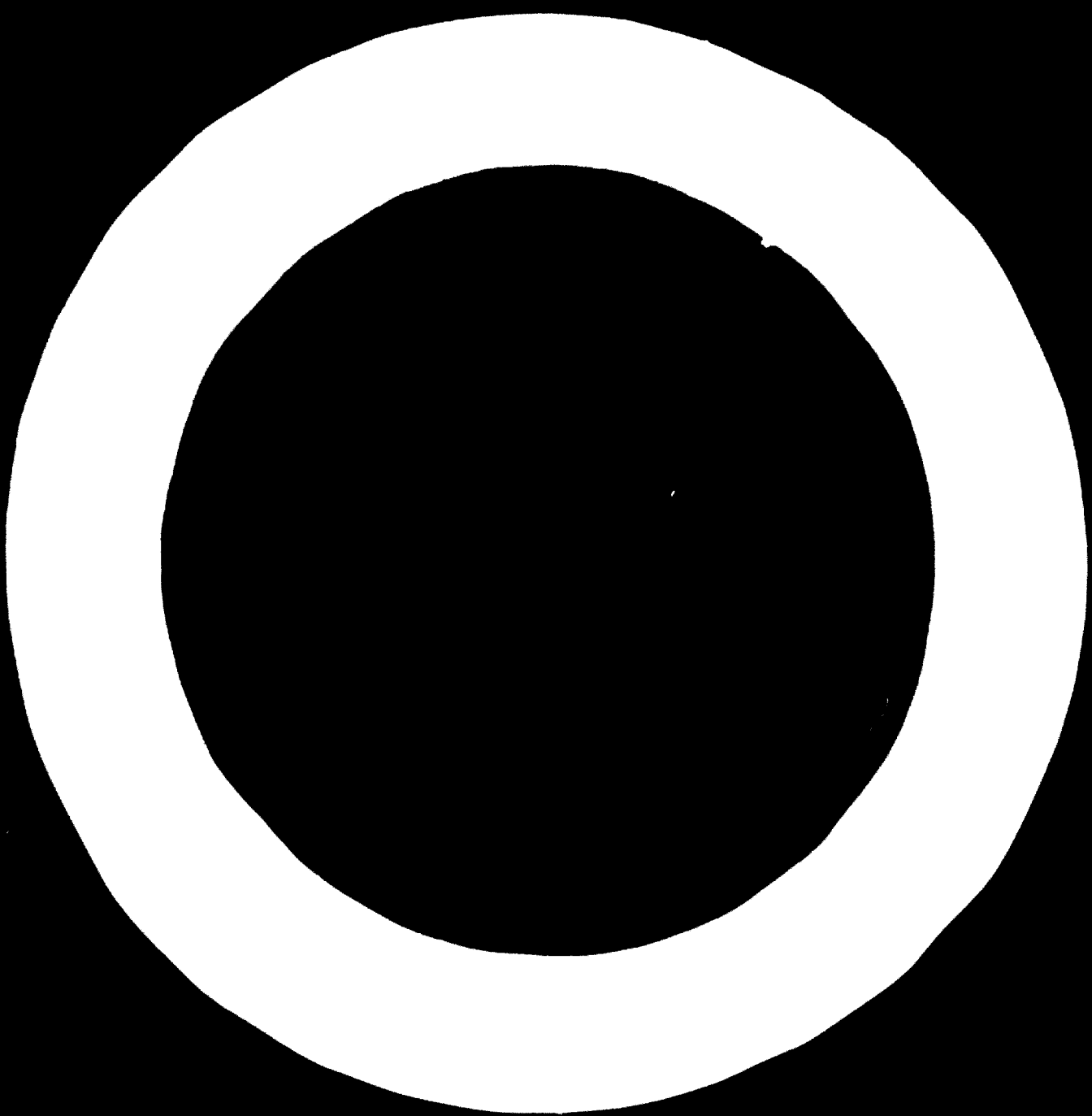

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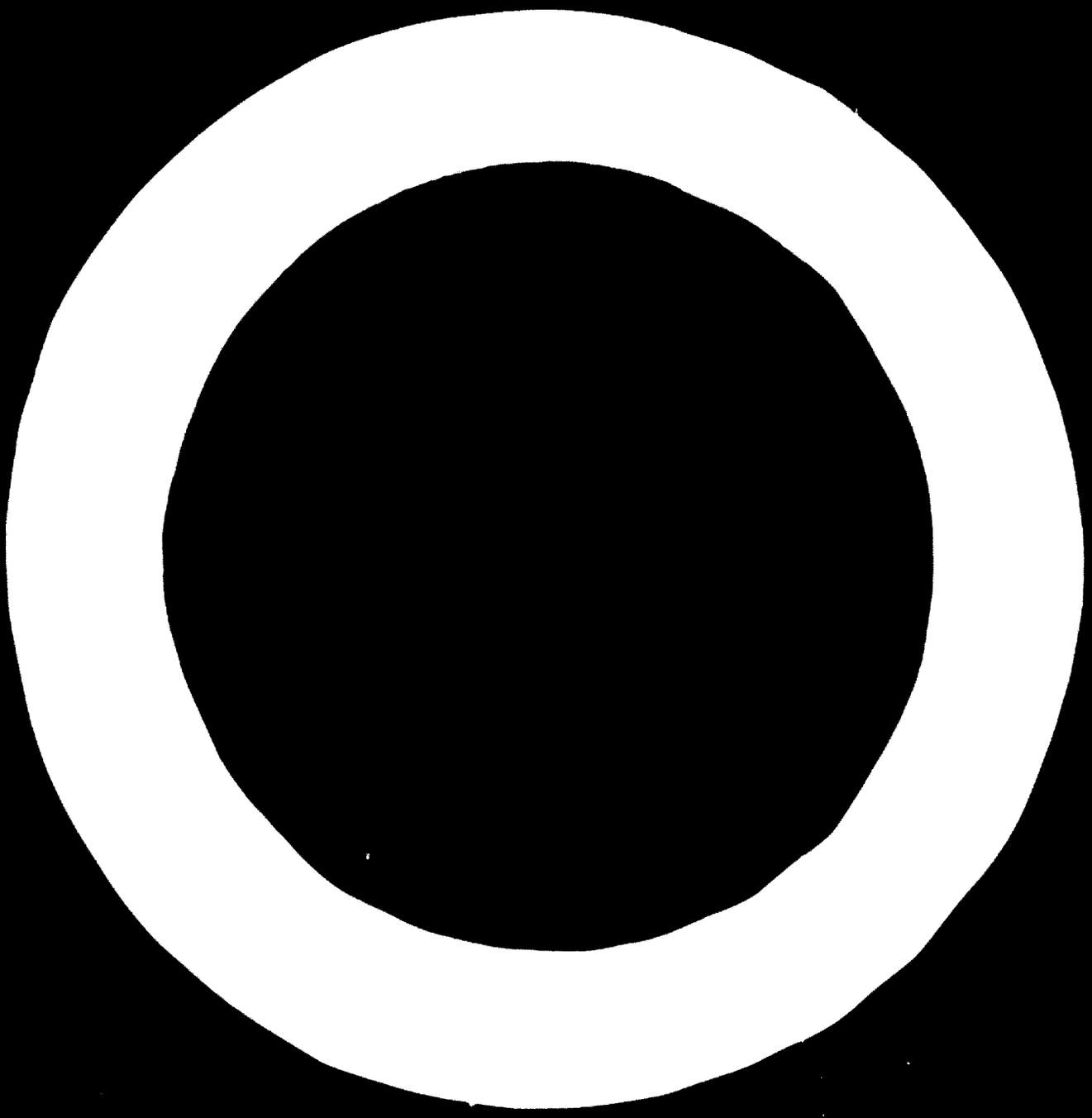

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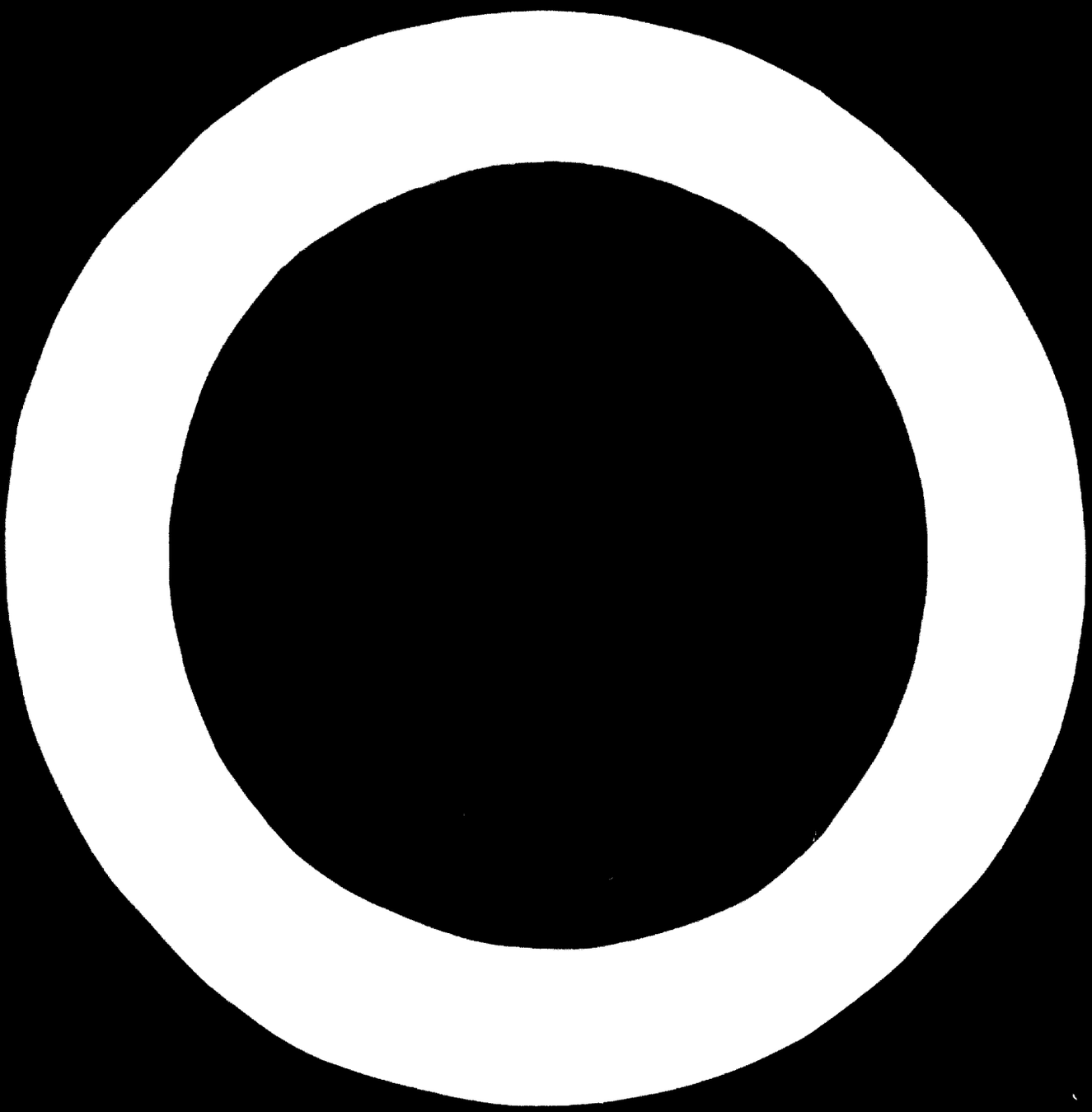
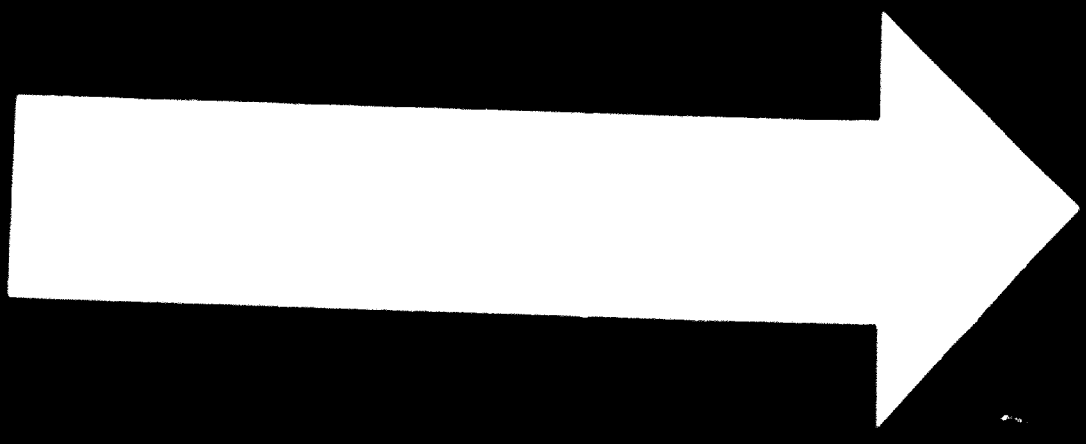


Table 1
Imports of Engineering Commodities
into the East African Sub-Region
Values in Million U.S. Dollars

SITC	Commodity Group	1956	1957	1958	1959	1960	1961	1962	1963
[illegible]	Structural Engineering and [illegible] Products								
71	[illegible] Electric	[illegible]	131	[illegible]	111	[illegible]	125	113	127
72	[illegible] Machinery, [illegible] and appliances	[illegible]	[illegible]	58	63	[illegible]	63	56	[illegible]
73	Transport Equipment	123	[illegible]	113	115	[illegible]	[illegible]	115	[illegible]
	[illegible]								

• [illegible] into the SITC Groups is a rough approximation

[illegible] National Publications. [illegible] Series B Publications of [illegible]



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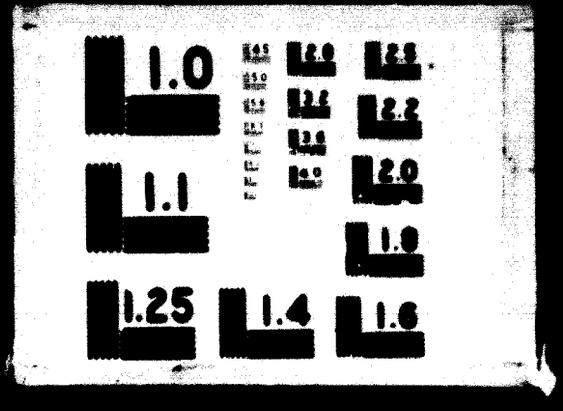


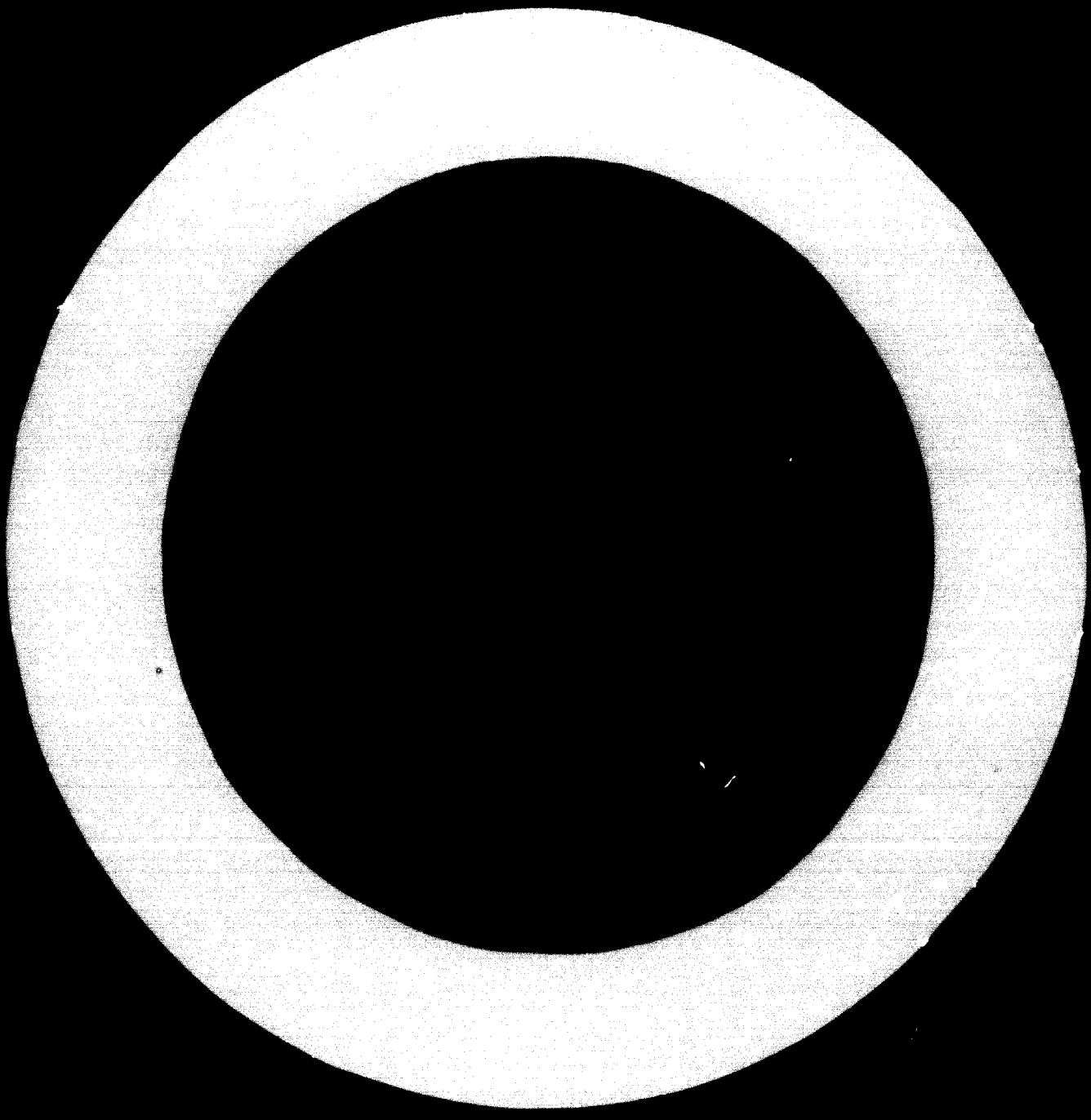


Table 2

Imports of Engineering Commodities into the North African Sub-region Values in Million U.S.Dollars.

SITC	Commodity Group	1956	1957	1958	1959	1960	1961	1962 1/	1963 1/
69	Structural Engineering and Metal Products	93	85	88	84	99	83	209	442
71	Machinery Non-Electric	165	160	151	251	306	266	293	293
72	Electrical Machinery Apparatus and Appliances	129	97	115	125	133	118	132	151
73	Transport Equipment	163	208	219	225	243	222	268	326
	TOTAL	549	550	573	685	781	689	992	1212

1/ Imports of Algeria show a sharp increase in 1962 and 1963

N. B. Classification into SITC Groups is a rough approximation

Source: National Publications, Series B Publications of ECA and Estimates by Secretariat.

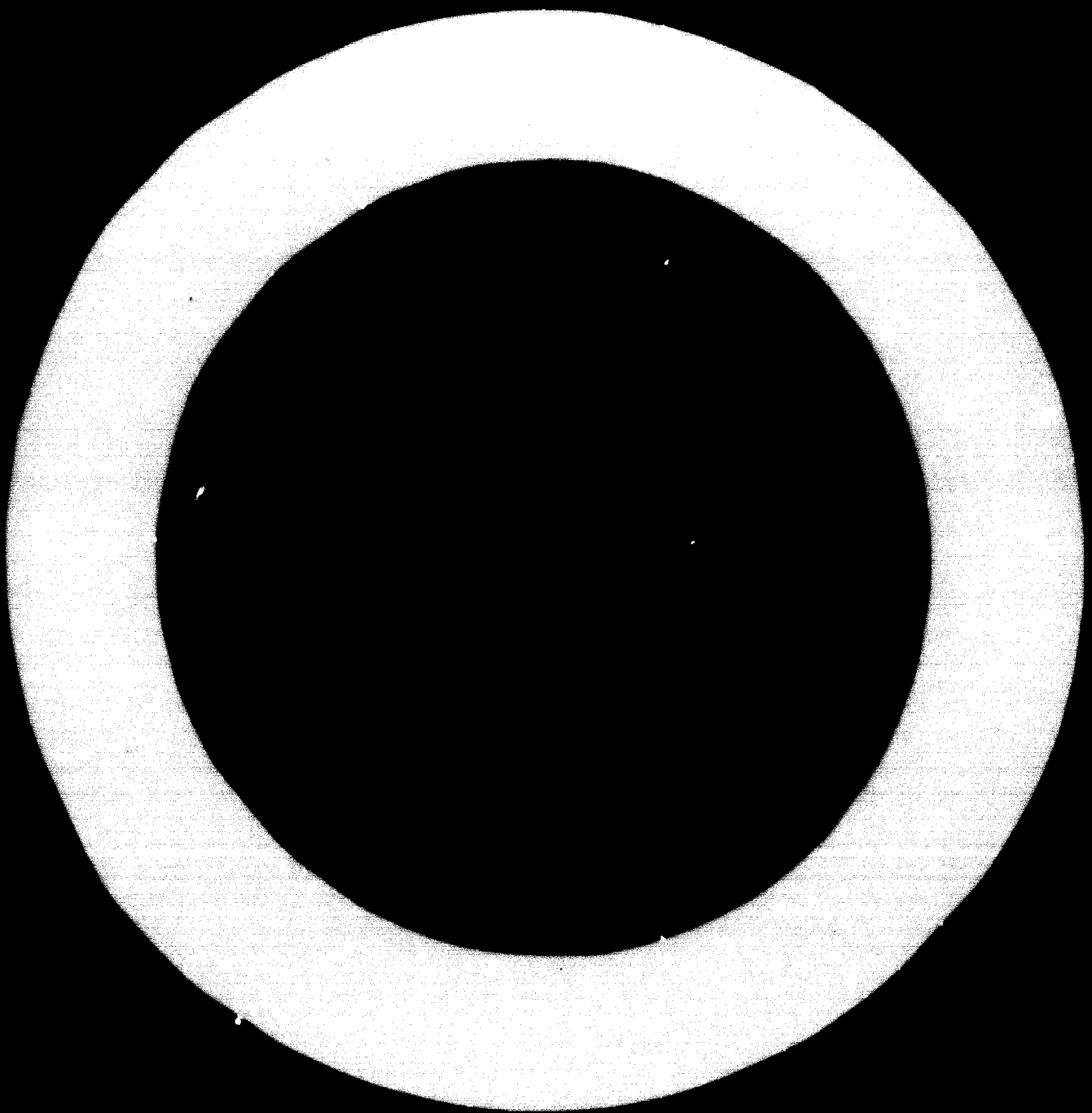


Table 3
Imports of Engineering Commodities into the West African Sub-Region
Values in Million U.S. Dollars.

SITC	Commodity Group	1956	1957	1958	1959	1960	1961	1962	1963
69	Structural Engineering and Metal Product	63	59	64	68	76	86	70	78
71	Machinery Non-Electric	77	78	83	109	126	114	153	182
72	Electrical Machinery, Apparatus and Appliances	37	38	43	53	66	71	83	84
73	Transport Equipment	131	125	128	139	166	188	123	144
	TOTAL	306	300	318	369	434	459	429	488

N. B. Classification into SITC Groups is a rough approximation

Source: National Publications, Series B Publication of E.C.A. and Estimates by Secretariat.

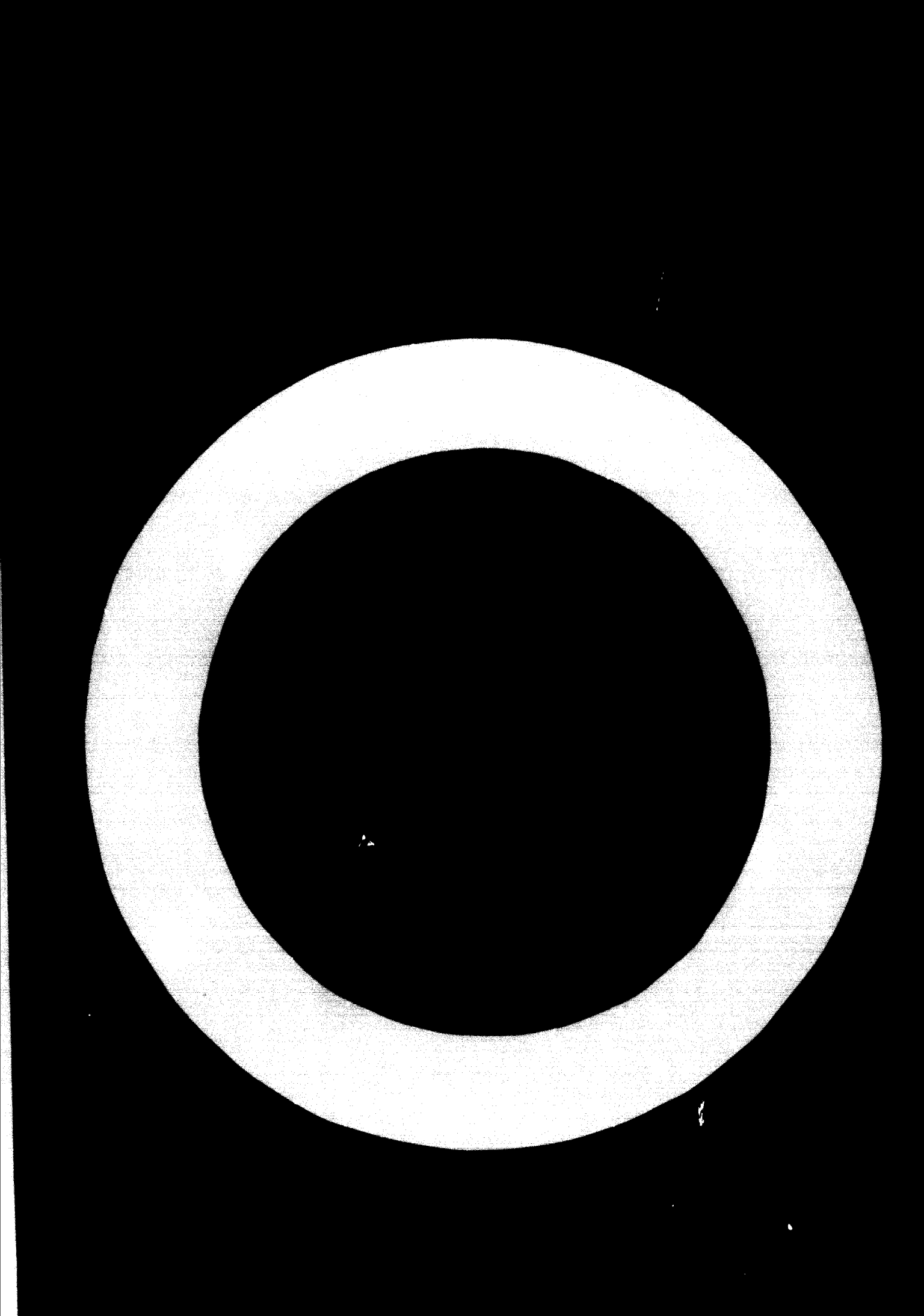


Table 5
Imports of Engineering Commodities
into the four sub-regions of Africa
Values in Million U. S. Dollars

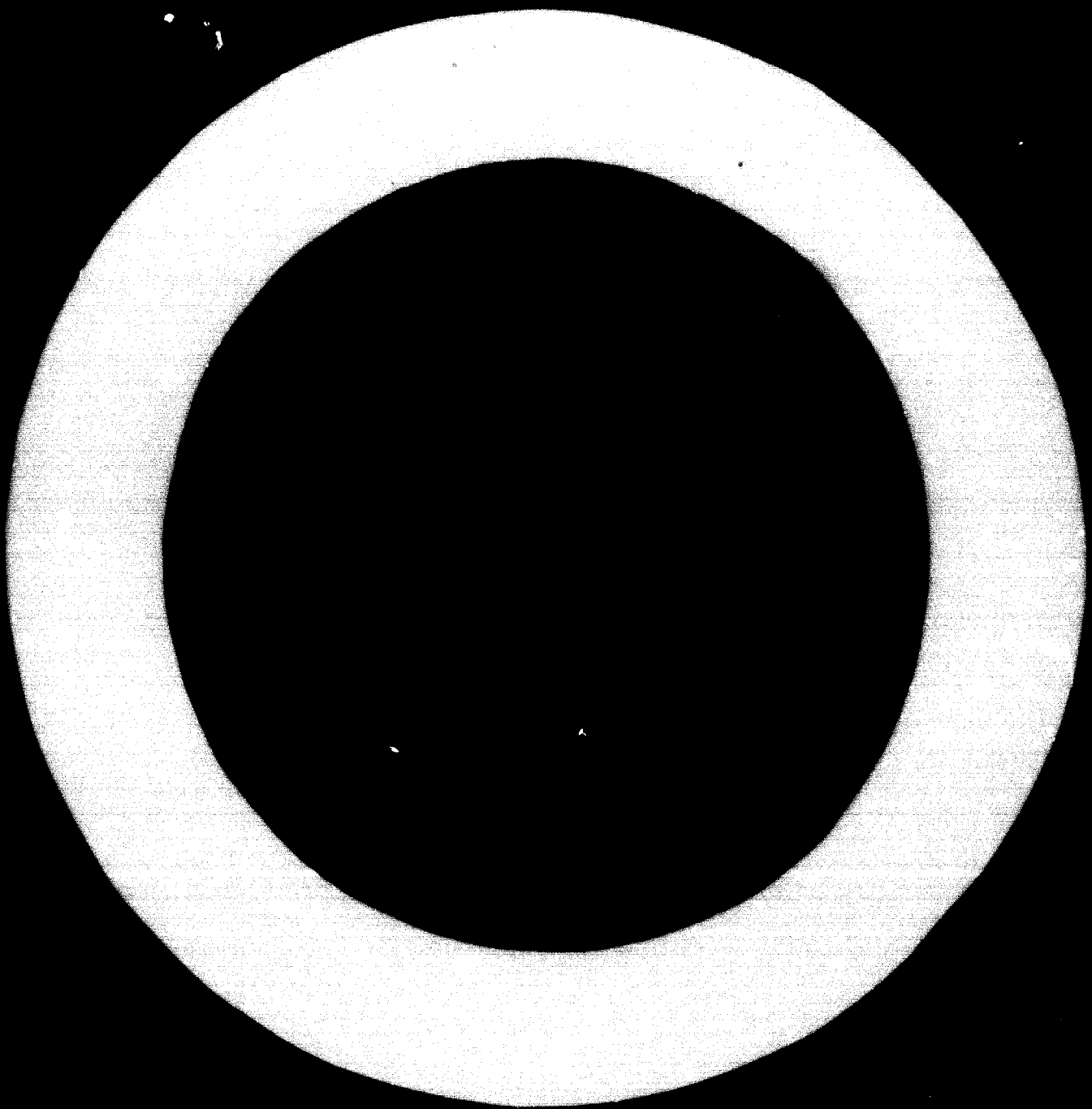
SITC	Commodity Group	1956	1957	1958	1959	1960 1/	1961 1/	1962 2/	1963 2/
69	Structural Engineering and Metal Products	234	224	232	227	238	230	345	395
71	Machinery Non-Electric	438	446	416	518	576	539	594	659
72	Electrical Machinery Apparatus and Appliances	238	236	251	267	279	268	291	383
73	Transport Equipment	487	522	527	535	572	561	554	660
	TOTAL	1397	1428	1426	1547	1665	1598	1784	2237

1/ Imports into Congo (Lec) show a sharp decrease in 1960 and 1961

2/ Imports into Algeria show a sharp increase in 1962 and 1963

N. B. Classification into the SITC Groups is a rough approximation

Source: National Publications, Series B Publications of E.C.A. and Estimates by Secretariat.



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Regional Symposium on Industrial
Development

ENGINEERING INDUSTRIES IN AFRICA

PART II

Map, Graphs, Tables and Annexes

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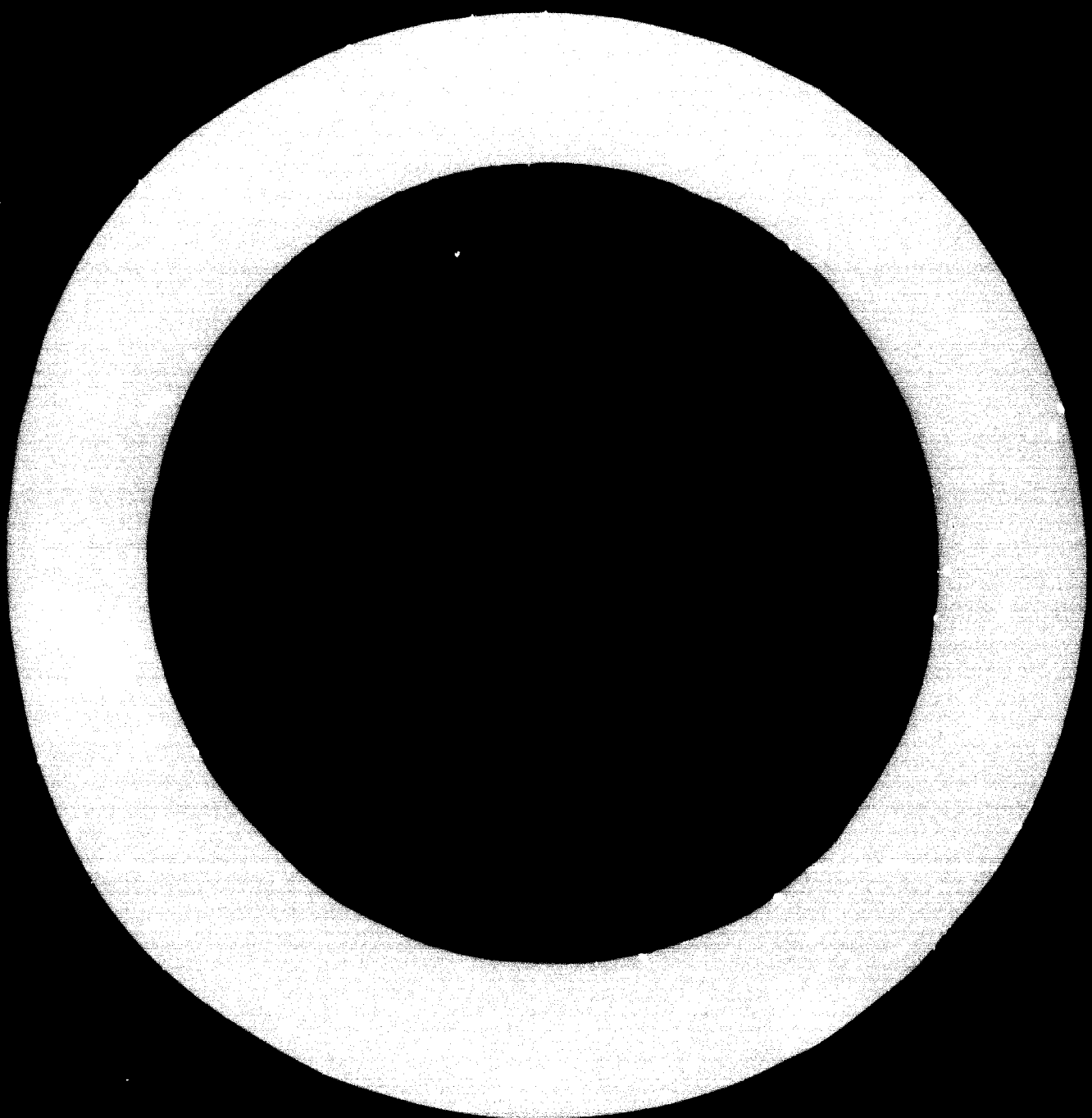

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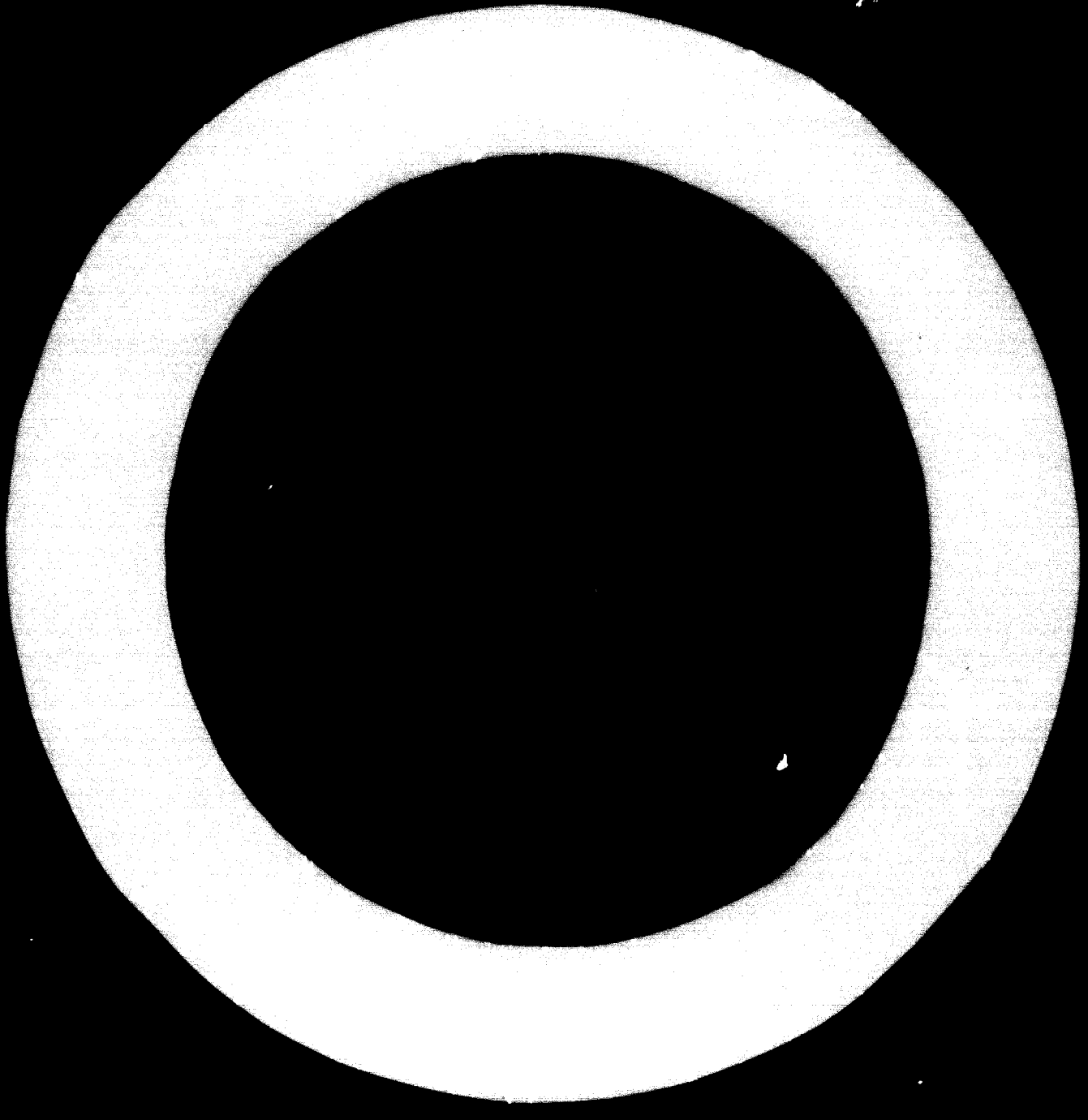

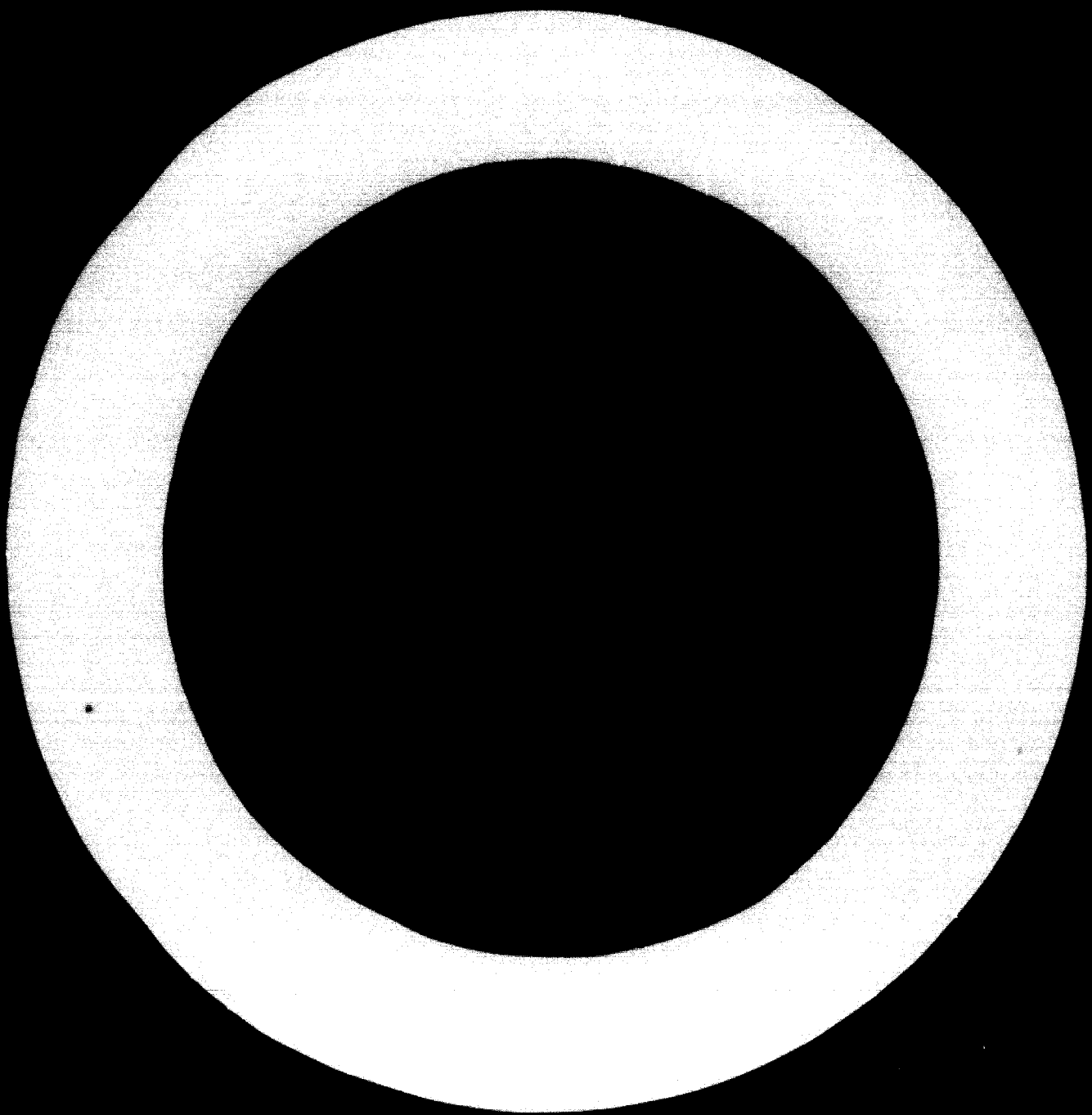

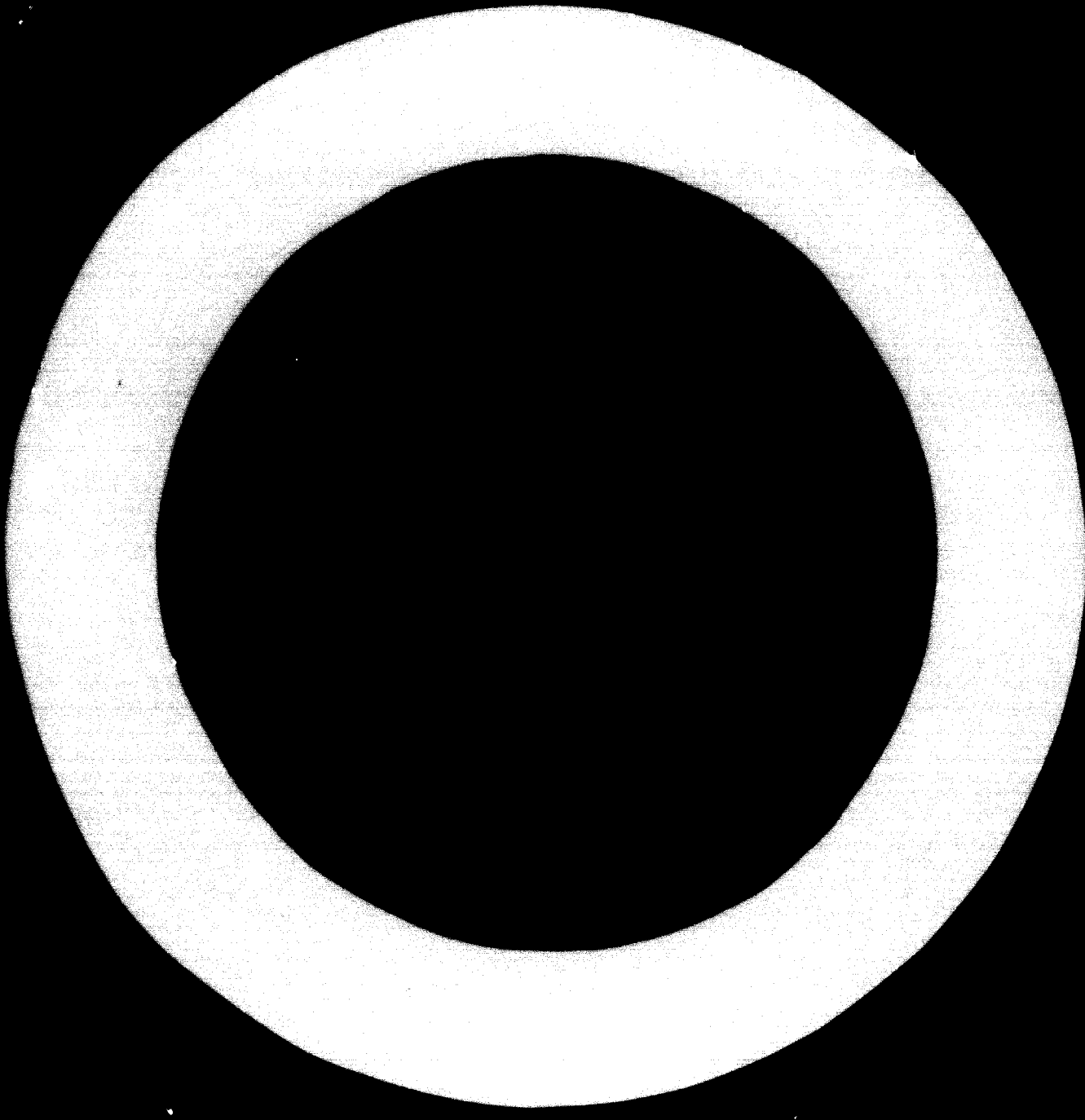

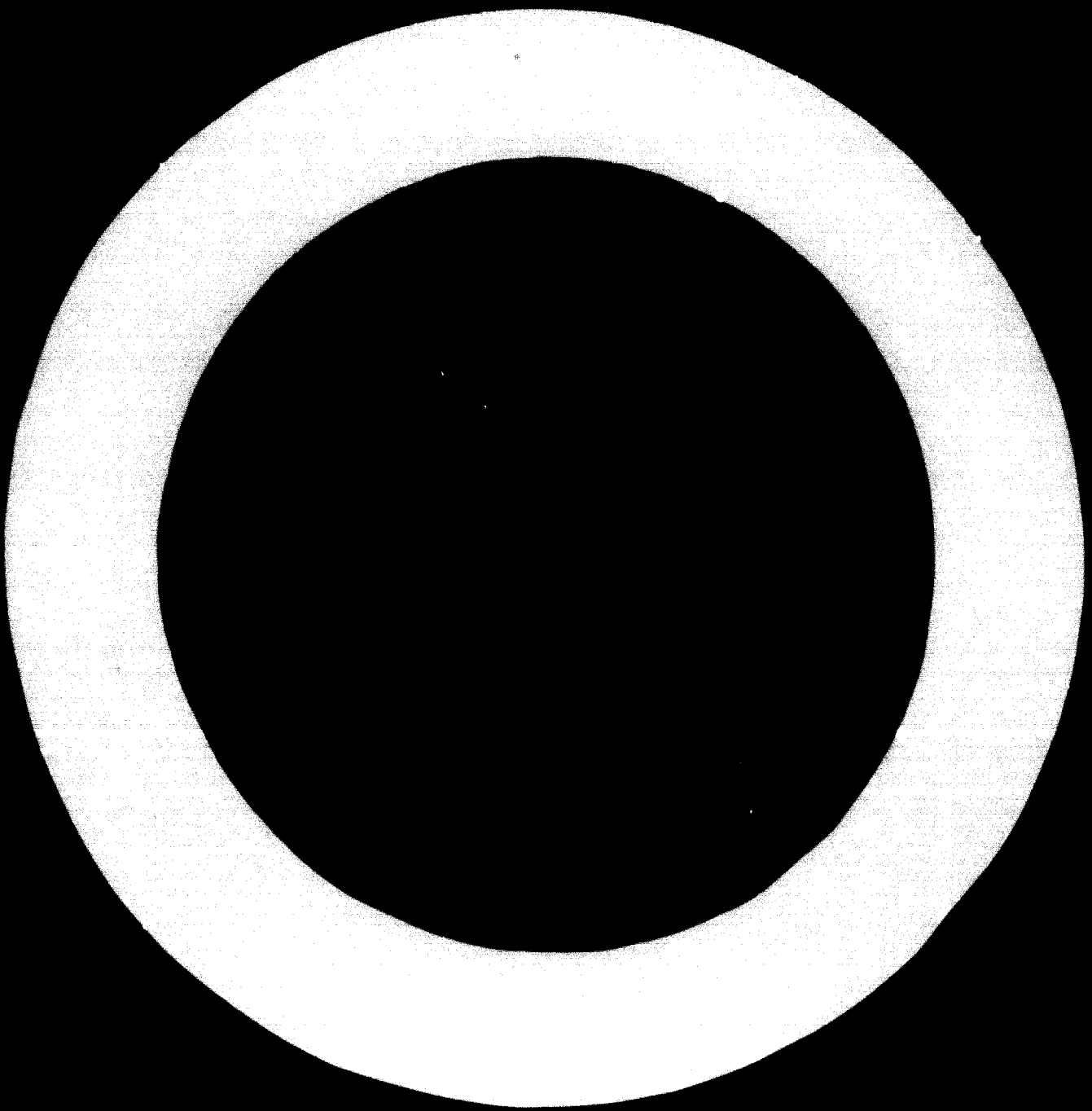

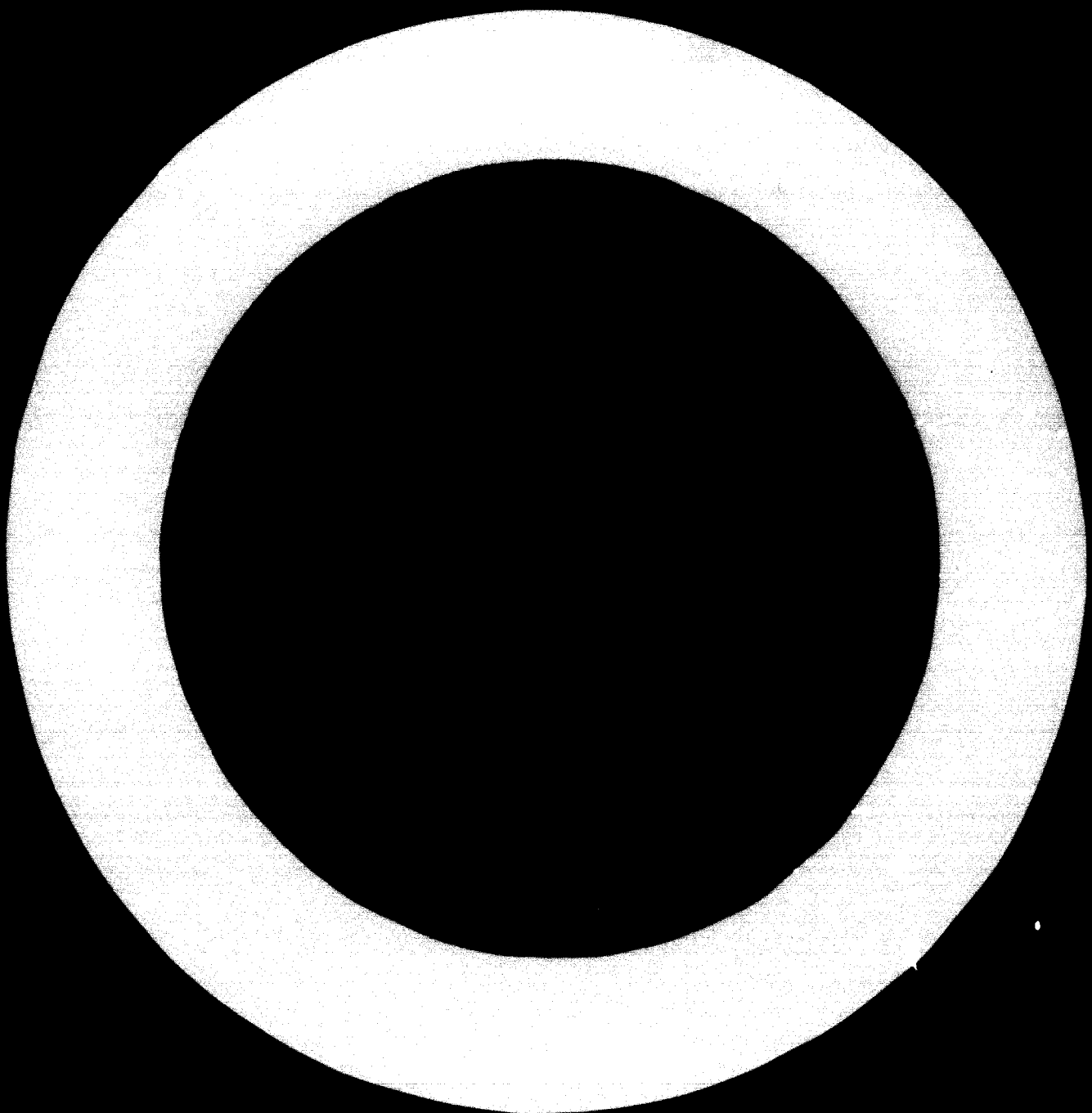

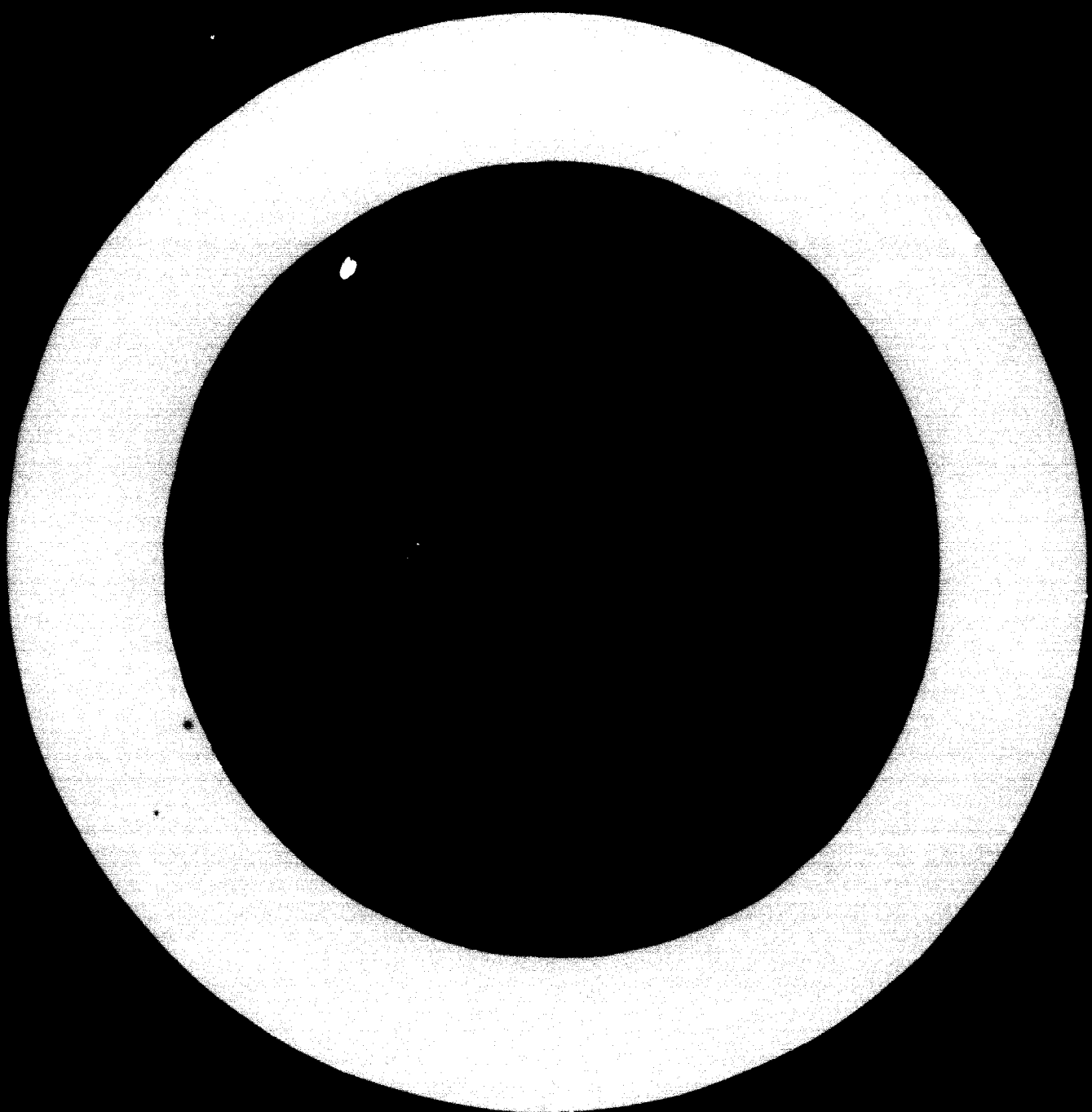

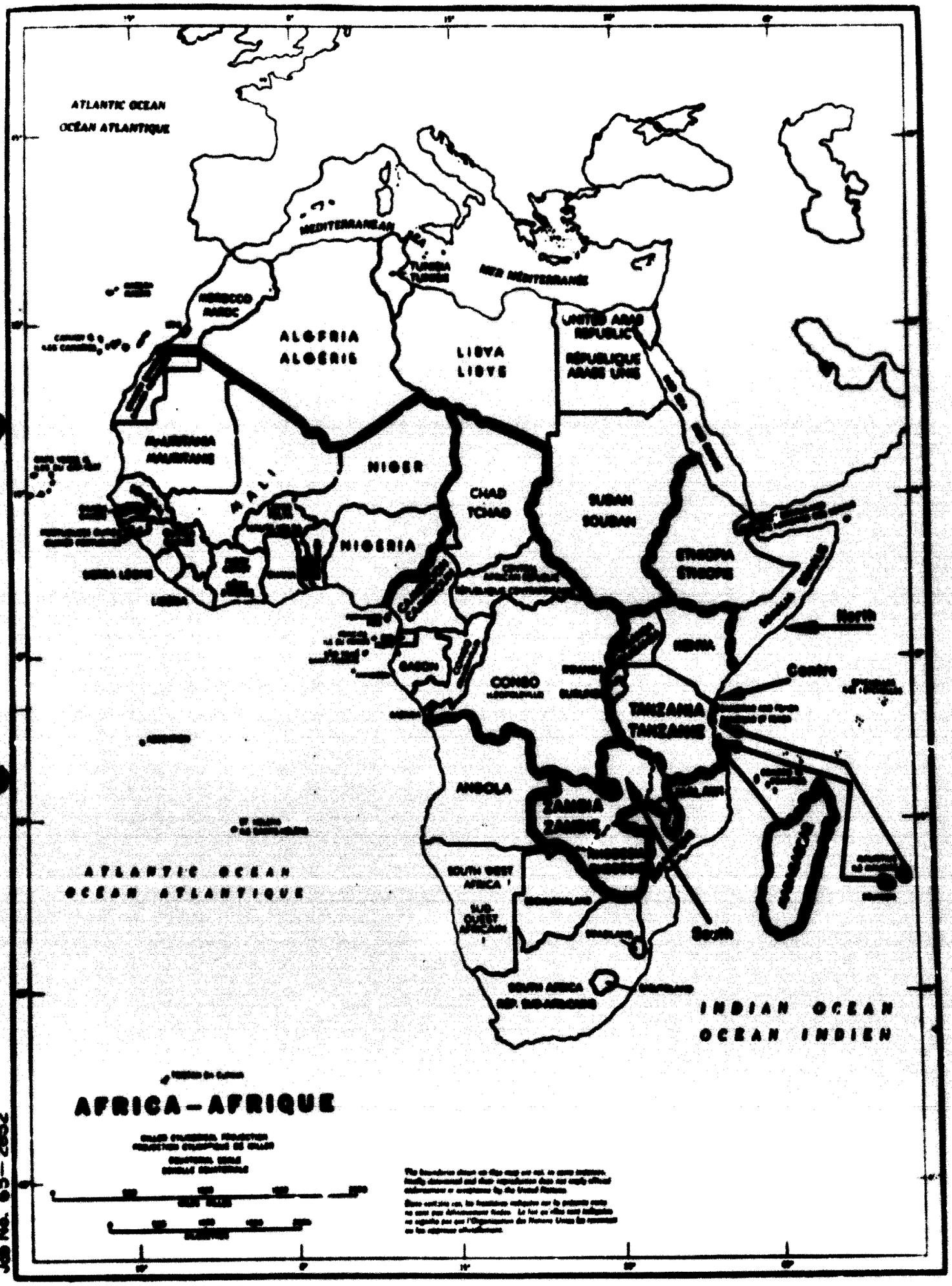

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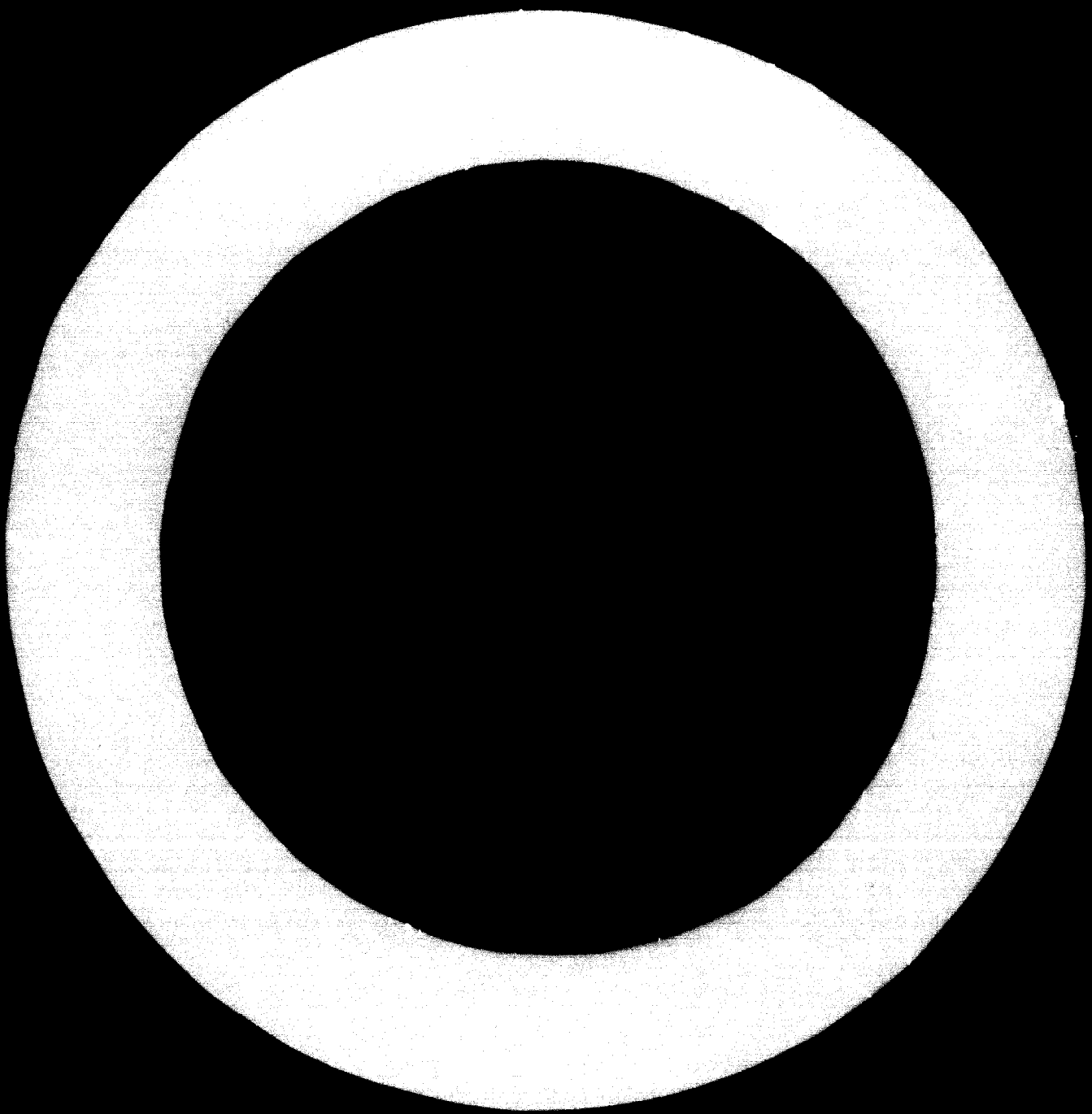

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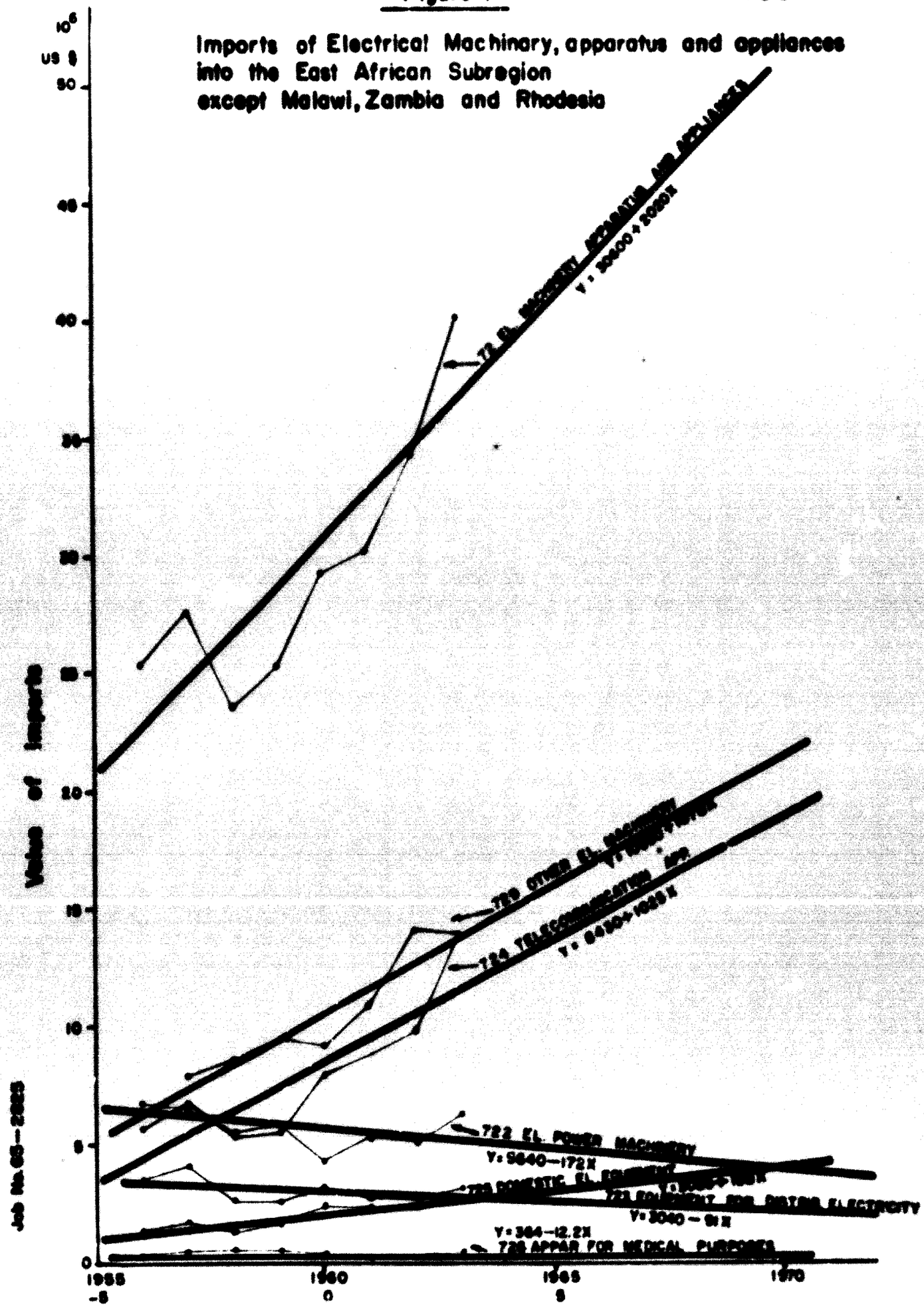
Figure 1

Imports of Electrical Machinary, apparatus and appliances into the East African Subregion except Malawi, Zambia and Rhodesia



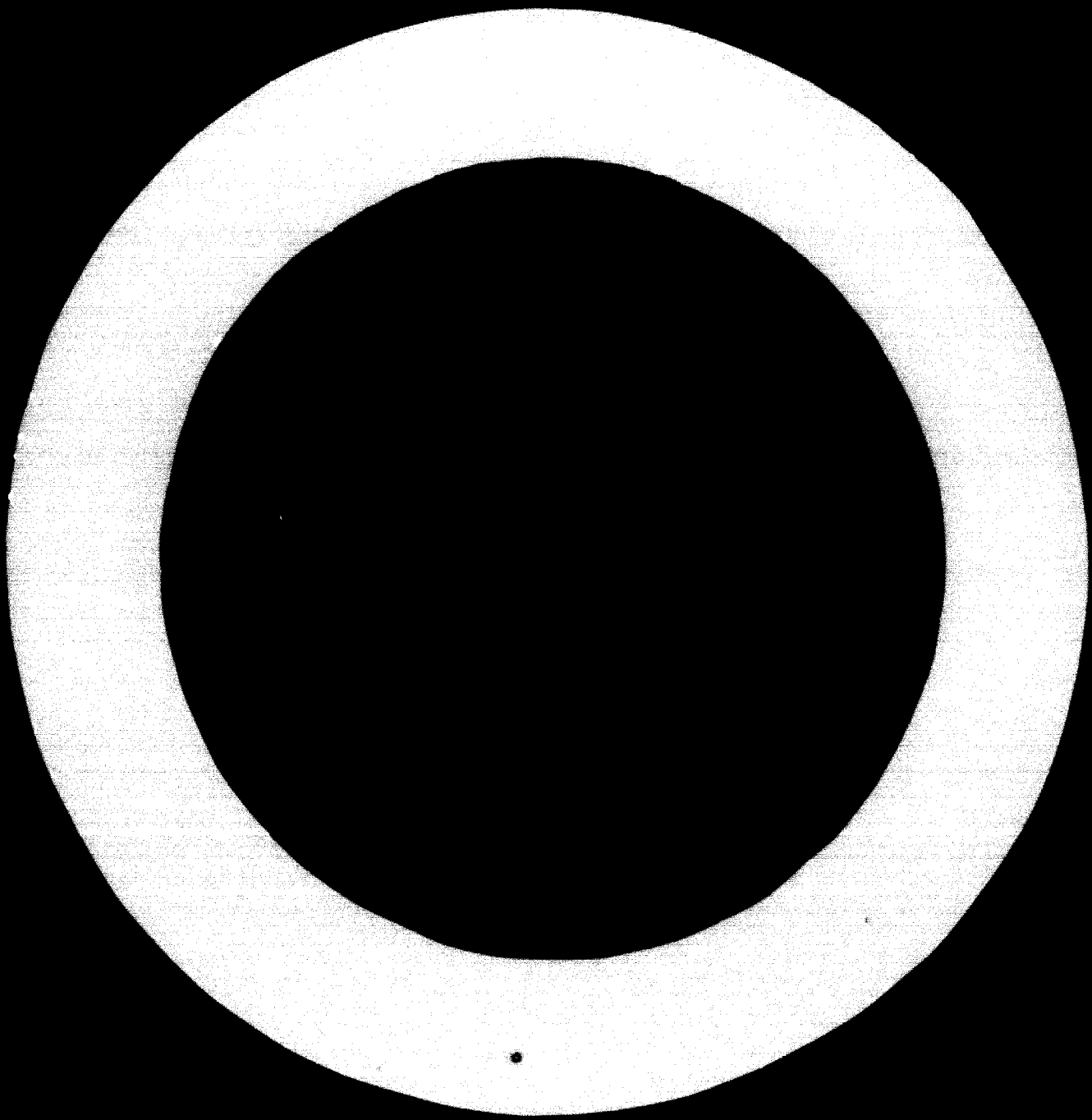
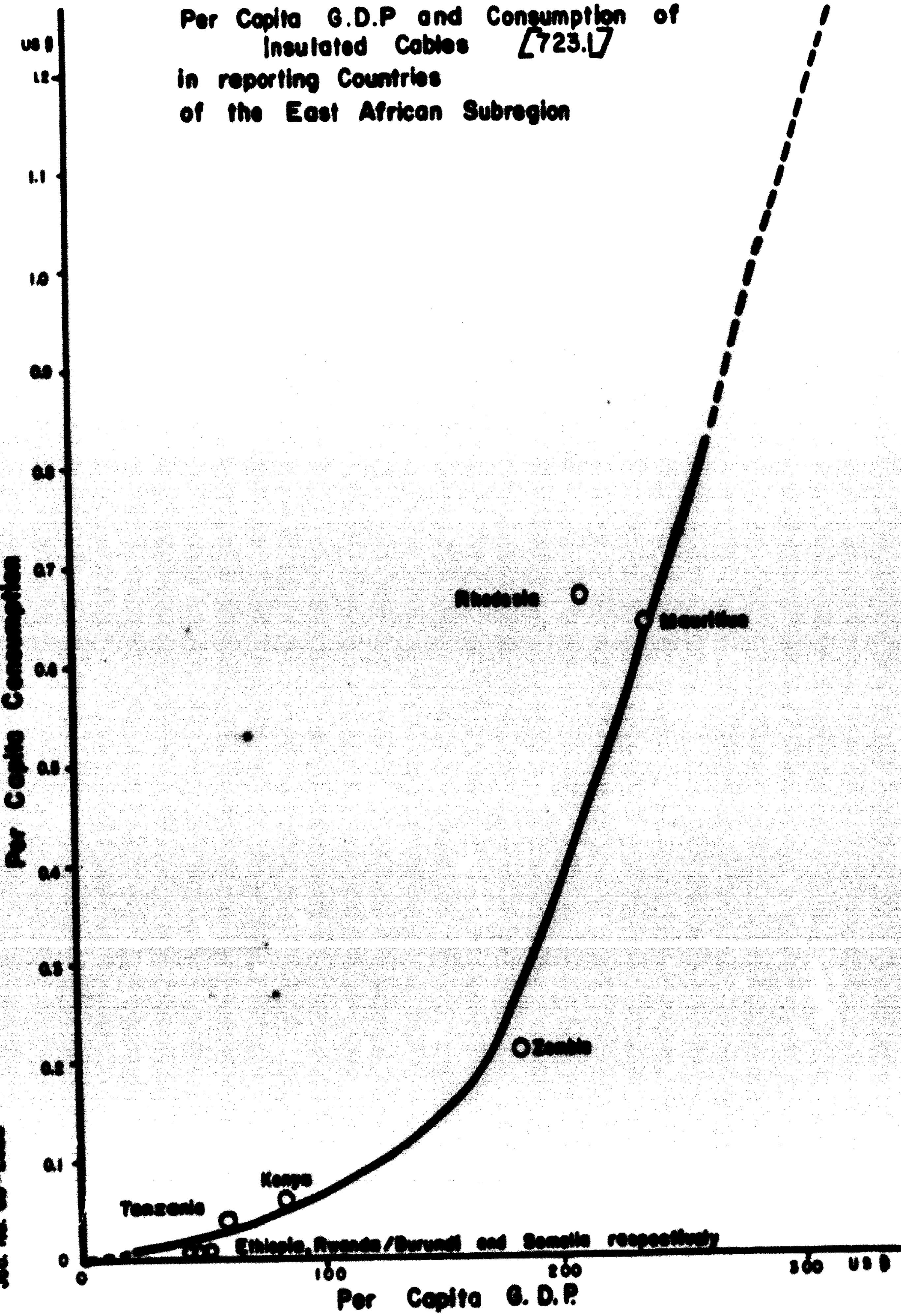


Figure 2

Per Capita G.D.P and Consumption of Insulated Cables [723.1] in reporting Countries of the East African Subregion



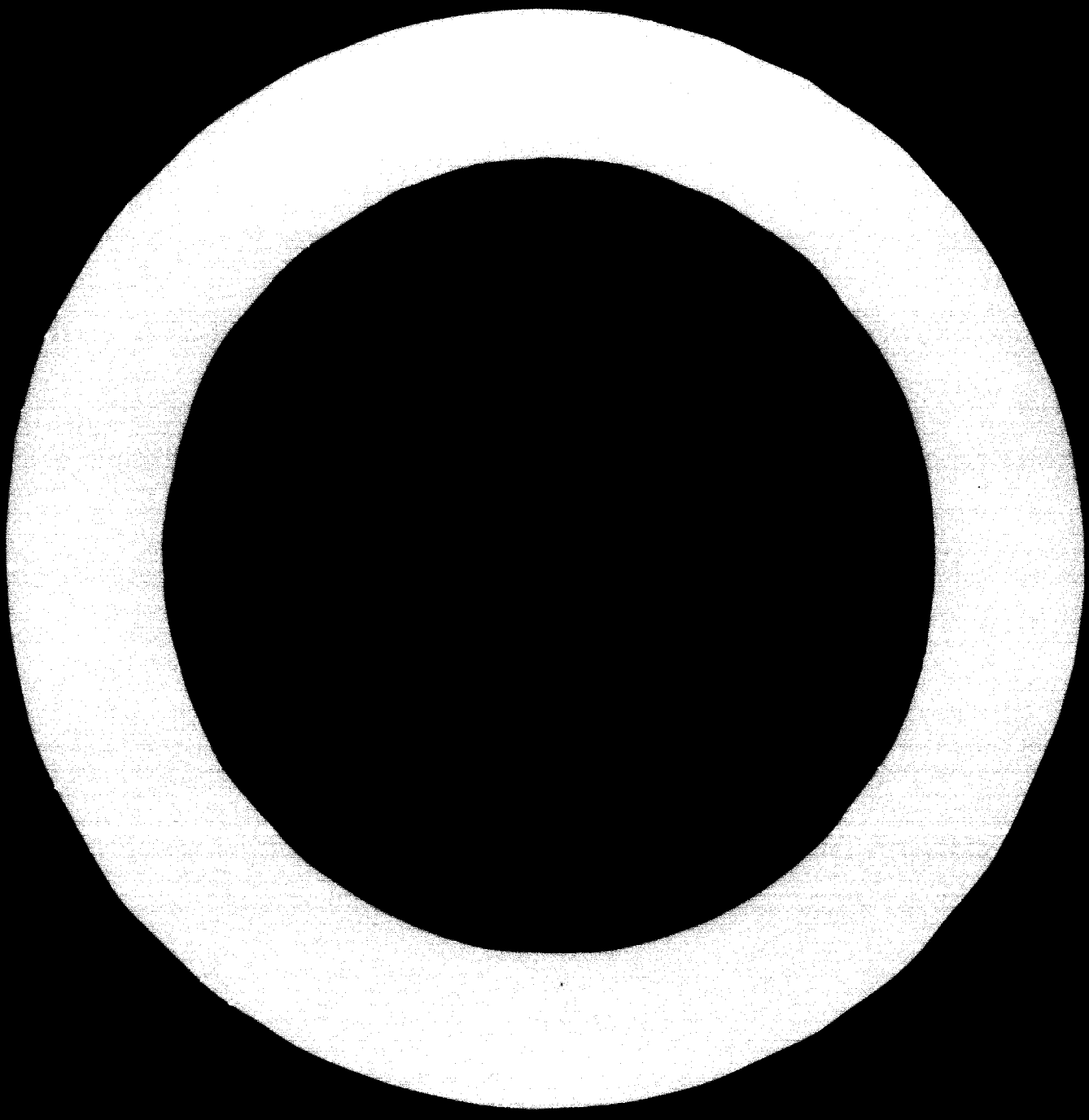


TABLE I.1

General Indicators

for the countries of the East African Sub-region

1963

Country	Area 000 sq.km.	Population: Total Million	Population: per sq.km.	Gross Domestic Product: Million US $	Gross Domestic Product: Per Capita US $	Gross Domestic Product: Per Sq. km. US $	Percentage share of Mining	Percentage share of Manufacturing	Growth Rate % 1960/70	Per Capita Cons.: Electric Energy kwh	Per Capita Cons.: Primary Energy kg.c.e.	Third Level Education: Within the Country	Third Level Education: With country plus abroad Total	Third Level Education: per 100,000	Installed power Station Capacity MW	Date of Independence
Ethiopia	1184	21.8	19	895	40	755	0.1	5.3 1/	4.3	6	11	1514	3557	17	86	o.c.
French Somali	22	0.1	3.0	25	300	1045	... 2/	3.1	5.0	158	278	...	...	..	7	N.I. 3/
Somali Republic	638	2.3	3.9	115	50	185	...	...	5.0	5	23	82 1/	274 1/	12	8	1.7.60
Kenya	583	8.8	15	715	80	1230	0.3	11.0	5.2	51	163	505 4/	2220	25	89	12.12.63
Uganda	240	7.2	30	465	65	1940	1.6	8.8	7.4	41	46	1127	3013	42	135	9.10.62
Tanzania	940	9.8	10.5	590	60	625	3.3	8.0 1/	6.7	160	50	47 1/	729 4/	8	68	9.12.61 10.12.63 5/
Burundi	28	2.7	96	140	50	5000	...	...	5.0	4	12	51	131	5	3	1.7.62
Rwanda	26	3.0	115	135	45	5230	...	...	5.0	3	13	-	66	3	22	1.7.62
Malawi	119	3.8	32	130	35	1100	-	6.6	5.0	9	...	-	355	...	15	6.7.64
Zambia	747	3.5	4.5	600	170	810	46.5	8.1	6.4	690	83	-	...	...	264	25.10.64
Rhodesia	389	4.0	10.5	835	210	2950	4.9	20.6	5.0	460	...	544 6/	...	...	1168	N.I.
Malagasy	596	5.9	10	685	115	1160	6.3 7/		4.8	20	37	1495 2/	2305	39	69	26.6.60
Mauritius	2	0.7	400	175	240	87000	0.1	19.1 1/	5.0	258	129	-	72	9	...	N.I.
Reunion	2.5	0.4	150	...	...	...	...	...	5.0	37	...	...	...	...	...	N.I.
Total	5580	74.0	13.5	5600	75	1000	...	...	...	...	...	...	...	...	...	

1/ 1962 figures   2/ not available   3/ Not independent   4/ Estimate   5/ Tanganyika then Zanzibar   6/ University of Rhodesia enrolment from Malawi, Zambia and Rhodesia. The number of students studying abroad is not available.

7/ 1960 figure covering mining and manufacturing.

Source: National Publications
UN Year Book of National Accounts and Other Publications
UNESCO
Statistical Division, ECA

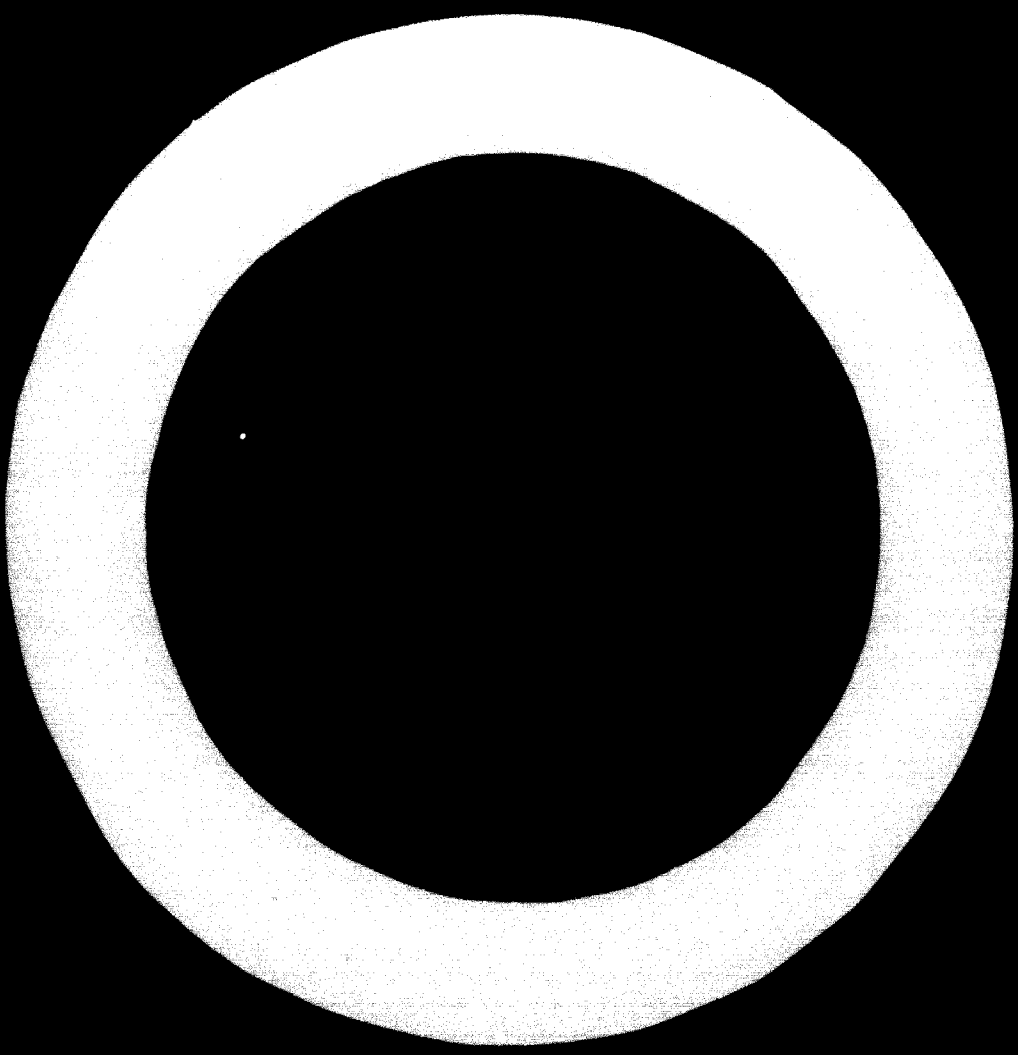


TABLE J.2

General Indicators

for the Countries of the North African Sub-region

1961

Country	Area 000 sq.km.	Population		Gross Domestic Product			Percentage share of		Growth rate % 1960/70	Per Capita Consumption		Third Level Education Within country	Plus Abroad		Date of
		Total million	Per sq. km.	Million US.$	Per Capita US$	Per sq. km. US$	Mining	Manufacturing		Electric Energy K.W.h.p.a	Primary Energy K.g.c.e.	Within the Country	Total	Per 1	
Morocco	414	12.9	27	1900	159	4,410	5.6 1/	14.3 1/	5.5	88	142	4972	...		
Algeria	2382	10.3	5	3471	339	1,835	3.6 2/	12.6 2/	5.8	133	255	7760	.	.	1.1
Tunisia	125	4.2	34	...	...	..	3.2 3/	13.0 3/	6.0	74	172	2643	...		
Libya	1760	1.2	1	231	186	130	7.7 4/	12.8 4/	8.1	92	310	897	...		1.1.
U.A.R.	1000	26.6	27	4150	156	4,150	0.9 5/	13.9 5/	5.5	140	278	112774	...		4...
Sudan	2506	12.1	5	874	72	350	0.1 1/	5.4 1/	5.1	8	51	3039	..	.	1.1.
TOTAL	8217	66.9	8	...	...	...	...	...	...	101	...	...	...	...	

1/ 1962 data; 2/ 1963 data; 3/ 1960 data; 4/ 1959 data; 5/ 1958 data.

Sources

National Publications
UN Year book of National Accounts and other Publications
Statistical Division, E.C.A.

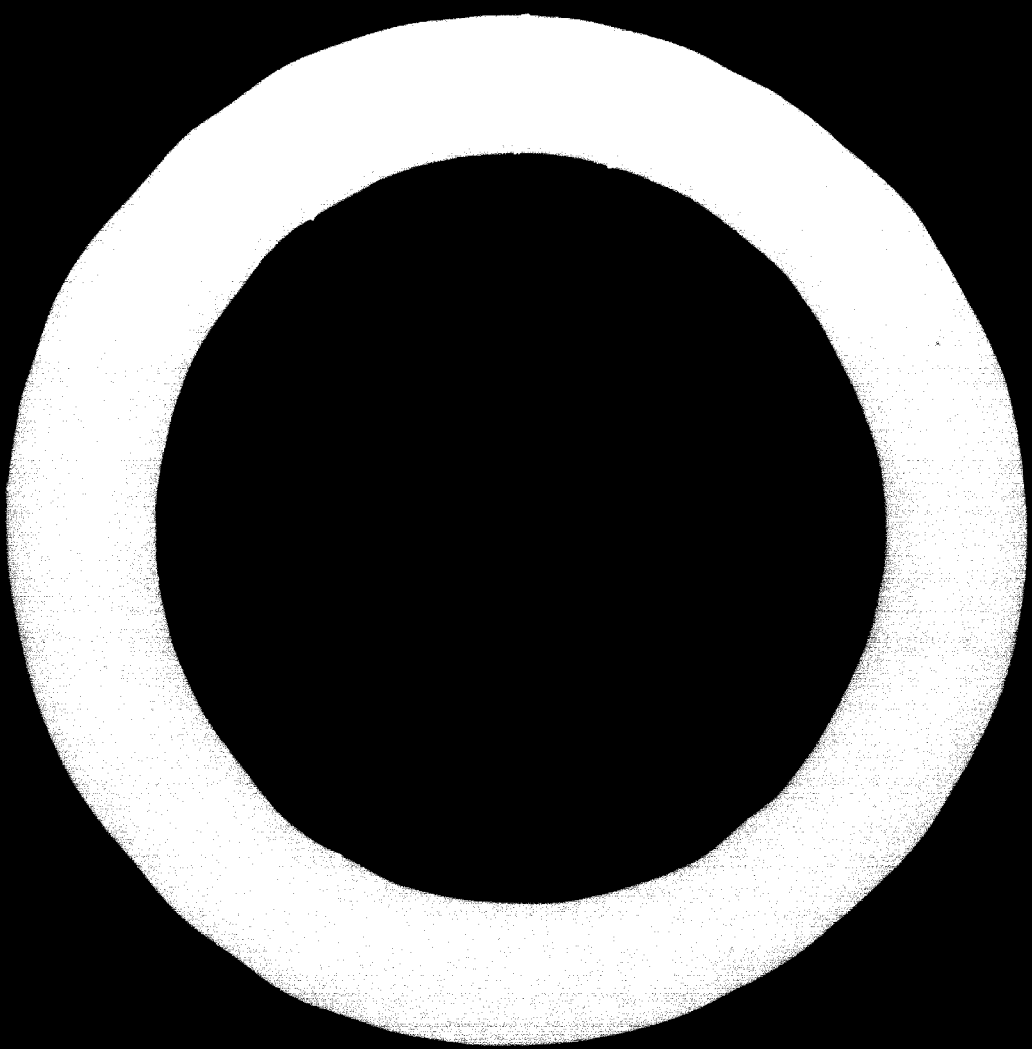


TABLE [illegible]

General Indicators

For the Countries of the West African Sub-region

1961

Country	Area 000 sq.km.	Population: Total Million	Population: Per square Km.	Gross Domestic Product: Million US.$	Per Capita US.$	Per Sq.km. US.$	Percentage Share of: Mining	Percentage Share of: Manufac.	Growth rate % 1960/70	Per Capita Consumption: Electric Energy Kwh.	Per Capita Consumption: Primary Energy [illegible]	Third Level Education: Within the Country	Within Country Plus Abroad: Total	Within Country Plus Abroad: Per [illegible]	Date of Independence
Nigeria	[illegible]	35.8	39	3078	86	3331	1.2 1/	3.3 1/	2.2	18	[illegible]	[illegible]	...	...	[illegible]
Togo	57	1.5	26	108	73	1895	5.2 2/		3.3	7	3	...	...	...	[illegible]
Ghana	239	7.0	42	1337	187	5616			[illegible]	56	[illegible]	[illegible]	...	...	[illegible]
Dahomey	116	2.1	18	164	80	1414	9.9 3/		2.9	5	30	...	..	...	[illegible]
Niger	1267	2.9	2	167	57	132	[illegible] 4/		3.2	3	8	...	..	...	[illegible]
Mali	1204	4.2	3	332	79	276	[illegible] 2/		5.8	[illegible]	14	...	...	...	[illegible]
Upper Volta	274	4.4	16	161	43	[illegible]	12.[illegible] 3/		4.6	2	9	...	...	...	[illegible]
Ivory Coast	322	3.3	10	472	143	1466	12.3 2/		[illegible]	27	[illegible]	[illegible]	...	...	[illegible]
Guinea	246	3.2	12	...	..	...	...	...	4.7	6	28	...	...	..	[illegible]
Senegal	197	3.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] 5/	8.6 6/	[illegible]	57	108	1612	...	...	[illegible]
Mauritania	1086	0.77	1	[illegible]	[illegible]	[illegible]	...	...	6.6	...	[illegible]	..	...	...	[illegible]
Sierra Leone	72	2.5	[illegible]	...	...	...	...	...	4.7	20	[illegible]	[illegible]	...	...	[illegible]
Liberia	111	1.0	[illegible]	...	...	...	...	...	4.7	110	61	[illegible]	...	...	[illegible]
Gambia	10	0.27	[illegible]	...	...	...	...	...	...	37	36	...	...	...	
Total	6124	72.0	12							22					

1/ Data for 1957; 2/ Data for 1958; 3/ Data for 1956; 4/ Data for 1959; 5/ Data for 1960, 6/ Data for 1962

Source:
National Publications; UN Year Book of National Accounts and other Publications; Statistical Division, E.C.A.

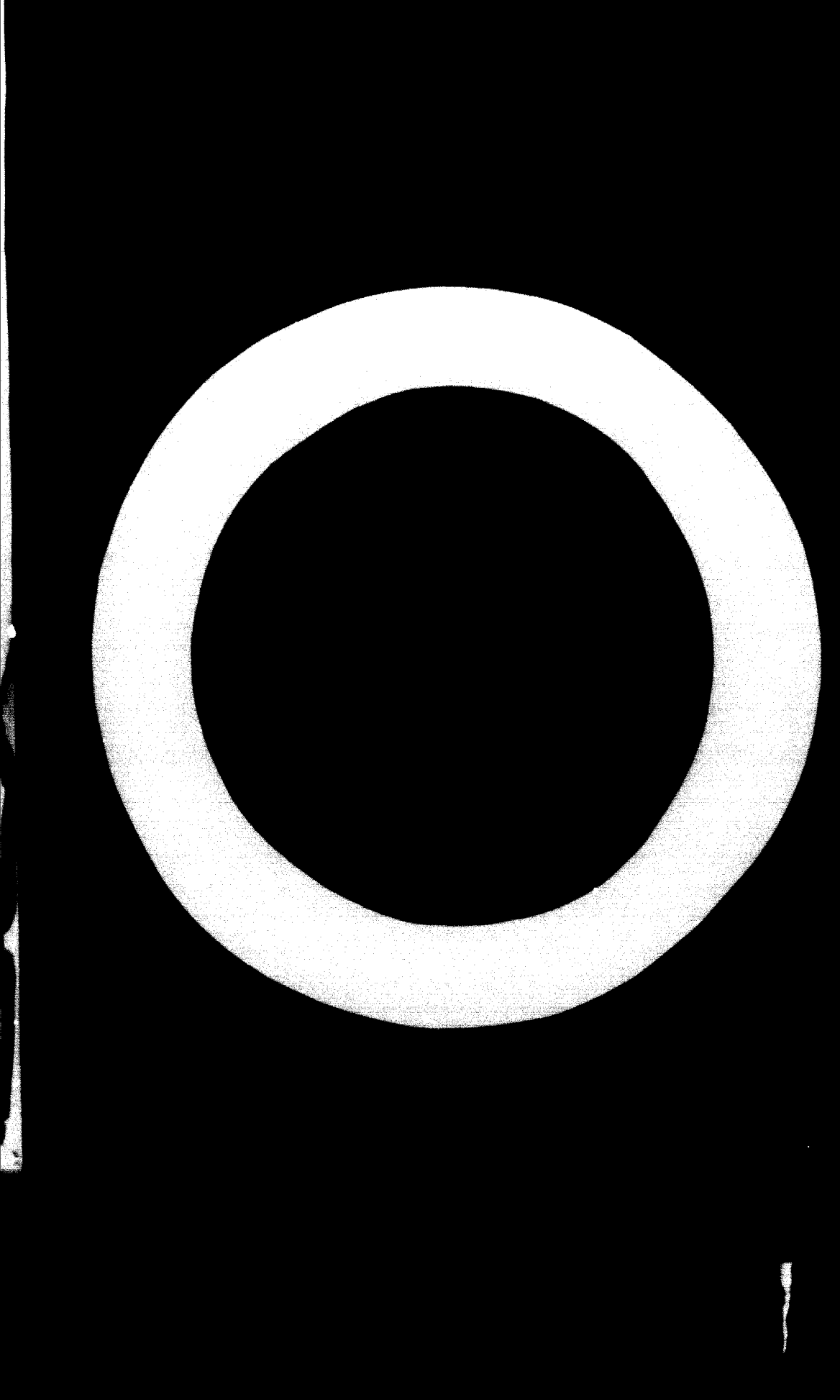


TABLE I.1

General Indicators

For the Countries of the Central African Sub-region

1961

Country	Area '000 Square Km.	Population Total Million	Population Per Square Km.	Gross Domestic Product Million US$	Gross Domestic Product Per Capita US$	Gross Domestic Product Per sq.km. US$	Percentage share of Mining	Percentage share of Manufac.	Growth Rate % 60/70	Per Capita Consumption Electric Energy K.W.H.	Per Capita Consumption Primary Energy K.G.C.A.	Third level Education Within Country	Third level Education Within Country Plus Abroad Total	Third level Education Within Country Plus Abroad per 100,000	Date of Information
Congo (Leo.)	2346	14.7	6	1247	100	617	16.3 1/	12.2 1/	5.2	248	99	1112	...	...	...
Congo (Braz.)	342	0.8	3	87	107	254	← 10.7 2/ →		7.3	37	159	468	...	...	...
Gabon	267	0.5	2	61	203	341	← 9.6 1/ →		6.9	40	154	...	..	...	...
Cam.	617	1.3	2	96	78	156	3.9	6.1	3.3	8	36	..	...	...	...
C.A.R.	617	1.3	2	96	78	156	...	5.3 1/	4.1	4	9	...	...	...	...
Chad	1284	2.7	2	160	60	125	...	6.1 4/	4.4	226	67	157	..	...	...
Cameroon	475	4.3	9 3/	387	62	815	...	...	...	192	...	...	...	...	
TOTAL	5331	24.3	5	2268	93	425	...	...	...						

1/ Data for 1958; 2/ Data for 1956; 3/ Data for 1960; 4/ Data for 1959.

Sources

National Publications

UN Year book of National Accounts and other Publications

Statistical Division, E.C.A.

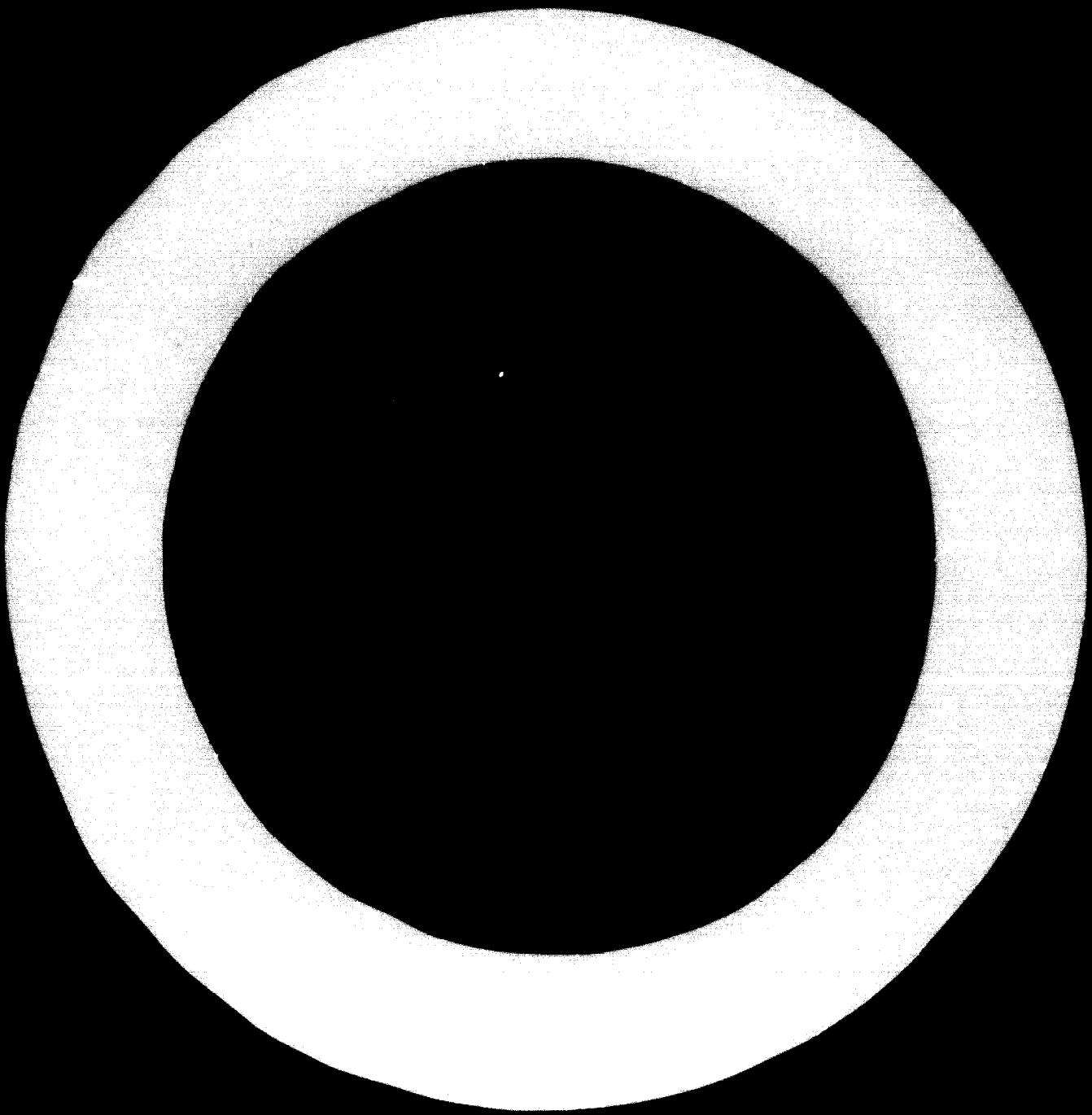


Table II.1 (1)

Imports of Electrical Machinery, apparatus and appliances into the countries of the East African Sub-region

Average Values over the period 1957 to 1960

Million U.S. Dollars per annum

SITC Revised	Commodity Group	Ethiopia A Value	Ethiopia %	Ethiopia B Value	East Africa A Value	East Africa %	East Africa B Value	The Rhodesias and Nyasaland A Value	The Rhodesias and Nyasaland %	The Rhodesias and Nyasaland Bo Value	The Rhodesias and Nyasaland B Value	Madagascar A Value	Madagascar %	Madagascar B Value	Subtotal 1 A Value	Subtotal 1 B Value	Subtotal 1 %	Somalia A Value	Somalia B1 Value	Mauritius A Value	Mauritius B1 Value	Reunion A Value	Reunion B1 Value	Subtotal 2 B2 Value	Fr.Somaliland Burundi and Rwanda B3 Value	Total B4 Value
72	Electrical Machinery app. and appliances	1.8	100	2.3	13.1	100	14.7	21.4	100	36.9	41.3	2.9	100	5.0	39.2	63.3	100	0.4	0.6	2.6	3.7	0.7	1.0	68.6	2.4	71.0
722.1	Rotating Machinery	0.2	11.1	0.3	0.8	6.1	0.9	2.6	12.2	4.5	5.0	0.5	17.2	0.9	4.1	7.1	11.2		0.1		0.4		0.1	7.7	0.2	8.0
722.2	Electric Switchgear	0.4	16.7	0.4	1.2	9.2	1.4	6.1	28.5	10.5	11.8	0.1	3.5	0.2	7.7	13.8	22.0		0.1		0.8		0.2	14.9	0.5	16.0
729.1	Electric Batteries	-	-	-	1.2	9.2	1.3	0.5	2.3	0.9	1.0	0.3	10.4	0.5	2.0	2.8	4.5		-		0.2		0.1	3.0	0.2	3.2
729.2	Bulbs and Lamps	-	-	-	0.1	0.7	0.1	0.3	1.4	0.5	0.6	-	-	-	0.4	0.7	1.1		-		-		-	0.7	0.1	1.0
724.2	Domestic Radio Receivers																									
724.1	Domestic Television Receivers	0.1	22.2	0.5	2.7	20.6	3.0	3.9	18.2	6.7	7.5	0.8	27.6	1.3	7.8	12.3	19.4		0.1		0.7		0.2	13.2	0.5	13.7
724.9	Other telecomm.and Telegraph apparatus																									
729.9(2)	Industrial furnaces electrical	-	-	-	-	-	-	0.1	0.5	0.2	0.2	-	-	-	0.1	0.2	0.3		-		-		-	0.2	-	-
729.9(3)	Other electrothermic apparatus	-	-	-	0.4	3.1	0.4	0.3	1.4	0.5	0.6	0.1	3.5	0.2	0.8	1.2	1.9		-		0.1		-	1.3	-	1.3
729.9(8)	Appliances for motor vehicles	-	-	-	0.6	4.6	0.7	0.5	2.3	0.9	1.0	0.1	3.5	0.2	1.2	1.9	2.9		-		0.1		-	2.0	0.1	2.1
729.9	Apparatus for measuring	0.1	5.6	0.1	0.6	4.6	0.7	2.2	10.3	3.8	4.2	0.3	10.4	0.5	3.2	5.5	8.7		0.1		0.3		0.1	6.1	0.1	6.2
729	Apparatus for Medical Purposes	-	-	-	0.1	0.7	0.1	-	-	-	-	-	-	-	0.1	0.1	0.1		-		-		-	0.1	-	0.1
723.1	Insulated Cables	0.3	16.7	0.4	1.4	10.7	1.6	1.9	8.9	3.3	3.7	0.3	10.4	0.5	3.9	6.2	9.8		0.1		0.4		0.1	6.7	0.3	7.0
729.6	Portable Electric Tools	-	-	-	0.1	0.7	0.1	0.2	0.9	0.3	0.4	-	-	-	0.3	0.5	0.8		-		-		-	0.5	0.1	0.6
	Others	0.5	27.7	0.6	3.9	29.8	4.4	2.8	13.1	4.8	5.4	0.4	13.5	0.7	7.6	11.1	17.3		0.1		0.7		0.2	12.1	0.3	12.5

Legend A = f.o.b. value of exports of the major exporting countries of the West, as provided by the Economic Commission for Europe, figures of exports from the Eastern European countries and China not being available.

B = Total c.i.f. value of imports as indicated by the country and its subdivision according to the percentages under A. For East Africa, the total c.i.f. value of imports given by the countries themselves was lower than the A value (f.o.b.) increased by 12% to cover sea freight and insurance and this latter value was taken.

Bo = For the Rhodesias and Nyasaland, same as B except that values are given f.o.b. In order to obtain B for this case, Bo is multiplied by 1.12 to cover freight and insurance.

B_1 = Case of country for which a figure for electrical machinery in total is given both by the E.C.E. and by the country statistics, but no details by either. The subdivision of B_1 is made according to percentages given under B in Subtotal 1.

B_2 = Under Subtotal 2 is the sum of all the Bos and the Bs.

B_3 = No figures are available for French Somaliland, Burundi and Rwanda, whose data for 1957 to 1960 was included in that of Congo - Leopoldville. The figure of US$2,400,000 for total imports cif for the three countries is an estimate. Within the approximation adopted in the last column for the total for the subregion it can vary from 1.9 to 2.8 million. The subdivision of the total is made according to the percentages of B under Subtotal 1.

B_4 = Average yearly cif value of imports into the 14 countries of the East Africa sub-region over the period 1957 to 1960 approximated to the nearest US$0.5 million.

Sources: The Economic Commission for Europe
Country publications.

Table [illegible] (a)

Imports of [illegible] machinery, apparatus and appliances [illegible] the countries of the North Africa Sub-region

Average Values over the period 1957-1960

Million U.S. Dollars [illegible]

	[illegible]	[illegible]		[illegible]		Tunisia		Libya		U.A.R.		Sudan		Total	
		A	B	A	B	A	B	A	B	A	B	A	B	A	B
[illegible]	[illegible] machinery, apparatus and appliances	[illegible]	14.6	[illegible]	4.5	5.5	[illegible]	5.1	5.6	23.9	26.[illegible]	4.3	4.8	101.3	112.[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.6	1.8	3.9	3.1	0.5	0.6	11.2	12.5
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.4	3.0	3.3	0.5	0.6	7.5	[illegible]
[illegible]	[illegible]	[illegible]	2.8	[illegible]	[illegible]	[illegible]	[illegible]	0.3	0.3	1.3	1.4	0.7	0.8	7.7	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-	0.2	0.2	-	-	2.1	2.3
[illegible]	[illegible]														
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.2	1.3	3.9	4.5	0.9	1.0	28.3	31.0
	[illegible] apparatus [illegible]														
[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	-	-	0.2	0.2	0.1	0.1	0.4	0.5
[illegible]	[illegible]	[illegible]	0.1	1.6	[illegible]	[illegible]	[illegible]	-	-	0.1	0.1		-	2.0	2.0
[illegible]	[illegible] motor vehicles	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.1	0.1	[illegible]	[illegible]	0.2	0.2	3.7	4.0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.3	1.4	1.6	0.2	0.2	8.8	10.0
[illegible]	[illegible]	[illegible]	.1	[illegible]	[illegible]	0.2	[illegible]	-	-	0.2	0.2	-	-	1.3	1.5
[illegible]	[illegible]	[illegible]	[illegible]	2.7	[illegible]	3.7	[illegible]	0.3	0.3	3.0	3.3	0.4	0.4	9.9	11.[illegible]
[illegible]	[illegible]	[illegible]	.1	[illegible]	[illegible]	.1	.1	-	-	-	-	0.1	0.1	0.9	1.0
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.8	1.0	7.2	8.0	0.7	0.8	17.4	19.[illegible]

[illegible] provided by the Economic Commission for Europe, figures of exports [illegible]

[illegible] the value of A whichever is the greater, and its subdivisions according [illegible]

Table I[illegible].1 (3)

Imports of Electrical Machinery, apparatus and Appliances into the Countries of the West African Sub-region

Average Values over the period 1957 - 1960

Million U.S. Dollars per Annum

SITC Revised	Commodity Group	Nigeria A	Nigeria B	Ghana A	Ghana B	Liberia A	Liberia B	Sub-Total * A	Sub-Total B Value	Sub-Total B Percent	West African Custom's Union 1/ A	West African Custom's Union B	Togo A	Togo B	Sierra Leone A	Sierra Leone B	Gambia A	Gambia B	Total A	Total B
72 *	Electrical Machinery Apparatus and Appliances	16.3	18.3	7.6	[illegible]	[illegible]	[illegible]	26.0	2[illegible].2	100	10.7	14.9	0.6	0.8	1.3	1.8	0.3	0.4	38.9	47.[illegible]
722.1	Rotating Machinery	[illegible].7	[illegible]	0.4	0.5	0.5	0.6	11.6	[illegible]	6.5		1.0		0.1		0.1		-		3.0
722.2	Electric Switchgear and Transformers	0.7	[illegible].8	0.4	0.5	0.3	0.3	2.4	[illegible]	2.5		0.8		0.1		0.1		-		[illegible]
72[illegible].1	Electric Batteries and Accumulators	2.0	2.2	[illegible]	1.2	0.1	0.1	3.6	[illegible]	11.3		1.7		0.1		0.2		0.1		5.5
7[illegible].2	Bulbs and Lamps	0.2	0.2	0.1	0.1	-	-	0.3	[illegible]	1.0		0.1		-		-		-		0.5
7[illegible].4	Domestic Radio Receivers																			
7[illegible].1	Domestic Television Receivers	[illegible].6	[illegible].2	[illegible]	1.6	[illegible]	0.3	[illegible]	[illegible]	24.3		3.6		0.8		0.5		0.1		11.5
724.9	Other Telecomm. Appliances and Telegraph																			
7[illegible].[illegible](2)	Industrial Furnace Electrical	-	-	-	-	-	-	-	-	-		-		-		-		-	-	-
729.[illegible](9)	Other Electrothermic Apparatus	0.3	0.3	0.1	0.1	-	-	0.4	[illegible].4	1.4		0.2		-		-		-		0.5
7[illegible].4(?)	Appliances for Motor Vehicles	[illegible].5	0.6	0.4	0.5	0.1	0.1	1.0	[illegible].2	4.1		0.6		-		0.1		-		2.0
729.5	Apparatus for Measuring	0.8	0.9	0.2	0.2	-	-	1.0	[illegible]	[illegible]		[illegible].6		-		0.1		-		2.0
726	Apparatus for Medical Purposes	0.1	0.1	-	-	-	-	0.1	[illegible].1	0.3		0.1		-		-		-		-
7[illegible].1	Insulated Wire and Cables	2.1	[illegible].4	[illegible]	1.2	[illegible]	0.1	[illegible]	[illegible].7	12.[illegible]		[illegible]		0.1		0.2		0.1		[illegible]
7[illegible].[illegible]	[illegible] Electric [illegible]	[illegible].1	0.1	0.1	0.1	-	-	0.2	0.2	[illegible]		[illegible]		-		-		-		[illegible]
	Others	[illegible]	[illegible].7	2.5	2.8	0.[illegible]	[illegible]	7.4	[illegible]	23.4		4.2		0.2		0.5		0.1		11.0

[illegible] of the value of exports [illegible] major exporting countries of the West, as provided by the Economic Commission for Europe, figures of exports from [illegible] being available.

[illegible] imports as indicated by the country or 1.2 times the value of A whichever is the greater, and its sub-division according [illegible] of A for Nigeria, Ghana and Liberia. For the countries of the previous West African Custom's Union, Togo, Sierra [illegible] no details are given either by the [illegible] or the countries themselves, the sub-division is made according to the percentages [illegible].

1/ [illegible] African Custom's Union was composed of Niger, Dahomey, Upper Volta, Ivory Coast, Mali, Guinea, Senegal and Mauritania.

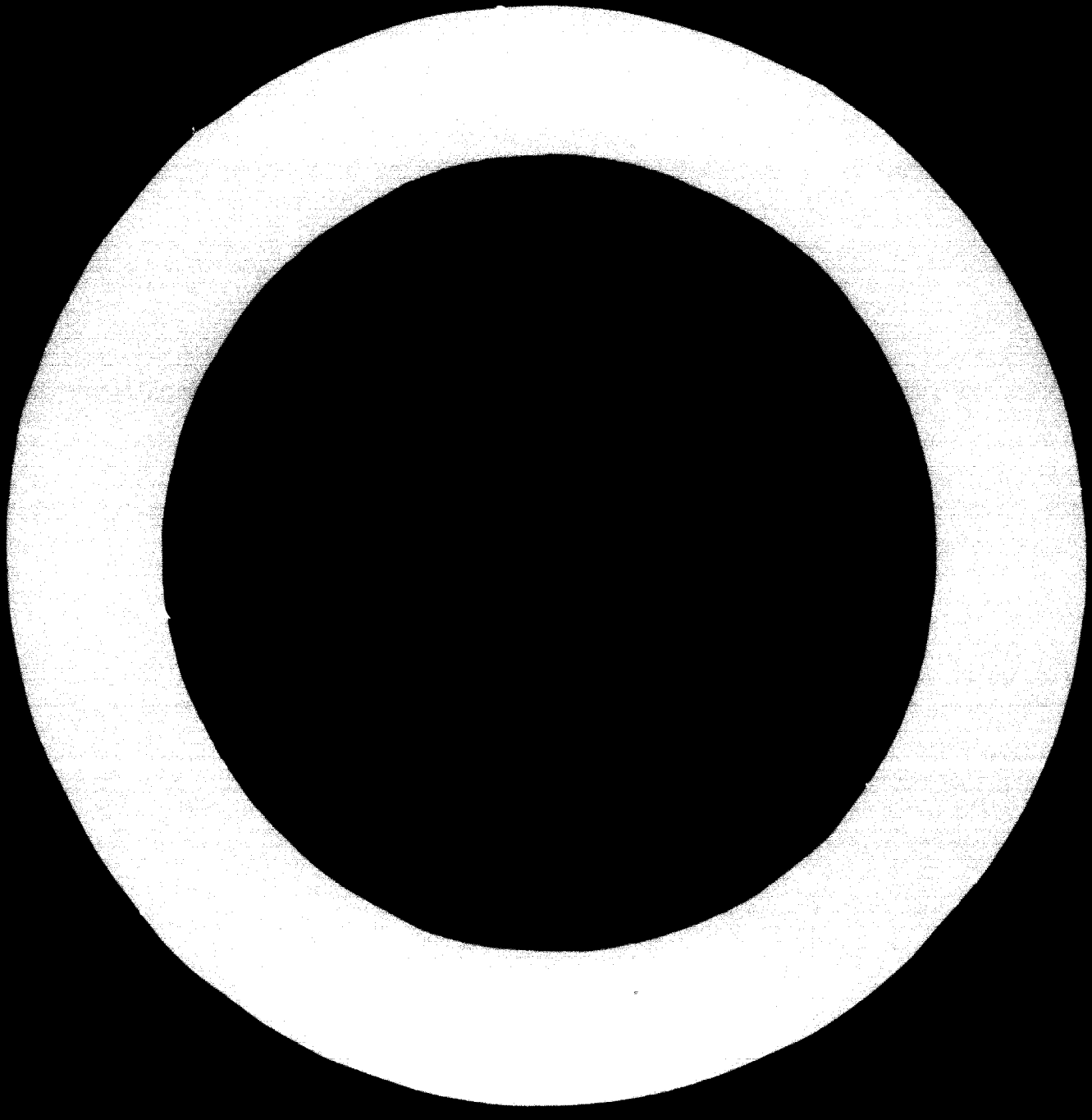


Table II.1 (A)

Imports of Electrical Machinery Apparatus and Appliances into the Countries of the Central Africa Sub-region

Average Values over the Period 195[illegible] - 196[illegible]

Million U.S. Dollars per Annum

S I T C Revised	Commodity Group	Congo(Leo)		E.C.U. 1/		Cameroun 2/		Total	
		A	B	A	B	A	B	A	B
72	Electrical Machinery Apparatus and Appliances	7.5	8.4	4.5	5.2	....	4.6	...	18.0
722.1	Rotating Machinery	1.0	1.1	0.7	0.8		0.5		2.5
722.2	Electric Switchgear and Transformers	0.9	1.0	0.2	0.2		0.4		1.5
729.1	Electric Batteries and Accumulators	1.1	1.2	0.4	0.5		-		1.7
729.2	Bulbs and Lamps	-	-	0.1	0.1		-		-
729.4	Domestic Radio Receivers								
724.1	Domestic Television Receivers	1.2	1.3	0.8	0.9		0.7		3.0
724.2	Other Telecomm.Appliances and Telegraph								
729.9(2)	Industrial Furnaces Electrical	-	-	-	-		-		-
729.9(9)	Other Electrothermic Apparatus	0.2	0.2	0.1	0.1		-		0.5
729.4(2)	Appliances for Motor Vehicles	0.4	0.5	0.4	0.5		-		1.0
729.5	Apparatus for Measuring	0.4	0.5	0.4	0.5		-		1.0
726	Apparatus for Medical Purposes	-	-	0.1	0.1		0.4		0.5
723.1	Insulated Cables	0.4	0.5	0.5	0.6		0.4		1.5
729.6	Portable Electric Tools	0.1	0.1	0.1	0.1		0.2		0.5
	Others	1.8	2.0	0.7	0.8		2.0		4.2

Legend: A = f.o.b. value of exports of the major exporting countries of the West, as provided by the Economic Commission for Europe, figures of exports from the Eastern European countries and China not being available.

B = Total c.i.f. value of imports as indicated by the country or 1.20 times the value of A whichever is the greater, and its sub-divisions according to the relative sub-divisions of A.

1/ Equatorial Customs Union comprising Congo(Braz.),Gabon, Central African Republic and Chad.

2/ The ECE did not provide complete data for the Cameroun (Col.A) and the c.i.f. values of imports given under B ard obtained from country publications

Sources: The Economic Commission for Europe - [illegible]

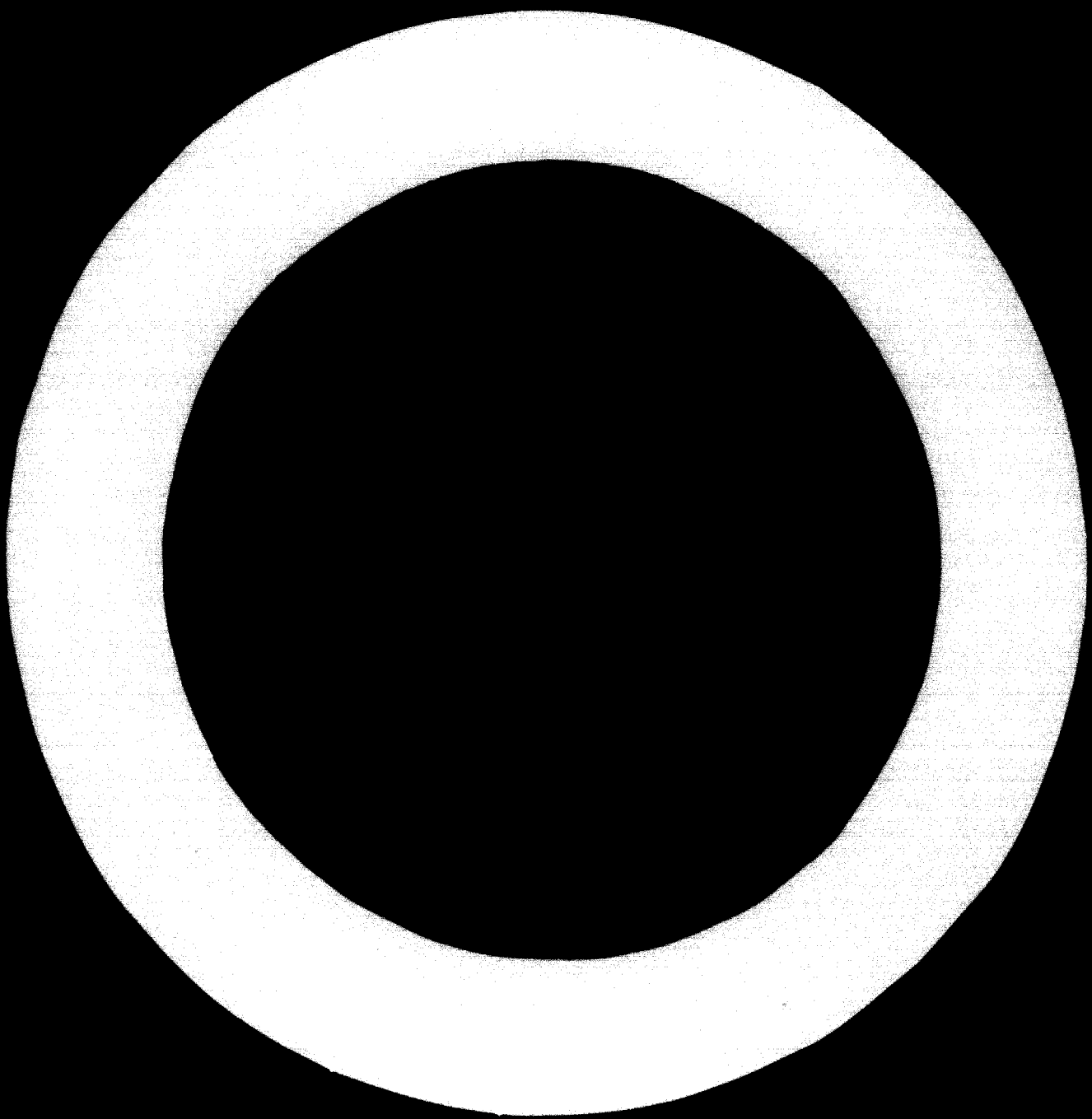


TABLE II.1 (5)

Imports of Electrical Machinery, apparatus and appliances into the countries of Africa

Average CIF Values over the period 1957 to 1960

Million U.S. Dollars per annum

SITC Revised	Commodity Group	Sub-region East African	Central African	West African	North African	TOTAL 4 Sub-regions	South Africa	Angola	Mozambique
72	Electrical Machinery, apparatus and appliances	71.0	18.0	47.0	112.0	248.0	93.0	3.0	3.0
722.1	Rotating Machinery	6.0	2.5	3.0	12.5	26.0	13.0	0.5	1.5
722.2	Electric Switchgear and Transformers	16.0	1.5	2.5	8.5	28.5	22.0	—	—
729.1	Electric Batteries and accumulators	3.0	1.5	5.5	8.5	18.5	2.0	—	—
729.3	Bulbs and lamps	1.0	—	0.5	2.5	4.0	1.5	—	—
724.2	Domestic Radio Receivers								
724.1	Domestic Television Receivers	13.5	3.0	11.5	31.0	59.0	18.5	0.5	0.5
724.9	Other Telecommunication and telegraph apparatus								
729.3(2)	Industrial Furnaces Electrical	—	—	—	0.5	0.5	1.0	—	—
729.9(3)	Other Electrothermic apparatus	1.5	0.5	0.5	2.0	4.5	2.0	—	—
729.4(2)	Appliances for motor vehicles	2.0	1.0	2.0	4.0	9.0	3.5	—	—
729.5	Apparatus for measuring	6.0	1.0	2.0	10.0	19.0	7.5	—	—
726	Apparatus for medical purposes	—	0.5	—	1.5	2.0	1.0	—	—
723.1	Insulated cables	7.0	1.5	6.0	11.0	25.5	5.5	0.5	—
729.6	Portable Electric tools	0.5	0.5	0.5	1.0	2.5	1.5	—	—
	Others	12.5	4.5	13.0	19.0	49.0	14.0	1.5	1.0

Sources: The Economic Commission for Europe
Country Publications

Table V.

[illegible] than Electric into the Countries of the East African Sub-region

[illegible] the Period 1967 - 1970 [illegible] Dollars per Annum

Code	Item	[illegible] A Vol.	[illegible] B Val.	[illegible] A Vol.	[illegible] B Val.	[illegible] A Vol.	[illegible]	[illegible] B Val	[illegible] A Vol.	[illegible] B Val.	Sub-total 1 A Vol.	Sub-total 1 B Val.	%	Somalia A Val.	Somalia B Val.	Mauritius A Vol.	Mauritius B1 Val.	Reunion A Vol.	Reunion B1 Val.	Sub Total B Value	Fr. Som. Eur/Ewa B3 Value	Total B4 Val.
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	31.[illegible]	[illegible].9	69.[illegible]	7.5	[illegible]	74.4	119.9	100	[illegible]	[illegible]	[illegible].8	4.4	2.7	3.1	130.0	4.0	[illegible]
	Power generating [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.6	1.6	[illegible]	10.1	1[illegible].2	11.8		0.3		0.5		0.4	15.4	0.1	15.5
	of which Internal Combustion Engines	([illegible])	([illegible])	(0.1)	[illegible]	(2.4)	([illegible])	(1.3)	(0.3)	(1.1)	([illegible])	(8.4)	(5.3)		(0.1)		(0.2)		(0.2)	(6.9)	(0.1)	(7.0)
	Agricultural Machinery other than Tractors	-	-	[illegible]	2.[illegible]	1.0	2.[illegible]	3.0	0.2	[illegible]	2.7	5.5	4.6		0.2		0.2		0.1	5.9	0.2	6.0
	Tractors	0.4	0.5	4.6	5.[illegible]	4.[illegible]	[illegible]	[illegible].4	0.9	[illegible]	10.1	13.1	10.9		0.3		0.5		0.3	14.2	0.3	14.5
	Office Machinery	[illegible]	0.2	[illegible]	1.3	[illegible].4	1.[illegible]	[illegible]	0.3	0.4	2.7	3.9	3.2		0.1		0.1		0.1	4.3	0.2	4.5
	Metal Working Mach.	[illegible]	[illegible]	.3	0.9	1.0	0.8	0.9	0.1	0.1	1.5	2.0	1.7		-		0.1		0.1	2.2	0.1	2.5
	of which Machine Tools (Metal)	(0.1)	(0.1)	(0.1)	(0.1)	([illegible])	([illegible])	([illegible])	-	-	(0.7)	(1.0)	(0.8)		(-)		(-)		(-)	(1.0)	-	(1.0)
	Other Industrial [illegible]	([illegible])	([illegible])	([illegible])	([illegible])	(19.3)	(45.0)	(50.4)	(3.0)	(6.3)	(47.4)	([illegible])	([illegible])		(1.8)		(3.0)		(2.1)	(85.2)	(2.8)	([illegible])
	Pumps	-	-	1.7	1.6	1.3	2.0	3.4	0.4	0.5	3.4	5.7	4.8		0.2		0.2		0.1	6.2	0.3	6.5
	Construction Machinery	[illegible]	0.3	0.4	0.4	0.7	1.[illegible]	1.6	0.3	[illegible]	1.7	2.9	2.4		0.1		0.1		0.1	3.2	0.3	3.5
	Earth Moving Machinery	[illegible]	[illegible]	1.1	1.2	1.5	4.2	4.7	0.4	0.5	4.1	7.3	6.1		0.2		0.3		0.2	8.0	-	8.0
	Conveying Machinery	0.2	0.2	1.0	1.1	1.8	4.[illegible]	4.7	0.3	.4	3.3	6.4	5.3		0.1		0.2		0.2	6.9	0.1	7.0
	Mining Machinery	0.1	[illegible]	0.6	0.7	1.3	3.0	3.4	0.1	0.1	2.1	4.2	3.5		0.1		0.2		0.1	4.6	0.4	5.0
	Wood Working Machinery	-	-	0.1	[illegible]	[illegible]	[illegible]	0.6	0.1	[illegible]	0.4	0.8	0.7		-		-		-	0.8	0.2	1.0
	Paper [illegible] Machinery	-	-	[illegible]	[illegible]	[illegible]	.5	.6	-	-	[illegible]	0.7	0.6		-		-		-	0.7	-	1.0
	Printing Machinery	-	-	0.5	[illegible]	[illegible]	0.6	0.7	0.1	.1	0.9	1.3	1.1		-		-		-	1.5	-	1.5
	Textile Machinery	0.7	0.8	1.6	1.4	1.1	2.5	[illegible]	0.5	0.6	3.7	5.6	4.7		0.1		0.2		0.1	6.0	-	6.0
717.3	of which Sewing (household)	-	-	(0.2)	(0.2)	(0.1)	(0.2)	(0.2)	(0.1)	(0.1)	(0.4)	(0.5)	(0.4)		(-)		(-)		(-)	(0.5)	-	(0.5)
	Refrigerating Equip.	-	-	[illegible]	[illegible]	[illegible]	1.9	2.1	[illegible]	0.1	1.5	2.2	2.4		0.1		0.1		0.1	3.2	0.3	3.5
	Food Processing Machinery	0.1	0.1	1.1	1.5	1.0	3.3	2.6	0.1	0.1	2.6	4.3	3.6		0.1		0.2		0.1	4.7	0.2	5.0
	Packaging Machinery	-	-	0.6	0.4	0.4	0.2	1.0	-	-	0.8	1.4	1.2		-		-		-	1.4	0.1	1.5
	[illegible]	-	-	0.2	0.2	0.4	1.0	1.1	0.1	0.1	0.7	1.4	1.2		-		-		-	1.4	0.1	1.5
718.5	Shoe and Glass Machinery	-	-	0.4	0.4	[illegible]	2.1	[illegible]	-	-	1.2	2.8	2.3		0.1		0.1		0.1	3.0	-	3.0
	Machinery for Plastics	-	-	0.1	[illegible]	0.5	1.2	1.3	-	-	0.6	1.4	1.2		-		-		-	1.4	0.1	1.5
	Sugar Machinery	-	-	[illegible]	[illegible]	[illegible]	0.5	[illegible]	0.2	0.2	1.3	1.7	1.4		-		0.1		-	1.8	-	2.0
	Industrial Furnaces	-	-	-	-	0.2	[illegible]	[illegible]	-	-	0.2	0.6	0.5		-		-		-	0.5	-	0.5
	Metallurgical Furnaces	-	-	-	-	-	-	-	-	-	-	-	-		-		-		-	-	-	-
	Ball and Roller Bearings	0.1	0.1	[illegible]	[illegible]	0.2	0.5	0.6	0.1	0.1	0.6	1.0	0.8		-		-		-	1.0	-	1.0
	Others	1.0	1.1	6.7	[illegible].3	6.6	14.0	15.[illegible]	2.4	3.0	18.1	28.8	23.9		0.7		1.2		0.7	31.4	0.6	32.0

Legend. [illegible] Except that Sub-divisions are made according to ratio without bringing in percentages of A

Source: [illegible]

Imports of Machinery other than Electric into the countries of the North African Sub-region

[illegible] period 1957-196[illegible] in million U.S. Dollars per annum

	Commodity Group	Morocco A	Morocco B	Algeria A	Algeria B	Tunisia A	Tunisia B	Libya A	Libya B	U.A.R. A	U.A.R. B	Sudan A	Sudan B	Total A	Total B
[illegible]	Machinery non-Electric	[illegible]	[illegible]	77.4	[illegible]	12.4	[illegible]	17.5	19.3	67.2	73.9	11.9	13.1	235.9	[illegible]
[illegible]	Power Generating Machinery	9.[illegible]	10.1	11.8	12.0	1.6	[illegible]	1.7	1.9	9.9	10.9	2.9	3.2	36.7	40.5
[illegible]	of which Int.Comb.Engines	(3.[illegible])	(4.1)	(10.0)	(11.0)	(1.3)	(1.4)	(1.3)	(1.4)	(7.0)	(7.7)	(2.5)	(2.8)	(25.8)	(28.5)
[illegible]	Agricultural Machinery other than tractors	1.6	1.7	5.3	5.8	0.5	0.6	0.1	0.1	0.4	0.4	0.6	0.7	8.4	9.0
[illegible]	Tractors	3.4	3.7	13.8	15.2	2.2	[illegible]	0.7	0.8	3.4	3.7	1.9	2.1	25.4	28.0
[illegible]	Office Machinery	0.9	1.0	3.5	3.8	0.3	0.3	0.3	0.3	0.5	0.6	0.1	0.1	5.6	6.0
[illegible]	Metal Working Machinery	0.4	[illegible]	2.0	2.2	0.4	0.4	0.1	0.1	4.5	4.9	0.5	0.6	7.9	9.0
[illegible]	of which Machine Tools (metal)	(0.1)	(0.1)	(1.2)	(1.3)	(0.2)	(0.2)	(0.1)	(0.1)	(1.4)	(1.5)	(0.3)	(0.3)	(3.3)	(3.5)
[illegible]	Other Ind. Machinery:	(14.0)	(15.4)	(61.3)	(67.4)	(7.5)	(8.3)	(14.7)	(16.2)	(48.5)	(53.4)	(5.9)	(6.5)	(151.9)	(167.0)
[illegible]	Pumps	1.2	1.3	5.1	5.6	0.6	0.7	0.7	0.8	1.9	2.1	0.6	0.7	10.1	11.0
[illegible]	Construction Machinery	0.4	0.4	4.0	4.4	0.3	0.3	0.2	0.2	0.5	0.6	0.1	0.1	5.5	6.0
[illegible]	Earth Moving Machinery	0.8	0.9	2.8	3.1	0.9	1.0	0.4	0.4	3.1	3.4	0.7	0.8	8.7	10.0
[illegible]	Conveying Machinery	1.3	1.4	6.9	7.6	0.5	0.6	0.6	0.7	1.6	1.8	0.4	0.4	11.3	12.5
[illegible]	Mining Machinery	1.1	1.2	4.5	4.9	0.3	0.3	7.5	8.3	0.8	0.9	0.1	0.1	14.3	16.0
[illegible]	Wood Working Machinery	0.1	0.1	0.8	0.9	-	-	0.1	0.1	0.2	0.2	-	-	1.2	1.5
[illegible]	Paper Mill Machinery	0.2	0.2	0.3	0.3	0.1	0.1	-	-	2.3	2.5	-	-	2.9	3.0
[illegible]	Printing Machinery	0.2	0.2	0.7	0.8	0.1	0.1	-	-	0.6	0.7	0.2	0.2	1.8	2.0
717.1	Textile Machinery	2.0	2.2	2.2	2.4	0.7	0.8	0.1	0.1	12.3	13.5	0.4	0.4	17.7	19.5
[illegible]	of which Sewing (household)	(0.2)	(0.2)	(0.2)	(0.2)	(-)	-	(0.1)	(0.1)	(0.1)	(0.1)	(-)	(-)	(0.6)	(0.5)
[illegible]	Refrigerating Equipment	0.2	0.2	3.0	3.3	0.2	0.2	0.2	0.2	1.4	1.5	0.2	0.2	5.2	5.5
[illegible]	Food Preparing Machinery	0.5	0.6	1.9	2.1	0.3	0.3	0.1	0.1	0.3	0.3	0.2	0.2	3.3	3.5
[illegible]	Packaging Machinery	0.3	0.3	0.5	0.6	0.1	0.1	-	-	0.4	0.4	0.2	0.2	1.5	1.5
[illegible]	Compressors	0.3	0.3	1.6	1.8	0.1	0.1	0.1	0.1	0.4	0.4	-	-	2.5	3.0
[illegible]	Stone and Glass Machinery	0.1	0.1	0.6	0.7	-	-	0.1	0.1	0.2	0.2	0.1	0.1	1.1	1.0
[illegible]	Machinery for Plastics	0.2	0.2	0.1	0.1	-	-	-	-	0.2	0.2	-	-	0.5	0.5
[illegible]	Sugar Machinery	0.2	0.2	1.5	1.6	0.1	0.1	-	-	0.2	0.2	-	-	2.0	2.0
[illegible]	Industrial Furnaces	0.1	0.1	0.3	0.3	-	-	-	-	0.4	0.4	-	-	0.8	1.0
[illegible]	[illegible] Furnaces	-	-	-	-	-	-	-	-	0.1	0.1	-	-	0.1	—
[illegible]	Ball & Roller Bearings	0.4	[illegible]	0.8	0.9	0.1	0.1	-	-	0.5	0.6	-	-	1.8	2.0
[illegible]	[illegible]	[illegible]	[illegible].1	[illegible]	[illegible].1	3.1	3.5	[illegible].6	5.1	21.4	23.2	[illegible]	3.0	59.6	65.5

[illegible] [illegible] exports of the major exporting countries of the West, as provided by the Economic Commission for Europe, figures of exports from the Eastern European countries and China not being available.

[illegible] Total [illegible] as indicated by the country or 1.10 times the value of A whichever is the greater, and its subdivisions according to the relative subdivisions of A.

[illegible] - [illegible] Economic Commission for Europe. Country publications.

TABLE [illegible] (8)

Imports of Machinery other than Electric into the countries of the West African Sub-region

Average values over the period 1957–1960 in Million U.S. Dollars per annum

[illegible]	Commodity group	Nigeria		Ghana		Liberia		Sub total			W.A.C.U. 1/		Togo		Sierra Leone		Gambia		Total	
		A	B	A	B	A	B	A	B	B%	A	B	A	B	A	B	A	B	A	B
[illegible]	Machinery non-electric	31.5	37.8	19.2	23.0	7.9	9.5	58.6	70.3	100	25.5	29.3	1.4	1.7	3.3	4.0	0.3	0.4	89.0	105.5
[illegible]	Power generating machinery	5.1	6.1	1.9	2.3	0.8	1.0	7.8	9.4	13.3		3.9		0.2		0.6		0.1		14.0
[illegible]	Of which Internal combustion Engines	(3.6)	(4.3)	(1.8)	(2.2)	(0.6)	(0.8)	(6.0)	(7.3)	(10.4)		(3.0)		(0.2)		(0.4)		—		(11.0)
[illegible]	Agricultural Machinery other than tractors	0.2	0.2	0.4	0.1	0.1	0.1	0.4	0.4	0.6		0.2		—		—		—		0.5
[illegible]	Tractors	2.[illegible]	2.4	2.2	2.7	1.3	1.6	5.5	6.7	9.5		2.8		0.2		0.4		0.1		10.0
[illegible]	Office Machinery	0.7	0.8	0.3	0.4	0.1	0.1	1.1	1.3	1.9		0.5		—		0.1		—		2.0
[illegible]	Metal Working Machinery	0.4	0.5	0.1	0.1	0.1	0.1	0.6	0.7	1.0		0.3		—		—		—		1.0
[illegible]	Of which Machine tools (metal)	(0.3)	0.4	(0.1)	(0.1)	(—)	(—)	(0.4)	(0.5)	(0.7)		(0.2)		—		—		—		(0.5)
[illegible]	Other Industrial Machinery:	(23.2)	(27.8)	(14.6)	(17.4)	(5.5)	(6.6)	(43.3)	(51.8)	(73.7)		(21.6)		(1.3)		(2.9)		(0.2)		(78.0)
[illegible]	Pumps	1.2	1.5	0.5	0.6	0.2	0.2	1.9	2.3	3.3		1.0		0.1		0.1		—		3.5
[illegible]	Construction Machinery	0.7	0.8	0.5	0.6	1.0	1.2	2.2	2.6	3.6		1.1		0.1		0.1		—		4.0
[illegible]	Earth Moving Machinery	2.0	2.4	2.1	2.5	1.4	1.7	5.5	6.6	9.3		2.7		0.1		0.4		0.1		10.0
[illegible]	Conveying Machinery	1.4	1.7	1.0	1.2	0.8	1.0	3.2	3.9	5.5		1.6		0.1		0.2		—		6.0
[illegible]	Mining Machinery	2.4	2.9	0.4	0.5	0.6	0.8	3.4	4.2	5.9		1.7		0.1		0.2		—		6.5
[illegible]	Wood Working Machinery	0.2	0.2	0.2	0.2	0.1	0.1	0.5	0.5	0.7		0.2		—		—		—		0.5
[illegible]	Paper Milling Machinery	—	—	—	—	—	—	—	—	—		—		—		—		—		—
[illegible]	Printing Machinery	0.6	0.7	0.2	0.2	—	—	0.8	0.9	1.3		0.4		—		0.1		—		1.5
[illegible]	Textile Machinery	1.1	1.3	0.3	0.4	0.1	0.1	1.5	1.8	2.6		0.8		—		0.1		—		2.5
[illegible]	Of which Sewing (Household)	(—)	(—)	(—)	(—)	(—)	(—)	(—)	(—)	(—)		(—)		(—)		—		—		(—)
[illegible]	Refrigerating Equipment	1.6	1.9	0.5	0.6	0.2	0.2	2.3	2.7	3.9		1.1		0.1		0.2		—		4.0
[illegible]	Food Preparing Machinery	0.6	0.7	0.2	0.2	—	—	0.8	0.9	1.3		0.4		—		0.1		—		1.5
[illegible](2)	Packaging Machinery	0.2	0.2	0.1	0.1	—	—	0.3	0.3	0.4		0.1		—		—		—		0.5
[illegible](2)	Compressors	0.2	0.2	0.1	0.1	0.2	0.2	0.5	0.5	0.7		0.2		—		—		—		0.5
[illegible]	Stone and glass Machinery	0.8	1.0	0.8	1.0	—	—	1.6	2.0	2.9		0.9		0.1		0.1		—		3.0
[illegible].5(2)	Machinery for Plastics	0.3	0.4	—	—	—	—	0.3	0.4	0.6		0.2		—		—		—		0.5
[illegible]8.3(9)	Sugar Machinery	—	—	0.1	0.1	—	—	0.1	0.1	0.1		—		—		—		—		—
[illegible]	Industrial Furnaces	—	—	—	—	—	—	—	—	—		—		—		—		—		—
[illegible]	Metallurgical Furnaces	—	—	—	—	—	—	—	—	—		—		—		—		—		—
[illegible]	Ball and Roller Bearings	0.1	0.1	—	—	—	—	0.1	0.1	0.1		—		—		—		—		—
	Others	9.8	11.6	7.6	9.1	0.9	1.1	18.3	22.0	31.5		9.2		0.6		1.3		0.1		33.5

[illegible] Table II.1 (3)) Sources: As for Table II.1 (3)

TABLE [illegible] (2)

Imports of Machinery other than Electric into the Countries of the Central African Sub-region

Average value over the period 1957-1960 in Million U.S. dollars per annum

SITC Revised	Commodity Group	Congo (Leo.) A	Congo (Leo.) B	[illegible] 1/ A	[illegible] 1/ B	Cameroon 2/ A	Cameroon 2/ B	TOTAL A	TOTAL B
71	Machinery non-electric	21.[illegible]	23.9	15.3	17.2	4.0	5.4	40.6	46.5
711	[illegible] machinery	[illegible]	2.6	2.1	2.4	0.9	1.2	5.3	6.5
[illegible]	of which Internal Combustion Engines	(1.5)	(1.7)	(1.7)	(1.9)	(0.7)	(1.0)	(3.9)	([illegible])
712	Agricultural Machinery other than tractors	0.6	0.7	0.1	0.1	—	—	0.7	1.0
712.5	Tractors	1.7	1.9	2.8	3.1	0.8	1.[illegible]	5.3	6.0
714	Office Machinery	0.9	1.0	0.4	0.5	0.3	0.4	1.6	2.0
715	Metal Working Machinery	0.4	0.5	0.1	0.1	—	—	0.5	0.5
715.1	of which Machine Tools (Metal)	(0.2)	(0.2)	(0.1)	(0.1)	(—)	(—)	(0.3)	(0.5)
717, 718, 719	Other Industrial Machinery:	(15.4)	(17.2)	(9.3)	(11.0)	(2.0)	(2.7)	(27.2)	([illegible])
719.2	Pumps	0.8	0.9	0.6	0.9	0.4	0.5	2.0	2.5
718.4	Construction Machinery	0.9	1.0	0.6	0.7	—	—	1.5	1.5
718.4(2)	Earth Moving Machinery	1.3	1.5	1.1	1.2	0.9	1.2	3.3	4.0
719.3	Conveying Machinery	1.0	1.1	1.2	1.4	—	—	2.2	2.5
718.4	Mining Machinery	1.1	1.2	1.0	1.1	—	—	2.1	2.5
719.5(2)	Wood Working Machinery	0.2	0.2	0.[illegible]	0.2	—	—	0.4	0.5
718.1	Paper Milling Machinery	—	—	—	—	—	—	—	—
718.2	Printing Machinery	0.2	0.2	—	—	—	—	0.2	—
717.1	Textile Machinery	1.2	1.4	0.4	0.5	0.2	0.3	1.8	2.0
717.3	of which Sewing (household)	(0.1)	(0.1)	(0.1)	(0.1)	(0.2)	(0.3)	(0.4)	(0.5)
719.5	Refrigerating Equipment	1.0	1.1	0.4	0.5	0.5	0.7	1.9	2.5
718.3	Food Preparing Machinery	0.6	0.7	0.2	0.2	—	—	0.8	1.0
719.6(2)	Packaging Machinery	0.3	0.3	—	—	—	—	0.3	0.5
719.2(2)	Compressors	0.2	0.2	0.2	0.2	—	—	0.4	0.5
718.5	[illegible] Glass Machinery	0.1	0.1	0.1	0.1	—	—	0.2	[illegible]
[illegible]	Machinery for Plastics	0.1	0.1	—	—	—	—	0.1	[illegible]
[illegible]	[illegible] Machinery	0.4	0.5	—	—	—	—	0.4	0.5
[illegible]	[illegible]	—	—	—	—	—	—	—	—
[illegible]	[illegible] Furnaces	—	—	—	—	—	—	—	—
[illegible]	[illegible] Bearings	0.2	0.2	0.2	0.2	—	—	0.4	0.5
		5.8	6 5	3.4	3.8	—	—	9.2	10.8

[illegible] Table II.1 ([illegible])

Table [illegible]

Imports of Machinery other than Electric into the countries of Africa

Average [illegible] over the period 1957-1[illegible] in Million U.S. Dollars per annum

SITC Revised	Commodity Group	African sub-region: [illegible]	CENTRAL	WEST	[illegible]	TOTAL 4 SUB-REGIONS	SOUTH AFRICA	ANGOLA	MOZAMBIQUE
71	Machinery non-electric	[illegible]	[illegible]	165.5	259.5	656	204.0	13.5	10.0
711	Power operating machinery	15.5	6.0	14.0	40.5	76.0	26.0	1.0	1.0
711.[illegible]	of which Internal Combustion Engines	(7.0)	(4.5)	(11.0)	(26.5)	(51.0)	(11.0)	(1.0)	(0.5)
712	Agricultural Machinery other than tractors	6.0	1.0	0.5	9.0	16.5	7.5	0.5	0.5
712.5	Tractors	13.5	6.0	10.0	28.0	59.0	29.5	1.5	1.5
714	Office Machinery	4.5	2.0	2.0	6.0	14.5	11.5	0.5	0.5
715	Metal Working Machinery	2.5	0.5	1.0	9.0	13.0	17.5	0.5	0.5
715.1	of which Machine tools (metal)	(1.0)	(0.5)	(0.5)	(3.5)	(5.5)	(7.0)	(—)	(—)
717, 718 and 719	Other Industrial Machinery	(91.0)	(31.0)	(78.0)	(167.0)	367.0	(112.0)	(9.5)	(6.0)
719.2	Pumps	6.5	2.5	3.5	11.0	23.5	7.0	0.5	0.5
718.4	Construction Machinery	3.5	1.5	4.0	6.0	15.0	2.5	0.5	—
718.4(2)	Earth Moving Machinery	8.0	4.0	10.0	10.0	32.0	9.5	1.5	0.5
719.3	Conveying Machinery	7.0	2.5	6.0	12.5	28.0	9.0	1.0	0.5
718.4	Mining Machinery	5.0	2.5	6.5	16.0	30.0	4.5	0.5	—
719.5(2)	Wood working Machinery	1.0	0.5	0.5	1.5	3.5	1.5	—	—
718.1	Paper Mill Machinery	1.0	—	—	3.0	4.0	3.0	0.5	—
718.2	Printing Machinery	1.5	—	1.5	2.0	5.0	3.5	—	—
717.1	Textile Machinery	6.0	2.0	2.5	19.5	30.0	13.5	—	0.5
717.3	of which Sewing (household)	(0.5)	(0.5)	(—)	(0.5)	(1.5)	(2.0)	(—)	(—)
719.5	Refrigerating Equipment	3.5	2.5	4.0	5.5	15.5	4.5	0.5	0.5
718.3	Food Preparing Machinery	5.0	1.0	1.5	3.5	11.0	4.0	0.5	0.5
719.6(2)	Packaging Machinery	1.5	0.5	0.5	1.5	4.0	2.0	—	—
719.2(2)	Compressors	1.5	0.5	0.5	3.0	5.5	3.0	—	—
718.5	Stone and glass machinery	3.0	—	3.0	1.0	7.0	2.0	—	—
719.5(2)	Machinery for Plastics	1.5	—	0.5	0.5	2.5	1.0	—	—
718.3(2)	Sugar Machinery	2.0	0.5	—	2.0	4.5	1.5	0.5	0.5
719.1(4)	Industrial Furnaces	0.5	—	—	1.0	1.5	0.5	—	—
719.1(4)	Metallurgical Furnaces	—	—	—	—	—	(0.5)	—	—
719.7	Ball and Roller Bearings	1.0	0.5	—	2.0	3.5	5.5	—	—
	Others	32.0	10.0	33.5	65.5	141.0	33.5	3.5	2.5

Source: [illegible] Economic Commission for Europe - Country Publications

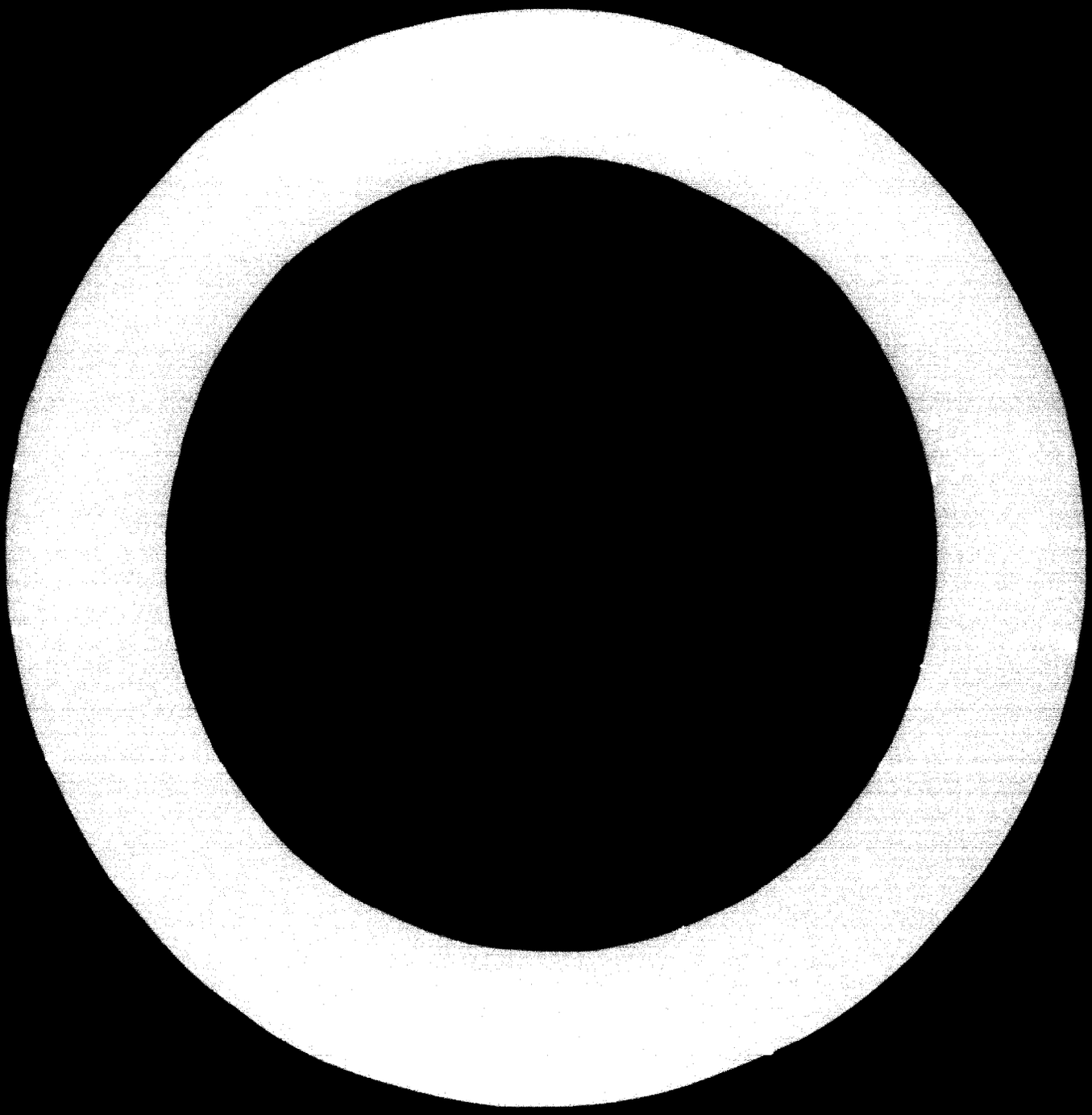


TABLE 17.2 (1)

Net Imports of Electrical Machinery, Apparatus and Appliances in the East African Sub-region

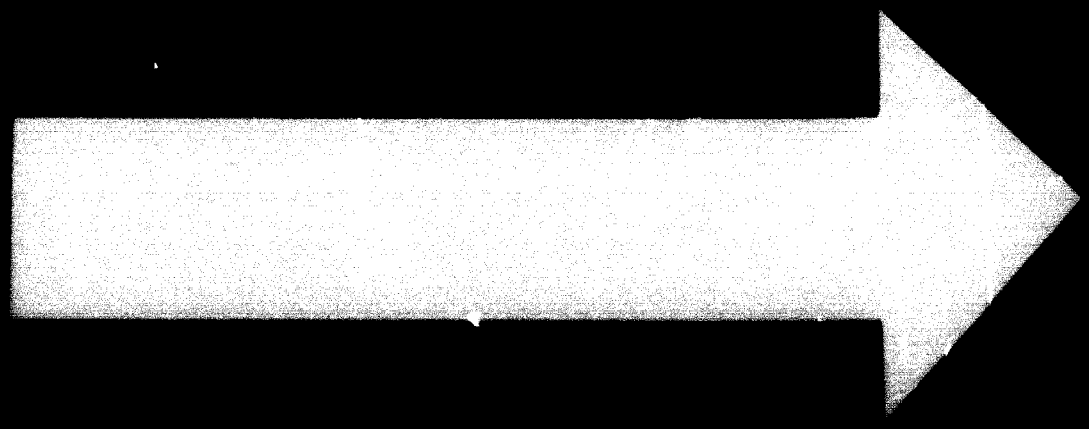
in '000 U.S. Dollars

Country	Year	Electrical Machinery, Apparatus & Appliances 72	Rotating Machinery 722.1	Motors 0.1-10KW 722.1	Motors 10-100KW 722.1	Electric switchgear and transformers 722.2	Electric batteries and accumulators 729.1	Bulbs and lamps 729.2	Domestic radio receivers 724.2	Domestic television receivers 724.1	Other telecommunication apparatus and telegraph 724.9	Industrial Furnaces (Electrical)	Metallurgical Furnaces	Other electrothermic apparatus	Appliances for Motor vehicles	Apparatus for starting 729.5	Electronic equipment 729.3	Apparatus for medical purposes 726	Insulated cables 723.1	Portable electrical tools 729.6	Others —	Domestic refrigerators	Domestic washing machines	Electro-mechanical domestic appliances	Electric space heating equipment	Domestic electrical equipment n.e.s.	Bare copper wire	Bare aluminium conductors	Electrical conduit tubing and joint	Electrical machinery and apparatus n.e.s.
Ethiopia	63	4272	501	—	—	530	363	123	551	—	1368	—	—	—	—	64	—	12	294	—	426	166	10	208	4	...	..	...	...	...
Fr. Somali		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia	59/62	1288	567	—	—	65	18	23	215	—	52	—	—	—	8	1	—	—	12	3	374	...	...	...	...	...	...	...	...	...
Kenya	64	8432	547 1/	130 2/	417 3/	522 4/	1269	218	1483	54	1512	...	...	185	25	155	27	60	592	36	1200	451	45	56 5/	121 6/	462	19	[illegible]	[illegible]	181
Uganda	61/63	4135		667			553	74	1188		40	...	...	314	254	43	...	64	258	93	747	111	...	...	...	[illegible]	...	...	...	...
Tanzania	61/63	1954	—	—	116 7/	1185	267 7/	82	690	7	83	178 8/	—	—	147	67	—	52	401	145	374	...	...	...	...	[illegible]	12	...	...	...
Burundi	61/63	480	...	39	19	42	29	28	25	—	79	—	—	25	34	24	14	5	58	4	—	37	10	7	1	...	6	1	...	...
Rwanda	61/63	[illegible]																												
Malawi		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zambia	64	9253	—	—	116 7/	2608	881	239	1444	16	1010	—	13	94	—	33	...	...	767	113	—	291	157	276	513	...	7	...	70	...
Rhodesia	64	13331	432	...	...	1292	1142	61	2874	102	2108	38	—	1469	—	40	—	—	1186	233	—	1006 10/	218	292	356	—	6	965	143	...
Madagascar	61/63	4823	—	500	...	165	700	204	1410	—	780	6	—	—	370	137	—	10	...	...	541	282	10	73	120	...	490	...	50	...
Mauritius	64	4045	433	...	...	...	196	86	1160 11/	...	108	25 12/	...	780	135	119	...	45	465	38	...	195	...	63 13/	197	...	14	309	...	...
Reunion		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	-	54093	2480	669	1875	6409	5418	1491	1194	179	7960	243	13	2765	933	703	41	248	4033	667	3612	2469	450	943	1390	767	630	1273	377	637

1/ Includes transformers; 2/ Motors of all sizes; 3/ Includes generators, alternators and transformers; 4/ Switchgear only; 5/ Electric fans only;
6/ Cookers, hot plates, etc.; 7/ Electric batteries except accumulators; 8/ Industrial and metallurgical furnaces and other electrothermic apparatus;
9/ Includes brandes t tubes; 10/ 376000 for domestic refrigerators plus $631,000 for refrigerating equipments; 11/ Includes television receivers; 12/ Includes metallurgical furnaces; 13/ Includes domestic washing machines.

Source

Country replies to questionnaire.



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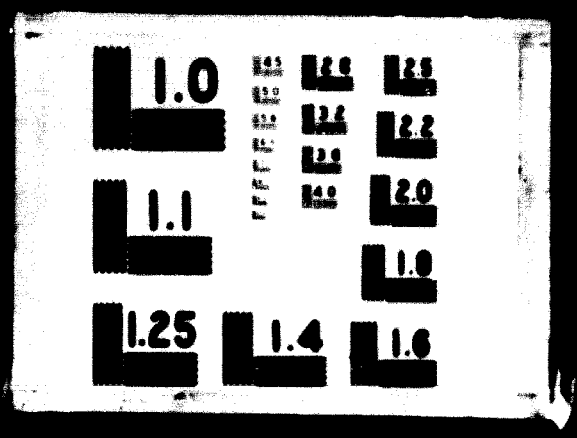


TABLE [illegible] (2)

Net Imports of Electrical Machinery, Apparatus and Appliances in countries in the North African, West African and Central African Sub-regions

Value in '000 U.S. Dollars

	Electrical machinery, apparatus and appliances	[illegible]	[illegible]	[illegible]	Electric [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Other electric [illegible]	Appliances for [illegible]	Apparatus for measuring	Electronic equipment	Apparatus for medical purposes	Insulated cables	Portable electrical tools	Others	Domestic refrigerators	Domestic washing machines	Electromechanical domestic appliances	Electric space heating equipment	Domestic electrical equipment n.e.s	Bare copper wire	Bare aluminium conductors	Electrical conduit tubing and joint	Electrical machinery and apparatus n.e.s.
[illegible] Year	72	722.1	722.1	722.1	722.2	729.1	729.[illegible]	724.[illegible]	724.1	724.9	729.[illegible]	72[illegible].9(2)	729.9(9)	72[illegible].4(2)	729.5	729.3	726	723.1	729.6	—	725.0(1)	725.0(2)	725.0(3)	725.0(5)	725.0(9)	682.2(1)	684.2(1)	723.2(3)	729.9
r[illegible] 64	10893	1335	739		2970	17[illegible]	610	2520	3[illegible]	3670	[illegible]	—	114	442	565	363	375	1005	81	—	733	795	204	279	—	208	297	10	...
[illegible]geria 63	60225	—	—	—	—	12746	5961	14366	7462	10785	—	—	—	—	56	—	793	14907	427	—	722		—	—	—	140	—	—	...
[illegible]isia 63	10570	1424	—	—	1850	880	392	—	974	1301	—	—	379	567	208	82	39	1036	102	—	1190				—	—	—	146	...
[illegible]ya 63	16353	—	7444		133	676	296	1278	162	2097	155	—	324	794	38	22	139	779	—	—	589	212	263	173	...	—	—	779	...
[illegible].R. 62/64	30651	—	8708	—	—	1030	1159	...	1900	6433	—	—	3370	1311	722	899	1237	3882	—	—	—	—	—	—	—	—	—	—	...
[illegible]an 63	10997	—	—	—	1394	1304	283	1421	360	1584	15	—	10	163	276	903	772	1967	61	—	342	27	—	—	—	249	—	115 1/	...
[illegible]AL	15568	2729	16882		6347	15360	8701	19585	11776	25276	178	—	4197	3277	1665	2269	3355	23576	671	—	2386	1034	1657	452	—	597	297	1050	
WEST AFRICAN SUB-REGION																													
[illegible]ria 60/63	2375	...	122	166	3931	1414	693	2079	573	[illegible]	299		3535	624	412	154	85	2830	84	...	1332	361	463	522	—	418	1679	646	...
[illegible] 64	1108	329	---	—	171	162	28	95	24	40	25		9	15	42	4	4	152	3	...	1	4	33	25	...	7	...	6	...
[illegible]a	16622	2095	...	...	837	2502	306	1866	6	1736	3670	...	1262	45[illegible]	121	85	29[illegible]	1677	51	...	805	...	263	296	...	96	698	106	...
[illegible]ney 64	1006	...	...	...	32	265	39	164	...	79	...	...	...	...	54	...	2	156	...	...	131	1	76	10	...	...	...	...	...
[illegible]ria	3737	...	...	...	500	229	69	231	—	270	—	—	201	25	87	—	13	730	197	—	--	35	409	...	111	123	—	—	...
[illegible]a 62/64	591	6	...	...	9	137	10	232		59	—	—	1	9	4	—	1	22	1	...	25	14		13	—	4	—	—	20
CENTRAL AFRICAN SUB-REGION																													
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

1/ Group 7[illegible]2

[illegible] country replies to questionnaire.

U.S.

Country	Year	67	678	674 .3	674. .8	69	691 .1	691 .2	691 .3	[illegible] .1	[illegible] .2	[illegible] .3	693 [illegible] .1	[illegible] .2		[illegible]	697	697 .1	697 .2	698.1 (1)	698.3 (4)	698 1.(2)	698 .2	698 .6	812		678 .2	678 .3	678 .5	698 .8	698 .9	679
Ethiopia		2793	591	2202		2449	-	327			-	327	-	904	-		249	294	-	-	78		189	56	-	381	-	-	-	-	-	-	-
Fr. Somali		...	...	...		...	...	...			...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	•••	-	-	-	-	-	-
Somalia	60/62	77	11	66		4?7	-	172			-	34	-	20		-	9	176	2	27	6			4	19	48	-	-	-	-	-	-	-
Kenya 1/	64	7434	24	6196		7612	76	-			60	473	70 2/	977	370	[illegible]	449	972	211	686	381		404	353	21	198	-	822	215	177	894		-
Uganda	61/63	4445	268	216		5531	335	...			...	351	...	550	421	[illegible]	443	500	311	135	570		...	398	...	226	...	...	...	...	603		654
Tanzania	61/63	227	192	35		2014	..	..				154		209	325	295	221	-	32	64	332		58	194	70	157	..	-	-	-	-	-	-
Burundi) 3/ Rwanda)		403	88	315		1467	20	3			37	45	9	143	54	783	88	-	17	69	84		44	19	40	12	...	-	-	-	-	-	-
Malawi		...	...	...		...	...	...			...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	...	-	-	-	-	-	-
Zambia	64	951	235	716		8496	1886	...			129	190	47	1666	885	[illegible]	381	75	256	875	456		471	77	64	194	1069	-	-	-	-	-	-
Rhodesia	64	10072	3059	7008		9163	20	237 4/			430	1054	100	1282	1214	1459	699	631	260	372	705		59	566	75	159	-	-	-	-	-	-	5
Malagasy	61/63	3348	708	2640		3086	317	6			112	130	182	56	15	134	205		182	61	170		200	108	-	102	290	-	-	-	-	-	-
Mauritius	64	1188	239	949		3556	755	18				51		202	122	210	130	205	132	73	619		755	284	-	393	-	-	-	-	-	-	-
Reunion		...	...	...		...	...	...			...	...	...	...	...	...	...	...	...	...	...		...	...	...	...	-	-	-	-	-	-	-
TOTAL		[illegible]	5415	20343		4384	3409	763			763	2807	408	5769	3406	7378	2874	2853	1403	2362	3401		2180	2061	289	1872	1365	822	215	177	1497		659

1/ Imports from outside East Africa, plus imports from Uganda and Tanzania, less re-exports.
2/ Compressed gas cylinders. 3/ Average of 1961-1963 and 1st quarter of 1964; 4/ Structural steel

Source: Country replies to questionnaire.

		Iron and Steel			Manufactures of metal				Metal Containers e.g. Drums and tins	Boilers, Pressure Vessels, and Autoclaves	Wire Products e.g. Barbed Wire Wire Netting, Wire Rivets, Ropes Nails and Staples	Bolts, Nuts, Screws Rivets, Washers	Metal Hand Tools and Implements	Cutlery	Domestic Utensils	Stoves, Baths, Sinks etc. of cast iron.	Metal Holloware	[illegible]	Door, [illegible]	[illegible]	Wire [illegible]	[illegible]	Malleable Iron Fittings.
			678	674.3								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] (1) [illegible]3. (4)	5981 (2)	698.2	698.	312	
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	143	[illegible]	[illegible]	1060	1890	793	1880	1245	580	297	735	48	198	-	1620
[illegible]	[illegible]	152000	[illegible]	-	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	573	-	35123	7315	-	-	-	5010	-	1165	248	495	-
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	709	157	[illegible]	606	539	1221	740	-	877	574	-	-	53	188	1135	-
[illegible]	[illegible]	[illegible]	[illegible]	1282	5	[illegible]	-	2485	-	-	734	-	1015	96	-	394	394	423	-	60	31	1300	
U.A.R.	[illegible]	15520	7926	10994	[illegible]		14757	-	-	[illegible]	1352	-	2162	1019	1107					-	-	3114	373
[illegible]	[illegible]	[illegible]	1592	1092	[illegible]	1951	1521	771	57	101	* 655	747	274	838	-	117	374	713	-	61	409	226	125
[illegible]		[illegible]	[illegible]	17568	45570	[illegible]	[illegible]	15792	5230	479238	9910	2426	26035	11401	1880	2633	3926	6063	735	1387	1077	6270	4538
West African Sub-Region																							
Nigeria	60/63	[illegible]	[illegible]	7912	15100	1881	135	1948	104	656	2050	1596	2699	851	-	679	8343	2361	1235	723 1/	135	1050	-
Togo		[illegible]	[illegible]	748	4014	[illegible]	12	128	13	56	140	91	246	30	428	91	405	139	28	5	28	306	-
Ghana		[illegible]	1307	1004	[illegible]	3035	2811	128	116	143	2451	607	2025	890	..	272	842	3	-	-	13	460	-
Dahomey		[illegible]	108	-	1080	9	-	23	[illegible]	12	15	73	112	7	639	25	604	79	-	48	[illegible]	5	31
Liberia		[illegible]	[illegible]	-	4781	1117	-	-	403	-	616	485	1107	-	117	687	201	399	643	614	-	317	-
Gambia	62/64	[illegible]	[illegible]	[illegible]	400	[illegible]	2	[illegible]	[illegible]	1	26	23	30	11	83	2	55	16	56	56	-	19	48
Central African Sub-region																							
Chad	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	56	43	16	59	121	175	38	391	29	359	44	54	[illegible]	[illegible]	138	-

1/ For 19[illegible] only

Source: [illegible] replies to questionnaire

Table [illegible]

Net imports of machinery other than Electrical in the East African Sub-region

Value in '000 U.S. Dollars

Country	Year	Machinery other than Electrical 71	Power generating machinery other than electric 711	Internal combustion engines other than aircraft 711.5	Agricultural machinery and implements 712	Agric. mach. and appliances for preparing & cultivating the soil 712.1	Agric. mach. and appliances for harvesting, threshing & sorting 712.2	Tractors 712.5	Office machines 714	Metal working machinery 715	Machine tools for working metals 715.1	Gas operating welding, cutting etc. appliances 715.2 (3)	Pumps and centrifuges 719.2	Construction machinery 718.4	Earth moving machinery 718.4 (2)	Conveying machinery 719.3	Mining machinery 718.4
Ethiopia		8366	916	—	1773	128 1/	122 1/	764 1/	373	3	—	—	176 1/	—	735 1/	102 1/	—
French Somaliland		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia	60/62	717	180	39	63	3	...	186	72	68	58	—	—	—	—	27	14
Kenya	64	26903	1692	839	4029	688	613	2152	1427	1709	1337	...	679	1307 3/	1340	477	...
Uganda	61/63	2728	168	168	328	...	...	358	267	...	...	...	29	1164	...	...	...
Tanzania	61/63	8600	58	19	146	346	68	1347	353 6/	235	84	...	400	1984			
Burundi 2/		907	81	18	3	3	68	41	139	—	57	1	68	57	82	15	1
Rwanda 2/																	
Malawi		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zambia	64	16945	264	2084	423	398	245	1806	893	226	87	62	1389	18	3377	1748	4748
Rhodesia	64	41437	5944	4906	7008	1009	521	5075 10/	1926	486	317 11/	82	1959	2309	111 12/	780	1782
Madagascar	61/63	5821	157	157	299	169	130	—	573	113	94	17	631	—	785	345	133
Mauritius	64	6335	809	145	1196	228	13	922	326	47	5	5	50	—	—	—	—
Reunion		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL		118759	10289	8375	15268	4084	1780	12651	6349	2916	2039	187	5381	4901	844	3494	6678

Country	Year	Wood working machinery 719.5 (2)	Paper milling machinery 718.1	Printing machinery 718.2	Textile machinery 717.1	Sewing, household machinery 717.3	Refrigerating equipment 719.5	Food preparation machinery 718.3	Packaging machinery 719.6 (2)	Compressors 719.2 (2)	Stone and glass machinery 718.5	Machinery for plastics 719.5 (2)	Sugar machinery 718.3 (9)	Industrial furnaces 719.1 (4)	Ball, roller and needle-roller bearings 719.7	Balances (Industrial + household) 719.6 (3)	Valves industrial 719.9 (2)	Other Ind. plant and equ.
Ethiopia		—	10 1/	142 1/	804	108 2/	405 1/	555 1/	—	176	460 1/	—	819 1/	—	—	16 1/	—	—
French Somaliland		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia	60/62	1	—	1	—	6	10	—	—	—	—	—	—	—	—	—	—	89
Kenya	64	...	81	574	916	77 4/	174	4885	...	...	23 5/	...	4680	...	316	...	201	118
Uganda	61/63	...	...	...	...	237	121	...	...	...	...	...	...	...	56	...	...	...
Tanzania	61/63	68	16	212 7/	600 8/	217	381	407	...	...	...	...	1048	...	1022	106	...	...
Burundi 2/		4	—	7	16	47	39	144	47	22	19	12	—	2	30	18	13	—
Rwanda 2/																		
Malawi		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zambia	64	103	...	278	256	238	383	52	—	250	32	—	—	—	388	73	—	—
Rhodesia	64	371	202 13/	452	750	843	489	360	—	746	...	...	...	...	708	60	1019	7537
Madagascar	61/63	64	21	780	553	330	328	285	—	—	75	—	17	7	225	100	—	—
Mauritius	64	15	3	—	8	157	40	—	889			15	1454	—	128	276	—	—
Reunion		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL		626	333	2446	3903	2260	2370	7188	47	2083	609	27	8018	9	2873	649	1233	7744

1/ For 1963 only; 2/ For 1962 only; 3/ Includes mining machinery; 4/ Includes industrial machinery; 5/ Glass machinery only; 6/ not including tape recorders; 7/ Includes book-binding; 8/ Includes sisal machinery; 9/ Average of 1961-1963 and 1st quarter of 1964; 10/ Tractors agricultural and parts; 11/ Workshop appliances; 12/ Bull and angle dozers; 13/ Paper making machinery

Source: Country replies to questionnaire

Table [illegible].

[illegible] Imports of Machinery other than Electrical in the North, West and Central African Sub-regions

in '000 U.S. Dollars

Country	Year	Machinery other than electric	Power generating machinery other than electric	Internal combustion engines other than aircraft	Agricultural machinery and implements	Agr. machinery and appliances for cultivating the soil	Agr. machinery and appliances for harvesting, threshing	Tractors	Office machines	Metal working machinery	Machine tools for working metals	Gas operating welding, cutting etc. appliances	Pumps and centrifuges	Construction machinery	Earth moving machinery	Conveying machinery	Mining machinery	Wood working machinery	Paper milling machinery	Printing machinery	Textile machinery	Sewing, Household machinery	Refrigerating equipment	Food preparation machinery	Packaging machinery	Compressors	Stone and glass machinery	Machinery for plastics	Sugar machinery	Industrial furnaces	Ball, Roller and needle roller bearings	Balances (Industrial & Household)	Valves Industrial	Other industrial plant and equipment
COUNTRY	Year	71	711	711.5	712	712.1	712.2	712.5	714	715	715.1	715.2 (3)	719.2	718.4	718.4 (2)	719.3	718.4 (2)	719.5 (2)	718.1	718.2	717.1	717.3	719.5	718.3	719.6 (2)	719.2 (2)	718.5	719.5 (2)	718.3 (9)	719.1 (4)	719.7	719.6 (3)	719.9 (2)	
Morocco	64	33600	7025	3920	1480	207	1005	2155	2165	1015	945	42	1650	2060	1030	1475	1765	377	760	437	6495	1000	844	795	40	150	1035	374	1	239	750	174	506	18
Algeria	63	111462	12820	12820	27541	3996	916	22629	7193	—	—	—	4512	—	335	3491	17642	840	—	331	1396	651	5662	1702	—	22984	—	910	—	—	3454	—	—	—
Tunisia	63	17176	3125	3125	2386	875	603	910	995	1171	1171	—	3787	—	—	1158	1134	—	131	372	957	779	—	406	—	—	926	—	—	—	446	—	—	—
Libya	63	38265	1517	1517	2332	—	—	—	473	137	—	—	2463	—	2801	983	—	—	9	151	78	311	124	304	—	2463	803	—	—	118	85	—	—	23113
UAR	62/64	59593	5644	...	1708	5757	3611	7740	2148	2111		—	6668	—	—	2102	4246	—	1872	1236	8328	—	1792	278	623	1941	—	—	966	759	1771	—	—	—
Sudan	63	22801	2517	2517	2087	546	608	933	459	1000	874	126	—	—	162	1856	3110	280	193	667	941	1017	400	1639	178	556	1579	—	1502	100	159	131	2277	—
TOTAL		282897	32648	23899	52936	11391	6813	14397	13364	5434	2990	168	15080	2860	4325	11065	27897	1497	2965	3194	18195	3758	8822	5124	841	28094	3743	1284	2469	1216	6665	305	2783	23131
WEST AFRICAN SUB-REGION																																		
Nigeria	60/63	41821	1351	1351	2411	321	109	1981	1481	2263	1422	841	2010	959	(953)	2425	637	270	110	1176	1073	1038	1801	637	55	845	244	270	—	67	235	243	11061	9179
Togo	64	4275	31	8	503	9	3	344	87	96	89	7	379	1661	(1636)	1034	(—)	12	1	13	9	35	41	6	—	114	127	(—)	—	14	52	17	42	1
Ghana	61/63	23181	3797	3440	4546	1565	187	2785	727	842	468	..	682	4681	(4133)	925	...	434	57	503	793	795	...	519	153	1071	...	...	...	—	376	—	—	2280
Dahomey	64	109	21	—	33	—	11	17	—	26	19	1	—	—	—	3	—	7	—	5	2	5	...	6	...	1	...	...	...	—	8	1	—	—
Liberia		26647	2225	1649	3756	31	20	3572	227	9039	8070	969	294	...	...	10522	...	85	...	169	...	117	198	21	...	...	...	...	...	72	...	—	—	—
Gambia	62/64	532	74	(64)	64	28		36	18	6	5	1	20	52	...	...	...	...	—	11	—	13	11	1	49	...	...	...	...	13	3	2	8	187
CENTRAL AFRICAN SUB-REGION																																		
Chad		647	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	136	159	77	55	10	—	49	...	57	22	82	—

Source: Country [illegible]

Table 7.

Imports of transport equipment into the East African Sub-region

Values in U.C.A. Dollars

Country	Year	73	731	731.1	731.2	731.3	731.4	731.5	731.6	732	732.1	732.2	732.3	732.4	732.5	732.6	732.7	732.8	733	733.1	733.3	735.3
			Railway vehicles	Railway locomotives steam or tenders thereof	Railway locomotives electric other than self-generating	Railway locomotives, other than steam or electric	Mechanically propelled railway, tramway vehicles	Railway, tramway parts not mechanically propelled	Railway, tramway maint.cars not mech.propelled	Road motor vehicles	Passenger motor cars	Buses and trolley buses	Lorries and trucks	Special purpose lorries, trucks and vans	Road tractors for tractor-trailer combination	Chassis with engine mounted of a kind used for vehicles of	Other chassis with engines mounted	Bodies, chassis, frames and other parts	Road vehicles other than motor vehicles	Bicycles and cycles not motorised and their parts	Trailers and other vehicles, not motorised & their parts	Ships and boats other than warships
Ethiopia		11378	641	—	—	—	—	—	—	10535	3880 1/	661 1/	—	952 1/	280 1/	—	—	166 1/	202	70 1/	142 1/	—
Fr.Somaliland		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Somalia		2477	1	—	—	—	—	—	—	2380	154	229			—	—	156	—	88	1	1	8
Kenya	64	26683	6753	—	—	3389	9	—	2104	17222	6613	106	2075	131	3	—	3276	4831	958	880	78	1750
Uganda	61/63	10089	111	—	—	—	111 2/	—	—	8914	3749	2753				...	...	...	1036	1036	—	28
Tanzania	61/63	12153	188	...	—	133	...	...	55	10762	4014	2337				1889	...	2522	1194	1046	148	9
Burundi 3/ Rwanda		2048	3	—	—	—	—	—	3	1909	741	40	722	5	33	—	41	327	130	98	32	6
Malawi		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Zambia	64	20041	389	—	43	41	—	—	5	18011	8794	389	3299	1387	136	...	2183	1823	1533	936	440	108
Rhodesia	64	33530	4514	—	9	2955	20	1	4	27709	8203	15	1254	436	76	—	4634	9848	1206	1034	172	101
Malagasy	61/63	11792	170	1	—	18	...	—	202	10600	3660	272	2800	120	—	5	236	2208	732	257	421	290
Mauritius	64	4447	47	—	—	36	—	—	—	4000	1928	905				—	308	732	392	118	239	8
Reunion		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL		134638	12817	1	52	6572	140	1	2373	112042	41136	6802	11055	3032	528	1894	10834	24637	7471	5476	1673	2308

1/ For 1963 only; 2/ Includes parts; 3/ Average of 1961-1963 and 1st quarter of 1964

Source: Country replies to questionnaire

			[illegible] Vehicles	[illegible] tives, [illegible] for	Electric, other [illegible] self-propelled	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Lorries and [illegible]	Special [illegible]	Road [illegible] Tractors [illegible]	[illegible]	Other [illegible]	Bodies, [illegible] Frames and other parts.	Road Vehicles other than Motor Vehicles	Bicycles Not Motorized	Trailers and other Vehicles	Ships and Boats other than Warships
Country	Year	73	731	731.[illegible]	[illegible]	[illegible]	731.4	[illegible]	[illegible]	732	[illegible]	732.[illegible]	732.3	[illegible]	732.5	732.6	732.7	732.8	733	733.1	733.3	735.3
Morocco		45774	18	-	[illegible]	-	-	-	[illegible]	[illegible]	[illegible]	75	[illegible]	[illegible]	43	22	190	7150	1530	1152	378	1097
Algeria	63	143439				[illegible]				14001	[illegible]	[illegible]	[illegible]	-	[illegible]	-	575	9528	2261	532	1729	-
Tunisia	63	17197	765	-	-	59	[illegible]	[illegible]	437	13968	2104	1394	4129	[illegible]	3143	3	-	2378	451	38	413	1993
Libya	63	[illegible]	3	-	[illegible]	-	-	-	-	[illegible]	[illegible]	[illegible]	10523	[illegible]	1030	-	-	[illegible]	2205	407	1858	905
U.A.R.	62/64	53485	10283	1373	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11095	[illegible]	[illegible]	4539	2728	708	-	223	27264	1635	1635	-	4920
Sudan	63	[illegible]	[illegible]	-	-	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible]	8649	530	781	-	828	[illegible]	1605	470	1135	127
TOTAL		[illegible]	18795	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	67574	7241	6224	25	1816	57486	9747	4234	5513	8054
										West African Sub-region												
[illegible]		[illegible]	[illegible]	-	[illegible]	61	12	88	737	[illegible]	[illegible]	[illegible]	6083	1074	136	6840	530	7754	6644	5539	1105	1956
Togo		[illegible]	[illegible]	31	[illegible]	-	-	-	[illegible]	[illegible]	11	657	215	35	18	-	-	234	223	182	41	48
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	41	[illegible]	[illegible]	97	[illegible]	11332	2072	507	1607	107			6022	1424	906	518	
[illegible]	64	[illegible]	-	-	-	-	-	-	-	[illegible]	[illegible]	41	627	34	-	-	-	18	233	-	233	5
L[illegible]		[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]	[illegible]	109	3909	-	-	57	220	1575	366	37	[illegible]	39
G[illegible]		[illegible]	-	-	-	-	-	-	-	[illegible]	[illegible]	127	70	51	5	-	7	107	37	(16)	(21)	(7)
										Central African Sub-region												
C[illegible]																						

[illegible]

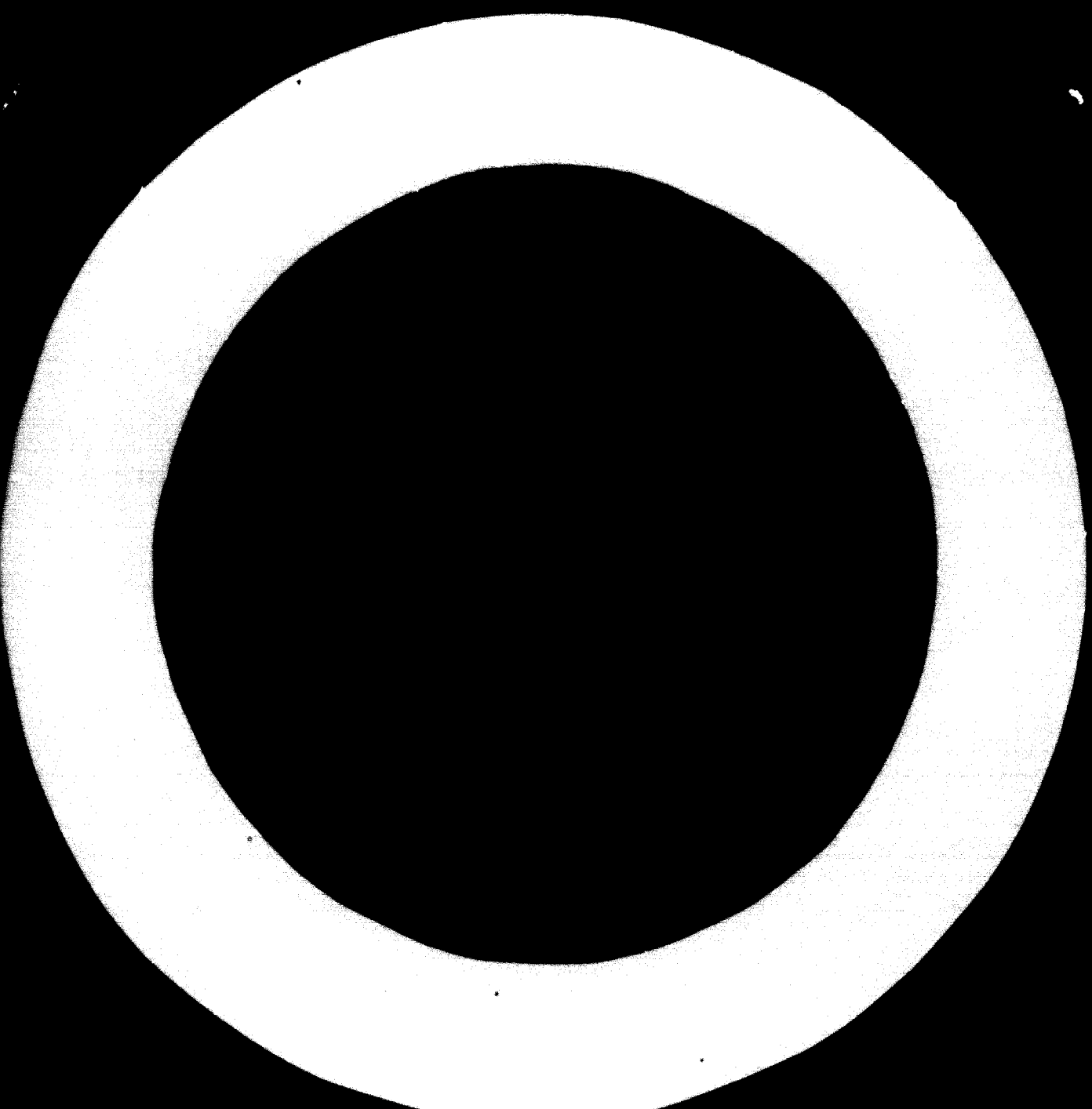


Table II.3 (1)

Local Production of Electrical Machinery, Apparatus and Appliances in the Countries of the East African Sub-region

Value in '000 U.S. Dollars

	Ethiopia 1963	Somalia	Kenya 1963	Uganda 1963	Tanzania 1963	Burundi 1963	Rwanda	Malawi	Zambia 1963	Rhodesia 1964	Malagasy 1963	Mauritius 1963
Rotating machinery		—		—	—	—	—	—		—	5/	—
Switchgear and transformers		—		—	—	—	—	—		526	—	—
Batteries and accumulators	...	—	...	—	—	—	—	—		[illegible]	—	5
Bulbs and lamps		—		—	—	—	—	—		[illegible]	—	—
Domestic radio receivers		—		—	—	—	—	—		[illegible]	11[illegible]	—
Domestic television receivers		—		—	—	—	—	—		—	—	—
Telecommunications apparatus		—		—	—	—	—	—		—	—	—
Electrothermic apparatus		—		—	—	—	—	—		—	—	—
Apparatus for measuring		—		—	—	—	—	—		—	—	—
Domestic refrigerators		—		—	—	—	—	—		—	—	—
Domestic washing machines		—		—	—	—	—	—		—	—	—
Electromechanical domestic appliances		—		—	—	—	—	—		—	—	—
Electric space heaters		—		—	—	—	—	—		—	—	—
Insulated cables	125 1/	—		—	—	—	—	—		—	—	—
Bare copper wire		—		—	—	—	—	—		—	—	—
TOTAL	125	—	780	—	—	—	—	—	620	17780	1200	60

1/ Estimate

Source: Country replies to questionnaire

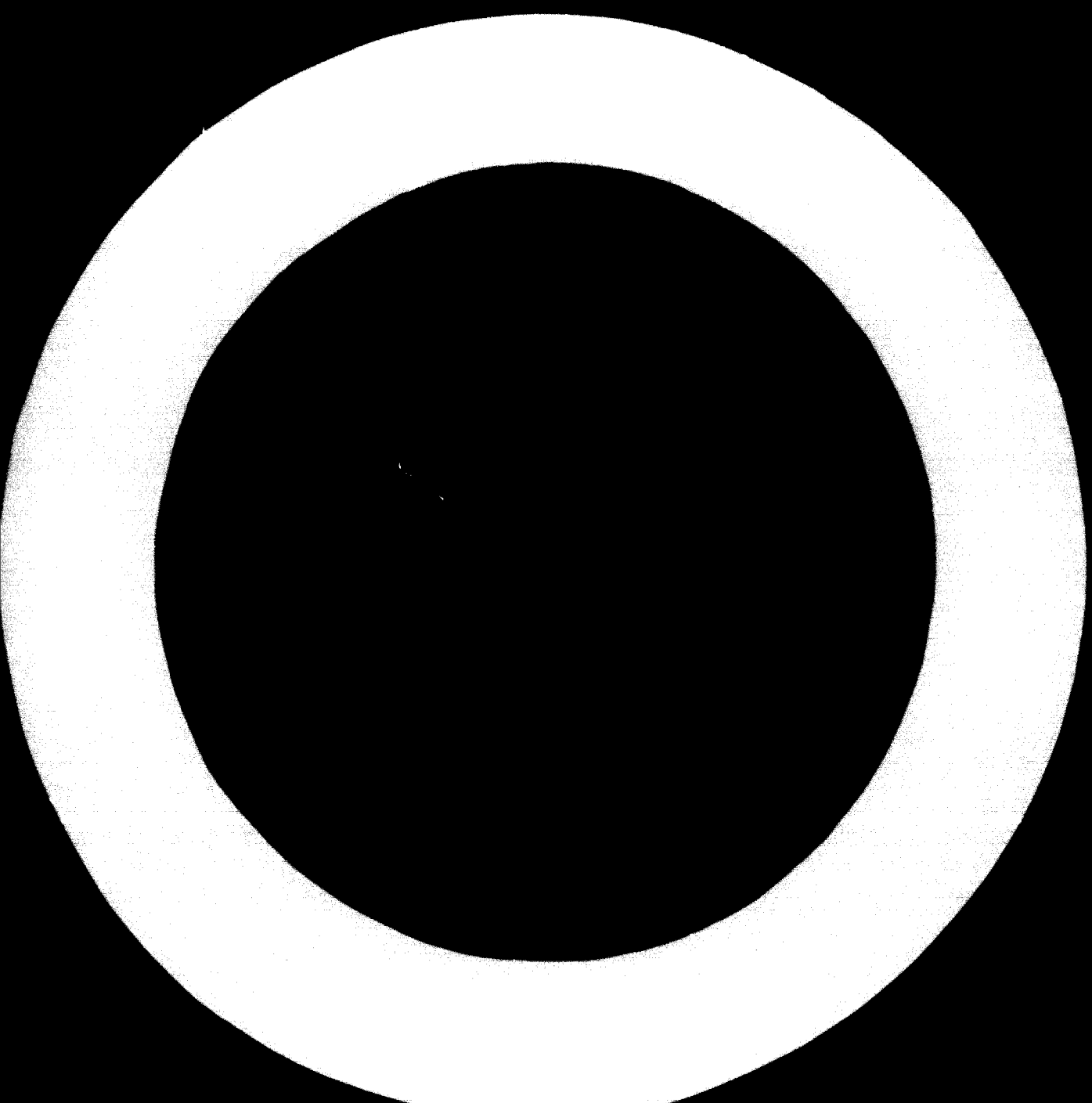


Table II.3(2)

LOCAL PRODUCTION OF STRUCTURAL ENGINEERING AND METAL PRODUCTS
IN THE COUNTRIES OF THE EAST AFRICAN SUB-REGION
Value in '000 U.S. Dollars

	Ethiopia 1963	Somalia	Kenya 1963	Uganda 1963	Tanzania 1963	Burundi 1963	Rwanda	Malawi	Zambia 1964	Rhodesia 1964	Malagasy 1963	Mauritius 1963
Iron Pipes and fittings	-	-	-	-	-	-	-	-		-	-	-
Cast Iron Pipes	-	-	-	-	-	-	-	-		-	-	-
Iron and Steel Foundry	910	-	-	...	-	-	-	-		-	-	-
Steel Sheets	-	-	2250	-	3750 1/	-	-	-		[illegible]	-	-
Steel Structures	-	-	2350	...	360	-	-	-		-	-	-
Metal Containers	-	-	9310	...	[illegible]	-	-	-		3310	-	-
Fuel and Gas Tanks	-	-	-	-	30	-	-	-		-	-	-
Boilers, Pressure Vessels	-	-	-	-	170	140	-	-		-	-	-
Wire Products	350 1/	-	1130	...	140	-	-	-		4950	-	240
Metal hand tools	-	-	-	-	-	-	-	-		-	-	-
Domestic Utensils	-	-	3090	-	-	-	-	-		2930	50	-
Of which Hollowware enamelled	-	-	-	-	310	-	-	-		-	-	-
And of which Aluminium Ware	300 1/	-	-	-	900 1/	-	-	-		-	-	-
Iron Mongery	-	-	-	-	-	-	-	-		-	-	-
Door, Window and balcony frames	-	-	1410	...	-	-	-	-		2290	-	250
Metal Furniture	-	-	570	-	110	-	-	-		1770	-	170
Wire Springs	-	-	-	-	-	-	-	-		-	-	-
Sanitary and Plumbing fittings	-	-	-	-	-	80	-	-		-	-	-
Razor Blades	-	-	-	-	140	-	-	-		-	-	-
Other Metal Products	-	-	1110	-	-	90	-	-		6550	-	-
Total	1560	17190	2800	8180	540	-	-	-	7000	25840	50	650

1/ Estimate

Source: Country replies to questionnaire.

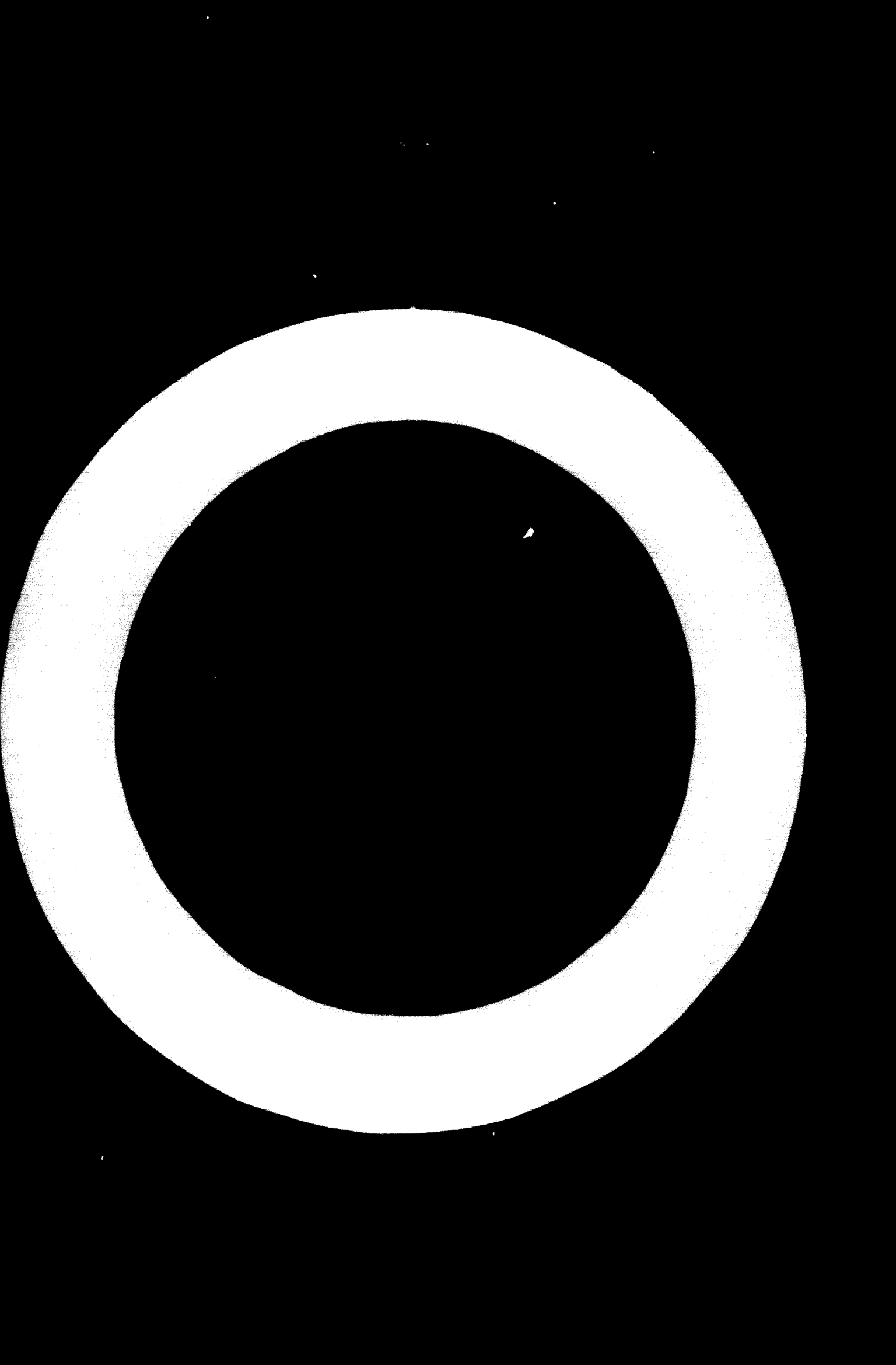


Table II.3 (3)

Local production of Machinery other than Electrical
in the countries of the East African Sub-region
Value in '000 U.S. Dollars

	Ethiopia 1963	Somalia	Kenya 1963	Uganda 1963	Tanzania 1963	Burundi 1963	Rwanda	Malawi	Zambia 1963	Rhodesia 1964	Malagasy 1963	Mauritius 1963
Internal combustion engines	—	—			—	—	—	—		—	—	—
Agricultural machinery	—	—		...	180 1/	—	—	—		2550	—	—
Tractors	—	—			—	—	—	—		—	—	—
Machine tools	—	—			—	—	—	—		—	—	—
Other industrial machinery	—	—			—	—	—	—		3520	—	—
of which Pumps and centrifuges	—	—			—	—	—	—		—	—	—
Earth moving machinery	—	—			—	—	—	—		—	—	—
Conveying machinery	—	—			—	—	—	—		—	—	—
Mining machinery	—	—			—	—	—	—		—	—	—
Sewing machinery	—	—			—	—	—	—		—	—	—
Refrigerating machinery	—	—			—	—	—	—		—	—	—
Balances	—	—			—	—	—	—		—	—	—
TOTAL	—	—	1710	...	180	—	—	—	2000 1/	6070	—	—

1/ Estimate

Source: Country replies to questionnaire

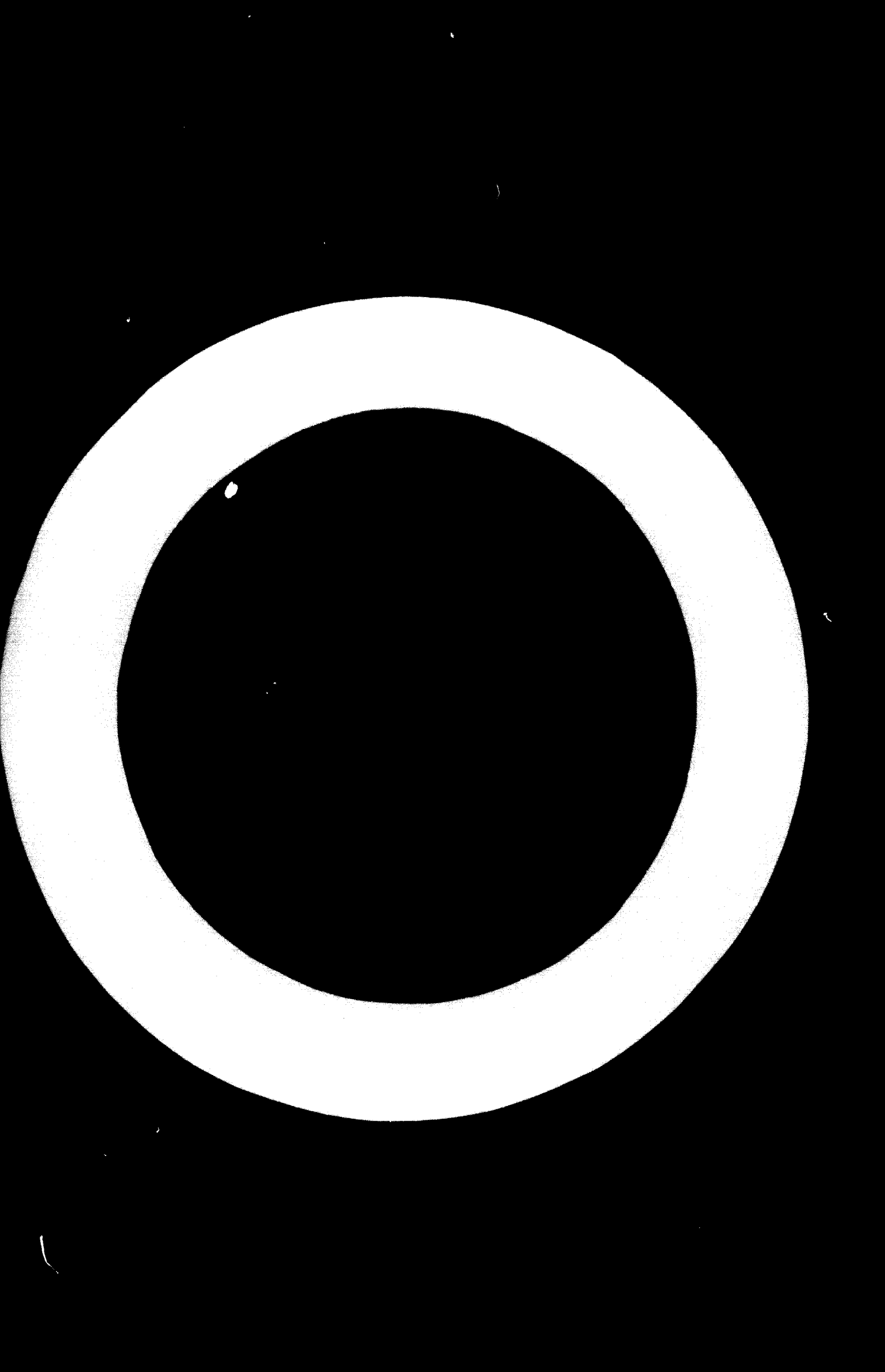


Table II.3 [illegible]

LOCAL PRODUCTION OF TRANSPORT EQUIPMENT

IN THE COUNTRIES OF THE EAST AFRICAN SUB-REGION

Value in '000 U. S. Dollars.

	Ethiopia 1963	Somalia	Kenya 1963	Uganda 1963	Tanzania 1963	Burundi 1963	Rwanda	Malawi	Zambia 1963	Rhodesia 1964	Malagasy 1963	Mauritius 1963
Railway Rolling Stock	-	-	7330 1/	-	-	-	-	-	...	-	-	-
Railway Freight Cars	-	-	...	-	-	-	-	-	-	-	-	-
Road Motor Vehicles	-	-	6430 2/	-	-	-	-	-	...	-	800	-
Of which Passenger Cars	-	-	-	-	-	-	-	-	-	-	800	-
Buses	-	-	-	-	-	-	-	-	-	-	-	-
Lorries and Trucks	-	-	-	-	-	-	-	-	-	-	-	-
Special Purpose Lorries	-	-	-	-	-	-	-	-	-	-	-	-
Chassis with Engines	-	-	-	-	-	-	-	-	-	-	-	-
Bodies Chassis Frames	-	-	-	-	-	-	-	-	-	-	-	-
Road Vehicles other than Motor Vehicles	-	-	-	-	-	-	-	-	...	31090	3 3/	-
Of which Road Tractors Trailer Combinations	-	-	-	-	-	-	-	-		31090	-	-
Trailers	-	-	-	-	140 4/	-	-	-	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	...	-	3	-
Ships and Boats	-	-	2660 5/	-	-	-	-	-	...	...	-	-
TOTAL	-	-	10 420	-	140	-	-	-	8600	31090	800	-

1/ Maintenance and Repair Work.
2/ Including repair shops
3/ Bicycle Assembly with 7 employees
4/ Estimate
5/ Ship building and repairing

Source: Country replies to questionnaires.

Source: Country replies to questionnaires.

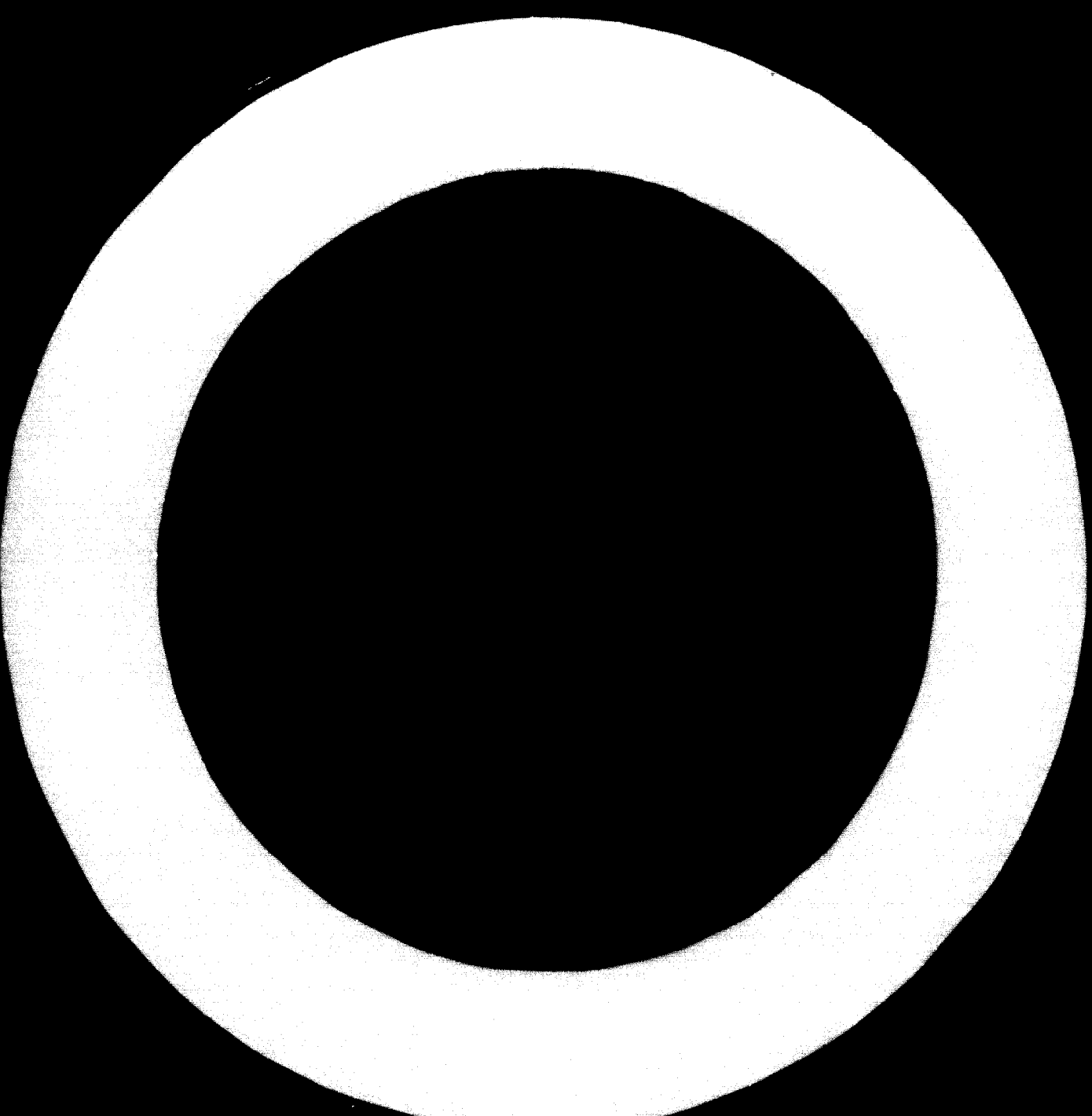


Table II.3 (5)

LOCAL PRODUCTION OF ENGINEERING COMMODITIES

IN THE COUNTRIES OF THE EAST AFRICAN SUB-REGION

Values in '000 U. S. Dollars

	Ethiopia 1963	Somalia	Kenya 1963	Uganda 1963	Tanzania 1963	Burundi 1963	Rwanda 1963	Malawi	Zambia 1963	[illegible]	[illegible]	[illegible]	[illegible]
Electrical Machinery Apparatus and Appliances	125	-	780	-	-	-	-	-	620	[illegible]	[illegible]	83	
Structural Engineering and Metal Products	1560	-	17190	2800	8180	540	...	...	7000	[illegible]			
Machinery other than Electrical	-	-	1710	...	180	-	-	-	1000	[illegible]	-		
Transport Equipment	-	-	16420 1/	-	140	-	-	-	9600	51040	[illegible]		
Total	1685	...	36100	2800	8500	540	...	...	18220	89780	[illegible]	[illegible]	[illegible]
Population (Million)	21.35		8.85	7.19	9.80	2.70			3.50	4.14	5.44	[illegible]	-
Per Capita Local Production US$	0.08	...	4.08	0.39	0.87	0.20	...	...	5.20	19.50	0.35	[illegible]	-

1/ Includes Railway, Motor Vehicle and Ship maintenance and repair

Source: Country replies to questionnaire.

[illegible]

RET [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
						[illegible]	[illegible]	19[illegible]	[illegible]
[illegible]	-	[illegible]	-	-	-		[illegible] [illegible]	[illegible] [illegible]	[illegible] H.P. Motors Large Motors
[illegible] gear [illegible]		1300	-	-	-	[illegible]	[illegible],000 500,000	[illegible],000 1,5[illegible],000	Switchgear Transformers
[illegible]	[illegible]	[illegible]		...	...	[illegible]	[illegible],000 40,[illegible],000	[illegible],000 100,000,000	Acedic Batteries Dry Cells
[illegible]	-	1057	-	-	-	[illegible]	27,000,000	40,000,000	
Domestic Radio Receivers	[illegible]	6000	-	...	-	[illegible]	400,000	650,000	
Domestic Television Receivers	[illegible]	1,000	-	-	[illegible]	[illegible]	300,000	450,000	
Telecommunication Apparatus	[illegible]	420	-	-	-	[illegible]	60,000 30,000 [illegible]	120,000 60,000 3,000	Telephone Sets Aut.Central Line Manuel Switch
[illegible] - [illegible] Apparatus	[illegible]	410	-	-	-		...	...	
[illegible]	-	700	-	-	-	Pieces	400,000	900,000	
[illegible]	-	9500	[illegible]	-	-	Pieces	[illegible]7,000	150,000	
[illegible]	-	1,150	-	-	-	Pieces	20,000	40,000	
[illegible] Appliances	-	1,050	-	...	...	Pieces	9,400 3,000	15,000 50,000	Air Conditioners Other
Electric Space Heaters	[illegible]	20	-	-	-				
Industrial [illegible]	-	-	-	-	-	Value	———	4,500	
Appliances for Motor Vehicles	-	45	-	-	-	Pieces	——— ——— ——— ———	70,000 70,000 70,000 1,000,000	Starters Generators Regulators Sparking Plug
Electronic Equipment	-	-	-	-	-	Set	200,000 80,000	500,000 1[illegible]0,000	Radio } - Components T.V. }
Electric [illegible] Tubing and [illegible]	-	185	-	-	-	Tons	2,000	5,000	
Insulated Cables	[illegible]	1[illegible]00	-	-	-	Tons	20,000	50,000	
Bare Copper Wire	[illegible]	-	-	-	-	Tons	1,000	4,000	
Bare Aluminium Conductor	-	-	-	...	-	Tons	5,000	9,000	
TOTAL	[illegible]	5883[illegible]	[illegible]	...	100				

a/ [illegible]
Source :- Country replies to questionnaires.

Product group	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-	[illegible] 1/	-	-	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Pipes	[illegible]	[illegible]	-	-	[illegible]			
Steel Pi[illegible]	-	[illegible]	-		[illegible]			
Steel Sheet	-	[illegible]	-	-		Tons	100,000	1,000,000
Steel Structures	[illegible]	[illegible] 2/	-	-	[illegible] 2/	Tons	1[illegible]0,000	200,000
Metal Containers	[illegible]	[illegible]	-	-	-	Pieces	50,000,000	88,000,000
Fuel and Gas Tanks	-	...		-				
Boilers, Pressure Vessels	[illegible]	80	-	-	-	Tons	4,000	10,000
Wire Products	[illegible]	1130 4/ 3320 5/	[illegible]	[illegible]	[illegible]	Tons	2,000 4/ 18,500 5/	5,000 4/ 47,000 5/
Metal Hand Tools	[illegible]	390	-	-	-	Tons	1,3[illegible]0	2,300
Domestic Utensils	[illegible]	3[illegible]5[illegible]	-	-	-	Tons	16,[illegible]00	34,000
Of which Hollowware enamelled	[illegible]	([illegible])	[illegible]	[illegible]	-		1,500	4,000
And of which Aluminium Ware	-	...	-	-	-			
Ironmongery	[illegible]	28[illegible]	-	-	-	Pieces	2,100,000	3,200,000
Door, Window and Balcony frames	-	2750	-	-	-	Tons	20,000	40,000
Metal Furniture	[illegible]	6100	-	-	[illegible] 3/	Tons	16,000 2/	30,000 5/
Wire Springs	610	1370	-	-	-	Tons	5,100	7,000
Sanitary and Plumbing Fittings	-	[illegible]350	-	-	-	Tons	100	200
Cutlery	-	...	-	-	-	Tons	1,000	2,000
Other Metal Products N.E.S.	-	11900	-		-	Tons	12,000	20,000
TOTAL	301[illegible]	78400	[illegible]	119[illegible]	[illegible]		...	...

1/ Cast Iron and Steel Fittings 2/ Includes fuel and gas tanks 3/ Estimated 4/ Steel Rope 5/ Other wire products
5/ Includes safes

Source: Country replies to questionnaire

Product								
Industrial Power Driven Engines	-	[illegible]	-	-	-	[illegible]	20,000	[illegible]
Agricultural Engines HP		1 [illegible]	-	-	-	[illegible]	5,000	37,500
Tractors	-	15[illegible]	-	-	-	[illegible]	2,000	[illegible]
Machine Tools	-	23[illegible]	-	-	-	[illegible]	10,000	3,000 1/ 5,000 2/
Other Industrial Machinery	-		-	-	12 3/			
Of Which:								
Pumps and Centrifuges	[illegible]	23	-	-	-	[illegible]	[illegible]	20,000
Compressors	-	-	-	-	-	[illegible]	----	500 1/ 16,000 2/
Office Machines	-	-	-	-	-	Pieces	----	10,000 4/ 1,000 7/
Woodworking Machinery	-	-	-	-	-	Pcs.	100	400
Earth Moving Machinery	-	57	-	-	-	Tons	5,000	30,000
Conveying Machinery	-	-	-	-	-	Tons	10,000	[illegible]
Mining Machinery	-	70	-	-	-		...	...
Textile Machinery	-		-	-	-	Tons	9,000	16,000
Sewing Machinery	-	770	-	-	-	Pieces	17,000	30,000
Refrigerating Machinery	-	1750	-	-	-	Pieces	100,000	200,000
Ball Bearings	-	-				Pieces	400,000	800,000
Valves C.I., Steel, Brass etc.	-	-	-	-	-	Pieces	110,000	130.000
Balances	-	790	-	-	-			
Others	-	1,70				Tons	5,000	30,000
TOTAL	[illegible]	12345	...	...	12		...	...

1/ For working [illegible]
2/ Pneumatic hand tools
3/ [illegible]
4/ Industrial
5/ For hydraulic brakes
6/ Typewriters
7/ Calculating Machines.

Source: Country Replies to Questionnaire.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1970	197[illegible]
[illegible]		-	-	-	-			
[illegible]	-	-	-	-	-	Pieces	1,200 1/ 50 2/	4,000 1/ 60 2/
Road Motor Vehicles			-	[illegible]	-			
Of which: Passenger Cars		[illegible]	[illegible]	-	-	Pieces	10,000	40,000
Buses	[illegible]	[illegible]	.	-	-	Pieces	1,700	5,000
Lorries and Trucks		9,000 1/	...	-	-	Pieces	6,000	15,000
Special Purpose Lorries	[illegible]	[illegible] 1/	-	-	-	Pieces	1,500	4,000
Chassis with Engines	[illegible]	[illegible]	-	-	-			
Trolley, [illegible]	[illegible]	[illegible] 2/	..	-	-			
Road Vehicles other than motor vehicles	[illegible]	...	-	-	-			
Of which: [illegible]	-	-	-	-	-			
Trailers	[illegible]	[illegible]	-	-	-	Pieces	3,500	6,000
Bicycles	[illegible]	[illegible]	-	-	[illegible] 4/	Pieces	100,000	150,000
Mechanically propelled [illegible]	-	-	-	-	-	Pieces	20	60
Motor Cycles	-		-	-	-	Pieces	10,000	25,000
Ships and Boats	-	[illegible]	-	[illegible]	-	Tons	306,000	180,000
Total	2[illegible].7	[illegible]	-	5365	100			

1/ [illegible]
2/ [illegible]
3/ Production [illegible] 1963
4/ Estimate
Source: Country [illegible] questionnaire

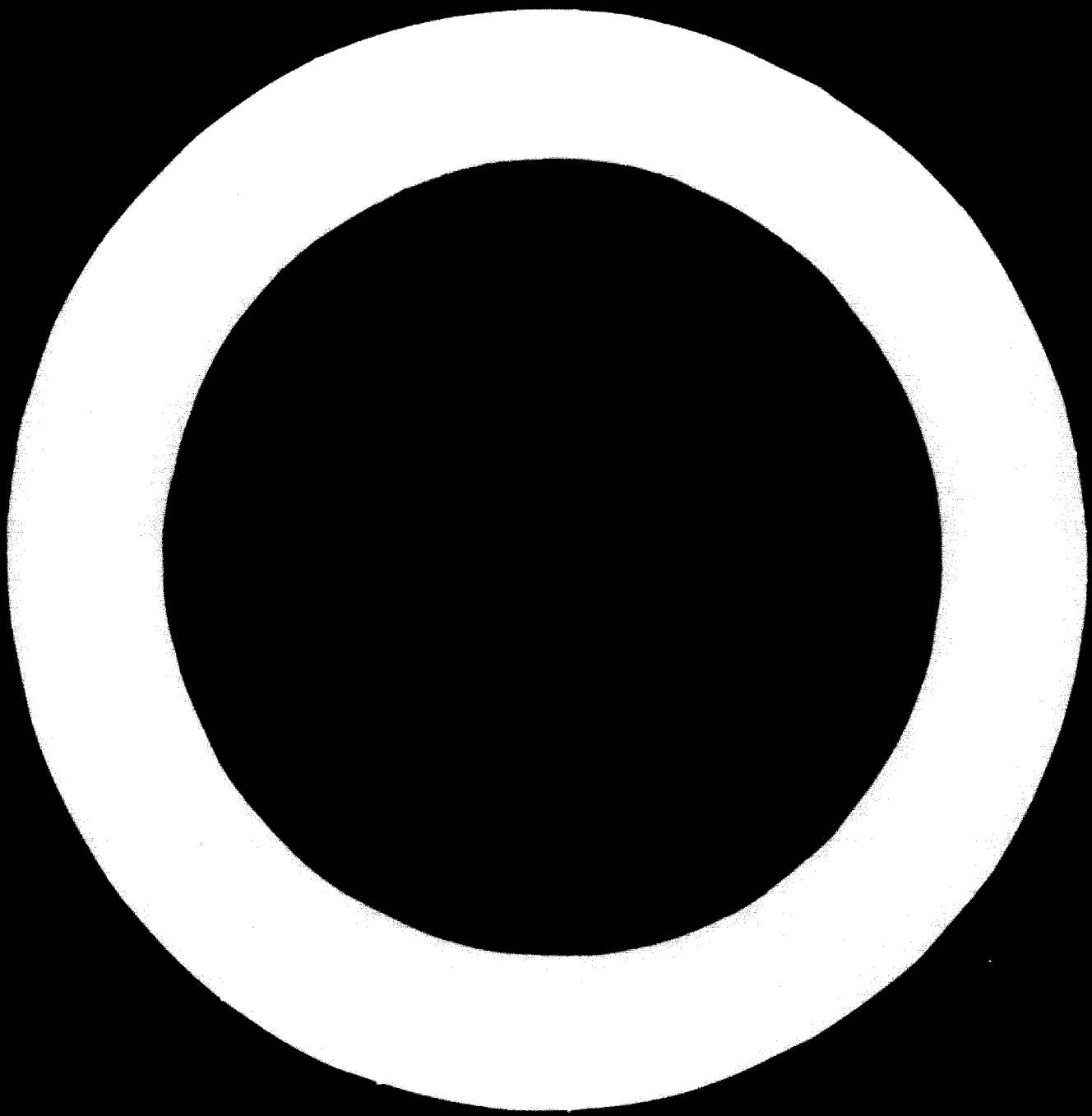


Table II. [illegible]

Local Production of Engineering Commodities

in reporting countries

in the North, west and Central african Sub-regions

Value in 1960 U.S. Dollars

Local Production of	Morocco 1963	UAR 1964	Sudan 1964	Ghana 1963	Chad 1963
Structural engineering and metal products	30,137	7[illegible]	405	11,925	44
Electrical machinery apparatus and appliances	5,468	58,830	371	...	100
Machinery other than electric	1,882	12,345	...	...	12
Transport equipment	20,917	45,660	...	5,366	400
TOTAL	58,404	195,235	776	17,291	556
Population in thousands	12,665	27,965	13,180	7,340	2,800
Production per capita in dollars	4.6	7,0	0,06	2.36	0.2

Source: Country replies to questionnaire

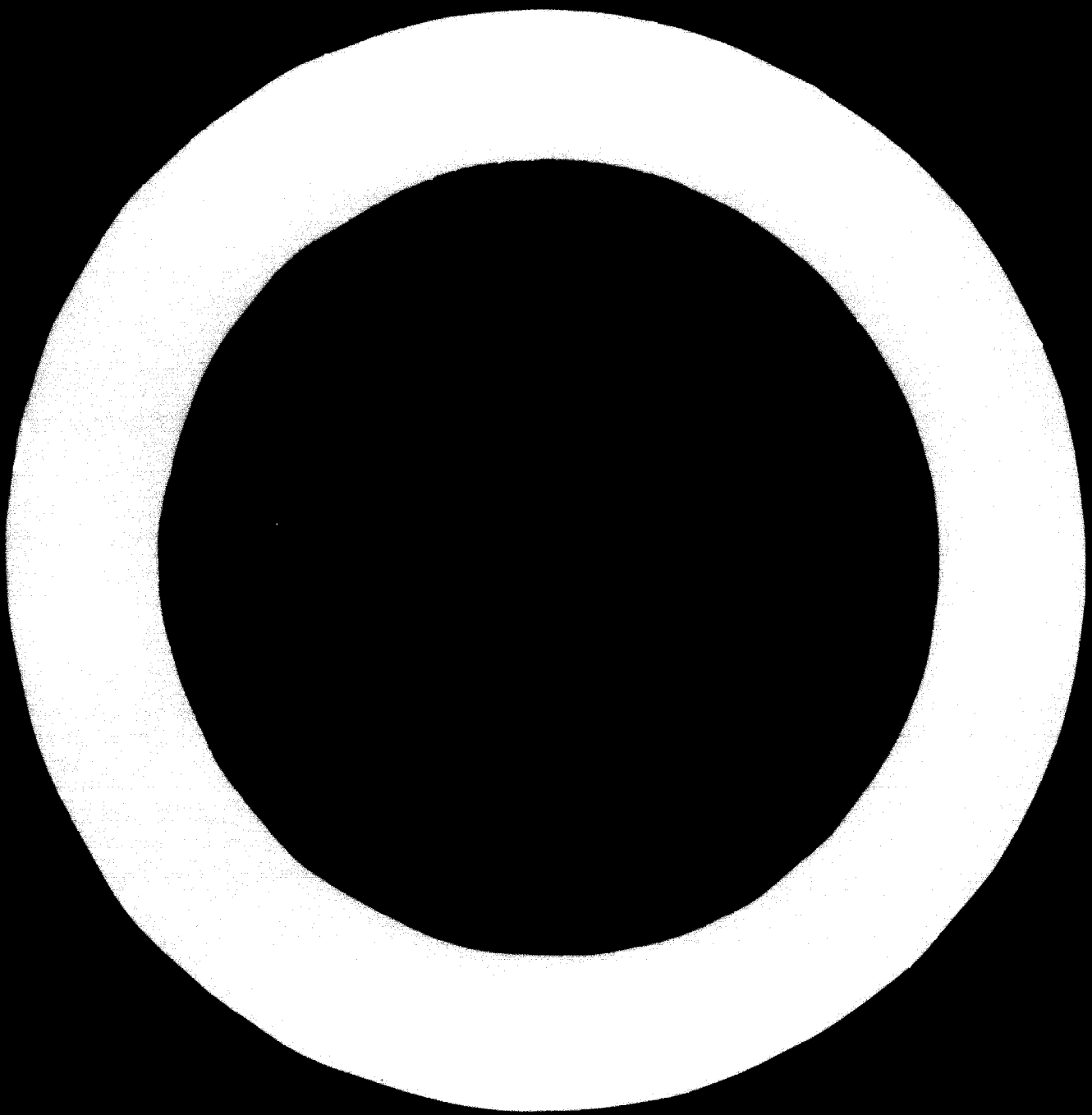


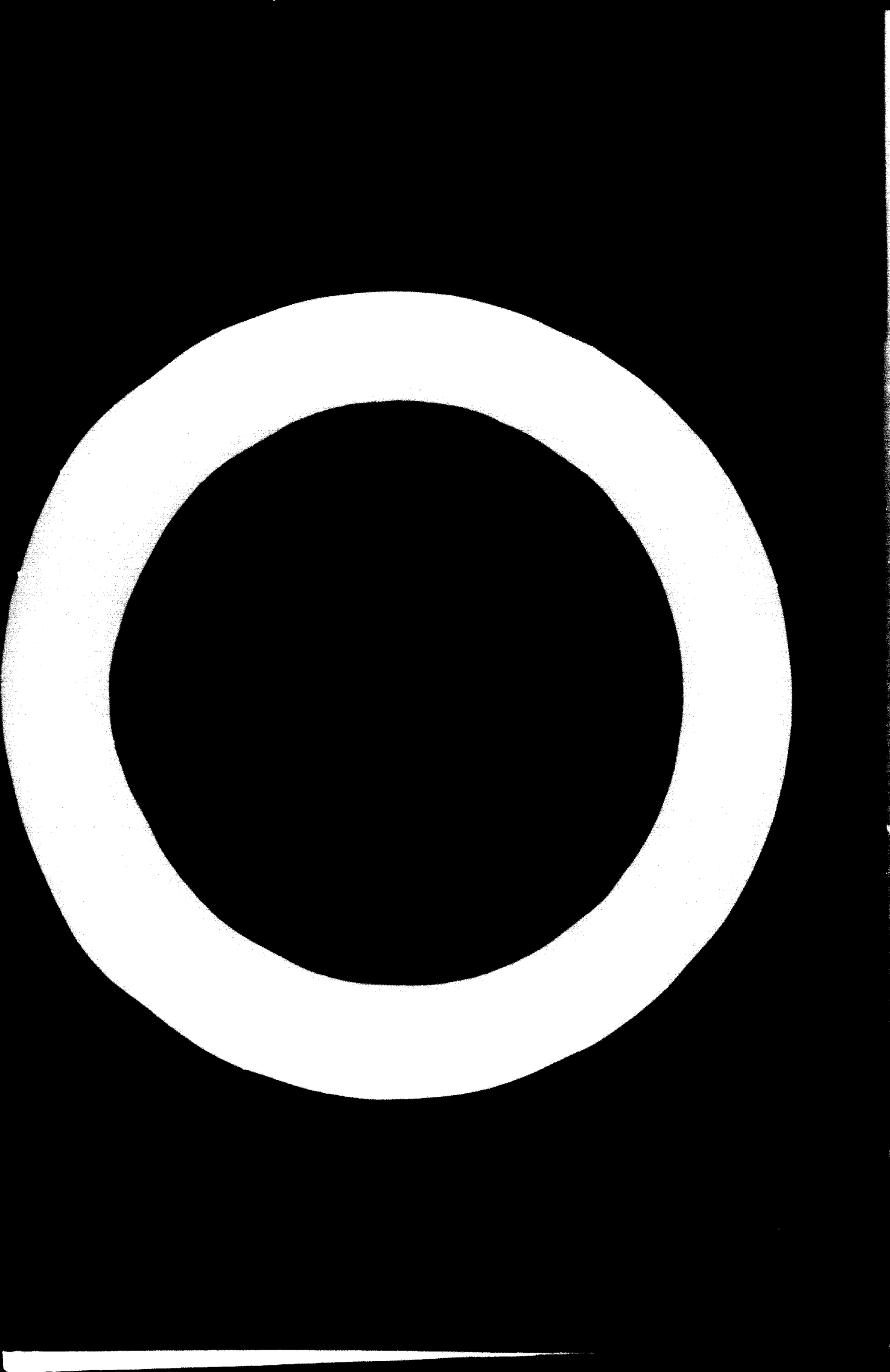
TABLE [illegible]

C.I.F. VALUE OF IMPORTS OF ELECTRICAL MACHINERY, APPARATUS AND APPLIANCES INTO THE COUNTRIES OF THE EAST AFRICAN SUB-REGION (000 U.S. Dollars)

Commodity Group: Electric Machinery Apparatus and Appliances (72)

COUNTRY	1956	1957	1958	1959	1960	1961	1962	1963
Ethiopia	1,937	1,500	2,200	2,900	2,700	3,200	3,872	5,855
Fr. Somaliland								
Somalia	319	524	237	532	2,027	682	974	1,491
Kenya								
Uganda	15,852	17,300	11,400	12,400	13,860	15,161	19,672	20,876
Tanzania								
Burundi								
Rwanda								
Malawi								
Zambia	20,903	39,900	34,200	37,700	35,781	32,527	23,734	20,237
Rhodesia								
Malagasacar	4,663	4,900	5,100	4,600	5,300	6,021	5,794	6,765
Mauritius	1,683	2,427	3,575	3,818	4,117	3,856	2,520	3,609
Reunion	790	882	990	1,103	1,080	1,419	1,530	1,730
Subtotal Malawi, Zambia & Rhodesia	20,903	39,900	34,200	37,700	35,781	32,527	23,734	20,237
Subtotal Others	25,250	27,533	23,502	25,353	29,284	30,338	34,362	40,326
Total	46,153	67,433	57,702	63,053	65,065	62,865	58,096	60,563

Source: Foreign Trade Statistics



(Table No. 2)

Per Capita G.D.P. and Per Capita Consumption
Of Insulated Cables (SITC 723.1)
In the Countries of the East African Sub-Region

Country	Base Year	Per Capita G. D. P. U.S.$	Per Capita Consumption U. S. $
Ethiopia	1963	43	0.01
Fr. Somalia		...	...
Somalia	60/62	50	0.01
Kenya	1964	85	0.06
Uganda	61/63	63	...
Tanzania	61/63	58	0.01
Burundi Rwanda	61/63	48	0.01
Malawi		...	...
Zambia	1964	180	0.21
Rhodesia	1964	213	0.67
Malagasy	61/63	112	...
Mauritius	1964	249	0.64
Reunion			

Source :- Country replies to questionnaire

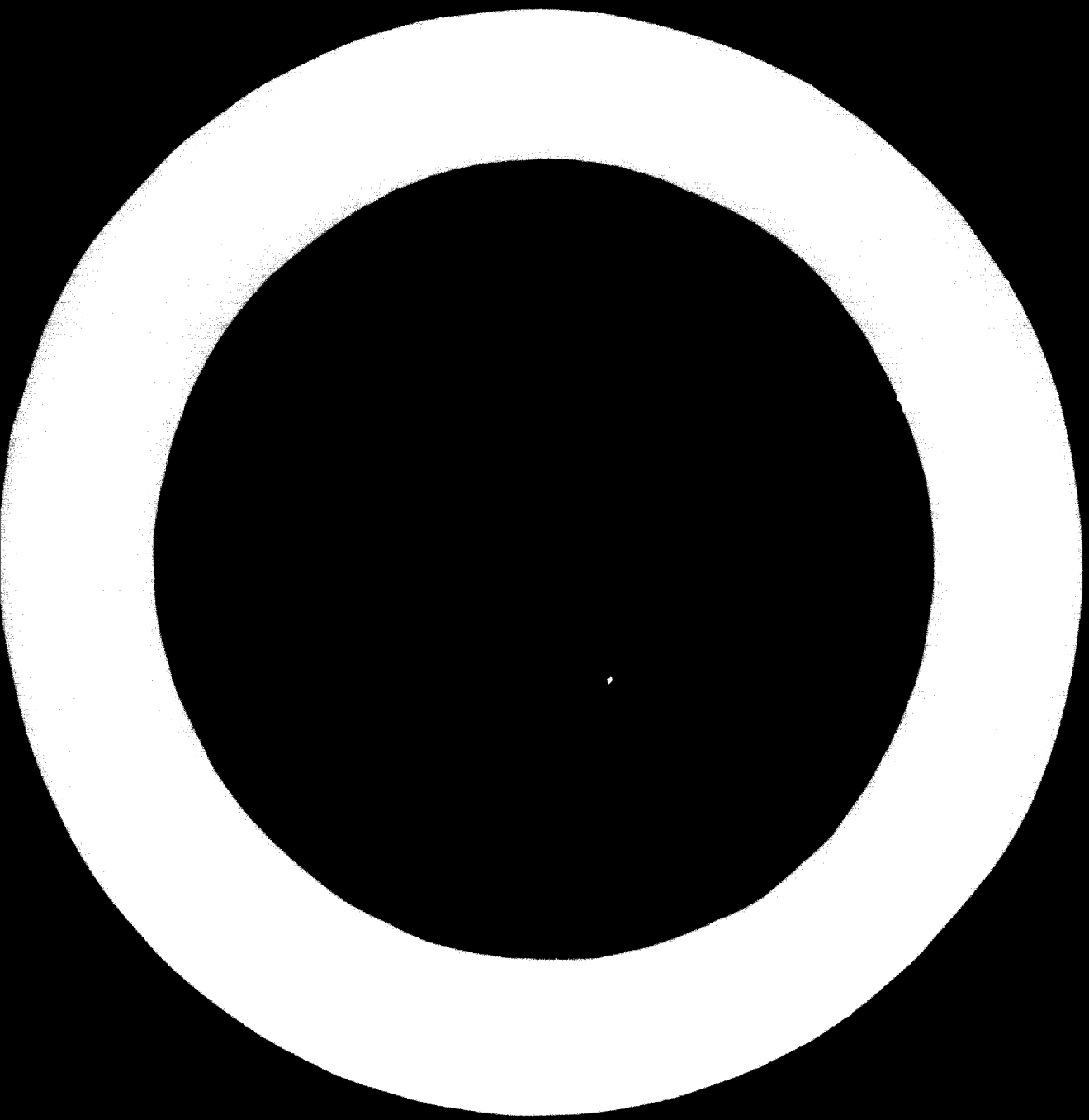


Table II 5

Annual Consumption of Engineering Products in the Countries of the East African Sub-region Average for 1961/1963 in [illegible]

Country	Iron and Steel 67	Non-ferrous Metals 68	Sub-total(1)	Structural Engineering and metal Products 69	Sub-total(2)	Machinery non-electric 71	Electrical machinery Apparatus and Appliances 72	Transport Equipment 73	Sub-total(3)	Total
Ethiopia	29,300	580	29,880	4,470	34,350	3,760	1,700	10,740	16,200	50,550
Fr. Somaliland	...	...	...	...	...	...	...	...	...	...
Somalia	2,960	120	3,080	820	3,900	940	260	900	2,100	6,000
Kenya	91,960	5,270	97,230	13,440	110,670	10,540	3,450	24,890	38,880	149,550
Uganda	9,410	170	9,580	3,470	13,050	3,990	1,270	5,390	10,650	23,700
Tanzania	24,920	1,790	26,710	6,780	33,490	5,330	2,140	9,300	16,780	50,270
Burundi	6,160	240	6,400	1,700	8,100	1,960	550	1,890	4,400	12,500
Rwanda	6,700	270	6,970	1,830	8,800	2,090	590	2,020	4,700	13,500
Malawi	5,210	200	5,410	1,440	6,850	1,400	350	1,900	3,650	10,500
Zambia	46,870	1,000	47,870	18,100	65,970	16,550	6,550	13,120	36,220	102,190
Rhodesia	124,620	6,020	130,640	21,920	152,560	26,620	9,870	32,300	68,790	221.350
Malagasy	28,880	670	29,550	6,150	35,700	4,010	1,990	5,560	11,560	47,260
Mauritius	14,220	380	14,600	7,920	22,520	2,190	1,400	1,700	5,290	27,810
Reunion	...	...	...	...	...	...	...	...	...	...
Sub-total 1	32,260	700	32,960	5,290	38,250	4,700	1,960	11,040	18,300	56,550
Sub-total 2	139,150	7,740	146,890	27,220	174,110	23,910	8,000	43,490	75,410	249,520
Sub-total 3	176,700	7,220	183,920	41,460	225,380	44,570	16,770	47,320	108,660	334,040
Sub-total 4	43,100	1,050	44,150	14,070	58,220	6,200	3,390	7,260	16,850	75,070
TOTAL	391,210	16,710	407,920	88,040	495,960	79,380	30,120	109,710	219,220	715,180
Mozambique	18,320	1,680	20,000	9,540	29,540	7,760	2,730	12,050	22,540	52,080

Legend: Subtotal 1: Ethiopia and Somali
Subtotal 2: Kenya, Uganda, Tanzania, Burundi and Rwanda
Subtotal 3: Malawi, Zambia and Rhodesia
Subtotal 4: Malagasy and Mauritius

																							742.2	
										I.T.			Production I.T.		Estimate	Production I.T.	DTC	Estimate	Production I.T.	DTC	Estimate	Production I.T.	DTC	Estimate
[illegible]	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	335	350	[illegible]	595	600	155	[illegible]	[illegible]
[illegible]	[illegible]	---	...	...	---	...	---	...	..	...	...	...	...	..	...	---	...	..	...	...	...	...	...	..
[illegible]	[illegible]	-	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	175	190	150	----	50	50	35	110	90	30	35	35
[illegible]	[illegible]	---	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2250	1390	1800	---	350	400	1740	980	1500	265	280	280
[illegible]	[illegible]	---	6000	[illegible]	---	[illegible]	---	175	500	[illegible]	[illegible]	[illegible]	695	[illegible]	800	---	260	250	365	645	700	95	190	160
[illegible]	5530	---	6600	[illegible]	---	[illegible]	---	210	500	1670	[illegible]	1600	150	1190	800	---	315	300	465	735	800	110	225	220
[illegible]	[illegible]	---	[illegible]	[illegible]	---	150	---	[illegible]	200	[illegible]	[illegible]	300	140	440	200	---	115	110	50	220	150	35	75	60
[illegible]	...	---	[illegible]	...	---	[illegible]	---	[illegible]	[illegible]	..	[illegible]	[illegible]	...	205	200	---	45	50	...	70	70	...	30	30
[illegible]	[illegible]	---	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2200	[illegible]	---	900	900	1300	1490	1450	290	470	430
[illegible]	[illegible]	---	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2750	[illegible]	---	1110	1100	3630	[illegible]	[illegible]	1010	580	[illegible]
[illegible]	[illegible]	---	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1400	[illegible]	1400	---	435	450	[illegible]	1115	1200	270	310	300
[illegible]	[illegible]	---	[illegible]	[illegible]	---	[illegible]	---	[illegible]	[illegible]	1780	[illegible]	1200	160	600	500	---	315	300	380	440	450	105	135	120
[illegible]	[illegible]	---	...	[illegible]	---	..	---	...	...	...	...	...	...	...	...	---	...	...	...	...	...	...	...	...
[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	600	---	---	1500	---	---	1950	---	---	400	---	---	690	---	---	205
[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	1300	---	---	5600	---	---	3600	---	---	1060	---	---	3150	---	---	720
[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	4900	---	---	2050	---	---	4520	---	---	1360
[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	1900	---	---	750	----	---	1650	---	---	420
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	[illegible]	---	---	10010	---	---	2705

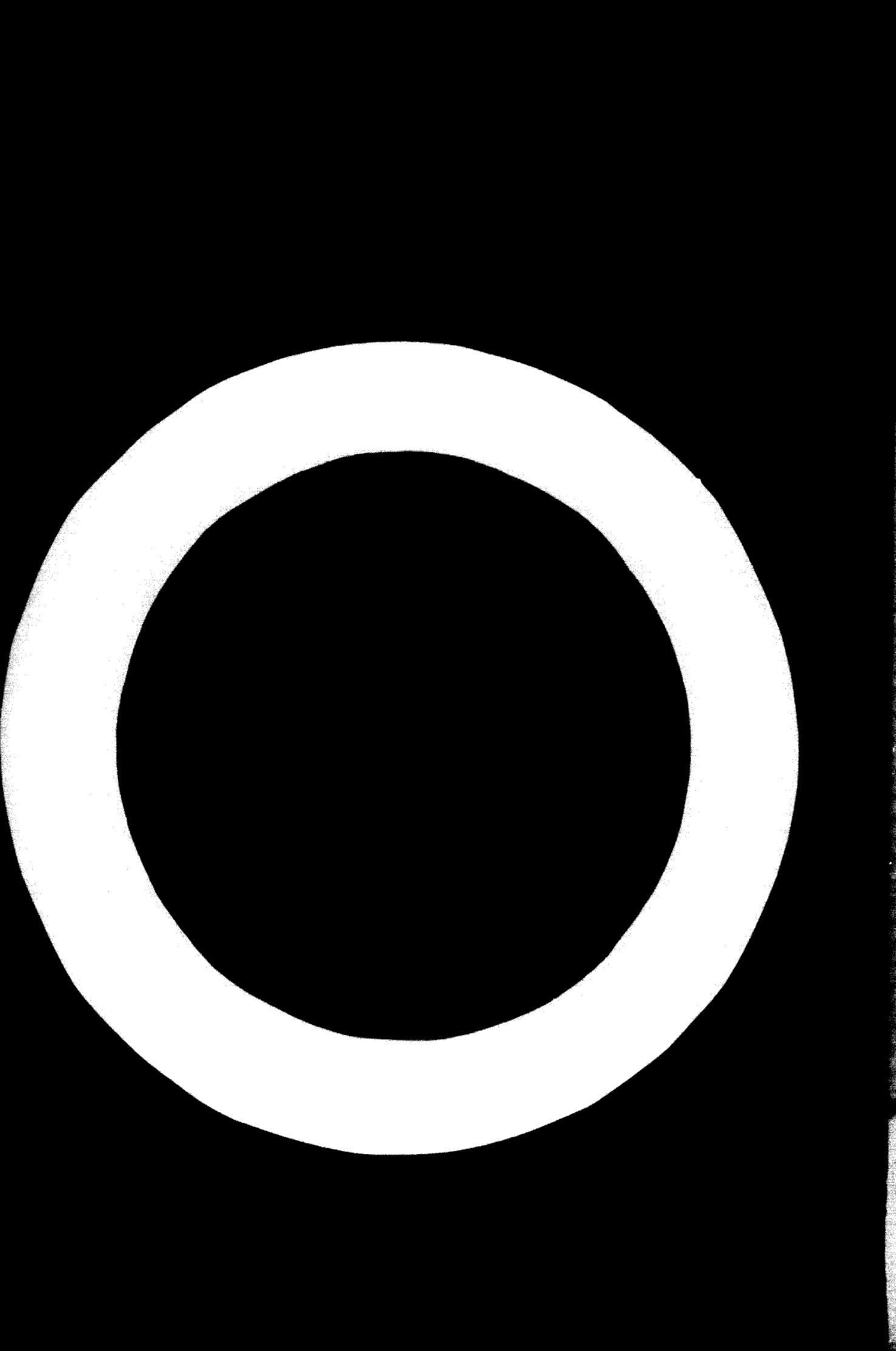


TABLE IV 1

DATA RELATIVE TO PRODUCTION OF ELECTRICAL MACHINERY

IN THE UNITED KINGDOM IN 1958

Firms employing 25 or more persons

Average Number employed by the enterprise in this industry[1]	Enterprises	Establishment	Total Sales[2]	Net Output	Employees			Wages and Salaries			Net Output per Person employed
					Operative	Others	Total	Operatives	Others	Total	
	No.	No.	Mil. US$	Mil. US$	No.	No.	No.	Mil. US$	Mil. US$	Mil. US$	US$
1	2	2	4	5	6	7	8	9	10	11	12
25-- 49	45	52	8.05	4.00	1,270	342	1,612	1.69	.82	2.51	2,480
50 - 99	56	56	17.80	9.20	2,998	877	3,875	3.75	1.66	5.41	2,374
100 - 199	38	47	30.45	15.45	4,360	1,299	5,659	5.70	2.61	8.31	2,730
200 - 299	20	20	26.85	12.55	3,731	1,245	4,976	5.47	2.67	8.14	2,520
300 - 399	7	9	10.50	5.90	1,910	613	2,523	2.62	1.25	3.87	2,340
400 - 499	12	13	27.20	14.55	3,873	1,495	5,368	5.40	2.94	8.34	2,720
500 - 749	11	15	26.20	15.20	5,075	1,633	6,708	6.66	3.50	10.16	2,360
750 - 999	11	38	50.50	24.45	6,500	2,671	9,171	9.72	5.38	15.10	2,670
1000 - 2499	20	23	66.45	34.15	8,939	3,253	12,192	14.07	6.90	20.97	2,800
2500 - 3499	4	10	48.80	22.50	5,416	2,657	8,073	7.59	5.60	13.19	2,790
3500 - 4999	4	11	64.05	36.90	8,939	3,793	12,732	14.30	7.72	22.02	2,900
5000 - 7499	4	23	118.85	61.70	13,370	7,727	21,097	20.85	15.20	36.05	2,930
7500 and over	3	42	553.45	321.40	60,800	35,406	104,266	114.18	71.14	185.32	3,080
Total	327	373	1,049.10	578.65	135,241	63,011	198,252	212.00	127.40	339.40	2,920

Source: United Kingdom Board of Trade Report on the Census of Production for 1958, Part 56.

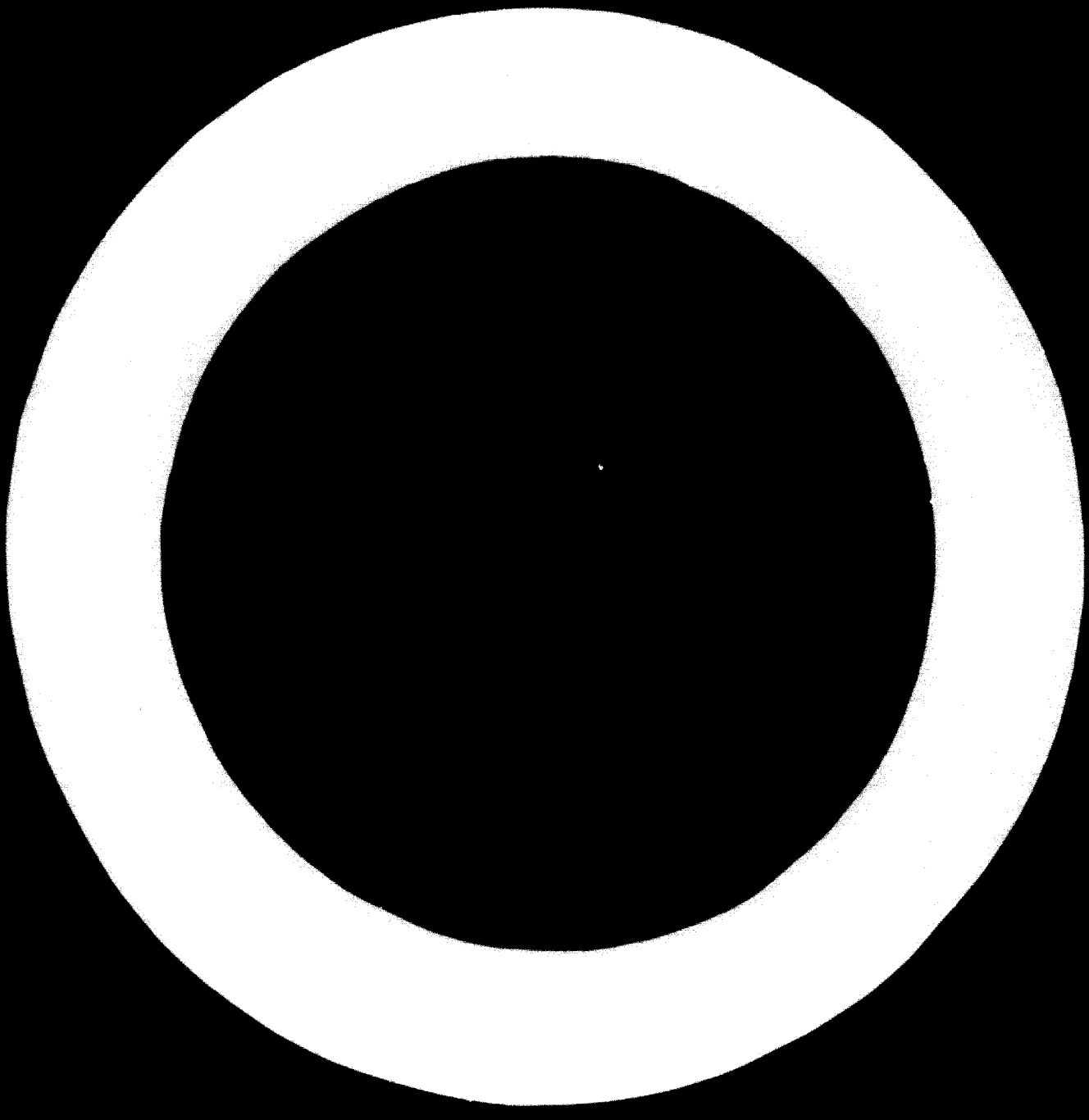


TABLE IV 2

DATA RELATIVE TO PRODUCTION OF INSULATED WIRES AND CABLES

IN THE UNITED KINGDOM IN 1958

Firms employing 25 or more persons

Average Number employed by the enterprise in this industry[1]	Enterprises	Establishments	Total Sales[2]	Net Output	Employees			Wages and Salaries			Net output per Person Employed
					Operatives	Others	Total	Operatives	Others	Total	
	No.	No.	Mil. US$	Mil. US$	No.	No.	No.	Mil. US$	Mil. US$	Mil. US$	US$
1	2	3	4	5	6	7	8	9	10	11	12
25 - 49	4	4	0.72	0.33	98	21	119	0.14	0.05	0.19	2,780
50 - 99	3	3	1.22	0.63	163	30	193	0.21	0.07	0.28	3,250
100 - 199	7	12	11.04	3.25	843	276	1,119	1.30	0.56	1.86	2,940
200 - 299	5	9	14.14	3.15	788	266	1,054	1.30	0.54	1.84	2,990
300 - 399	3	4	16.16	3.32	896	239	1,135	1.37	0.45	1.82	2,930
400 - 499	3	5	9.47	2.91	1,033	295	1,328	1.28	0.45	1.73	2,190
500 - 749	8	11	63.75	19.20	3,522	1,255	4,777	5.55	2.30	7.85	4,020
750 - 999	—	-	-	-	-	-	-	-	-	-	-
1000 - 1499	3	4	31.73	8.72	2,372	948	3,320	4.06	2.20	6.26	2,630
1500 - 2499	3	3	49.03	15.10	3,334	1,999	5,333	6.10	3.69	9,79	2,830
2500 - 4999	—	—	-	-	-	-	-	-	-	-	-
5000 and over	3	17	239.16	77.40	18,251	8,789	27,030	29.96	18.33	48.29	2,860
Total	42	70	436.44	134.06	33,295	14,120	45,418	51.27	28.64	79.91	2,950

[illegible] United Kingdom Report of [illegible] Census of Production for 1958, [illegible]

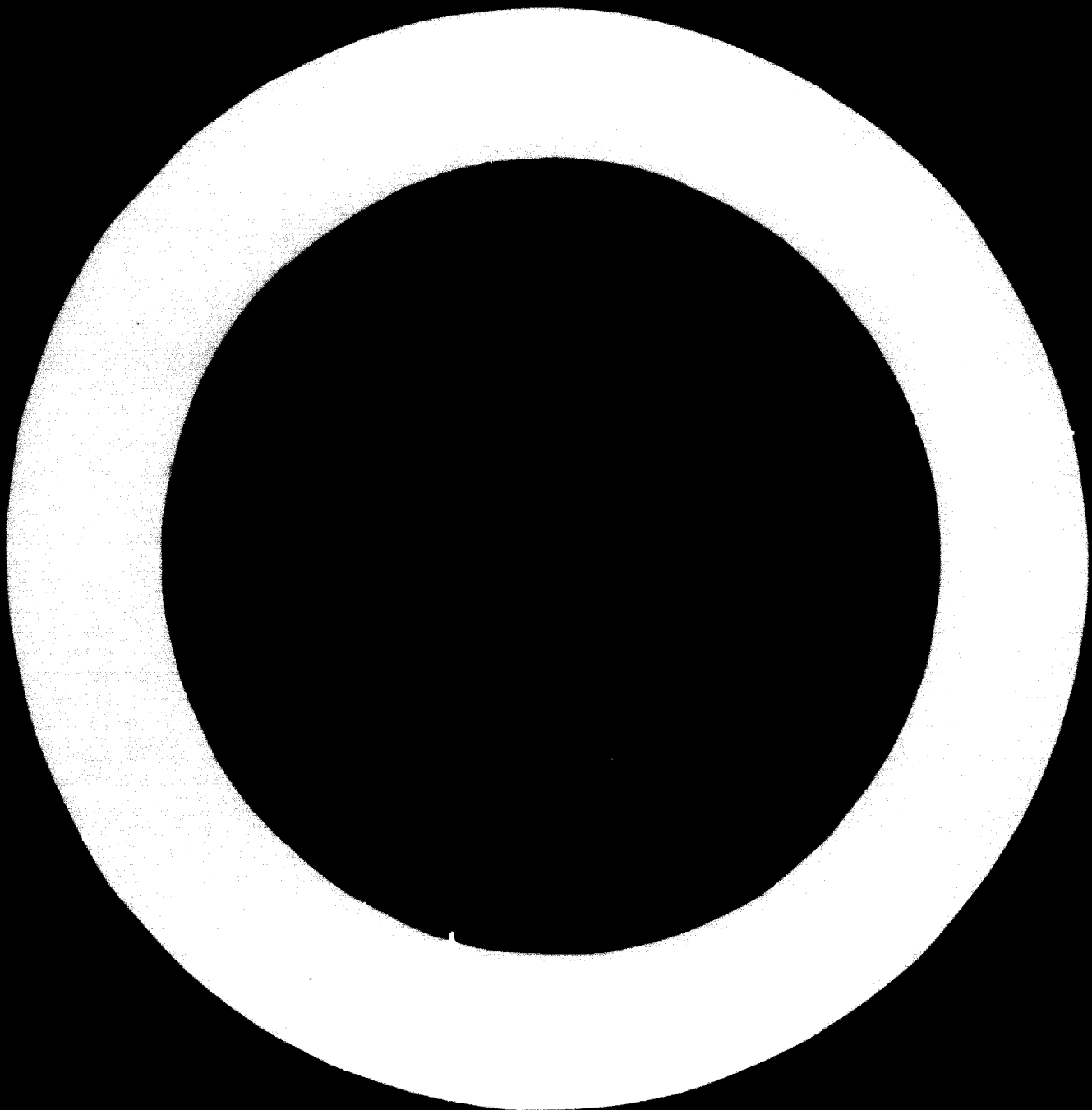


Table IV B (1)

Minimum Economic Sizes of Plants for Various Electrotechnical Engineering Industries, Fixed Capital Requirements, Labour Force, Floor Area and Electric Energy Consumption

Average European Conditions in 1965

Serial No.	Product Group	Minimum Economic Capacity	Maximum Weight of piece to be lifted	Fixed Capital: per unit of production	Fixed Capital: into buildings as % of total	Machine Hours: Total per unit of production	Machine Hours: Machinery Hrs. as % of Total	Output per annum per Production Workman	Output per annum per sq. m of production area	Total Floor Area per Workman	Production Workmen as % of Total Workmen	Production Workmen as % of Total Employees	Energy Consumption per Unit of production
		1000 t.p.a.	kgs.	$/ton	%	Hrs/ton	%	Tons per Workman	Tons per square metre	Square metre	%	%	kwh per Ton
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Motors, 0.1 to 10 kw	1.5-2	80	230	31	370	55	5	1.0	14	95	80	350
2	Rotating Machinery	3-5	1000	120	30	87	56	22	2.0	20	75	65	280
3	Switchgear Transformers	0.2-0.5	600	265	45	385	54	5	0.5	32	88	77	255
4	Industrial Furnaces	4-5	1000	40	52	82	35	25	2.0	27	80	60	250
5	Apparatus for Measuring	0.7-0.9	50	240	42	700	56	2.7	0.5	14	84	74	370
6	Insulated Cables	20-25	-	90	26	22	90	87	1.7	89	77	75	220
7	Domestic Refrigerators	20-25 000 pieces	110	80	45	95	58	20	1.7	36	85	66	300
8	Domestic Washing Machines	20-25 000 pieces	100	80	45	90	90	20	1.6	35	85	66	300
9	Electromechanical Domestic Appliances	1.5-2	50	100	30	115	55	16	2.0	20	75	68	250

TABLE

Minimum Economic Sizes of Plants for Various Engineering Industries other than Electrotechnical, Fixed Capital Requirements, Labour Force, Floor Area and Electric Energy Consumption

Average European Conditions in 1965

No.	Product Group	Minimum Economic Capacity	Max.Wt.of pieces to be lifted	Fixed capital per unit of prodn.	Fixed capital bldg. as % of total	Working Time/unit of prodn.	Hours Mcry.Hrs. % of total	Output per prodn. workman	Output p.a. per m² of prodn.area	Total floor area per worker	Prodn.workmen as % of Total Workmen	Prodn.workmen as % of Total Employees	Energy Cons. per unit of production
		1000 t.p.a	kgs.	$/ton	per cent	Hrs/ton	per cent	tons/Wkr	tons/m²	sq.m.	per cent	per cent	KWH/Ton
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Cast Iron Pipes and Fittings	4-9	500	90	38	40	70	47	1.8	30	80	72	240
2	Heavy Structures	5-10	40,000	120	60	45	40	42	1.2	80	85	75	230
3	Light Structures	5-10	10,000	70	50	35	40	40	3.6	30	70	64	260
4	Fuel and gas tanks	5-10	10,000	60	45	34	45	55	2.3	48	70	65	240
5	Metal Containers	2-5	3,000	120	50	32	45	40	2.5	40	70	65	250
6	Boilers, pressure vessels, etc.	10-20	20,000	120	45	44	48	43	1.8	55	80	72	275
7	Metal hand tools and implements	1-1.5	30	160	28	220	80	8.5	0.95	24	93	88	400
8	Ironmongery	1-2	18	116	30	130	80	14.5	1.6	16	86	80	300
9	Sanitary and plumbing fittings	6-8	300	40	36	30	65	62	4.2	35	78	70	250
10	Internal Combustion Engines	6-10	150	140	40	110	63	17	1.0	40	75	65	280
11	Agricultural machinery for preparing and cultivating the soil	16-20	—	45	44	23	65	82	3.0	66	75	66	230
12	Agricultural machinery for harvesting, threshing and sorting	4-6	—	42	47	57	72	33	2.2	33	80	76	250
13	Machine tools for working metals	0.7-1.0	210	290	33	188	90	10	0.8	30	78	70	450
14	Machine tools, welding and cutting of metals	1.6-2.5	1,000	140	27	87	70	22	2.0	24	80	65	320
15	Pumps and centrifuges	2-3	2,000	180	31	150	56	13	1.0	30	80	72	320
16	Earth Moving Machinery	2-3	7,500	110	46	60	51	32	1.0	61	78	73	290
17	Conveying Machinery(light)	4-6	500	88	28	47	60	40	2.2	37	80	70	270
18	Mining Machinery	2-4	3,000	150	37	130	70	15	0.7	49	90	75	330
19	Woodworking Machinery	6-10	1,000	230	31	255	58	7.5	0.5	34	87	83	430
20	Textile (Household) Machinery	2-10	50	120	38	190	75	10	1.5	15	72	60	600
21	Refrigerating Equipment[1]	20-25 000 units	110	80	45	95	52	20	1.7	36	85	66	300
22	Food Preparation Machinery	3-5	1,500	160	39	135	52	14	0.7	37	78	67	300
23	Stone and glass machinery	25-30	10,000	270	39	34	60	56	1.7	72	81	72	300
24	Machinery for Plastics	1-2	8,000	200	36	150	55	12	1.0	31	75	65	380
25	Reheating, annealing and drying furnaces	3-5	1,000	85	30	90	51	21	2.0	26	87	82	260
26	Rail and Boiler Fittings	0.2-0.3	—	410	29	3500	80	0.5	0.05	34	88	70	16,000
27	Brick and ceramic working machinery	6-10	1,500	90	32	75	60	26	1.7	35	85	78	300
28	Tractors	20-25 000 units	175	80	40	11.0	53	10	1.3	31	81	73	260
29	Lorries (Industrial)	4-6	800	100	31	63	85	30	1.6	37	72	65	280
30	Railway Carriages	20-25	10,000	100	39	60	45	32	2.0	37	72	65	240

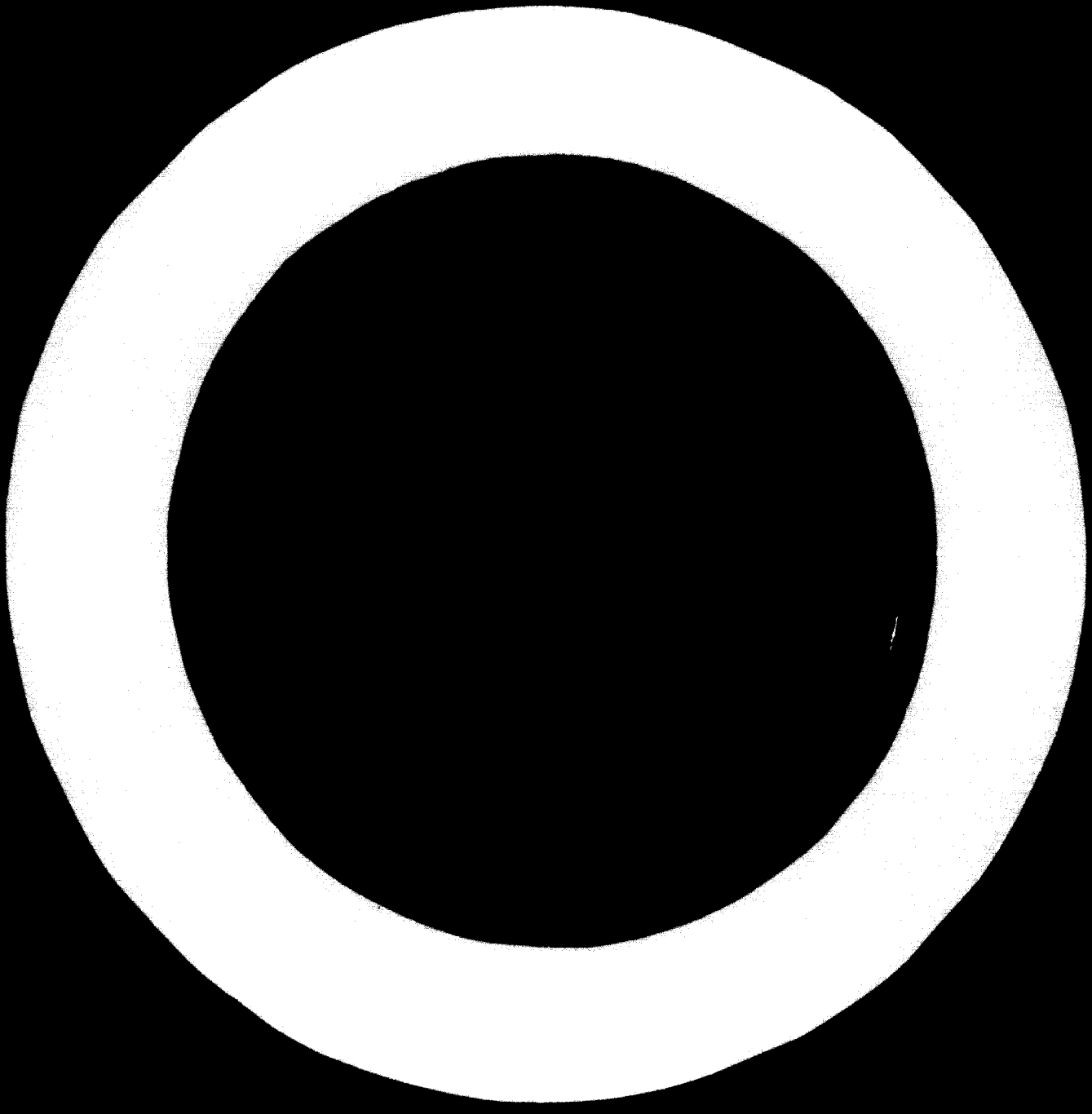


TABLE IV·4 (1)

Data Relative to Electrotechnical Engineering Industries with possibilities for developing countries based on U.S.A. Conditions in 1959/1960 and one shift operation

SERIAL NO.	SIC	BRANCH INDUSTRY	Annual Production Capacity	Capital Requirements '000 US Dollars: Fixed capital	Working Capital	Total	Foreign Currency	Local Currency	Employment: Direct Labour	Indirect labour	Total	Fixed Investment per employee US$	Annual Gross Sales Revenue '000 US$	Total annual costs '000 US$	Gross annual profit: Total '000 US$	As percentage of Total Capital	As percentage of gross sales	[illegible]: Annual Needs '000 US$	Annual Savings '000 US$	[illegible]: US$ per annum	Percentage of gross sales	Capital output ratio
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	3351	Copper Tubing	1875 tons	238	312	550	460	90	15	13	28	8500	2800	2,000	810	148	29	1,600	1,210	1,230	44	0.45
2	3351	Copper wire drawing and insulating	120 tons	67	24	91	67	24	2	3	5	13300	200	167	33	36	18	115	85	87	44	1.04
3	3471	Electroplating	Services worth US$120,000	47	19	66	23	43	11	3	14	3400	120	90	30	45	25	11	—	108	90	0.61
4	3585 / 3632	Air conditioning and Refrigerators	3000 Air cond. 3000 Refrig.	208	132	340	190	150	38	8	46	4500	900	655	245	72	27	360	540	545	60	0.62
5	3621	Electric Motors 1/6 to 10 H.P.	3000 motors	87	60	147	73	74	23	11	34	2600	410	325	85	58	21	144	265	264	64	0.36
6	3624	Electrodes for Neon Lights	800,000 electrodes	14	11	25	10	15	3	1	4	3500	80	54	26	104	35	24	56	57	71	0.44
7	3634	Electric space Heaters	25,000 heaters	50	20	70	38	32	8	2	10	5000	135	108	27	39	20	50	85	89	66	0.79
8	3634	Fans, domestic, 12" electric oscillating	10,000 units	41	32	73	26	47	[illegible]	4	13	3200	200	158	42	59	21	75	125	124	62	0.59
9	3641	Electric bulb assembly plant	11,000,000 units	150	130	280	120	160	33	15	48	3100	880	640	240	86	26	284	596	550	63	0.51
10	3642	Specular Reflectors	75,000 units 12" diametre	85	65	150	70	80	16	4	20	4300	450	335	115	76	26	145	305	310	69	0.48
11	3651	Radios (assembly)	25,000 units	40	100	140	75	65	31	3	34	1200	670	570	100	72	15	375	295	260	39	0.54
12	3691	Automobile batteries	24,000 units	54	38	92	50	42	10	3	13	4200	264	222	42	46	16	150	114	109	41	0.84
13	3694	Motor Starters	4,200 starters	38	33	71	35	36	12	7	19	2000	210	170	40	56	10	65	145	145	69	0.49

1/ Electricity needs are given as connected load or as KWH. consumption per annum

2/ Distilled water needed for electrolyte

Based on the Industry Fact Sheets published by the Department of State Agency for International Development, U.S.A.

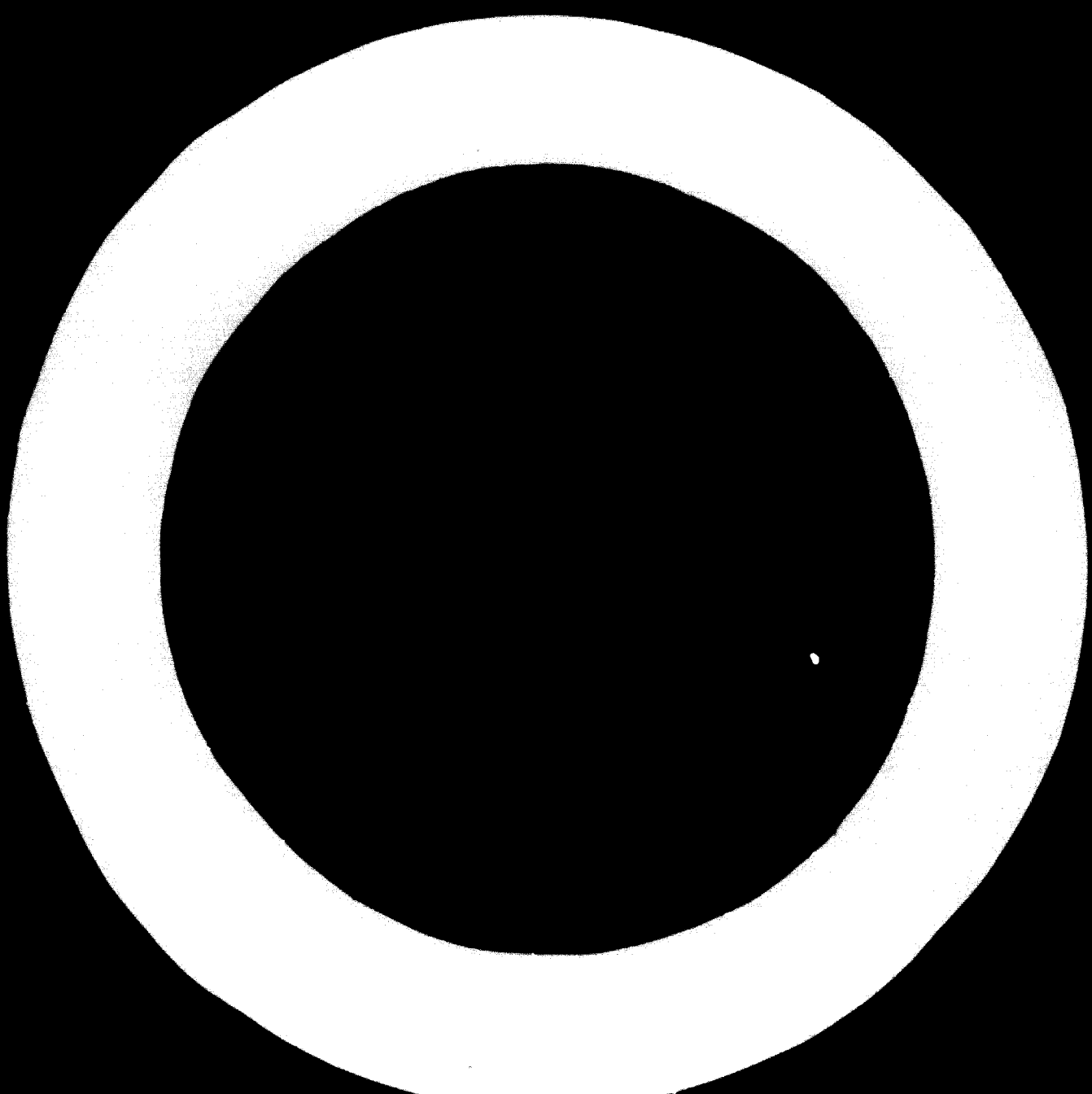


TABLE IV 4 (2)

Data Relative to Electrotechnical Engineering Industries with possibilities for developing countries

African Conditions in 1965

based on one shift operation

SER IAL No.	SIC	BRANCH INDUSTRY	Annual production Capacity	Capital Requirements '000 U.S. Fixed Capital	Working Capital	Total	of which Foreign Currency	Local Currency	Employment Direct Labour	Indirect Labour	Total	Fixed Investment per employee US$	Annual Gross sales Revenue '000 US$	Total Annual Costs '000 US$	Gross Annual Profit '000 US$	As percentage of Fixed Capital	As percentage of Gross Sales	Foreign Currency Annual Savings '000 US$	Value '000 US$ per annum	Value added Percentage of gross sales	Capital output Ratio
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	3351	Copper Tubing	1875 tons	300	500	800	700	100	30	25	55	5450	2810	2,110	700	235	25	1,860	950	960	34	0.83
2	3351	Copper wire drawing and insulating	120 tons	82	38	120	95	25	5	5	10	8200	200	175	25	31	13	135	65	66	33	1.82
3	3471	Electroplating	Services for $120,000	55	15	70	32	38	16	5	21	2600	120	64	56	102	47	14	—	103	86	0.58
4	3585 3635	Air Conditioning and Refrigerators	3000 Refrig. 3000 air conditioners	255	135	390	310	80	85	15	100	2550	900	600	300	118	34	430	470	490	54	0.80
5	3621	Electric Meters 1/6 to 10 H.P.	3000 Meters	102	78	180	104	76	38	21	59	1750	410	280	130	128	32	170	240	237	58	0.71
6	3624	Electrodes for Neon Lights	800,000 electrodes	17	12	28	17	11	7	3	10	2800	80	51	29	176	36	27	53	54	68	0.52
7	3634	Electric Space Heaters	25,000 units	70	23	93	57	36	17	3	20	4150	135	95	40	67	30	58	77	82	61	1.71
8	3634	Fans, domestic 12" oscillating	10,000 units	47	33	80	47	33	18	7	25	3200	200	140	60	128	30	90	110	113	57	0.71
9	3641	Electric bulbs assembly plant	11,000,000 bulbs	180	140	320	200	120	90	30	120	2700	880	600	280	156	32	310	570	490	56	0.65
10	3642	Specular Reflectors	75,000 units 12" dia.and 2" deep	105	65	170	125	45	28	7	35	4850	450	300	150	143	33	170	280	290	64	0.57
11	3651	Radio assembly	25,000 radios	45	150	195	135	60	85	5	90	2150	670	550	120	266	18	480	190	200	30	0.29
12	3691	Lead Acid Batterries	24,000 batteries	62	58	120	75	45	25	5	30	4000	264	223	41	66	16	180	84	87	33	1.48
13	3694	Motor Starters	4200 starters	46	44	90	54	34	22	13	35	2600	210	145	65	141	31	75	135	135	64	0.67

1 Electricity needs are given as connected load or as KWH consumption per annum

2/ Distilled water needed for electrolyte

Based on the information given in the Industry Fact Sheets published by the Department of State, Agency for International Development, adjusted to average African conditions in 1965 as given in the explanatory note.

TABLE [illegible].

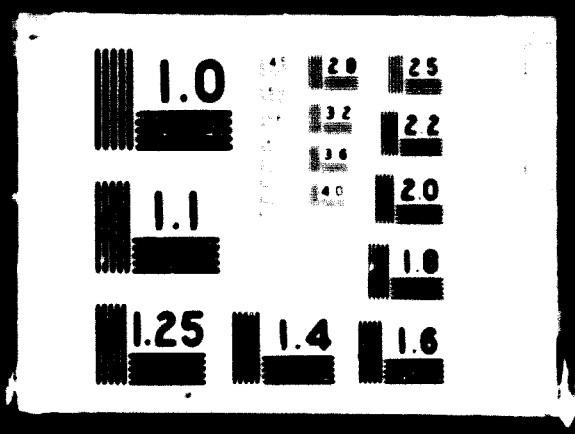
[illegible] industries [illegible] technical with possibilities for developing countries

[illegible] conditions in [illegible] one shift operation

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	of which [illegible] machinery	of which [illegible]	Employment: Direct labour	Employment: In-direct labour	Employment: Total	Fixed investment per employee US$	Annual gross sales '000 US$	Total annual costs '000 US$	Gross annual profit: Total '000 US$	Gross annual profit as percentage of: Total Capital	Gross annual profit as percentage of: gross sales	Foreign currency: Annual [illegible] '000 US$	Foreign currency: [illegible] '000 US$	Value [illegible] US$ per annum	Added [illegible] percent of gross sales	[illegible]
	2	3	[illegible]	[illegible]	7	8	[illegible]	10	11	12	13	14	15	16	17	18	19	20	21	22
[illegible]	[illegible]	[illegible]	3	[illegible]	[illegible]	[illegible]	11	3	14	3900	200	149	51	60	26	66	134	137	48	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	284	25	14	20	34	[illegible]	697	434	263	69	38	188	508	530	76	[illegible]
[illegible]	[illegible]	113	254	741	635	[illegible]	22	25	47	10000	[illegible]	1,528	372	50	19	1,226	674	732	39	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	71	[illegible]	[illegible]	12	20700	625	656	169	49	20	496	329	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	43	211	98	113	9	3	12	14000	279	216	63	30	23	116	163	170	61	1.24
[illegible]	[illegible]	[illegible]	[illegible]	479	282	197	17	[illegible]	24	13300	1,094	819	275	56	25	594	600	612	58	0.78
[illegible]	[illegible]	84	86	167	91	76	26	7	33	2500	480	390	90	54	19	164	316	*324	67	0.52
[illegible]	[illegible]	72	60	[illegible]	50	42	16	6	22	1500	320	257	63	68	19	145	175	178	56	0.54
[illegible]	[illegible]	73	[illegible]	118	76	42	14	6	20	3700	250	210	40	34	16	76	174	178	71	0.66
[illegible]	[illegible] tools	[illegible]	67	269	[illegible]	82	27	[illegible]	36	5600	411	322	89	33	22	93	318	324	79	0.63
[illegible]	[illegible]	108	54	162	89	73	27	5	32	3400	350	253	97	60	28	80	270	265	76	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	262	[illegible]	100	33	10	43	3400	440	380	* 60	23	14	140	300	301	68	0.87
[illegible]	[illegible]	201	[illegible]	[illegible]	185	[illegible]	46	8	54	3700	322	722	200	62	22	217	705	414	45	0.77
[illegible]	[illegible] pieces	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8	[illegible]	11	2000	[illegible]	185	65	117	26	119	131	133	53	[illegible]
[illegible]	[illegible]	105	43	148	91	57	22	5	27	3900	275	209	66	45	24	77	198	204	74	0.73
[illegible]	[illegible]	[illegible]	103	[illegible]	[illegible]	149	26	6	32	7750	678	514	264	76	39	264	414	414	61	0.84
[illegible]	[illegible]	352	164	516	347	169	[illegible]	10	45	[illegible]	1,314	1,019	295	57	23	625	689	676	51	0.76
[illegible]	[illegible]	616	120	738	576	162	33	5	38	15300	667	510	157	21	24	219	448	464	70	1.59
[illegible]	[illegible]	[illegible]	46	306	[illegible]	[illegible]	31	5	36	7200	336	268	68	22	20	107	229	242	72	1.27
[illegible]	12500 ploughs	92	50	142	66	76	23	6	29	3200	350	278	72	51	21	83	257	233	67	[illegible]
[illegible]	[illegible] tractors	234	[illegible]	366	[illegible]	228	38	8	46	5100	1,450	1,252	198	42	14	977	473	444	31	1.95
[illegible]	[illegible]	77	58	[illegible]	60	75	14	5	19	4100	380	300	80	59	21	192	188	192	51	0.70
[illegible]	[illegible] conveyors	105	30	135	93	42	12	4	16	6600	190	152	48	36	25	50	140	128	67	1.05
[illegible]	[illegible]	70	73	115	77	[illegible]	19	[illegible]	23	1700	444	346	98	83	22	253	191	193	43	[illegible]

[illegible]

25.3.74



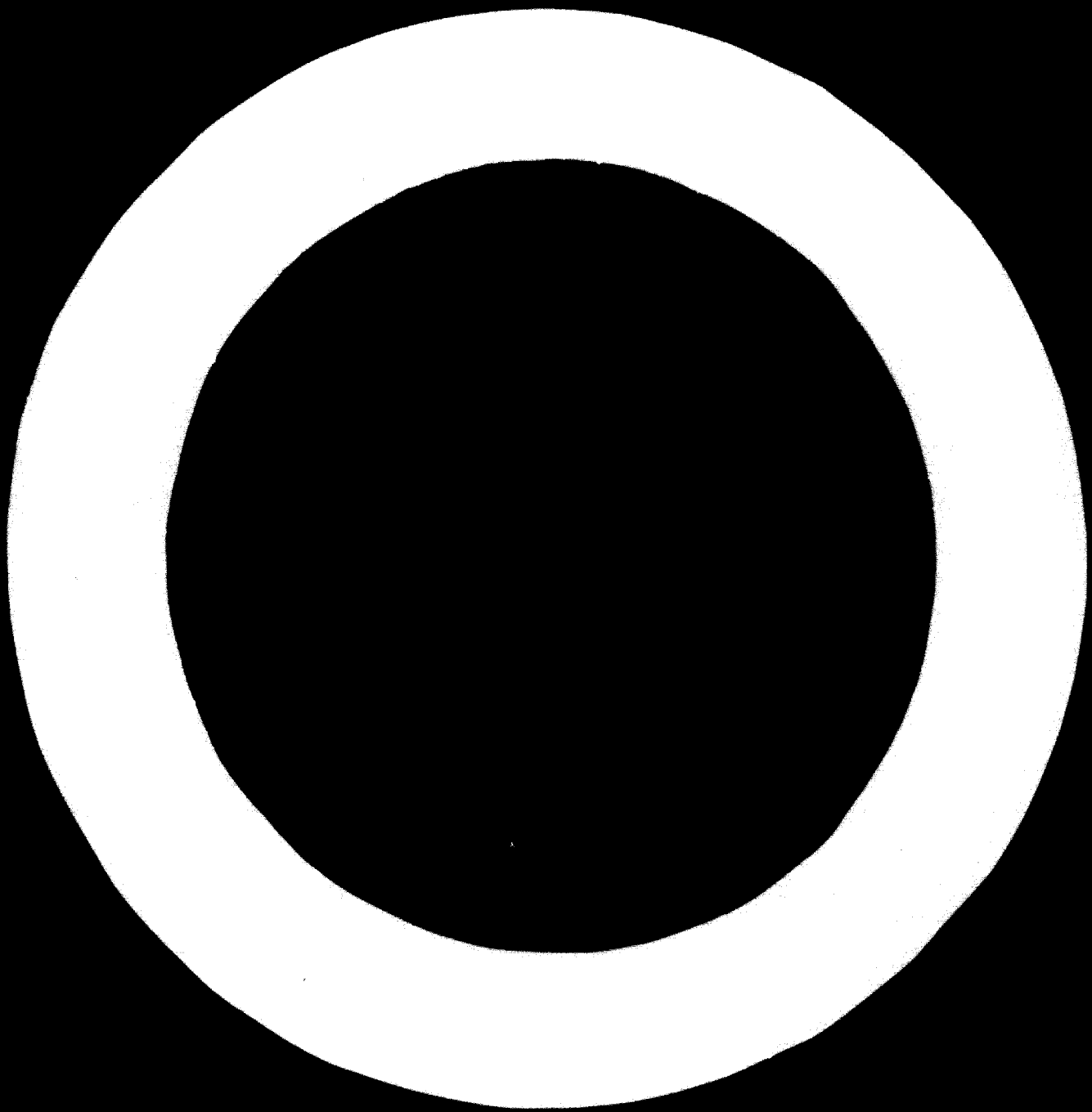
TABLE

[illegible] Relative to Engineering Industries other than electromechanical with possibilities for developing countries

African conditions in 1965

[illegible]

No.	[illegible]	[illegible]	Annual Production Capacity	Capital Requirements ('000 US $): Fixed Capital	Working Capital	Total Capital	of which: Foreign Currency	Local Currency	Employment: Direct Labour	Indirect Labour	Total	Fixed investment per employee US$	Annual gross sales '000 US$	Total Annual Costs '000 US$	Gross Annual profit: Total '000 US$	As percentage of Total Capital	As percentage of Gross sales	Foreign Currency: Annual Needs '000 US$	Annual Savings '000 US$	Value Added: '000 US$ p.a.	Percentage of gross sales	Capital output Ratio
			3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
[illegible]	[illegible]	[illegible]	[illegible] units	[illegible]	30	[illegible]	67	23	23	[illegible]	28	2400	200	132	68	76	34	72	128	127	64	0.[illegible]
[illegible]	[illegible]	[illegible] steel [illegible]	2,5[illegible],000 lbs.	[illegible]90	[illegible]	[illegible]	400	130	24	41	65	6000	700	385	315	62	45	222	478	502	72	1.05
[illegible]	[illegible]	[illegible]	[illegible]0,000 tons	[illegible]	[illegible]0	1,1[illegible]	1,[illegible]20	135	30	50	80	7800	1,900	1,595	305	29	16	1,425	475	540	28	2.15
[illegible]	[illegible]	[illegible]	[illegible] million [illegible] of tubes	[illegible]	[illegible]	515	430	75	16	7	23	13300	825	673	152	30	18	585	240	274	33	1.90
[illegible]	[illegible]	[illegible]d pipe	1000 twenty [illegible] lengths	145	50	245	150	95	15	5	20	9800	280	205	75	31	27	137	143	153	55	1.60
[illegible]	38[illegible]	[illegible]	8150 tons	390	140	530	400	130	37	13	50	7800	1,090	830	260	49	24	405	685	440	40	1.20
[illegible]	[illegible]	[illegible] iron joining [illegible]	[illegible] million lbs.	95	125	229	100	120	40	15	55	1700	480	335	145	66	30	120	360	300	62	0.75
8	[illegible]	[illegible]	400,000 lbs.	4[illegible]	[illegible]00	140	60	80	30	13	43	930	320	240	80	57	25	165	155	150	47	0.95
9	[illegible]	[illegible]	35[illegible],000 pieces	[illegible]	70	160	95	65	21	12	33	2700	250	180	70	44	28	90	160	165	66	0.95
10	[illegible]	[illegible]	250 000 tools	25[illegible]	[illegible]	350	24[illegible]	110	50	20	70	3700	410	240	170	49	41	70	340	315	77	1.10
11	[illegible]	[illegible]	500,000 hand tools	132	58	190	140	50	47	7	54	3400	350	200	150	79	43	95	255	254	73	0.75
12	[illegible]	[illegible]	300,000 dozen pieces	185	135	320	220	100	52	18	70	2600	440	320	120	37	27	185	255	260	59	1.25
[illegible]	[illegible]	[illegible]	[illegible]4000 pieces	245	190	435	260	175	115	20	135	1800	900	640	260	60	29	260	640	450	50	0.95
[illegible]	[illegible]	[illegible] windows and doors	9000 windows 2250 doors	25	45	70	45	25	15	5	20	1300	250	180	70	100	28	135	115	115	46	0.60
15	[illegible]	Aluminium cooking [illegible]	1[illegible]0,000 pieces	129	41	170	129	41	41	9	50	2600	275	165	110	85	40	78	197	197	72	0.85
16	[illegible]	Enamelled plates, pots and kettles	600,000 pieces	300	115	415	305	110	50	12	62	4800	675	470	205	49	30	310	365	375	55	1.10
17	[illegible]	Automobile and truck leaf springs	18000 for autos 54000 for trucks	425	345	770	545	225	58	22	80	5300	1,310	990	320	42	24	735	575	585	45	1.30
18	[illegible]	Centrifugal pumps and valves	320 pumps 1.5"-10" 1,[illegible]00 valves 4"-16"	770	130	900	760	140	55	10	65	11800	660	440	220	24	33	225	435	465	70	1.95
19	[illegible]	Agricultural implements	[illegible]500 implements	320	80	400	290	110	60	10	70	4700	330	220	110	28	33	120	210	220	57	1.80
20	[illegible]	[illegible]	1250[illegible] ploughs	110	90	200	115	85	50	13	62	1800	350	230	120	60	34	100	250	220	63	0.91
21	[illegible]	[illegible] tractor	[illegible],000 tractors	285	[illegible]35	520	480	140	90	15	105	2700	1,450	1,220	230	37	16	1,145	305	300	21	2.05
22	[illegible]	[illegible] and [illegible] elevators	47[illegible] conveyors	90	70	160	110	50	26	9	35	2600	380	295	85	53	22	225	155	165	43	0.97
[illegible]	[illegible]	[illegible]	[illegible]90,000 [illegible]	130	50	180	130	50	19	8	27	4800	190	135	55	31	29	70	120	120	63	1.50
[illegible]	[illegible]	[illegible]	[illegible] bicycles	45	120	165	[illegible]	[illegible]	50	8	58	860	444	340	104	63	23	290	154	160	36	1.[illegible]



Annex I

MATERIALS, SUPPLIES, ELECTRICITY, FUEL AND WATER NEEDED BY THE ELECTRO-TECHNICAL ENGINEERING INDUSTRIES COVERED IN TABLES IV 4(1) AND IV 4(2)

The industrial plants covered in Tables IV 4(1) and IV 4(2) as having possibilities for developing countries need the following materials, fuel and water annually to meet the production figures given in the Tables. Electricity requirements are given either as connected load or as annual consumption in kilowatthours. As regards supplies, where an industry needs small amounts of lubricants, hand tools, cutting tools, abrasives, maintenance and spare parts and office supplies these are referred to as normal. Where special supplies or large quantities are needed, these are detailed.

1. **Copper Tubing** (SIC 3351)

Direct Materials

Copper 1900 tons

Supplies

Normal supplies except for tools, dies and fixtures which would cost about US.$17,000 and maintenance and repair parts which would cost about US.$18,000.(both for African conditions).

Electric Power

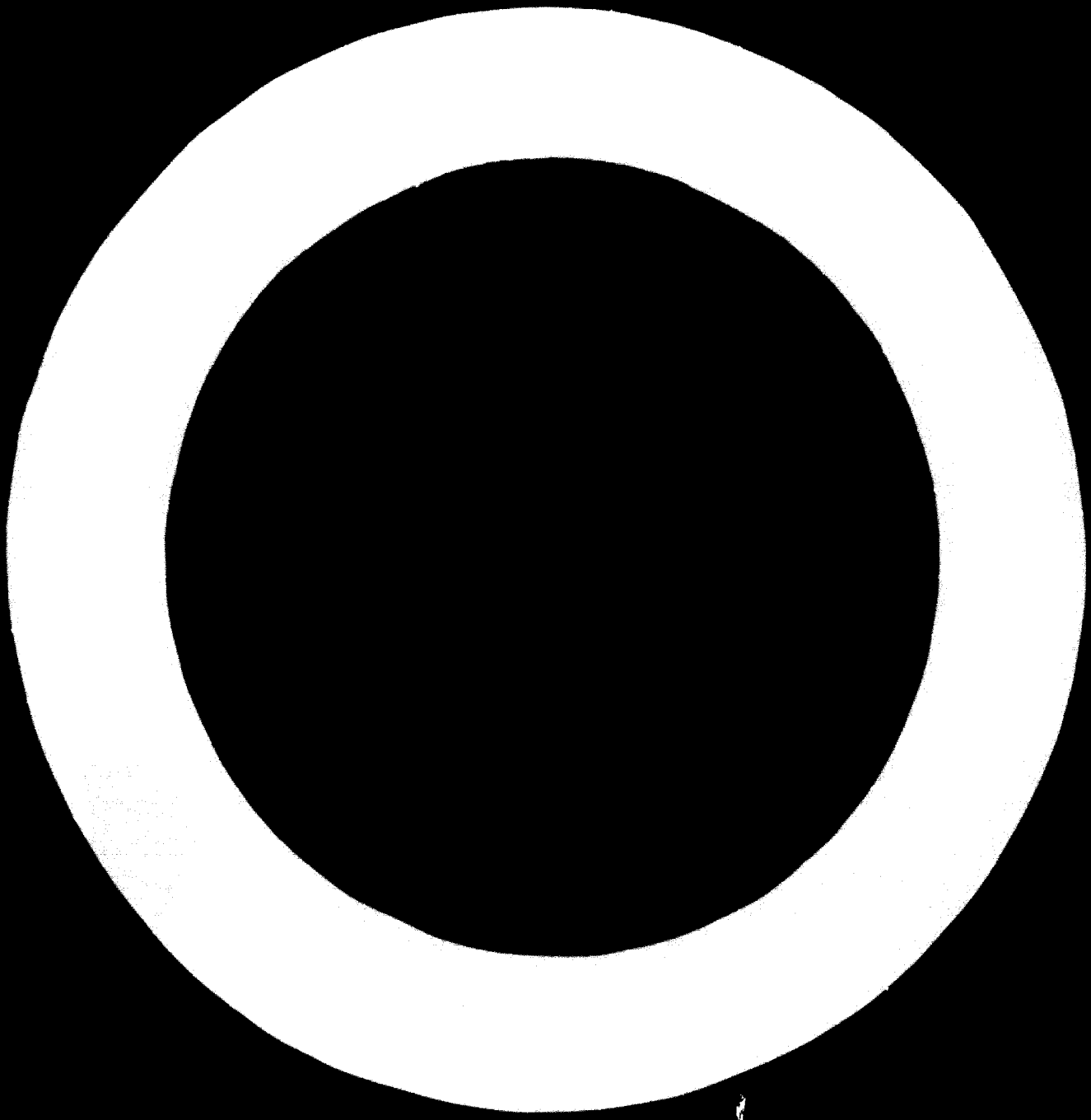
Connected load about 250 H.P.

Fuel

About 300,000 gallons (U.S.) furnace fuel.

Water

5.6 million gallons for make-up and general purposes.



2. Copper Wire Drawing and Insulating (SIC 3351)

Direct Materials

Hot drawn copper rod	120 tons
Vinylite insulation	6300 lbs.

Supplies

Normal supplies plus spools ($4,000) wire dies ($450) and sulphuric acid ($200).

Electric Power

Connected load about 500 H.P.

Fuel

30,000 gallons diesel oil.

Water

1.5 million gallons for production, sanitation and fire protection.

3. Electroplating (SIC 3471)

Direct Materials

Nickel sulphate	17,500 lbs.
Nickel chloride	3,400 lbs.
Boric acid	2,300 lbs.
Anodising dies	$ 100 worth
Packaging material	$ 400 worth

Supplies

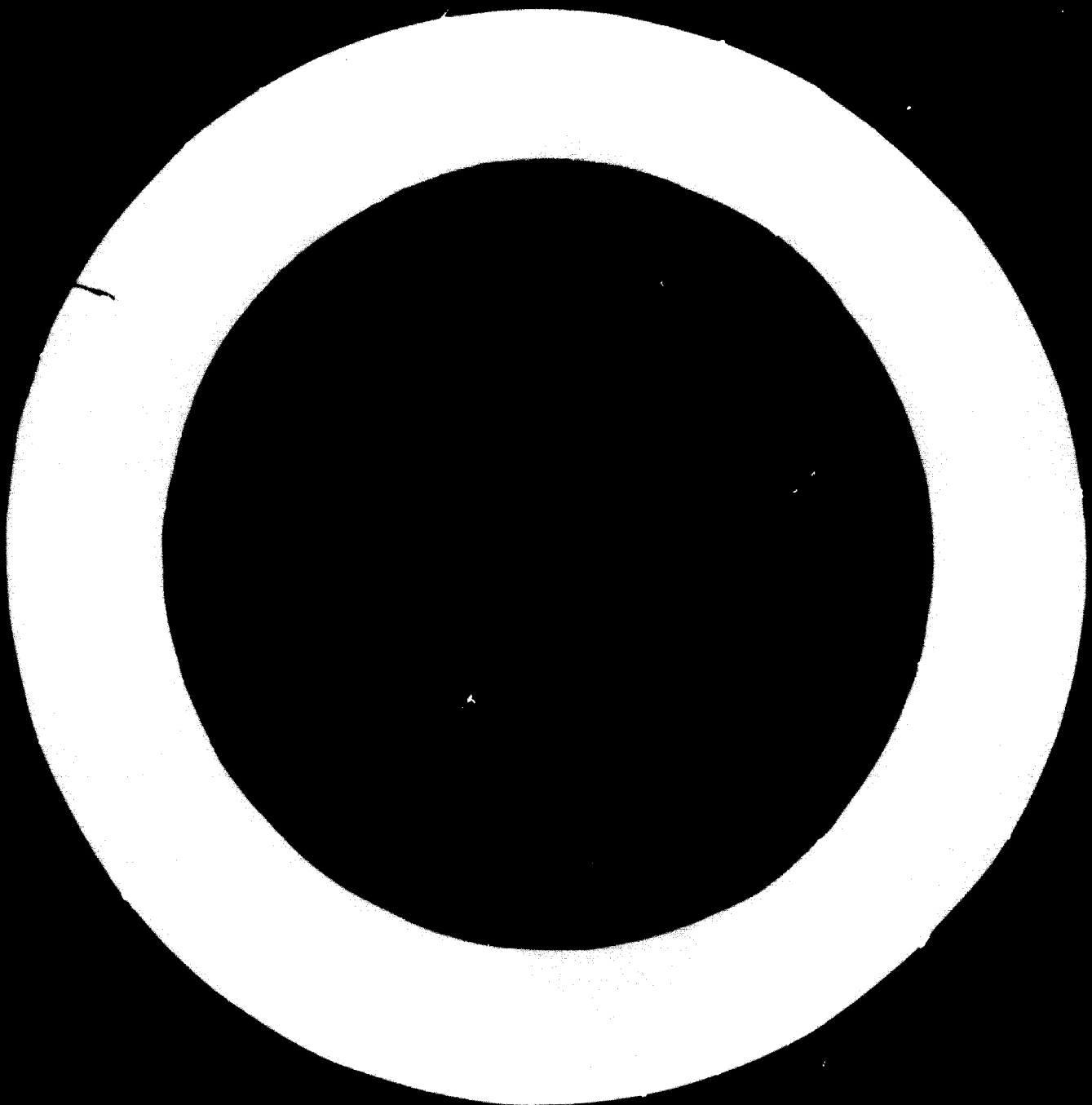
Normal plus spares and petrol for the truck.

Electric Power

120,000 kilowatthours

Fuel

14,000 gallons furnace fuel



Water

3,200,000 gallons.

4. **Air Conditioners and Refrigerators** (SIC 3585/3632)

Direct Materials

Sheet metal	440 tons
Copper Tubing	425,000 feet
Sheet aluminium	240,000 sq.ft.
Plastic trays, dials, hose	$ 10,000 worth
Round metal wire	$ 4,000 worth
Wire mesh	$ 4,000 worth
Electric wire and switches	6,000 sets
Insulation (heat)	$ 5,000 worth
Freon	9,000 gallons
Door fittings, name plates	3,000 sets
Fan motors 0.1 H.P.	3,000
Compressor motors 0.75 H.P.	3,000
Compressor motors 0.25 H.P.	3,000
Capacitors	6,000
Bolts, nuts, washers	$ 2,500 worth
Enamel	$ 3,500 worth
Shipping boxes	6,000

Supplies

Normal except that maintenance and spare parts would cost about $5,000, plus welding supplies and petrol for the truck.

Electric Power

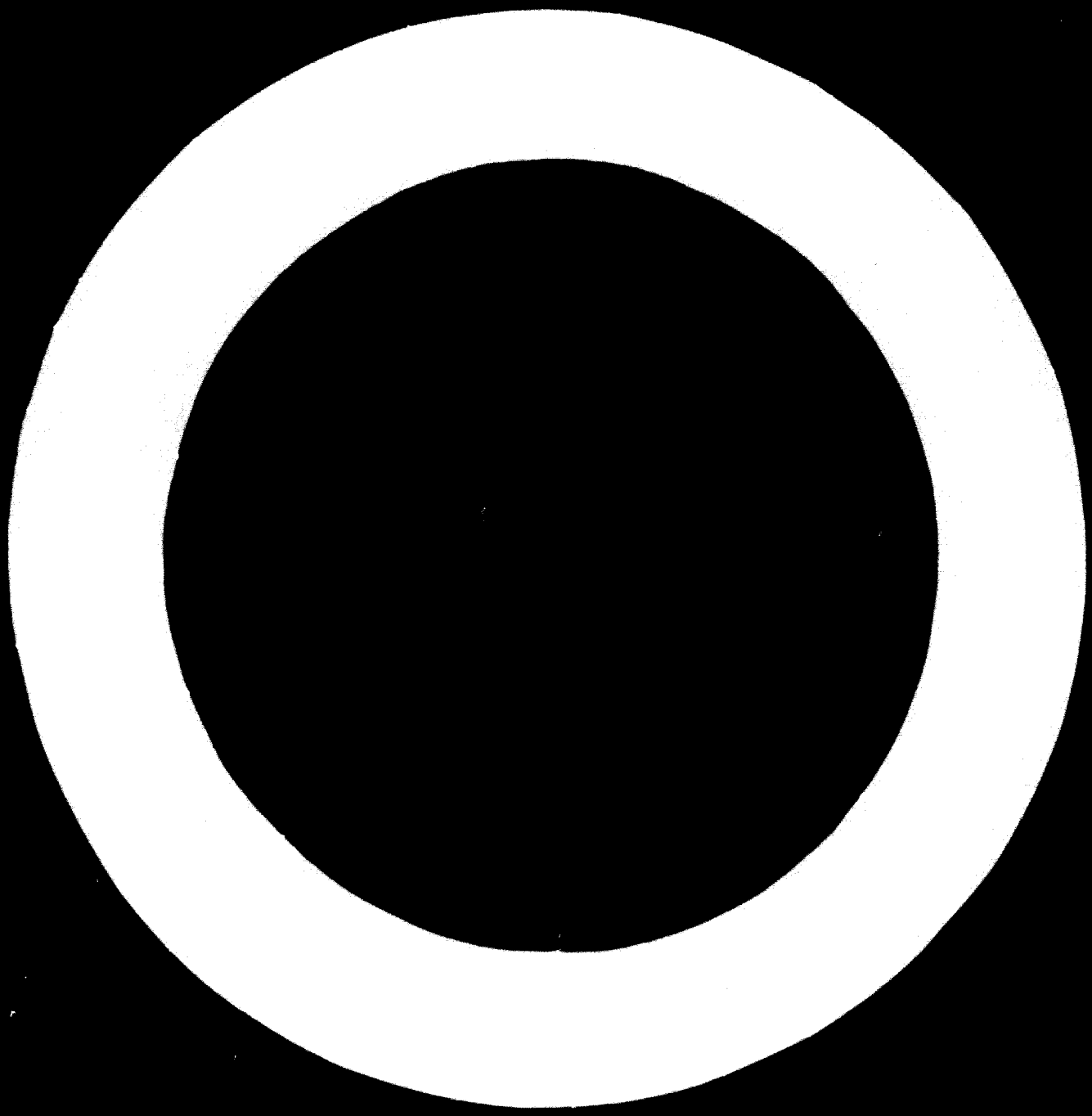
250,000 kilowatthours

Fuel

Heating, if any, and sanitation

Water

Sanitation and fire protection.



5. <u>Electric motors 1/6 to 10 H.P.</u> (SIC 3621)

<u>Direct Materials</u>

Steel	107 tons
Sheet aluminium	2800 lbs.
Copper	1700 lbs.
Varnish	$ 6,000 worth
Purchased parts	30,000 worth
Packaging materials	2,500 worth

<u>Supplies</u>

Normal except that maintenance and repair parts cost about $3,500 and cleaning materials about $1,000.

<u>Electric Power</u>

Connected load about 200 H.P.

<u>Fuel</u>

About 4,500 gallons furnace fuel (baking oven)

<u>Water</u>

800,000 gallons

6. <u>Electroles for Neon Lights</u> (SIC 3624)

Direct Materials

Glass tubing	16,400 lbs.
Exhaust tubing	1,500 lbs.
Metal electrodes	800 M

<u>Supplies</u>

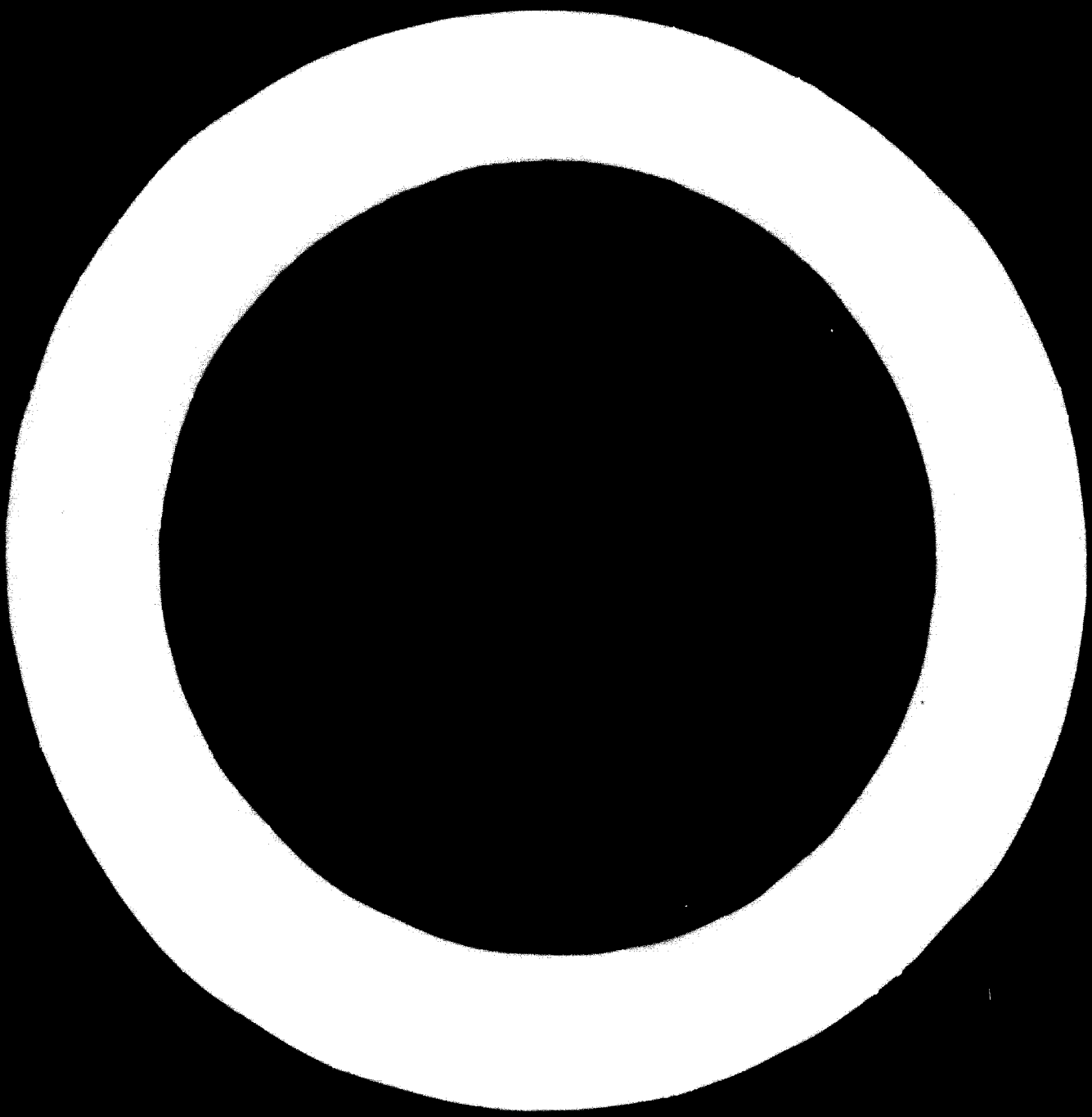
Normal

<u>Electric Power</u>

1.5 H.P. connected load

<u>Fuel</u>

75 cubic feet gas per day



Water

Sanitation and fire protection

7. Electric space Heaters (SIC 3634)

Direct Materials

Sheet metal	132 tons
Guard Wire	7.5 tons
Heating element wire	2 tons
Terminals	50,000
Insulators	175,000
Connection cord	$ 600 worth
Screws	$ 5,000 worth
Cartons	$ 6,000 worth

Supplies:

Normal

Electric Power

Connected load 30 H.P.

Fuel

Heating, if any

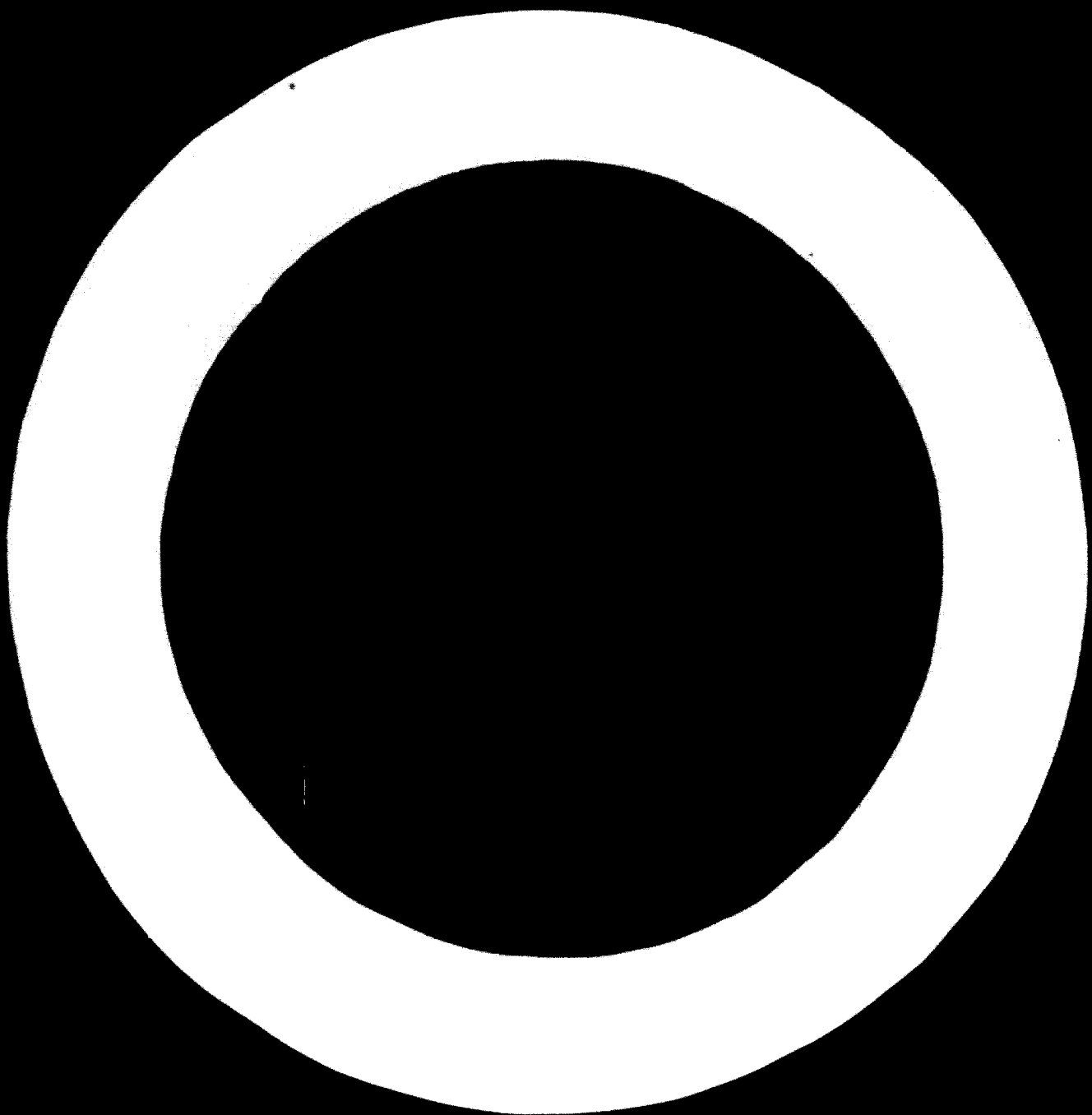
Water

Sanitation and fire protection

8. Fans, domestic, 12" electric oscillating (SIC 3634)

Direct materials

Motors 0.5 H.P.	10,000
Sheet steel	50 tons
Steel rounds	6 tons
Bolts	10 kegs.
Nuts	10 kegs.
Rivets	5 kegs
Paint	$ 1,000 worth
Packaging material	$ 1,000 worth



[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Sanitation and fire protection

9. Electric light bulb assembly plant (SIC 3641)

[illegible] Materials

Bulbs and stems	11,000,000
Tungsten filaments	11,000,000
[illegible] filament lead and supporting	
wire	1,200 lbs.
[illegible] wire	1,900 lbs
[illegible] and cement	$ 3,000 worth
[illegible]	$ 105,000 worth

Cartons for packaging 11,000,000 bulbs

[illegible]

[illegible] costing about $10,000

Electric Power

1,040,[illegible] kilowatthours

Fuel

[illegible],000 cubic feet of gas

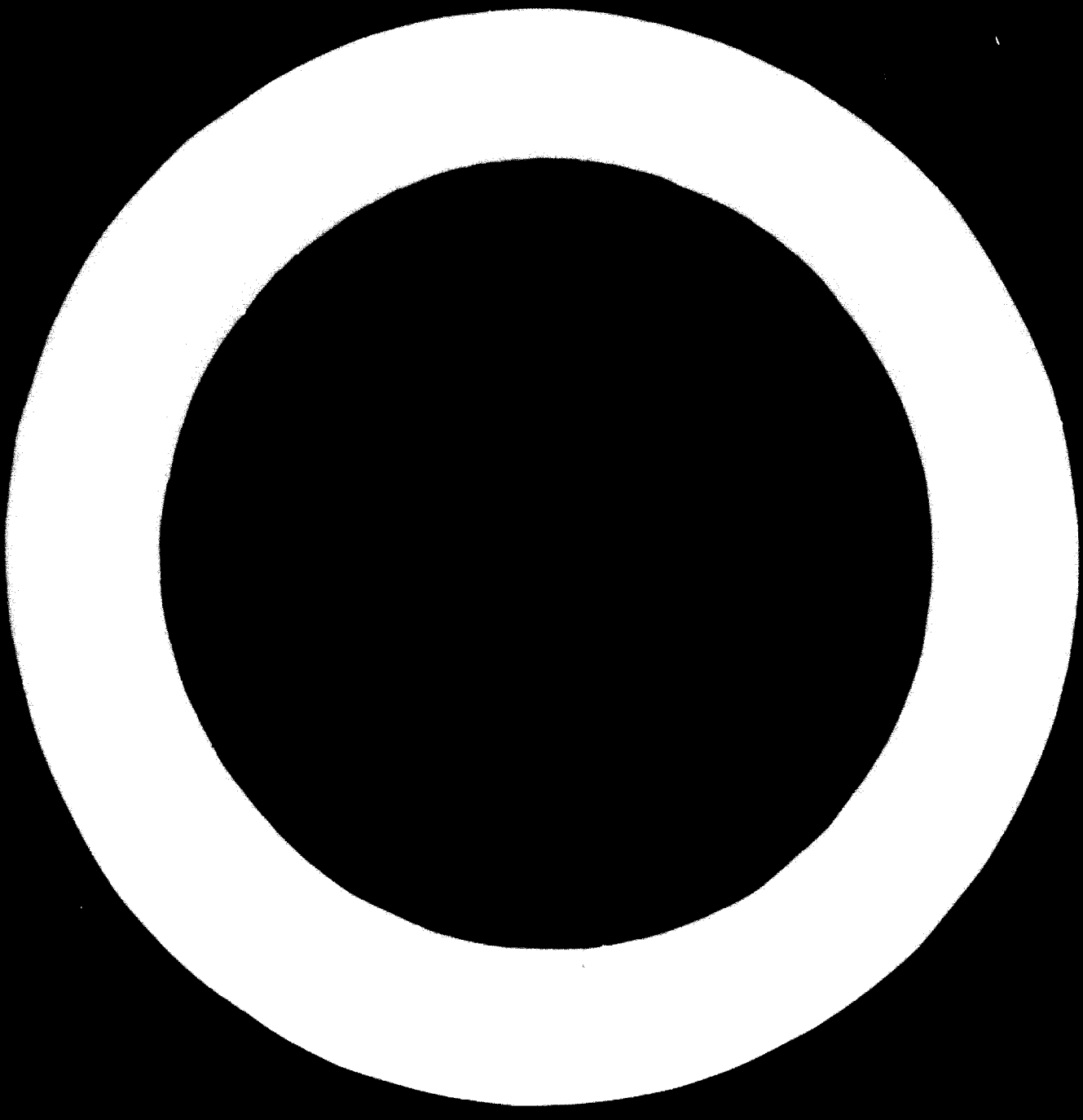
Water

600,[illegible] gallons

10. [illegible] reflectors (SIC 3642)

[illegible] Materials

[illegible] aluminum 75,000 - 14" squares



Tallow and degreaser	$ 500 worth
Lacquer and reducer	1,500 gallons
Lamps	75,000
Electrical fittings	75,000
Lens and lens clamps	75,000 each
Steel bars for U-clamps	75,000
Bolts and sealer	$ 7,000 worth
Tungsten and aluminium wire	$ 2,000 worth
Packaging	$ 15,000 worth

Supplies

Normal plus dies costing about $1,200 and welding rods costing $300

Electric Power

Connected load 30 H.P.

Fuel

About 500,000 cubic feet of gas for production and heating (if any).

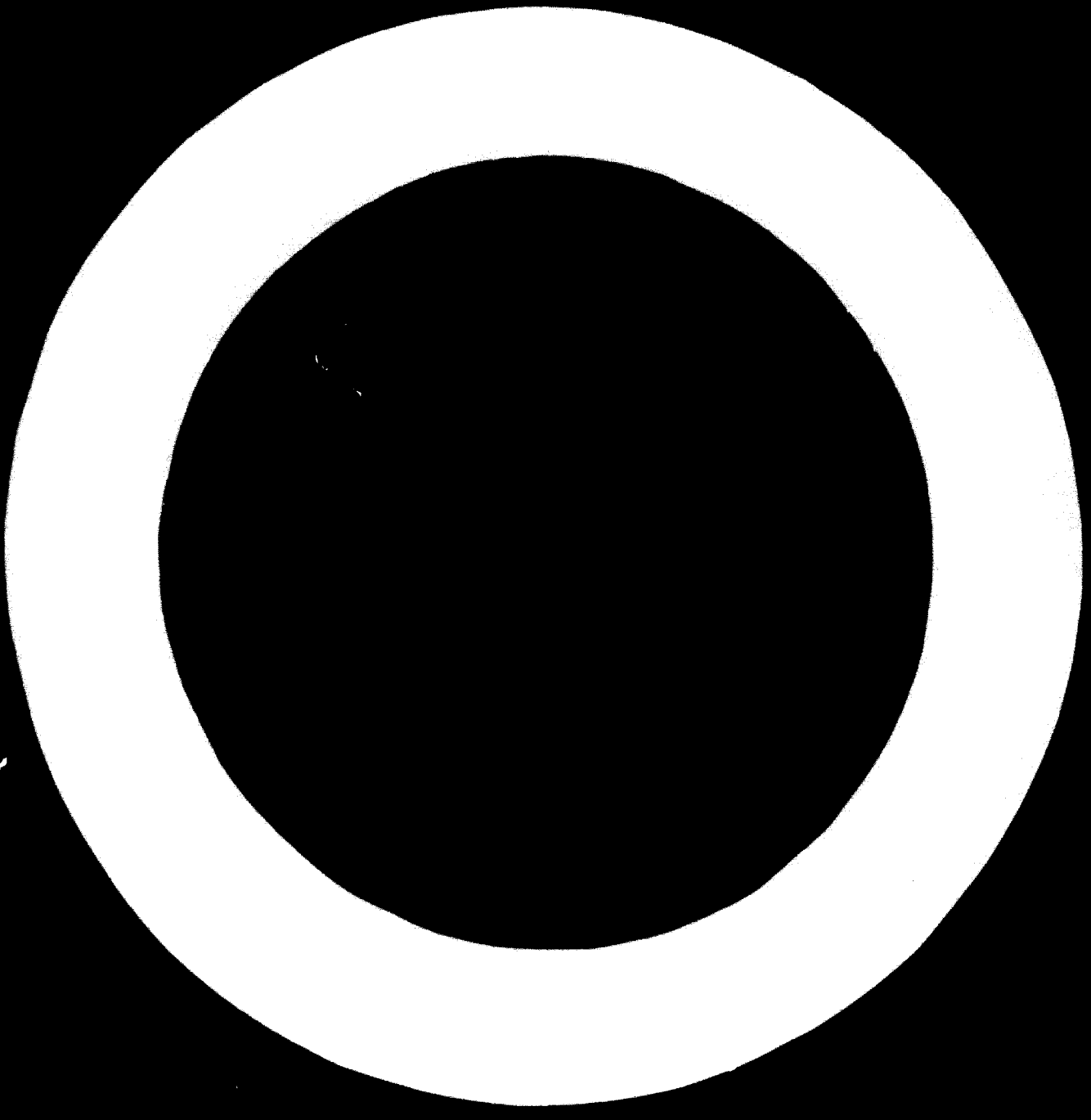
Water

Small amount for production plus sanitation and fire protection.

11. Radios (SIC 3651)

Direct Materials

Resistors	175,000
Condensers	225,000
Hardware, screws, nuts, spacers	1,150,000
Transformers	125,000
Cabinets	25,000
Tubes (amplifiers)	125,000
Chassis	25,000
Dial assembly	25,000
Switches	25,000



Corrugated pads	$ 23,000 worth
Cartons	25,000

Supplies

Normal plus solder and flux ($1,200) and radio repair parts ($2,000).

Electric Power

Connected load 60 H.P.

Fuel

Heating, if necessary

Water

Sanitation and fire protection

12. Automobile Batteries (SIC 3691)

Direct Materials

Antimonial lead	125 tons
Lead oxides	125 tons
Cases	24,000
Sets of covers	24,000
Vents	72,000
Separators	$ 14,000 worth
Sulphuric acid	$ 4,500 worth
Paint and lacquer	$ 500 worth
Sealing compound	$ 500 worth
Shipping cartons	24,000

Supplies

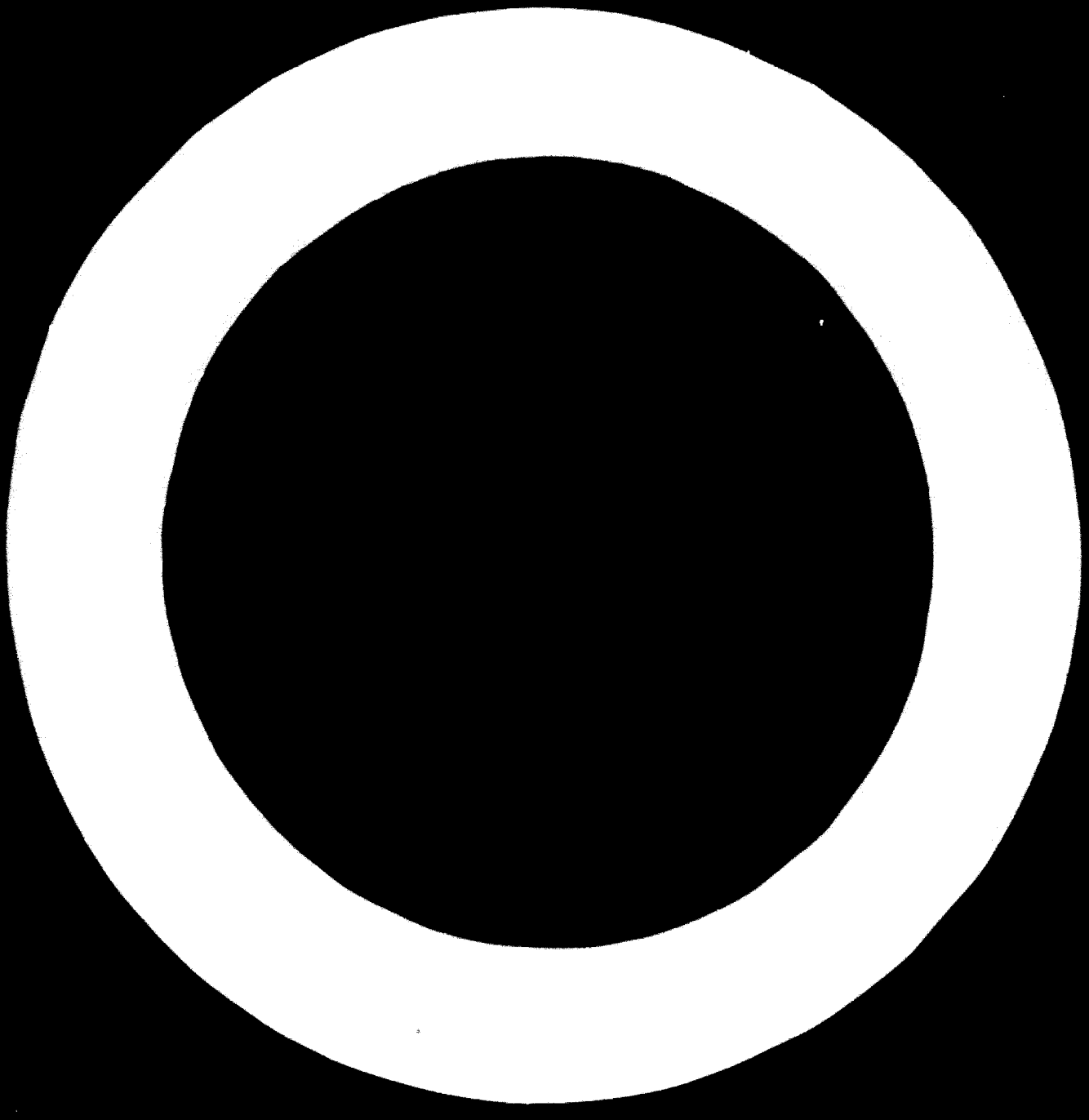
Normal plus propane gas ($3,000)

Electric Power

200,000 kilowatthours

Fuel

16,000 gallons Bunker C oil



<u>Water</u>

850,000 gallons

13. <u>Motor Starters</u> (SIC 3694)

<u>Direct Materials</u>

Steel	37 tons
Copper	10 tons
Ceramic	8.5 tons
Purchased castings, bolts, nuts, etc.	$ 40,000 worth
Paint and finish	$ 500 worth
Packaging materials	$ 750 worth

<u>Supplies</u>

Normal plus moulding supplies ($1,500) and welding materials ($500)

<u>Electric Power</u>

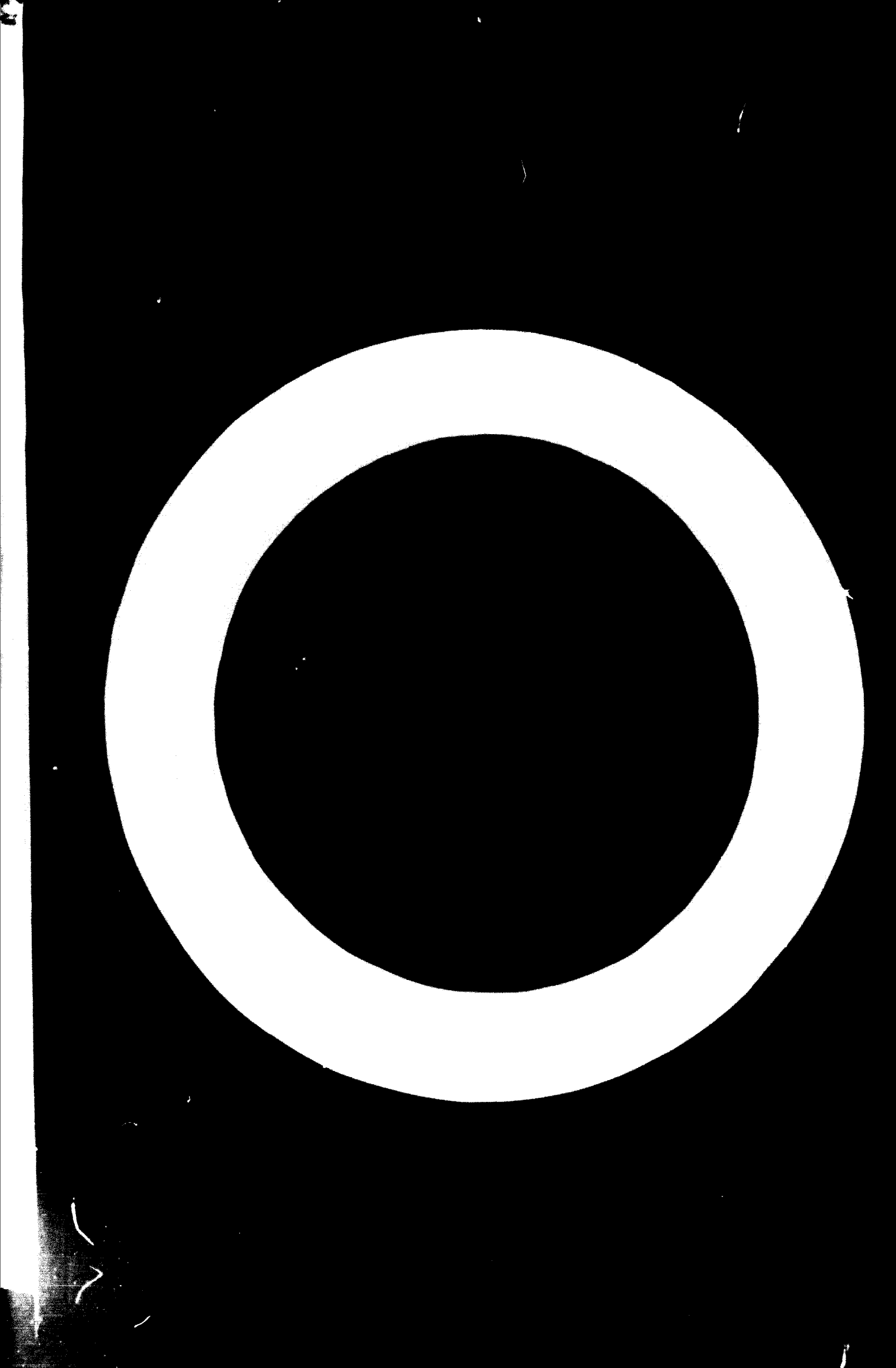
Connected load about 100 H.P.

<u>Fuel</u>

3,000 gallons furnace fuel

<u>Water</u>

400,000 gallons



Annex II

MATERIALS, SUPPLIES, ELECTRICITY, FUEL AND WATER NEEDED FOR THE ENGINEERING INDUSTRIES OTHER THAN ELECTROTECHNICAL COVERED IN TABLES IV 4(3) AND IV 4(4)

The industrial plants covered in Tables IV 4(3) and IV 4(4) as having possibilities for developing countries need the following materials, supplies, electricity, fuel and water annually to meet the production figures given in the tables. Electricity requirements are given either as connected load or as annual consumption in kilowatthours. As regards supplies, where an industry needs small amounts of lubricants, hand tools, cutting tools, abrasives, maintenance and spare parts and office supplies these are referred to as normal. Where special supplies or large quantities are needed, these are [illegible]

1. Metal Filing Cabinets (SIC 2522)

Direct Materials

Sheet steel	320 tons
Hardware, including rods, locks, rollers handles, label frames	$6,000 worth
Enamel	$1,000 worth
Cartons	$8,000 worth

Supplies

Normal

Electric Power

Connected load about 40 H.P.

Fuel

Heating only, if any

Water

Sanitation and fire protection only.

2. Flexible Steel Conduit (SIC 3317)

Direct Material

Hot rolled steel strip	2,575,000 lbs.

Zinc	130,000 lbs.
Aluminium	500 lbs.

Supplies

Normal plus:

Sulphuric acid	44,000 lbs
Sal Ammoniac	3,000 lbs.
Wire	$ 500 worth

Electric Power

Connected load about 150 H.P.

Fuel

About 24,000 gallons

Water

About 4 million gallons

3. **Galvanised Steel Pipe** (SIC 3317)

Direct Materials

Hot rolled steel strip	10,500 tons
Zinc	840 tons

Supplies

Normal plus:

Sulphuric acid	185 tons
Cooling compound	3,000 gallons
Cutting compound	2,400 gallons
Zinc bath flux	6,000 lbs.

Electric Power

Connected load about 120 H.P.

Fuel

About 30,000 gallons

Water

About 1.2 million gallons.

4. Steel Mechanical Tubes (SIC 3317)

Direct Materials

Sheet steel	3,000 tons

Supplies

Normal plus:

Rolls	$ 14,000 worth
Electrodes	$ 3,000 worth

Electric Power

Connected load about 130 H.P.

Fuel

About 14,500 gallons for heating

Water

About 2.5 million gallons for production and general purposes.

5. Welded Pipe (SIC 3317)

Direct Materials

1/4" steel plate	785 tons
Flux (powdered)	5,500 lbs.
Electrode coil	6,000 lbs.

Supplies

Normal

Electric Power

Connected load about 120 H.P.

Fuel

Heating only, if any

Water

Sanitation and fire protection only

6. Centrifugal Cast Iron Pipe (SIC 3321)

Direct Materials

Cast iron scrap	4,600 tons
Pig iron	4,600 tons

Supplies

Normal plus:

Welding rods	$ 100 worth
Core sand	$ 500 worth
Carbon dioxide	$ 600 worth
Sodium silicate	$ 700 worth

Electric Power

Connected load about 160 H.P.

Fuel

About 240,000 gallons Bunker C

Water

1,500 gallons per minute for make-up.

7. Gray iron jobbing foundry (SIC 3321)

Direct Materials

Metals	2,000 tons
Coke	120 tons
Core sand	530 tons
Moulding sand	800 tons
Other materials	$ 6,000 worth

Supplies

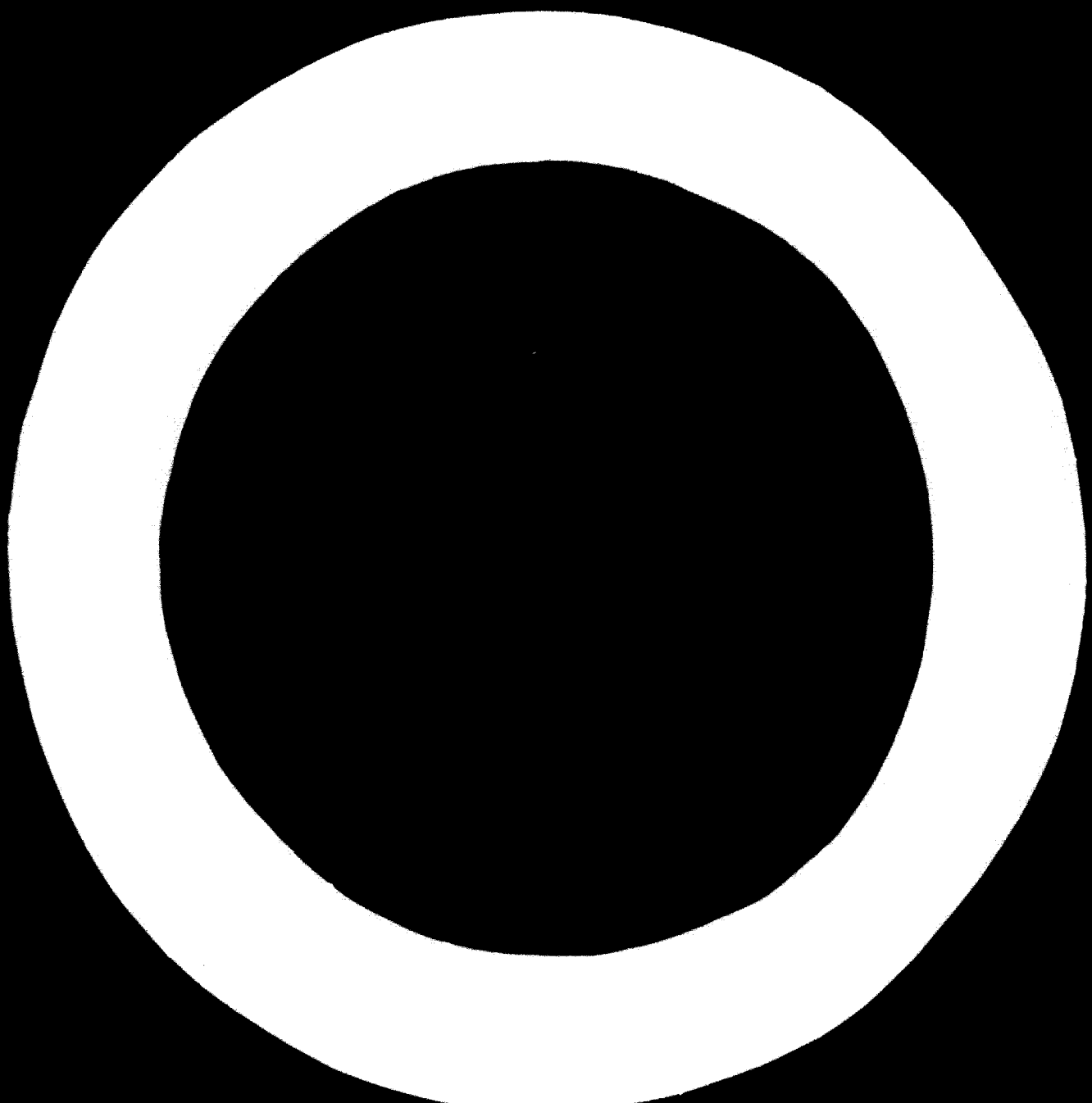
Normal

Electric Power

Connected load about 45 H.P.

Fuel

Given under direct materials



Water

About 1.5 million gallons

8. Brass Foundry (SIC 3362)

Direct Materials

Copper, ingot	120,000 lbs.
Copper, melting scrap	200,000 lbs.
Zinc, ingot	$ 8,000 worth
Zinc, melting scrap	40,000 lbs.
Tin, ingot	24,000 lbs.
Brass, melting scrap	32,000 lbs.
Aluminium, ingot	16,000 lbs.
Magnesium, ingot	8,000 lbs.
Alloying briquettes	$ 4,000 worth

Supplies

Moulding sand	$ 1,500 worth
Core sand	$ 1,500 worth
Parting sand	$ 600 worth
Sea coal	$ 1,500 worth
Pitch, corn flour, core oil, molasses	$ 600 worth
Fuel oil for core oven	$ 700 worth
Core wires, rods, chaplets	$ 1,000 worth
Maintenance & Office supplies	$ 1,000 worth

Electric Power

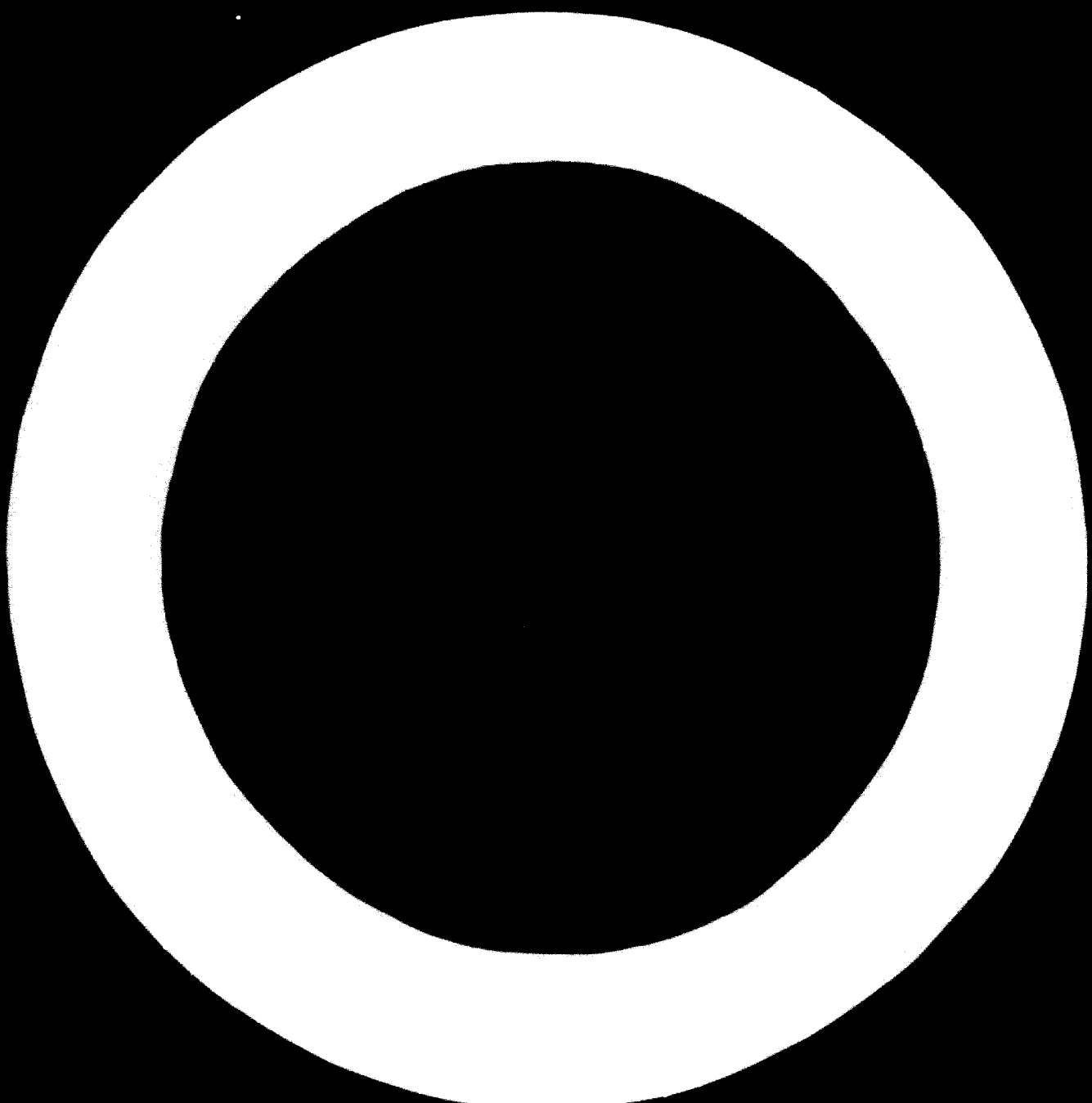
100,000 kilowatthours

Fuel

About 37,000 gallons furnace fuel

Water

600,000 gallons



9. Buckets, pails and pans (SIC 3411)

Direct Materials

Steel, cold rolled sheet	160 tons
Steel wire, 16 gauge	3 tons
Zinc prime western	40 tons
Tin	15 tons
Chemicals	$ 2,000 worth
Packaging materials	$ 5,000 worth

Supplies

Normal plus belting worth $500.

Electric Power

Connected load about 60 H.P.

Fuel

15,000 gallons furnace fuel

Water

About 1.2 million gallons

10. Farm Hand Tools (SIC 3423)

Direct Materials

Steel	325 tons
Lumber	$ 2,500 worth
Lacquer	$ 4,500 worth

Supplies

Normal plus dies worth $4,000

Electric Power

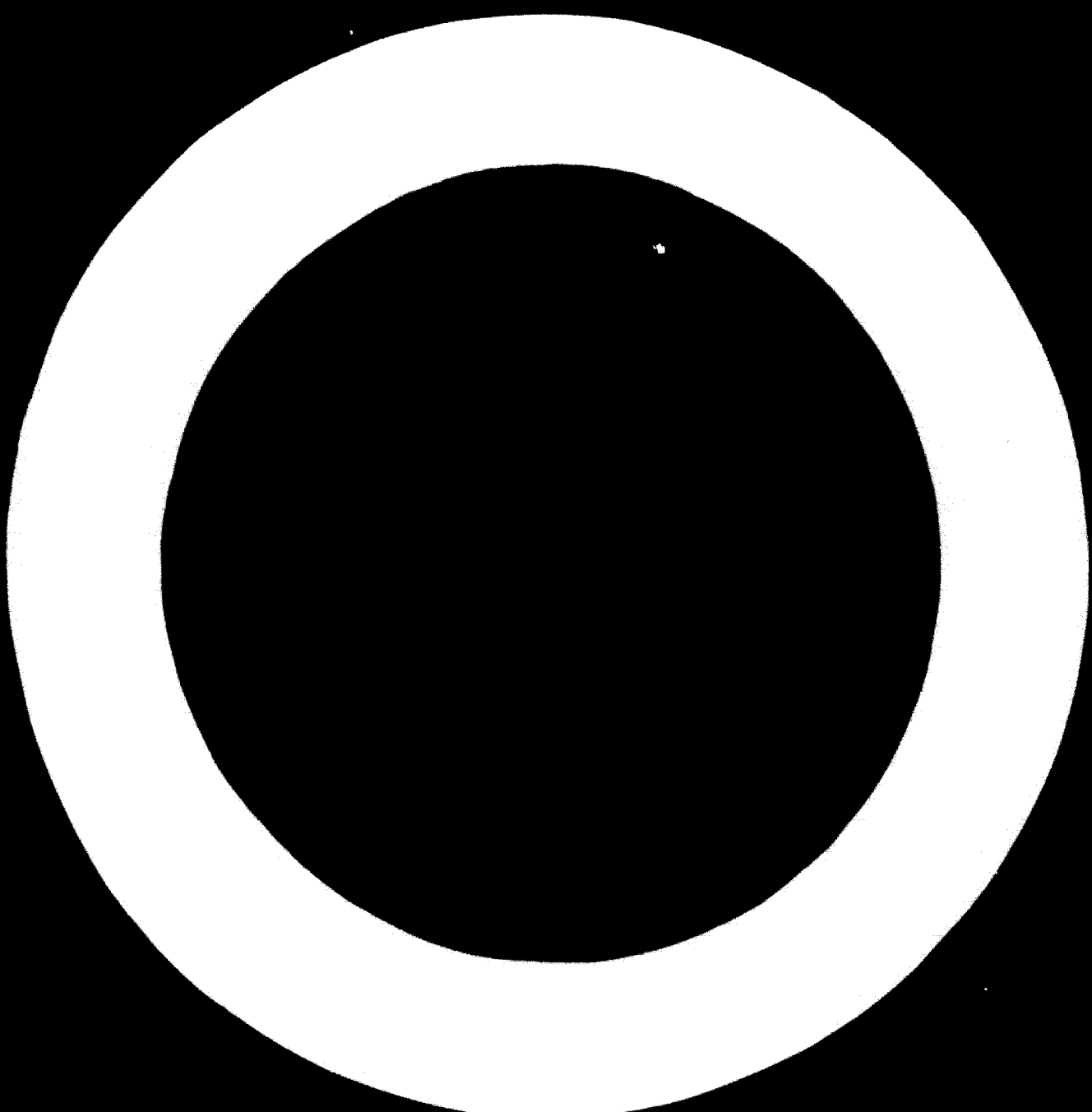
300,000 kilowatthours

Fuel

1,700 gallons for production and general purposes.

Water

1.2 million gallons



11. Hand Tools (SIC 3423)

Direct Material

Steel	500 tons
Wood handles	125,000
Lacquer	1,000 gallons
Packaging materials	$ 4,000 worth

Supplies

Normal plus cleaning compound ($300) and petrol for the truck.

Electric Power

Connected load about 135 H.P.

Fuel

14,000 gallons Bunker C oil

Water

1 million gallons

12. Building Hardware (SIC 3429)

Direct Materials

Zinc alloy	160 tons
Cold rolled steel	280 tons
Bright wire round	55 tons
Bright wire square	35 tons
Spring steel	1.5 tons
Plating cadmium	3.5 tons
Packaging materials	$ 6,000 worth

Supplies

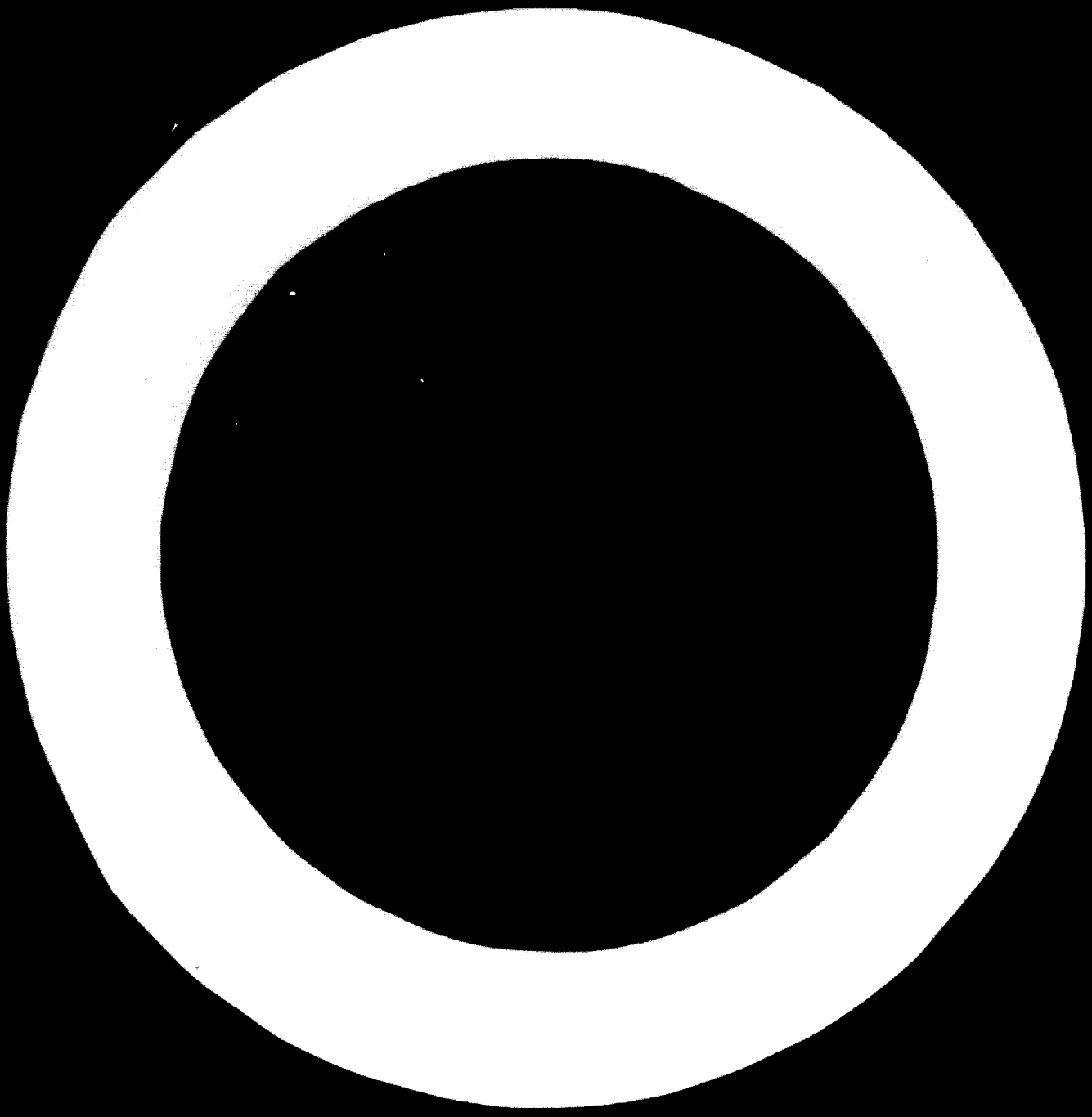
Normal plus dies costing $6,000

Electric Power

300,000 kilowatthours

Fuel

30,000 gallons for heat treatment furnace and boiler.



Water

Sanitation and fire protection only.

13. Sanitary Ware (SIC 3431)

Direct Materials

Pig iron	1,470 tons
Purchased scrap	1,280 tons
Home scrap	960 tons
Wet base enamel	37.5 tons
Frit, dry ground	250 tons
Steel strapping	16,000 linear feet
Crating lumber	630 M bd. ft.

Supplies

Normal plus:

Moulding sand	$ 33,000 worth
Coke by-product	$ 16,000 worth
Metal abrasives	$ 12,000 worth
Alloy briquettes, parting sand, fire clay	$ 6,000 worth

Electric Power

Connected load about 60 H.P.

Fuel

Coke for the cupola costing about $25,000. Oil for enamelling furnace costing $5,000.

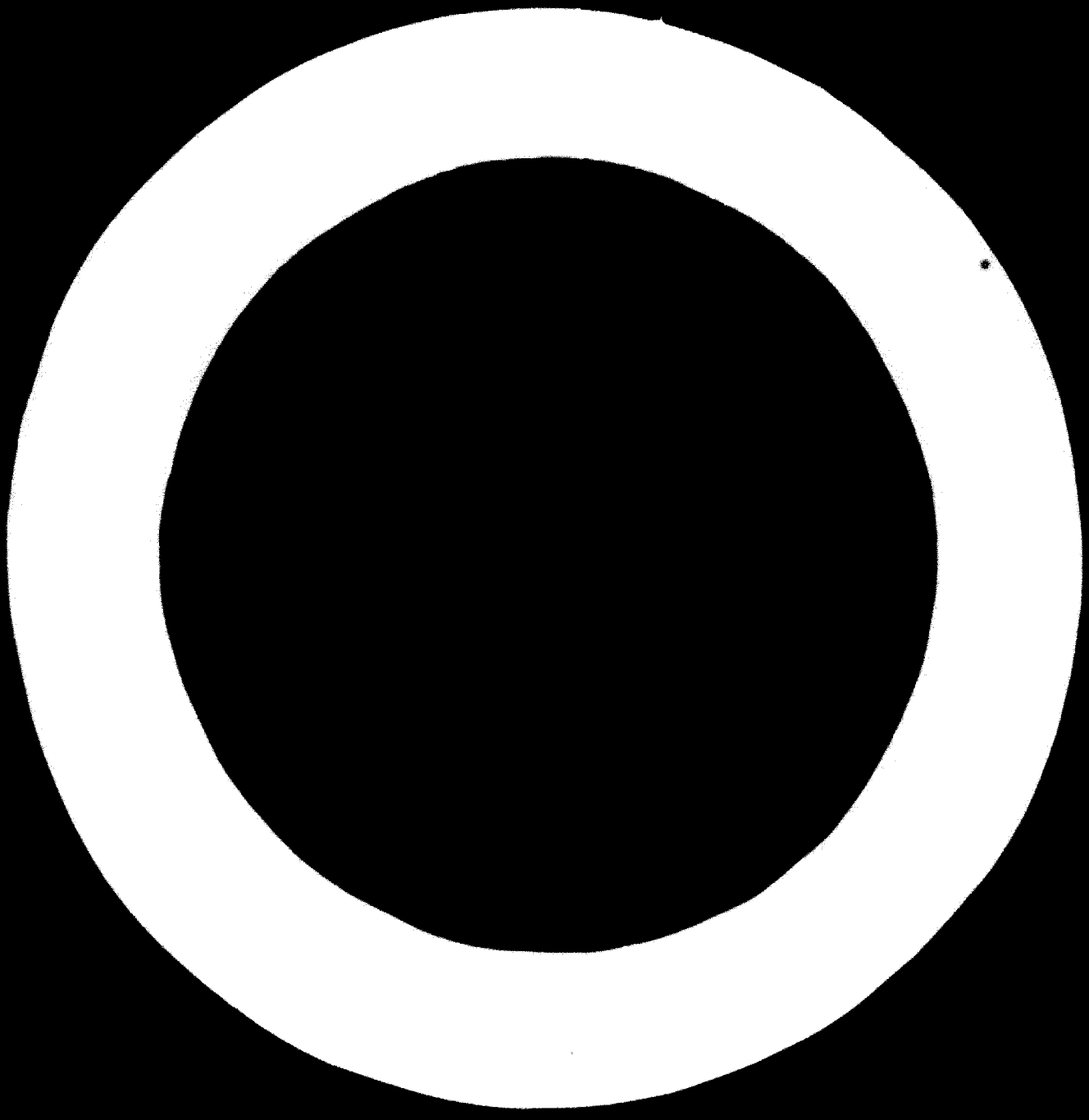
Water

1.2 million tons for preparing moulding sand, sanitation and fire protection.

14. Aluminium windows and doors (SIC 3442)

Direct Materials

Extruded aluminium stock	530,000 feet
Glass	129,000 sq. ft.



Hardware, including springs, rivets braces	11,300 sets
Glazing channel	200,000 feet
Aluminium screen wire	42,000 sq.ft.
Screen moulding	147,000 feet
Screws	170,000

Supplies

Normal

Electric Power

Connected load 7 H.P.

Fuel

Heating only, if any

Water

Sanitation and fire protection only.

15. Aluminium cooking utensils (SIC 3461)

Direct Material

Aluminium sheets	91 tons
Handles	80,000
Wrapping cartons	$ 10,000 worth

Supplies

Normal

Electric Power

Connected load 50 H.P.

Fuel

8,000 gallons Bunker C for annealing oven and heating

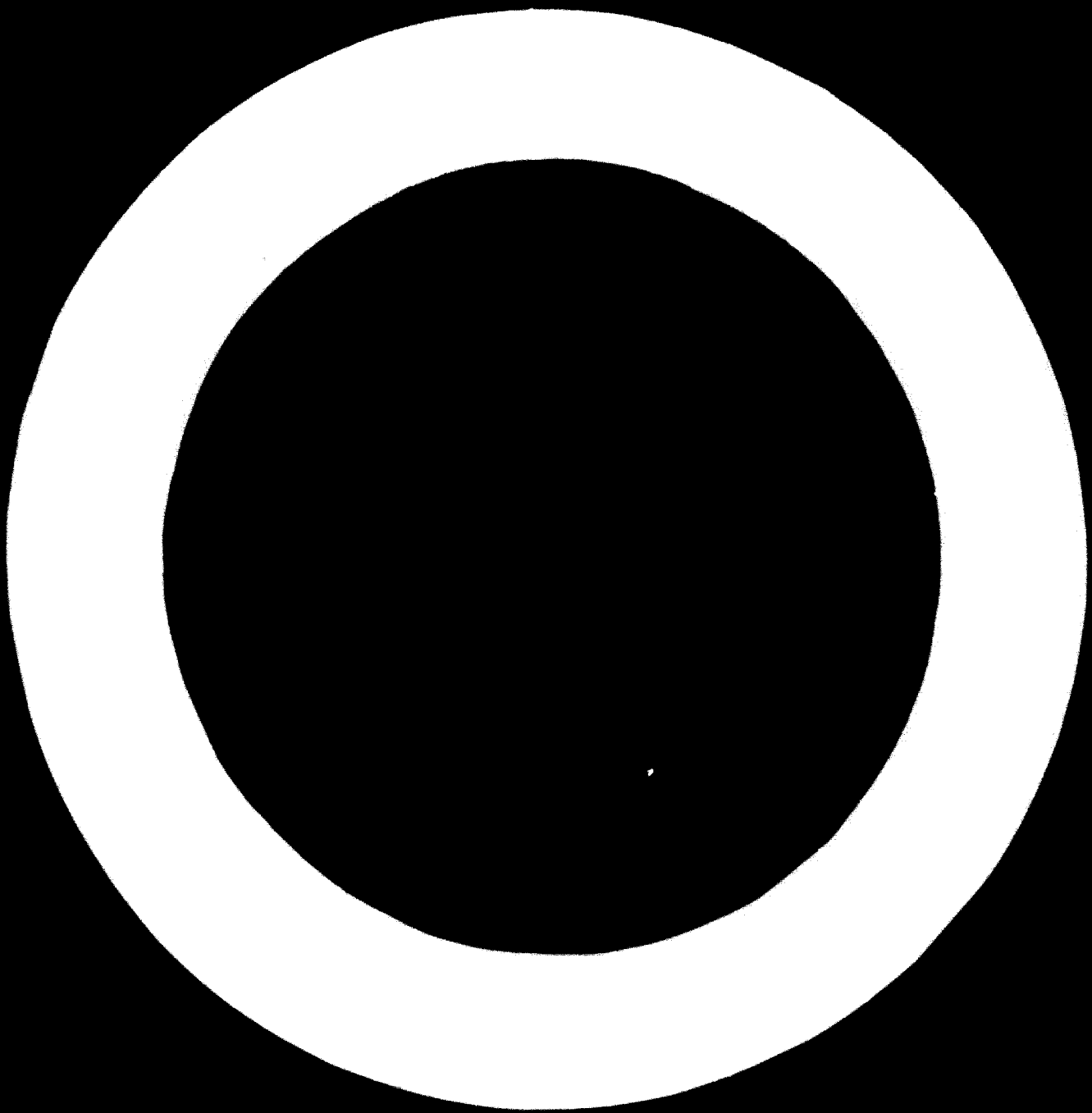
Water

Sanitation and fire protection only.

16. Enamelled plates, pots and kettles (SIC 3479)

Direct Materials

Black metal shapes	1,950,000 lbs.



Pickling liquid	90 tons
Ground coat material	79,000 lbs.
White coat	212,000 lbs.
Packaging	50,000 boxes.

Supplies

Normal plus welding gas and rods ($200) and petrol for the truck

Electric Power

Connected load 50 H.P.

Fuel

70,000 gallons Bunker C oil

Water

1,600 gallons per minute

17. Automobile and truck leaf springs (SIC 3493)

Direct Materials

Spring steel, bolts and nuts	2,500 tons
Rivets and inserts	$ 30,000 worth
Bushings	144,000
Paint	$ 5,000 worth

Supplies

Normal plus tools and dies costing $8,000.

Electric Power

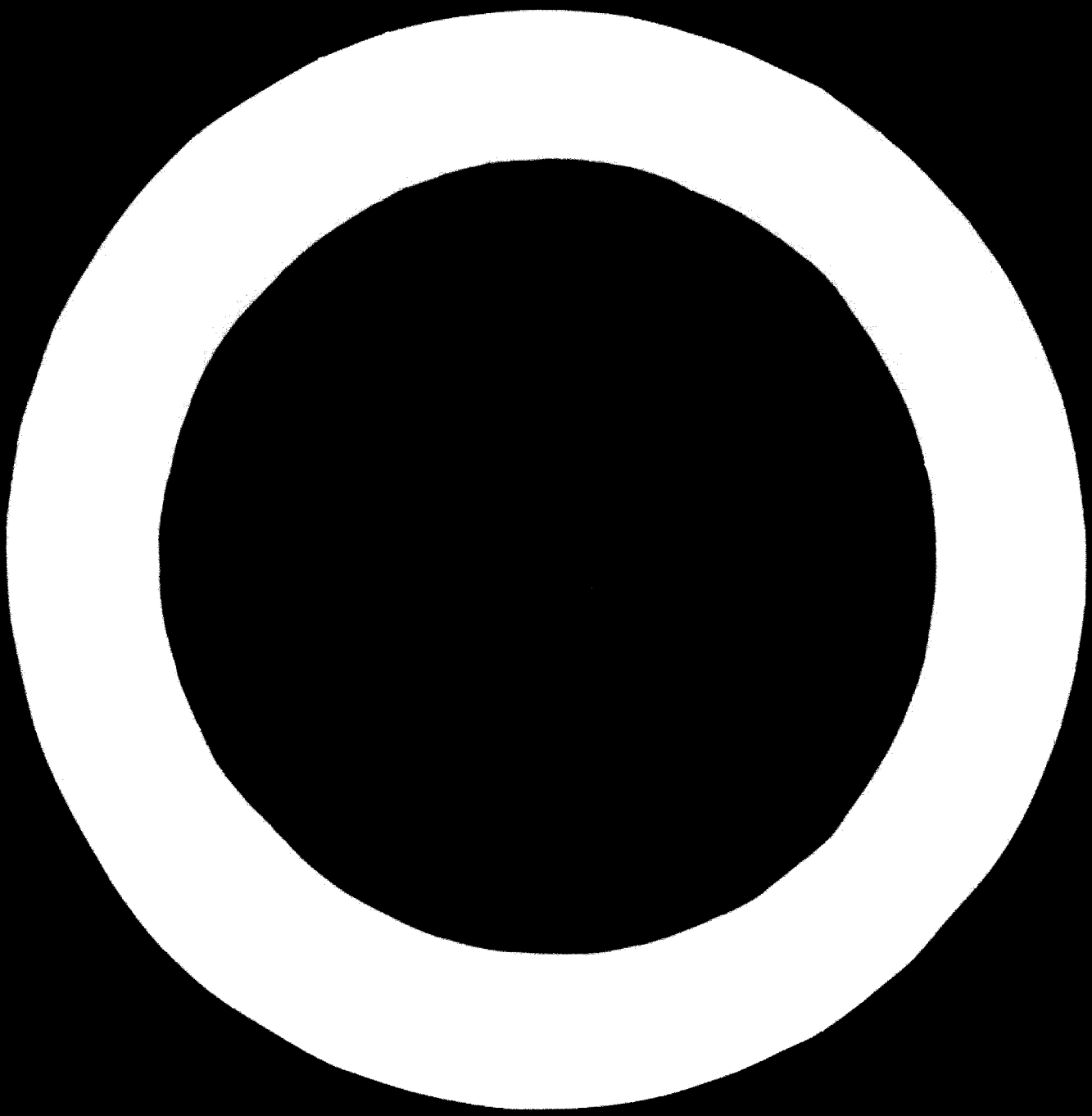
Connected load about 200 H.P.

Fuel

180,000 gallons furnace fuel

Water

800,000 gallons



18. Centrifugal pumps and valves (SIC 3561-3494)

Direct Materials

Grey iron castings	380 tons
Bronze fittings	30 tons
Steel rods	76 tons
Bolts, nuts and washers	$ 3,000 worth
Paint	$ 3,000 worth
Skids and crating material	$ 6,000 worth

Supplies

Normal plus petrol for the truck.

Electric Power

Connected load about 190 H.P.

Fuel

Heating only, if any

Water

Sanitation and fire protection

19. Agricultural implements (SIC 3522)

Direct materials

Steel: tubing, shafting, sheet, plate, spring, stock, strip and castings	255 tons
Grey iron castings	75 tons
Bearing metal	$ 600 worth
Ball bearings	$ 1,000 worth
Paint and other finishes	$ 300 worth

Supplies

Normal

Electric Power

Connected load about 100 H.P.

Fuel

6,000 gallons furnace fuel

Water

500,000 gallons for production, sanitation and fire protection.

20. Ploughs (SIC 3522)

Direct Materials

Castings (pig iron, scrap, coke)	625 tons
Paint	$ 6,500 worth
Steel braces	$ 3,000 worth
Bolts, nuts and washers	$ 1,500 worth
Lumber	$ 37,000 worth

Supplies

Normal plus:

Moulding sand, fire bricks, fire clay, flux, core sand, core oils, wires, rods, chaplets	$ 3,000
Patterns and flasks	$ 1,000

Electric Power

Connected load about 50 H.P.

Fuel

Coke for the cupola included in the castings under direct materials. For the core oven about 10,000 gallons oil are needed.

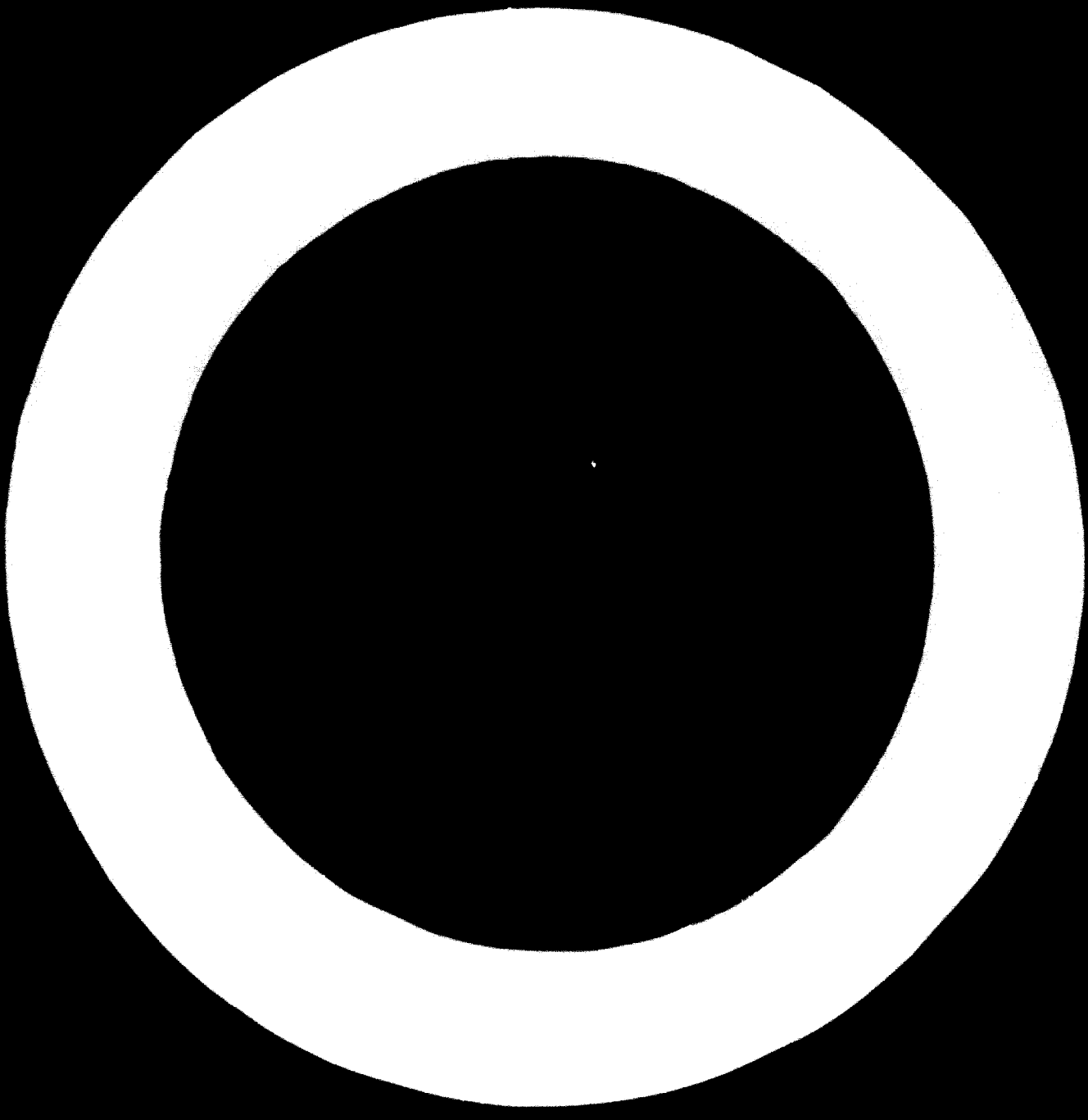
Water

1.5 million gallons for conditioning the sand, sanitation and fire protection.

21. Utility Tractor, 10 H.P. (SIC 3522)

Direct Materials

10 H.P. gas engines	10,000



Steel sheets and shapes	500 tons
H.R. rounds and flats	250 tons
Differential gears	10,000 assemblys
General hardware	$ 60,000 worth
Tyres and tubes (pneumatic)	20,000 each
Tyres (solid)	20,000
Packaging	$ 3,000 worth

Supplies

Normal plus petrol for truck plus:

Cutting tools and abrasives	$ 15,000 worth
Solvents, cleaners, paints and finishes	$ 12,000 worth
Welding supplies	$ 1,500 worth.

Electric Power

1,350,000 kilowatthours

Fuel

200,000 gallons Bunker C oil

Water

25 million gallons

22. Conveyors and Portable Elevators (SIC 3535)

Direct Materials

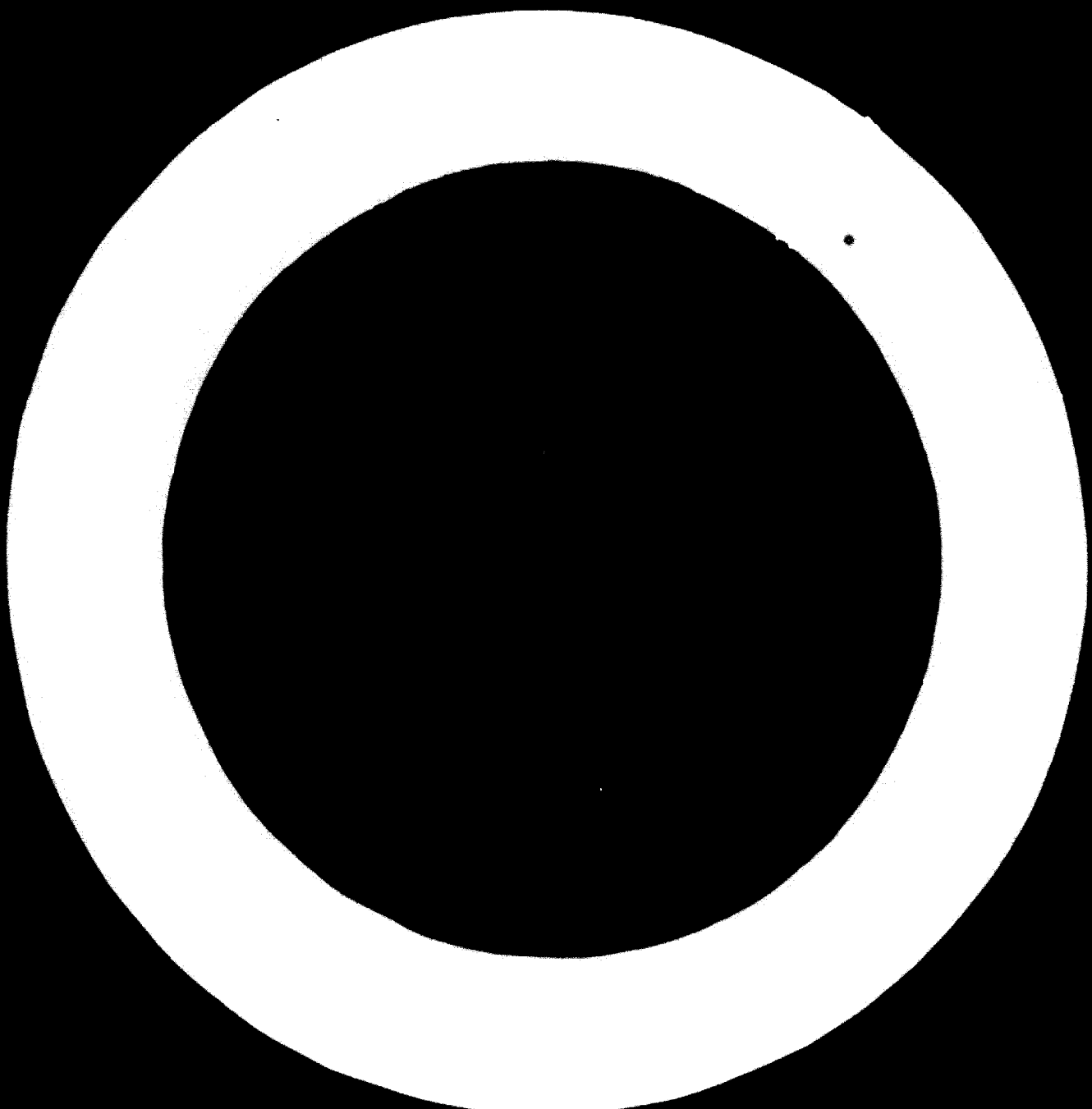
Angle iron	580 tons
Flat bars	4 tons
Rollers, solid and tubes	260 tons
Pins, bushings, bolts and nuts	$ 2,500 worth
Crating materials	$ 1,000 worth

Supplies

Normal

Electric Power

Connected load 50 H.P.



Fuel

Heating only, if any

Water

Sanitation and fire protection.

23. Job machine shop (SIC 3591)

Direct materials

Various, according to type of work available, average cost $ 55,000 worth

Supplies

Normal plus welding rods and gas costing about $300.

Electric Power

275,000 kilowatthours.

Fuel

Small amount for production purposes

Water

900,000 gallons for production, sanitation and fire protection

24. Bicycle assembly (SIC 3751)

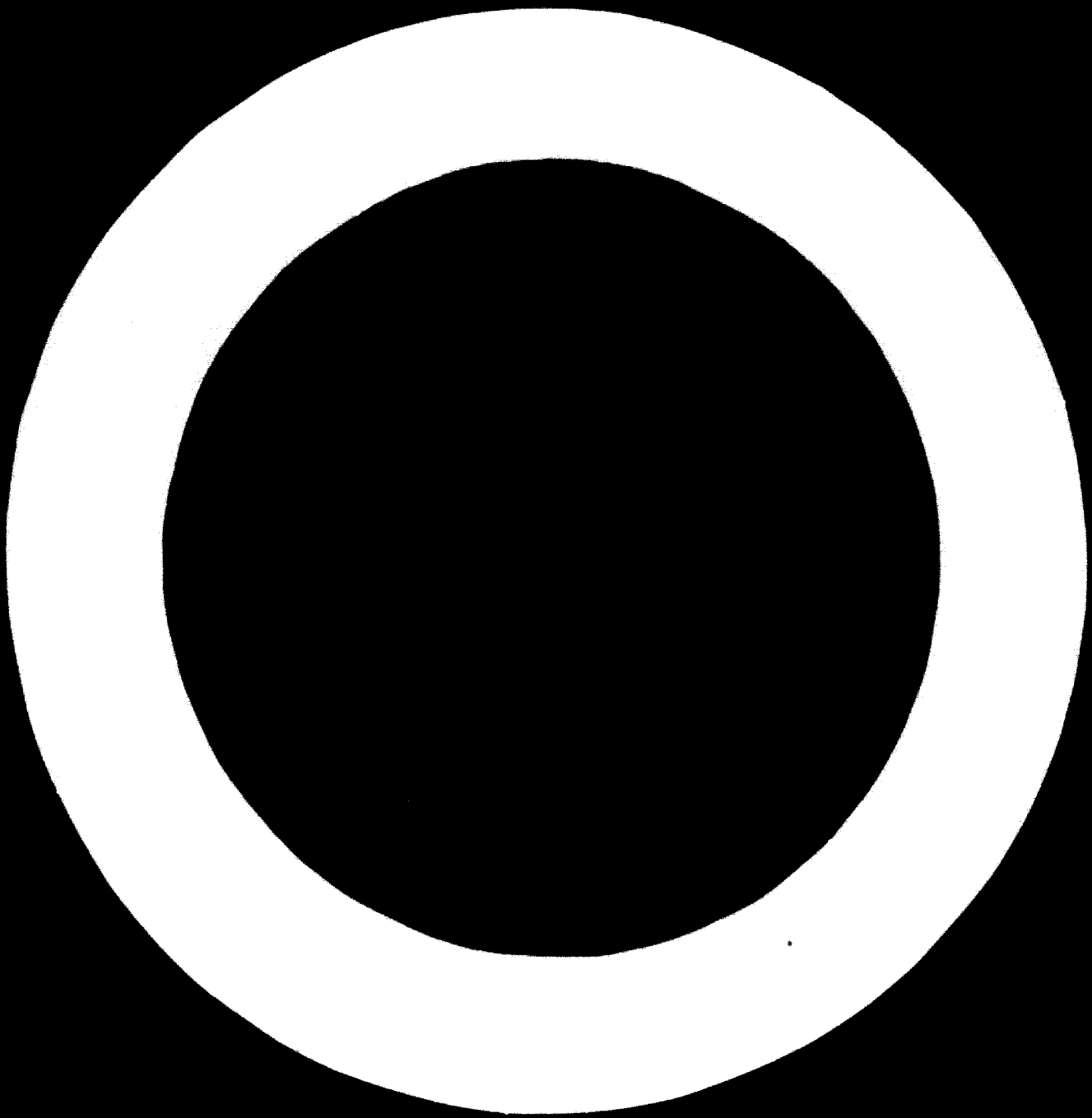
Direct Materials

Purchased parts	$ 250,000 worth
Tubing for frames	$ 12,000 worth
Seat posts	$ 1,200 worth
Carbon steel for rear frame lugs	$ 600 worth
Shipping cartons	$ 9,000 worth

Supplies

Normal plus small amount caustic soda plus:

Welding rods	$1,200 worth
Acetylene gas	$2,500 worth
Oxygen	$3,500 worth



Enamel $ 3,000 worth

Electric Power

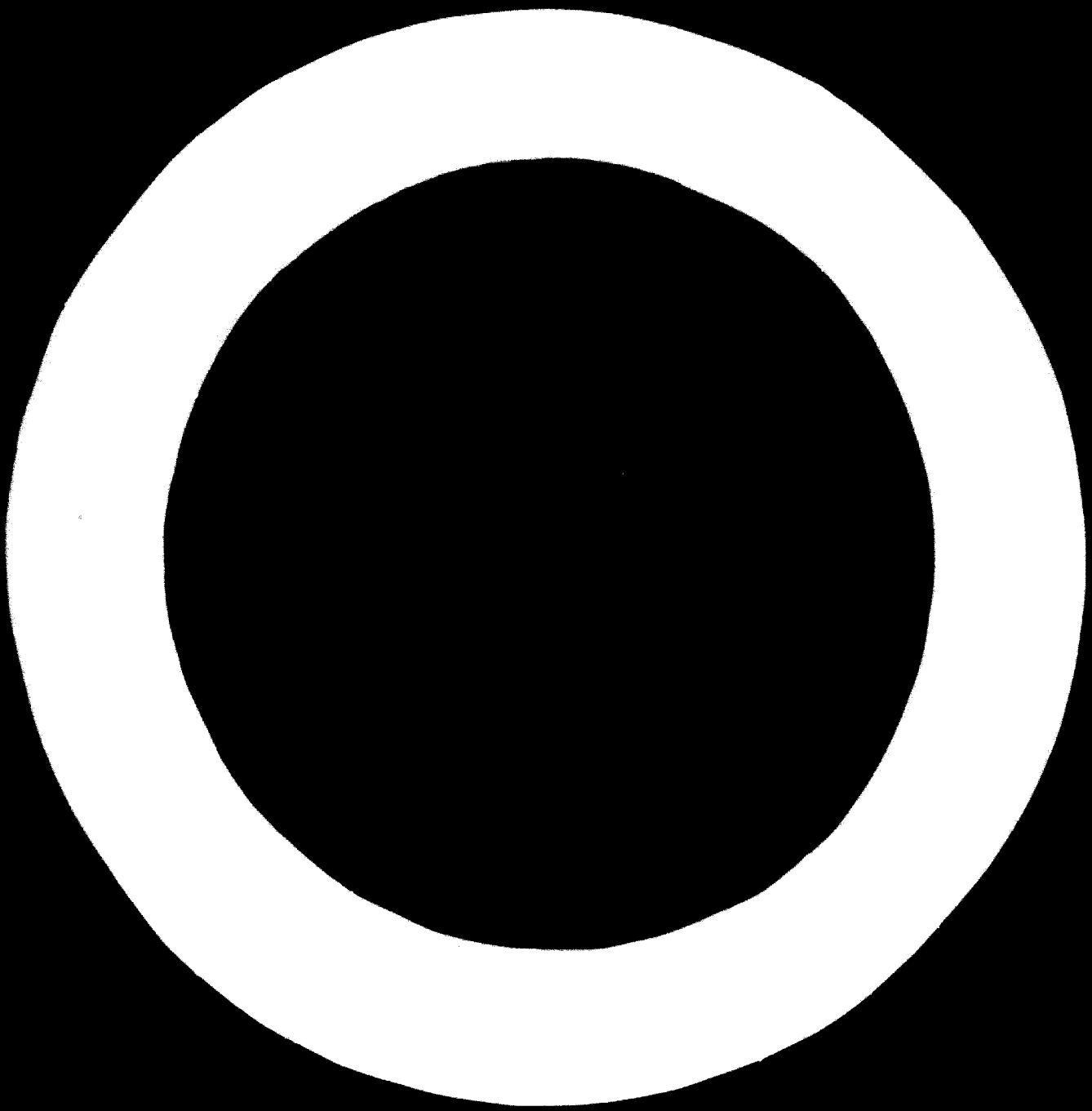
Connected load about 25 H.P.

Fuel

5,000 gallons Bunker C for hot water for degreasing

Water

400,000 gallons for boiler, sanitation and fire protection.



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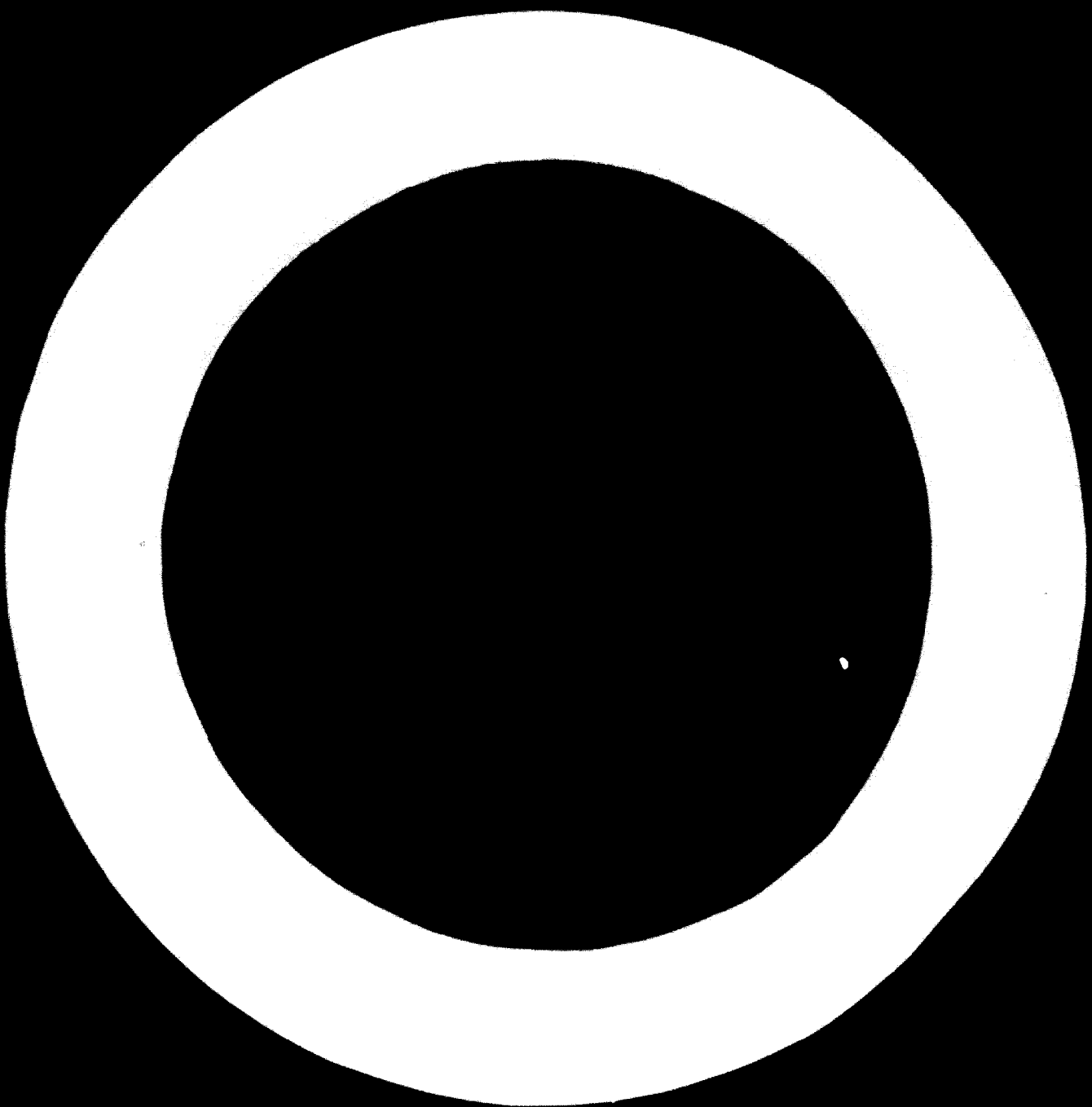
ECONOMIC COMMISSION FOR AFRICA AND
CENTRE FOR INDUSTRIAL DEVELOPMENT
Symposium on Industrial Development in Africa
Cairo, 27 January - 10 February 1966

ENGINEERING INDUSTRIES IN AFRICA

M65-661



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PART II/Corr.1
Addendum/Corr.1

ENGINEERING INDUSTRIES IN AFRICA

PART II

MAPS, GRAPHS, TABLES AND ANNEXES

Corrigendum

Page

7 Table I.4

First column, to read vertically downwards:
Country; Congo (Leo.); Congo (Braz.); Gabon;
Central African Republic; Chad; Cameroon, Total.

9 Table II.1(2)

First line in heading, for Africa read: African.

11 Table II.1(4)

Footnote 2/, second line, for "ard" read: "are".

16 Table II.1(9)

Last column, last line, read: 10.0

22 Table II.2(5)

Heading of column 8 to read:
"Agricultural Machinery and Appliances for harvesting, threshing and sorting".

24 Table II.3(7)

Opposite Somalia under Passenger motor cars read.
"15".

27 Table II.3(2)

Last line in the table to read horizontally:
Total; 1560; —; 17190; 2800; 8180; 540; —;
—; 7[illegible]0; 25840; 50; 650.

[illegible] Table II.[illegible](4)

Opposite "Ships and boats" and under "Kenya" read:
"[illegible]".

Page

31 Table II.3(6)

Opposite "Insulated Cables" and under "UAR 1964" read: "15400".

33 Table II.3(8)

Vertically under "UAR 1964", read:

3800; 1070; 1580; 265, ...; 230;

—; —; —; 570.

34 Table II.3(9)

Opposite "Ships and Boats" and under "Estimated Production in the UAR in 1970" read: "106,000".

Second page 35 (Table II.4(1)): page numbering to be corrected to 36.

39 Table III

Under "Insulated Cables 723.1 Projections C.D.P.C.", read vertically downwards:

475; ...; 85; 670; 475; 510; 190; 70.

41 Table IV.2

Opposite "100-199" and under column 6 read: "841".

44 Table IV.4(1)

1) Delete reference to footnotes in headings of columns 7, 20 and 22

ii) Opposite Serial No. 13 and under column 17 read: "19"

iii) Delete footnotes 1/ and 2/

45 Table IV.4(2)

i) Delete reference to footnote in heading of column 7

ii) Heading of column 18 to read:

"Foreign Currency - Annual Needs - 000 U.S. $"

iii) Delete footnotes 1/ and 2/

50 Fifth line -

Opposite "Sheet metal" read : "440 tons".

55 Fifteenth line

Opposite "Copper lead wire" read: "1000 lbs".

Page

55 Line 22

Opposite "sealing compound" read: "$3500 worth".

Line 27

Instead of "200000 kilowatthours" read:

"connected load 170 H.P."

Line 29

Instead of "16000 gallons Bunker C Oil" read:

"8500 gallons gas oil for heating and general purposes";

56 Second line

Instead of "850000 gallons" read:

"4000 gallons purified water".

60 Last line

For "didect" read: "direct".

25.3.74

5 OF 5

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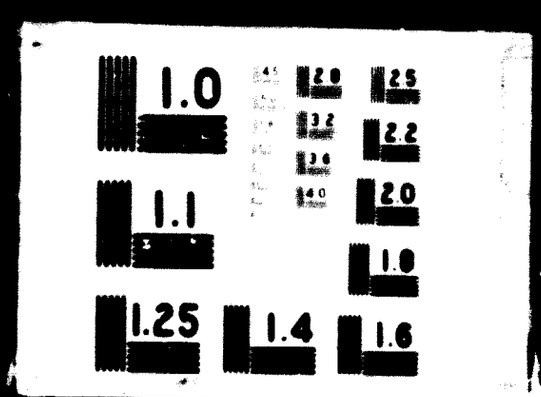

ENGINEERING INDUSTRIES IN AFRICA

Addendum

Corrigendum

Page

1 First line below Table 1 to read :

N.B. "Classification into ..."

3 Table 1

Opposite "SITC 72" and under "1956" read:

"37"

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18 janvier 19
FRANCAIS
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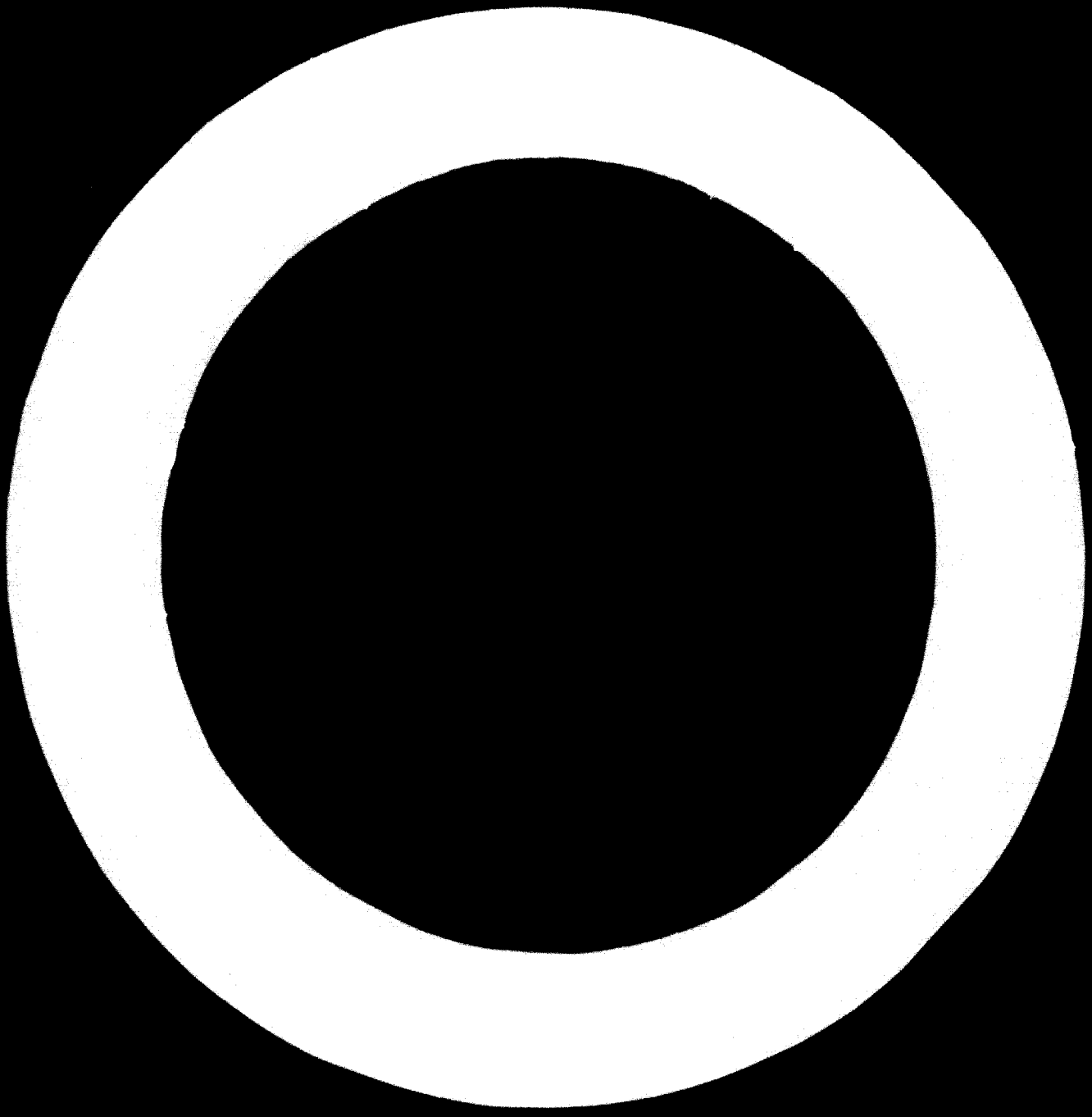
COMMISSION ECONOMIQUE POUR L'AFRIQUE
Colloque régional sur le développement
industriel en Afrique
Le Caire, 27 janvier - 10 février 1966

LES INDUSTRIES MECANIQUES ET ELECTRIQUES EN AFRIQUE

TROISIEME PARTIE
ANNEXES

M65-598



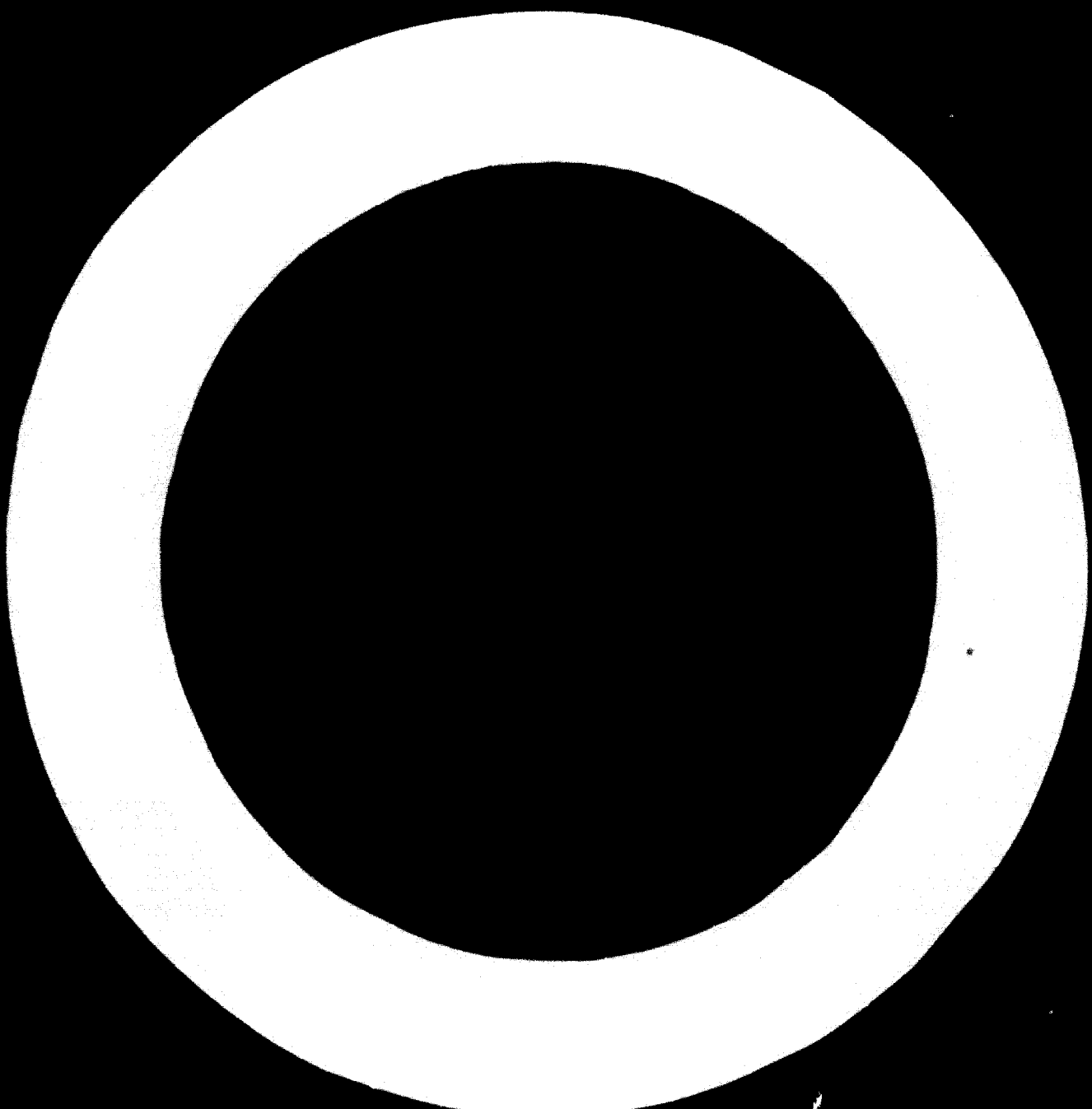
LES INDUSTRIES MECANIQUES ET ELECTRIQUES EN AFRIQUE

TROISIEME PARTIE
ANNEXES

I. Conclusions et recommandations des missions de coordination industrielle de la CEA envoyées dans les sous-régions d'Afrique de l'ouest, d'Afrique de l'est et en Algérie, en Libye, au Maroc et en Tunisie.

II. Conclusions et recommandations de la mission de coordination industrielle de la CEA envoyée dans la sous-région d'Afrique centrale.

III. Conclusions et recommandations concernant les industries électromécaniques dans la sous-région d'Afrique de l'est.



ANNEXE I

CONCLUSIONS ET RECOMMANDATIONS DES MISSIONS DE COORDINATION INDUSTRIELLE DE LA CEA ENVOYEES DANS LES SOUS-REGIONS D'AFRIQUE DE L'OUEST D'AFRIQUE DE L'EST ET EN ALGERIE, EN LIBYE, AU MAROC ET EN TUNISIE

A la suite de la décision que le Comité permanent de l'industrie, des ressources naturelles et des transports a prise en décembre 1962 à sa première session et que la Commission a reprise à son compte à sa cinquième session en février 1963, des missions de la Commission économique pour l'Afrique ont été envoyées dans les sous-régions suivantes :

i) en Afrique de l'ouest du 17 août au 1er novembre 1963;
ii) en Afrique de l'est et en Afrique centrale du 10 octobre au 3 décembre 1963;
iii) en Algérie, en Libye, au Maroc et en Tunisie du 2 au 28 janvier 1964.

Le texte de cette décision était le suivant :

"Assistance aux gouvernements, aux fins d'encourager la coopération sous-régionale pour le développement industriel sur la base de la division internationale du travail, et, s'il y a lieu, de l'harmonisation des plans de développement industriel, par des études et enquêtes sur place".

Le mandat des missions, établi sur la base de la décision ci-dessus, est résumé ci-après :

Les missions avaient principalement à définir en termes concrets les possibilités ouvertes au développement industriel au cours approximativement des dix prochaines années dans les sous-régions considérées, en s'attachant particulièrement aux entreprises appelées à desservir plusieurs pays. Les missions se sont donc intéressées particulièrement aux industries dont le seuil de rentabilité correspondait à une production supérieure aux possibilités d'absorption du

marché probable d'un pays. Mais elles ne se sont pas limitées aux industries de forte capacité. Elles ont tenu aussi à mettre en lumière les possibilités que la création d'industries petites et moyennes offrirait dans le domaine du remplacement des importations. Toutefois, la mise en envoyée en Afrique du nord a estimé que la question du remplacement des importations grâce à la création d'industries petites et moyennes était bien connu des pays de cette sous-région, si bien que dans son rapport elle a laissé de côté ces industries. Les missions n'avaient pas à se livrer à des enquêtes économiques ou industrielles. Néanmoins, elles ont examiné les problèmes du commerce et des transports, de même que les autres questions se rapportant à l'infrastructure dans le contexte des efforts tendant à favoriser le développement industriel.

S'agissant des industries électromécaniques, les conclusions et recommandations des missions ont été les suivantes :

I. <u>Sous-région de l'Afrique de l'ouest</u>

1. Comme jusqu'ici, la production de métaux est limitée en Afrique de l'ouest et comme, en particulier, il n'y a pas d'industrie sidérurgique digne de ce nom, le travail des métaux et les activités électromécaniques sont moins avancés que dans les autres grandes sous-régions du continent. On n'y trouve pratiquement pas d'industries électromécaniques d'une certaine capacité. Cependant les activités de montage et de finissage se développent. On peut citer à titre d'exemple des usines de montage de voitures automobiles en Côte-d'Ivoire, au Sénégal, et en Nigéria; des usines de montage de bicyclettes en Côte-d'Ivoire, au Ghana et en Nigéria; des installations de montage sont de plus en construction en Haute-Volta.

2. Il est nécessaire que les plans de développement soient coordonnés dans le domaine du montage des véhicules automobiles et des bicyclettes. A Abidjan, l'usine de montage des voitures automobiles fait appel à des éléments importés de France, mais les prix de revient sont plus élevés qu'en France, phénomène qui s'explique en partie par la plus faible productivité de la main-d'oeuvre et en

sortie par le fait que, si la capacité est de 20 véhicules par jour, la production ne dépasse pas actuellement six unités. Au moment de la création de l'usine en 1959, on avait pensé que des marchés s'ouvriraient dans les pays voisins, mais les espoirs ne se sont pas réalisés. De même, en ce qui concerne le montage des bicyclettes la capacité est de 35.000 machines par an en Côte-d'Ivoire, alors que la production ne dépasse pas actuellement 18.250 unités. On espère toutefois que l'usine de montage de Haute-Volta, dont la capacité annuelle atteindra 35.000 bicyclettes et 5.000 scooters, sera rentable grâce aux marchés des pays de l'intérieur. L'industrie du montage donne des résultats concluants dans un autre cas, celui des machines à coudre. Le Libéria possède deux centres de production qui fabriquent ensemble plus de 10.000 machines par an. La principale des conclusions qui se dégagent, en la matière, c'est que le développement des industries de montage est nettement possible en Afrique de l'ouest, mais que la rentabilité est subordonnée à une certaine spécialisation, à une harmonisation des plans et à un ensemble d'accords commerciaux entre les pays producteurs. Un bon exemple de ces accords est celui qu'ont conclu la Côte-d'Ivoire et le Sénégal, en vertu duquel le Sénégal s'abstient de monter des camions alors que la Côte-d'Ivoire renonce à la production de certaines catégories de véhicules légers.

3. A l'heure actuelle, les activités électromécaniques ne sont guère représentées que par des ateliers de réparation et d'entretien d'une certaine importance, qui se livrent aussi à des travaux de finissage et de reconstruction et qui souvent appartiennent à de grandes entreprises, comme les chemins de fer à Lagos et à Dakar. Les effectifs de ces ateliers sont souvent assez importants; quant aux dispositions prises pour la formation de la main-d'oeuvre, elles sont assez efficaces et le rendement est acceptable. Ces ateliers sont certainement les noyaux autour desquels la production électromécanique est appelée à se développer.

4. Dans les ports importants (Dakar, Abidjan, Lagos) il existe un certain nombre de chantiers, qui se consacrent surtout à des travaux

[illegible] se dévelop-pent également [illegible] de la construction de navires de petits tonnages (de 300 à 500 tonnes, par exemple, à Abidjan).

5. Le travail des métaux, auquel se consacrent en général des ateliers modernes, est très répandu. La Nigéria possède 44 centres de production, le Ghana 25, le Sénégal 20 et la Côte-d'Ivoire 15. Dans certains cas, les effectifs atteignent de 250 à 300 employés. Dans tous les pays, même ceux de l'intérieur, il existe au moins un centre de production d'une certaine importance. La production des outils et matériels agricoles se développe, de même que celle des matériaux de construction et des bacs, cuves et autres récipients métalliques. Les perspectives d'une expansion du travail des métaux et des activités électromécaniques sont favorables, compte tenu des progrès du développement économique et de l'amélioration du niveau de vie. Dans les conditions actuelles, on peut prévoir que l'expansion reposera surtout sur de petites entreprises, pour lesquelles les investissements sont modestes et l'amortissement rapide. L'expansion connaîtra une impulsion supplémentaire si l'on venait à produire sur place des matériaux en fonte et en acier et de l'aluminium.

6. Il n'y a aucune contradiction entre une politique axée sur la création d'industries de forte capacité et l'entreprise consistant à stimuler vigoureusement le développement à la fois des industries fondées sur l'agriculture et des petites et moyennes industries, appelées à alimenter les marchés nationaux. En outre, les petites industries présentent un intérêt supplémentaire en ce sens qu'elles favorisent l'esprit d'entreprise chez les Africains, ce qui est très important.

II. <u>Afrique de l'est et du centre</u> (actuellement la sous-région de l'Afrique de l'Est)

1. La production des industries électromécaniques s'accroît, en même temps qu'elle se diversifie, dans les principaux centres de la sous-région. En Afrique de l'est, Nairobi est jusqu'ici au

au premier rang, mais d'autres centres sont à considérer, comme Mombassa, Arusha, Dar-es-Salaam et Jinja. En raison de l'accroissement de la production de l'industrie des articles en fonte et en acier comme de l'industrie chimique, auquel s'ajoute les avantages qui découlent d'une concentration de la population, de l'existence de moyens de transport et de la possibilité de bénéficier des économies extérieures, éléments qui se rencontrent toujours dans les zones où l'industrialisation a déjà démarré, une impulsion naturelle se fait sentir dans ces centres en faveur d'une expansion supplémentaire des entreprises électromécaniques de forte capacité. La même situation se retrouve à Salisbury, à Bulawayo, à Umtali et dans le Copperbelt.

2. On pourrait développer la production de machines légères au Kénya et celle des machines-outils en Tanzanie. Au Kénya également, il serait possible d'élargir la production de moteurs électriques de faible puissance, d'éléments normalisés de distribution du courant électrique et d'accessoires pour transformateurs, les industries correspondantes étant associées avec celle de la fabrication et du revêtement des fils et câbles électriques. L'Ouganda de son côté pourrait se lancer dans la fabrication des accessoires de transport du courant électrique. La Rhodésie du sud et la Zambie pourraient s'entendre pour se partager la fabrication des articles suivants: étaux, scies, moteurs électriques de faible puissance, éléments normalisés de distribution du courant électrique, accessoires pour transport du courant et pour transformateurs.

3. Au Kénya, on pourrait élargir l'assortiment des outils agricoles actuellement fabriqués. Il serait possible, probablement, d'installer à Jinja (Ouganda) une usine de montage de tracteurs, alors qu'à Dar-es-Salaam, où l'on fabrique déjà des machines agricoles moyennes et légères en petites quantités, on pourrait en accroître la production. En Ouganda, on procède actuellement à l'agrandissement de l'atelier d'entretien de la sucrerie de Mehta, à Luzazi, afin qu'il puisse recevoir des machines lourdes

de mines; une fonderie sera adjointe à cet atelier, de même qu'une unité de fabrication de boulons appelés essentiellement à satisfaire les besoins locaux. Toutefois, Jinga se prêterait dans de meilleures conditions à l'implantation d'une usine dont le marché serait sous-régional; cette usine pourrait construire également des bouteilles à gaz soudées portatives. La Rhodésie du sud pourrait entreprendre de fabriquer un large assortiment d'outils agricoles et de machines simples; elle pourrait aussi construire des tracteurs agricoles complets (sauf les moteurs). La Zambie pourrait produire certaines machines spécialisées utilisées dans les mines, telles que tamis vibreurs, transporteurs à courroies complets (y compris les galets), et aussi des aciers spéciaux pour perforatrices et des accessoires pneumatiques. En Zambie, encore, on pourrait établir des usines fabriquant une partie des installations et des accessoires servant au raffinage du pétrole et à l'élaboration des engrais azotés, par exemple les éléments de construction en acier, les tubes et tuyaux, les réchauffeurs. La Tanzanie a entrepris la construction d'une usine de montage spécialisée dans les véhicules commerciaux, qui pourrait approvisionner une partie importante de la sous-région. Il existe quatre usines de montage des véhicules automobiles en Rhodésie du sud et une usine en Zambie, qui suffiront sans doute pendant de nombreuses années encore aux besoins de cette partie de la sous-région.

4. En Rhodésie du sud, il serait possible d'accroître la production annuelle des bicyclettes pour qu'elle atteigne un chiffre compris entre 200.000 et 300.000 unités, les éléments étant fabriqués sur place à 80 pour 100. On pourrait en outre développer la production de bicyclettes, par le montage principalement, dans d'autres pays de la sous-région, La Tanzanie, par exemple, qui pourrait utiliser dans une certaine mesure des éléments fabriqués en Rhodésie du sud.

5. La création d'une usine de construction de matériel roulant de chemin de fer se justifierait, d'autant plus que le matériel du réseau ferré de l'Afrique de l'est devra être renouvelé assez

assez prochainement. Logiquement, c'est à Dar-es-Salaam qu'il faudrait implanter cette usine, le Kénya conservant le principal atelier de réparation du matériel ferroviaire. Une autre usine, qui se spécialiserait dans la construction de wagons légers de marchandises, pourrait être installée en Zambie; elle produirait en particulier des wagons à minerai et des tombereaux; en outre, la Zambie pourrait fabriquer des aiguilles de voie ferrée, des croisements, des coeurs de croisement en acier.

6. On pourrait réserver au Kénya et à la Rhodésie du sud la production de réfrigérateurs et de moteurs électriques ne dépassant pas 5 cv.

7. La Tanzanie possède une usine de lames de rasoir qui, elle-aussi, devra desservir la sous-région toute entière pour être viable.

8. La nouvelle installation de laminage de l'aluminium de Chandaria (Dar-es-Salaam) doit exporter sa production à des usines associées établies au Malawi, au Rwanda, au Burundi, au Kénya, en Ethiopie, en Zambie et en République démocratique du Congo; ces usines travailleraient le métal fourni par Chandaria pour en faire surtout des ustensiles de ménage creux.

9. La mission a proposé la création des industries électromécaniques et des industries connexes suivantes :

Au Kénya

Numéro d'ordre	Industries proposées	Prod. annuelle en tonnes fortes 1/	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
1.	Machines légères, étaux, forets, scies	500	300	227	70
2.	Instruments agricoles et outils à main	3000	500	625	80
3.	Moteurs électriques (10 cv maximum)	400	300	4(0	60
4.	Eléments normalisés de distribution du courant électrique (légers et moyens)	250	250	150	40
5.	Transformateurs (2kVA maximum)		200	140	40
6.	Câbles électriques en cuivre (légers)	750	1000	700	80
7.	Réfrigérateurs, machines à laver, appareils de ménage		1000	1250	150

N.B.: Toutes ces industries sont proposées dans l'hypothèse d'un marché sous-régional.

1/ 1 tonne forte = 1 016 kg

En Ouganda

Numéro d'ordre	Industries proposées	Prod. annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
1.	Usine sidérurgique intégrée (four électrique); acier brut	200.000	20.000	15.000	4.000
2.	Installation de laminage; produits légers	150.000	20.000	12.000	1.000
3.	Usine de montage de tracteurs	200 unités	700	850	130
4.	Machines pour mines, pompes, groupes de transmission du mouvement	300	250	200	40
5.	Accessoires de transport du courant électrique, moyens-lourds		500	400	60
6.	Fonderie générale, objets moulés, bouteilles à gaz	900	300	250	80

N.B.: Les cinq premières industries sont proposées dans l'hypothèse d'un marché sous-régional, la dernière d'un marché local

En Tanzanie

Numéro d'ordre	Industries proposées	Prod. annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
1.	Machines-Outils générales	350	170	130	40
2.	Machines agricoles-légères	600	500	400	150
3.	Construction de bicyclettes	50.000 unités	1.400	1.000	175
4.	Matériel roulant pour chemin de fer		4.000	5.000	400

N.B.: Ces quatres industries sont proposées dans l'hypothèse d'un marché sous-régional.

En Zambie

Numéro d'ordre	Industries proposées	Prod. annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
Pour le marché local					
1.	Tubes, tuyaux, raccords, en fonte et en acier	10.000	1.300	850	100
2.	Articles en fer forgé et en fonte moulée	5.000	700	500	100
Pour un marché sous-régional					
3.	Articles moulés et forgés en acier et en métaux non ferreux	15.000	2.250	2.250	300
4.	Articles en plomb, plaques brides, pièces moulées, tubes	2.000	675	1.030	50

En Zambie

Numéro d'ordre	Industries proposées	Prod. annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
Pour un marché sous-régional					
5.	Machines pour mines, tamis transporteurs, etc.	2.500	3.000	3.900	500
6.	Matériel roulant et accessoires pour voies ferrées de mines		6.000	7.250	600
7.	Eléments généraux de distribution du courant électrique		200	150	50
8.	Transformateurs et accessoirs de transport du courant électrique		500	370	110
Pour un marché sous-régional plus exportations					
9.	Acier, boulets pour broyeurs garniture, articles moulés (généraux)	10.000	1.200	1.000	200
10.	Cuivre, demi-produits, barres tubes, profilés	8.000	10.000	6.400	300

En Zambie

Numéro d'ordre	Industries proposées	P... annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
11.	Alliages non ferreux, finis et bruts	5.000	5.500	3.500	400
12	Câbles électriques pour mines et remorquage	6.000	8.400	6.000	360
En Rhodésie du Sud					
	Pour un marché sous-régional plus exportations				
1.	Production de fonte (deux hauts-fourneaux)	1.000.000	70.000	78.000	8.200
	Pour un marché sous-régional				
2.	Installation de laminage de l'acier-produits moyens	200.000	26.600	30.000	1.400
3.	Petit laminoir semi continu à feuillards	40.000	5.400	7.000	280
4.	Fer blanc (procédé de l'immersion à chaud)	6.000	1.400	1.370	70
5.	Fils machine, clôtures, articles en fil d'acier	25.000	3.000	3.000	250
6.	Tubes et tuyaux en acier	10.000	1.300	850	100

Numéro d'Ordre	Industries proposées	Prod. annuelle en tonnes fortes	Prod. annuelle en milliers de dollars	Ventes annuelles en milliers de dollars	Nombre d'ouvriers
7.	Machines, tours, étaux limeurs, raboteuses, fraiseuses, etc.		3.000	3.000	450
8.	Tracteurs (fabrication de pièces détachées), machines agricoles	1.600	3.000	3.300	750
9.	Construction de bicyclettes	100.000 unités	2.800	2.000	350
10.	Réfrigérateurs, machines à laver, appareils de ménage		3.000	3.750	450

10. <u>Petites et moyennes industries</u>

Outre les industries de forte capacité mentionnées ci-dessus, la mission a proposé la création des industries électro-mécaniques petites et moyennes ci-après, dont le marché serait national.

Pays	Industries	Capacité annuelle	Investissement en milliers de dollars	Emploi
Burundi	Petit outillage agricole	1,000 tonnes	250	12
"	Meubles métalliques		35	16
Kenya	Eléments de lampes à pétrole		30	12
"	Fourneaux à pétrole	5.000 unités	30	8
Zambie	Outillage agricole	1.000 tonnes	250	12
	Chaudronnerie	600 tonnes	40	24
	Fourneaux de cuisine	5.000 unités	30	10
	Portes et fenêtres métalliques	15.000 tonnes	75	35
	Ustensiles métalliques	250 tonnes	100	25
Malawi	Ustensiles métalliques	250 tonnes	100	25
	Outils de jardinage	600 tonnes	85	12
	Usine de montage (bicyclettes et postes de radio	20.000 bicyclettes 3.000 radios	60	45
Tanzanie	Quincaillerie pour le bâtiment	3.000 tonnes	35	12
	Ouvrages en métal	600 tonnes	40	25
Ouganda	Fonderie générale, bouteilles à gaz, fabrication d'articles métalliques 1/	900 tonnes	250	80

1/ La même industrie est proposée dans la catégorie des industries de forte capacité.

II. Algérie, Libye, Maroc et Tunisie

1. Les possibilités qui s'offrent au développement de l'industrie du travail des métaux, de l'industrie mécanique, de l'industrie électro-technique et de l'industrie du montage sont grandes dans la sous-région, à condition que les programmes de production soient harmonisés dans tous leurs détails. Le Maroc en particulier dispose de moyens bien établis dans ce domaine. La mise en œuvre d'un programme commun dans le secteur Bone-Menzel Bourguiba pourrait aboutir à des résultats extrêmement avantageux. Compte tenu de la possibilité de faire largement appel aux moyens permettant de sous-traiter les marchés aisément dans la sous-région, on donnera ci-après des exemples des économies de dimensions possibles dans le secteur industriel, les perspectives pouvant aller jusqu'à une réduction de 30 pour 100 des prix de revient.

2. A Mohammedia, une usine fabrique des câbles électriques et des transformateurs pour le marché intérieur. Elle ne travaille actuellement qu'à 50 pour 100 environ de sa capacité. La plus grande partie des matières premières qu'elle utilise sont importées d'Europe, dont 1500 tonnes de cuivre en 1963. Il semble peu probable que, sans protection sur les marchés nord-africains, cette usine puisse soutenir la concurrence des entreprises européennes, qui sont plus proches des grands centres de production de France et d'Italie. Un débouché plus logique serait sans doute l'Afrique de l'ouest, ses régions côtières en particulier.

3. En Tunisie, le secteur de la transformation primaire des métaux est pour ainsi dire inexistant, mais plusieurs projets sont en cours de préparation. Au Maroc, ce secteur est relativement développé; il est représenté en particulier par l'étirage de fil recuit ou de fil brut pour clous, des travaux de chaudronnerie, la fabrication d'éléments de construction en fonte et en acier. La production suffit aux besoins actuels et les possibilités sont très grandes. Des projets sont en cours d'exécution: ils portent sur la fabrication de tubes soudés longitudinalement et de tubes de grand diamètre soudés en hélice (jusqu'à 1.400 mm). Les instal-

lations actuelles et celles qui sont en cours de réalisation suffiront aux besoins jusqu'en 1970 et au delà. Le Maroc possède plusieurs fonderies de fonte et d'acier; dans ce secteur ses besoins seront couverts pendant quelque cinq ans encore. L'Algérie est bien équipée également dans ce secteur; elle possède en effet :

- 2 usines de tuyaux à gaz (noirs et galvanisés) de divers diamètres (60 mm au maximum); la capacité annuelle de ces usines atteint 10.000 tonnes;
- 1 usine de tubes légers (meubles métalliques, cadres de bicyclettes, chauffage central), de 3.600 tonnes de capacité annuelle;
- 1 usine de tubes soudés longitudinalement de grand diamètre (entre 250 et 700 mm), de 3.000 tonnes de capacité annuelle;
- 1 usine de tuyaux de grand diamètre soudés en hélice (200-700 mm), de 7.000 tonnes de capacité annuelle;
- des ateliers de chaudronnerie et des fonderies de fonte et d'acier, d'une capacité annuelle de 6.000 tonnes.

4. L'Algérie et le Maroc possèdent chacun une usine très importante de construction du matériel roulant de chemin de fer; ces deux usines ont l'une et l'autre une capacité qui suffit aux besoins de tout le Maghreb. Il serait souhaitable que les deux pays s'accordent pour se partager la production des divers matériels ou pour que leurs productions soient complémentaires.

5. En Algérie, au Maroc et en Tunisie, les industries mécaniques sont représentées essentiellement par des ateliers d'entretien ou de réparation générale (16 établissements seulement en Tunisie). Ces entreprises n'ont aucun programme bien défini, si bien que la production reste au dessous de la capacité.

6. Au Maroc, les efforts d'industrialisation ont orientés quelques entreprises vers la production de certains articles semi-durables, tels que fourneaux à pétrole, chauffe-eau électriques,

serrureries, petits outils agricoles, accessoires industriels, galets de transporteurs à courroies, éléments de machines de mines, accessoires pour concasseurs, broyeuses pour l'industrie du ciment.

7. L'installation de chaînes de montage des voitures automobiles a permis à un grand nombre d'entreprises d'arriver au plein emploi et pour certaines d'entre elles de consacrer des investissements à l'achat de machines et d'outils destinés à la production en série, dans des conditions satisfaisantes d'économies et de qualité, des éléments mécaniques nécessaires à ces chaînes de montage. Ces machines et outils sont importants pour les industries mécaniques et les industries auxiliaires (chaudronnerie, travail du bois, appareillage électrique, accessoires d'appareils de commande, etc.). L'existence de cet équipement a permis aux industries locales de participer dans une mesure notable à l'établissement de nouvelles industries, à l'époque où de grands ensembles industriels étaient mis en service.

8. Il y a très peu de temps encore, la Tunisie ne disposait guère de moyens dans ce domaine. Toutefois, l'arsenal maritime de Menzel Bourguiba pourrait se lancer dans l'industrie lourde grâce à son équipement de base; il est capable de produire les principaux matériels d'équipement.

9. Par la coordination de leurs plans, les pays du Maghreb pourraient connaître un développement rapide grâce à la spécialisation, voie unique pouvant conduire les industries de montage à une production en grande série. Un grand nombre d'industries de montage offrent de grandes possibilités dans la sous-région: montage de voitures automobiles particulières, de véhicules utilitaires, de camions petits et grands, de tracteurs (à roues et à chenilles), de matériels pour l'industrie textile (pour les cinq prochaines années, les besoins des pays du Maghreb en ce qui concerne seulement les métiers à tisser le coton ou la fibrane se chiffrent par plusieurs milliers). Une coordination extrêmement

poussée pour le choix des modèles et de l'assortiment à fabriquer est indispensable pour qu'un tel programme d'industrialisation soit couronné de succès, eu égard à l'importance considérable des séries requises pour que les prix de revient soient diminués et pour que les éléments fabriqués répondent aux conditions de qualité et d'interchangeabilité requises.

10. Le plan tunisien prévoit la construction d'une usine de montage de véhicules Renault-SAVIEM dont la capacité annuelle sera de 400 camions lourds et de 50 autocars; un agrandissement ultérieur permettra en outre de construire 1000 automobiles particulières par an ("Dauphine" et R4), plus 1200 tracteurs agricoles de l'International Harvesting Co. (à roues et à chenilles).

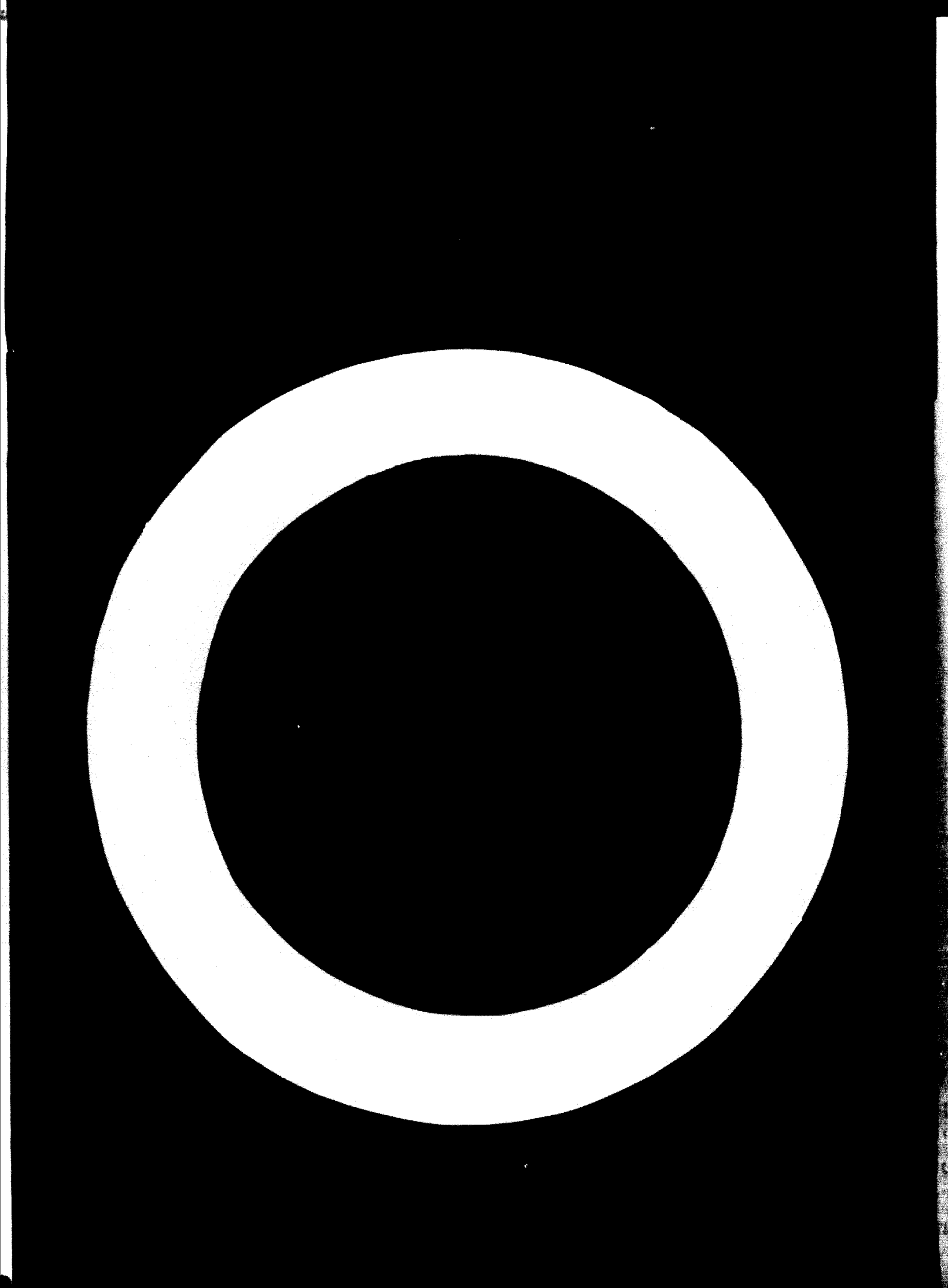
11. L'Algérie monte des camions lourds Berliet (jusqu'à 60 tonnes) et se propose de monter des automobiles particulières. La production de tracteurs agricoles à roues est aussi envisagée.

12. Le Maroc monte des automobiles particulières par l'intermédiaire de la société SOMACA (Simca-Fiat), la capacité des installations étant de 10.000 véhicules par an. Il est également équipé pour produire des véhicules utilitaires (à quatre roues motrices), à savoir des Landrover (400 par an) et des Willys (également 400). Dans le cas des camions lourds et moyens, la gamme des Berliet s'arrête à 36 tonnes (capacité: 1200 camions par an). L'entreprise Saida, qui monte des tracteurs Volvo et des tracteurs Ford, est comparable à la chaîne des Berliet pour le nombre des modèles, la capacité également étant la même.

13. Une normalisation poussée et la coordination entre les pays du Maghreb pour les modèles à fabriquer permettraient de produire diverses pièces en séries suffisamment importantes pour que leurs prix puissent soutenir la concurrence. Si l'on établissait pour les moteurs, les essieux, les boites de vitesses, etc. une liste minimale des besoins, en recourant à la normalisation, le montage s'en trouverait facilité et en outre on pourrait envisager de fabriquer par exemple des pistons et des soupapes. Ultérieurement,

la production de pièces élaborées (par exemple de pièces forgées importées à l'état d'ébauches, fabrication d'éléments en caoutchouc). L'approvisionnement pourrait s'élargir régulièrement, la région et l'industrie de l'Afrique du nord pourrait produire de 60 à 85 pour 100 des éléments nécessaires, compte tenu également de la contribution de l'industrie textile, de celle des éléments en plastique, de l'industrie chimique pour les colles, les peintures et les vernis, de l'industrie du verre (qui pourrait fabriquer des verres de sécurité), des pièces forgées qui pourraient être réalisées, des pneumatiques et autres éléments en caoutchouc, des accessoires tels que les accumulateurs et les câbles. Il en résulterait en outre une multiplication des pièces de rechange sur le marché, ce qui communiquerait une impulsion aux activités d'entretien et de réparation.

14; Les installations de la base de Menzel Bourguiba sont remarquablement adaptées à la réparation des navires. La base, qui est dotée d'un équipement lourd, peut recevoir des navires de 60.000 tonnes. L'ensemble des installations est parfaitement entretenu. Pour que l'exploitation de l'arsenal de Menzel Bourguiba soit rentable et aussi pour qu'il puisse attirer et conserver la main-d'oeuvre indispensable aux travaux de réparation des navires (main-d'oeuvre qui existe dans le voisinage), il faudrait y monter une cale pour la construction de bateaux de faible tonnage (bateaux de pêche, remorqueurs, etc.). Compte tenu de la nécessité de travaux de grande envergure pour que l'ensemble de la base soit rentable, compte tenu aussi des immenses possibilités qu'impliquent les installations actuelles, la base pourrait en même temps entreprendre d'autres travaux. Elle pourrait par exemple fabriquer des outils tels que des pics et des pelles, des outils de machines pneumatiques, certains matériels de mines, des broyeurs, des concasseurs et des pièces détachées. Il lui serait possible également, en faisant appel à des sous-traitants, de forger et d'usiner des pièces pour d'autres industries (par exemple, des éléments de moteurs électriques). Enfin, en se fondant essentiellement sur le marché nord-africain, elle pourrait fabriquer sous licence de petites machines-outils, des métiers à tisser, etc.



ANNEXE II

CONCLUSIONS ET RECOMMANDATIONS DE LA MISSION DE COORDINATION DE LA CEA ENVOYEE DANS LA SOUS-REGION D'AFRIQUE CENTRALE

A la sixième session de la Commission économique pour l'Afrique, les pays de la sous-région d'Afrique centrale (qui venait d'être délimitée), ont demandé qu'une mission analogue à celles qui avaient déjà séjourné en Afrique de l'ouest, en Afrique du nord et en Afrique de l'est, fût envoyée dans la nouvelle sous-région. Par la suite, les gouvernements de la sous-région ont prié le Secrétaire exécutif de bien vouloir leur fournir des conseils et une assistance dans un domaine englobant les divers aspects de la coopération économique. C'est pour répondre à cette requête que la CEA a envoyé dans les six pays de la sous-région une mission qui les a parcourus successivement du 23 avril au 24 mai 1965.

Bien que très large (considérablement plus large que dans le cas des missions précédentes), le mandat de la mission de l'Afrique centrale n'embrassait pas tous les aspects de la coopération économique. Les principaux objectifs qui lui avaient été fixés concernaient l'étendue et les formes de la coopération dans les domaines du développement de l'énergie, de l'agriculture et de l'industrie. En outre, la mission devait aborder les problèmes de la main-d'oeuvre, de l'enseignement et de la formation, en examinant en même temps l'étendue et les formes de la coopération dans ces domaines.

Laissant de côté les industries orientées essentiellement vers les marchés extra-africains, la mission s'en est constamment tenue à une classification des industries en trois catégories: premièrement, les industries rentables avec une faible production, qui doivent logiquement être envisagées dans la plupart des pays; deuxièmement, les industries auxquelles il faut au minimum un marché correspondant à la sous-région tout entière; troisièmement, une catégorie intermédiaire mais importante, celles des industries qui, en principe, pourraient exister dans tous les pays, quels qu'ils soient, mais pour lesquelles la spécialisation internationale et, par conséquent, l'harmonisation offriraient des avantages manifestes.

Pour ce qui est des industries électromécaniques, les conclusions et les recommandations de la mission ont été les suivantes.

1. Faute de données statistiques, il a été impossible d'établir des projections (même approximatives) de la demande relative aux différentes catégories d'articles manufacturés en métal. Dans le cas des biens de consommation durables, tels que les récepteurs de radio, les lampes électriques, les réfrigérateurs, les machines à laver, l'élasticité de la demande par rapport au revenu est probablement grande. Ce secteur industriel, toutefois, est principalement celui des biens intermédiaires et des biens d'équipement. Dans les projections industrielles d'ensemble, on a supposé des taux de croissance élevés, qui ne seront atteints que si les pays s'équipent et augmentent leur production de biens d'équipement, particulièrement de machines, d'appareillage électrique et de matériels de transport.

2. Au Tchad il n'existe pratiquement aucune industrie; les plans n'en prévoient pas pour l'avenir immédiat.

3. La République centrafricaine, ne possède à l'heure actuelle aucune industrie électromécanique. Elle envisage de fabriquer des outils, des ustensiles de ménage, des lampes tempête, des ferrures, des récepteurs de radio à transistors (montage), des petits bâteaux, des bicyclettes et des vélomoteurs.

4. En dehors de certaines activités concernant la chaudronnerie (300 tonnes de capacité annuelle prévue pour 1966) et la fabrication de meubles métalliques, le Gabon, à l'heure actuelle, ne produit ni articles en métal, ni machines, ni matériels de transport. Des industries sont envisagées: fabrication de clous (300 tonnes en 1966), de récepteurs de radio (2500 unités en 1966) et d'accumulateurs (1000 tonnes en 1968).

5. Au Congo (Brazzaville) il existe les industries suivantes :

- Clous (depuis 1964)
- Ustensiles en aluminium
- Articles métalliques (malles, valises, etc.)
- Chaudronnerie et éléments de construction en métal
- Montage de bicyclettes et de vélomoteurs

- Carrosseries d'automobiles, bennes, caisses, etc.
- Matériel forestier
- Matériel pour mines et travaux publics

Les nouveaux projets industriels sont les suivants :

- Tôles ondulées et galvanisées
- Quincaillerie pour bâtiment
- Petites machines agricoles
- Fourneaux à pétrole et réfrigérateurs
- Fûts métalliques
- Bondes filetées

6. Le Cameroun est beaucoup plus avancé que ses partenaires de l'Union douanière et économique de l'Afrique centrale sur le chemin du développement industriel. Il dispose de la base sur laquelle pourra se fonder une industrie importante des articles métalliques (en aluminium particulièrement). Avec la République démocratique du Congo, le Cameroun semble devoir être le centre naturel de la sous-région pour l'implantation d'une industrie des biens d'équipement (articles métalliques, machines, appareillage électrique, matériel de transport).

Article	Importations en tonnes		Production en tonnes	Nombre d'usines	Nombre d'employés	Investissements en millions de CFA	Observations
Aluminium	1.004	62	52.250	1	548	8.200	Chiffres d'affaires 3.600 M CFA
Articles en Al.		62 64	254 326	1	123	100	
Tôles d'Al. ondulées		64	1.225	1	5	62	
Constructions métalliques	929			5	357	105	Employés par usine
Chaudronnerie	334			2	140		
Malles en métal		60	20.000 unités	1	37	6	
Clous	500	63	720	2	46	19	Importations de clous et de boulons
Articles émaillés	83			1	80	57	Depuis 1964
Machines agricoles				1	106	150	Depuis 1964
Ferronerie				4			Production des usines de constructions métalliques
Fonderie				2		50	Depuis 1963

Article	Importations en tonnes	Production en tonnes	Nombre d'usines	Nombre d'employés	Investissements en millions de CFA	Observations
Réparation des tracteurs agricoles	116		1	45	64	Fabrication et réparation de pièces de rechange
Construction de navires	456		1	140	16	Egalement chaudronnerie; 630 tonnes de fer consommées
Bicyclettes	62	11,800 pièces	1	104	80	Tubes d'acier importés
Brouettes et remorques	62	120	1	20	8	Depuis 1964

7. La République démocratique du Congo est au nombre des principaux producteurs de métaux non ferreux en Afrique, mais elle est orientée principalement vers l'exportation

	Production en tonnes 1962	1964
Cuivre (équivalent en métal)	297.000	277.000
Concentrés de zinc (équivalence en métal)	95.700	86.000
Zinc, métal	56.000	55.600
Etain, métal	1.010	1.500
Plomb	280	1.050
Cobalt	9.700	7.700
Cadmium	300	470

8. La République démocratique du Congo est le pays le plus industrialisé de la sous-région. Si l'on prend 1950 comme année de référence (indice 100), la production industrielle a atteint l'indice (235) en 1959.

Article	Importations	Production
Clous et boulons	62 2.230 tonnes	63 88 tonnes
Seaux en fer galvanisé		64 250.000 pcs. 350.000
Outils à main	62 935.000 Fr	62 750.000 Fr en 1965
Pièces moulées en métaux non ferreux		550 t.p.a.
Réfrigérateurs de (ménage)		15 unités par jour
Fourneaux à pétrole		50 unités par jour, 1966
Cadres de bicyclettes		58 140.000 65 60.000

La République possède une usine pour chacune des catégories suivantes de produits: tôles industrielles fortes ou minces, tôles ondulées galvanisées, tubes, boîtes de fer blanc pour empaquetage, fils métalliques, fils et câbles de cuivre, bouchons et bondes métalliques, pièces moulées en fonte et en acier; deux usines pour chacune des catégories suivantes: articles de voyage en métal,

éléments de construction en acier, articles de ménage en aluminium, meubles en acier; trois usines pour chacune des catégories suivantes: constructions métalliques et chaudronnerie. Des projets sont en cours d'étude en vue de la création des industries suivantes: décolletage (fils, clous, vis, etc.) (600 tonnes par mois); articles émaillés (1500 unités par jour); pics, pioches et haches, montage de voitures particulières (date non encore fixée) et de vélomoteurs. Il n'existe pas d'industrie électromécanique.

9. En ce qui concerne les industries électromécaniques, la situation dans la sous-région est la suivante :

Articles métalliques

Le Cameroun et la République démocratique du Congo ont commencé à produire des boulons et des vis; leurs industries pourraient être développées pour desservir la sous-région.

La République démocratique du Congo a commencé à produire des articles de coutellerie et des couverts de table; cette industrie pourrait également être élargie pour approvisionner toute la sous-région.

Les industries suivantes pourraient être créées à l'échelon de la sous-région: extincteurs, vérins, clés, serrures et cadenas, couteaux de poches et ciseaux, appareils d'éclairage des rues et armatures, parties non mobiles de machines à laver, tamis et cribles en fils métalliques.

Appareillage électrique

Le Cameroun et la République démocratique du Congo fabriquent des moteurs et des appareils électriques; le Cameroun, la République démocratique du Congo et la République centrafricaine, des récepteurs de radiodiffusion (montage); la République démocratique du Congo, des accumulateurs et des câbles électriques isolés. Le Gabon et la République démocratique envisagent de fabriquer des piles sèches. D'autres industries pourraient être créées: fabrication d'armatures (d'électro-aimants), de ventilateurs électriques mobiles, accessoires de distribution du courant électriques et

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Matériels de transport

Dans cette catégorie, un certain nombre d'industries ont été créées et pourraient être créées pour approvisionner les marchés intérieurs; ce serait, par exemple, la fabrication de charrues et de chariots à traction animale, la réparation de voitures automobiles et la construction de carrosseries, la construction et la réparation de péniches, de bateaux de pêche, de petits bateaux et de remorqueurs, le montage de bicyclettes. D'autres possibilités existent dont on pourrait profiter à l'échelon des pays: redressement des essieux, meulage des cylindres, réparation de locomotives, construction et réparation du matériel roulant de chemin de fer.

Il intervient ensuite les industries pour lesquelles la coordination sous-régionale serait avantageuse sinon indispensable; il s'agit, par exemple du montage et de la fabrication progressivement élargie d'éléments de bicyclettes.

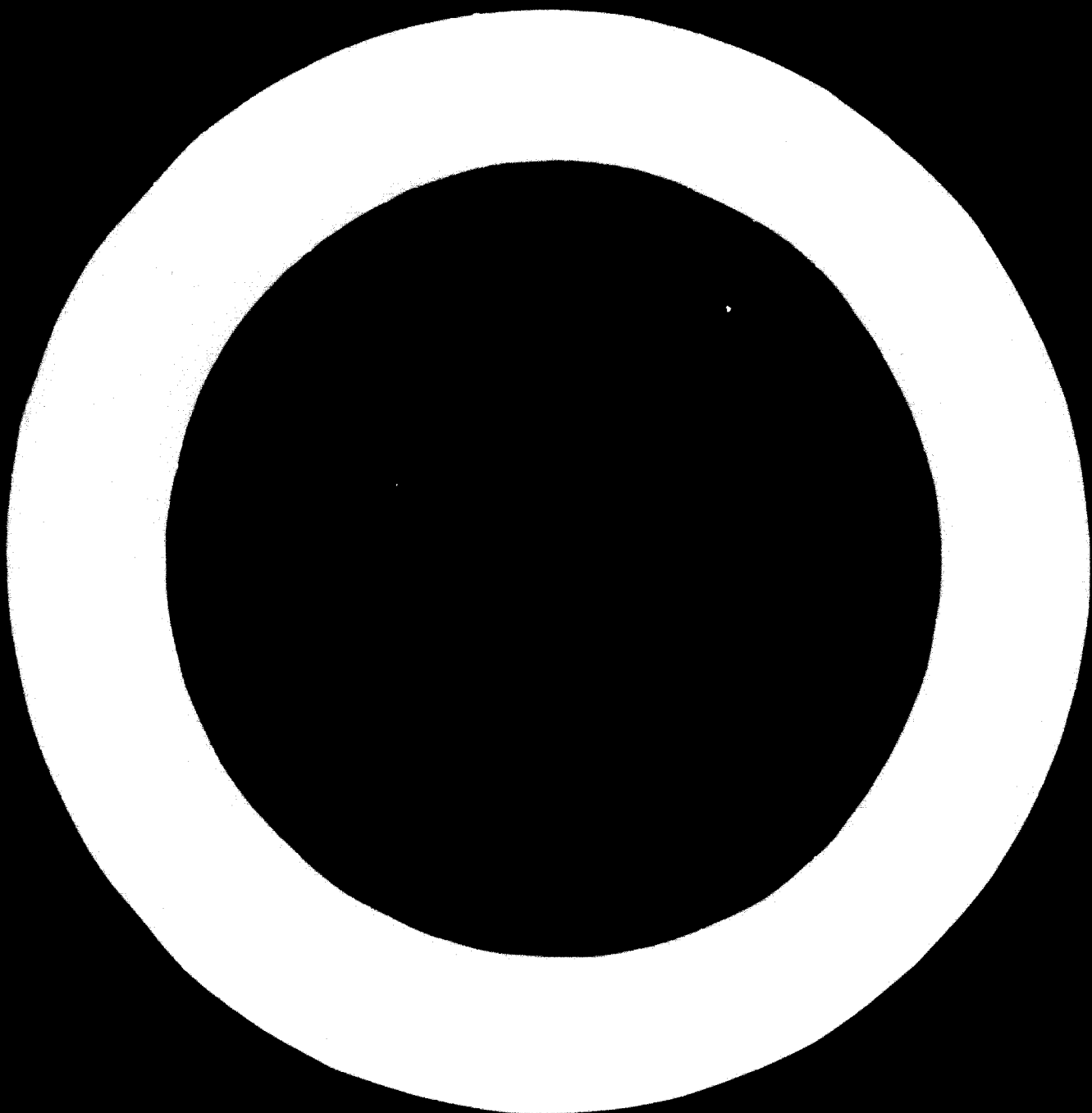
Pour les dix prochaines années, un programme important de développement des réseaux ferrés a été lancé, particulièrement au Gabon, au Cameroun et en République centrafricaine. Il en découle des possibilités dans le domaine du montage de matériel roulant, comme dans celui de la fabrication progressivement élargie de pièces détachées, coordonnée sur le plan sous-régional.

Machines

La République démocratique du Congo est pratiquement le seul pays qui fabrique actuellement des machines (machines agricoles, fabrication et montage de réfrigérateurs et de machines à coudre). D'autres industries pourraient être rentables dans la sous-région, par exemple la fabrication de compresseurs d'air, de roulements à billes, de machines à faire les briques, les carreaux et les tuiles, de bétonnières, de transporteurs à courroies, de fourneaux de cuisine, de pompes, de vannes hydrauliques, de treuils et d'essoreuses pour machines à laver.

10. La mission a proposé que les industries suivantes soient implantées dans la sous-région :

- Fabrication d'outils agricoles à main au Congo (Brazzaville), au Cameroun et en République centrafricaine (base locale ou multinationale).
- Fabrication de cadres de portes et fenêtres au Congo (Brazzaville) et en République centrafricaine (base multinationale ou sous-régionale).
- Fabrication de récipients métalliques au Gabon (base locale).
- Fabrication d'articles émaillés au Cameroun (base locale, ou multinationale ou sous-régionale).
- Fabrication d'éléments d'échaffaudage en acier au Cameroun (base locale, multinationale ou sous-régionale).
- Fabrication de tamis et de cribles en Congo (Brazzaville) et au Cameroun (base multinationale ou sous-régionale).
- Fabrication de machines et instruments agricoles au Congo (Brazzaville), au Cameroun et en République centrafricaine (base locale, multinationale ou régionale).
- Fabrication de réfrigérateurs au Congo (Brazzaville) (base locale, multinationale ou sous-régionale).
- Fabrication d'accumulateurs électriques au Gabon et au Congo (Brazzaville) base sous-régionale).
- Fabrication et réparation de récepteurs de radiodiffusion au Congo (Brazzaville), au Gabon, en République démocratique du Congo et en République centrafricaine (base multinationale ou sous-régionale).
- Construction et réparation de péniches et autres bâteaux en République centrafricaine (base locale ou multinationale).
- Construction de cadres de motocyclettes et montage de motocyclettes en République centrafricaine (base locale ou multinationale).
- Montage de véhicules automobiles au Cameroun (base multinationale ou sous-régionale).



ANNEXE III

CONCLUSIONS ET RECOMMANDATIONS CONCERNANT LES INDUSTRIES ELECTROMECANIQUES DANS LA SOUS-REGION D'AFRIQUE DE L'EST

1. Les industries électromécaniques de la sous-région de l'Afrique de l'est ont fait l'objet d'études en 1965, les conclusions dégagées à la suite de ces études ont été présentées à la Conférence sur l'harmonisation des programmes de développement industriel en Afrique de l'est, qui a eu lieu à Lusaka dans le courant du dernier trimestre de 1965, dans deux documents intitulés "Les industries électromécaniques dans la sous-région de l'Afrique de l'est" (E/CN.14/INR/89) et "L'expansion des industries mécaniques et électriques en Afrique de l'est - les industries mécaniques" (E/CN.14/INR/90), ce dernier document portant sur les articles métalliques, les machines (non électriques) et les matériels de de transport. Les conclusions formulées dans ces deux documents sont résumées ci-après:

2. En 1962, la sous-région[1/] a consommé 770.000 tonnes d'articles des industries électromécaniques (y compris les produits sidérurgiques de base); sur ce total, la production locale est estimée à 190.000 tonnes, ou 25 pour 100. La production la plus forte a été celle de la Rhodésie (70.000 - 80.000 tonnes), suivie de la Zambie (40.000 - 50.000 tonnes), du Kénya (30.000 - 40.000 tonnes), de la Tanzanie (35.000-40.000 tonnes) et de l'Ethiopie (7.000-10.000 tonnes). Le chiffre cité pour la Rhodésie comprend la production d'une industrie sidérurgique primaire assez importante destinée à la consommation locale et celui de la Tanzanie comprend la production de l'industrie de l'élaboration de l'aluminium et de la galvanoplastie.

1/ Bien que n'appartenant pas à la sous-région, le Mozambique a été compris dans les chiffres relatifs à la demande cités dans le document E/CN.14/INR/90; on a considéré en effet que ce pays était un marché possible pour les industries de la sous-région.

3. Les industries électromécaniques proprement dites, c'est-à-dire abstraction faite des industries métallurgiques primaires, sont assez bien développées par rapport à l'industrie manufacturière dans son ensemble; elles assurent en effet 20 pour 100 de la production nette de l'industrie manufacturière au Kénya et 25 pour 100 en Rhodésie. Néanmoins, dans la plupart des pays, dont le Kénya et la Rhodésie, les articles électromécaniques (y compris les produits sidérurgiques) s'inscrivent pour plus des deux tiers des importations totales.

4. Dans tous les pays, le secteur le plus développé est celui de la fabrication d'articles métalliques pour le bâtiment et les ménages; ces articles représentent près d'un tiers de la production de l'industrie manufacturière au Kénya, par exemple, et 50 pour 100 en Zambie. Dans les pays les plus industrialisés de la sous-région, les deux tiers du marché sont approvisionnés par l'industrie locale et, dans tous les pays, il y a au moins une usine qui travaille dans ce domaine.

Les éléments de construction légers sont fabriqués dans tous les pays par les usines de constructions métalliques. La Rhodésie et la Tanzanie fabriquent des éléments lourds de construction, car ces deux pays sont les seuls à posséder les moyens de manutention, de sciage et de soudage nécessaires. Dans le cas des petits marchés, les usines de constructions métalliques fabriquent aussi généralement des cadres de portes et fenêtres, mais dans le cas des marchés plus importants (Rhodésie et Kénya), il a spécialisation dans ce domaine.

Dans tous les pays, la deuxième industrie pour l'importance est celle de la fabrication des ustensiles creux. Les récipients métalliques à usages commerciaux ne sont pas fabriqués aussi généralement; dans le cas des boîtes en fer blanc, par exemple, leur fabrication est subordonnée à l'existence de produits agricoles exportables.

Les fils métalliques et les articles en fils métalliques sont fabriqués principalement en Rhodésie, mais aussi en Tanzanie

et à l'île Maurice. Parmi les articles de petites dimensions figurent les chaînes, les ressorts, les boules filetées, fabriqués principalement en Rhodésie, et les lames de rasoirs, en Tanzanie.

5. Puis vient la fabrication et surtout la réparation des matériels de transport; en Rhodésie et au Kénya la production de ce secteur représente le quart à peu près de la production totale des industries électromécaniques et près de la moitié en Zambie. La réparation des véhicules routiers, du matériel roulant des chemins de fer, des navires est un moyen important pour les pays en voie de développement de s'initier aux industries mécaniques car ils peuvent s'y consacrer sans difficulté particulière, à l'abri de toute concurrence étrangère, étant donné que les réparations sont entreprises nécessairement dans le pays où les véhicules sont utilisés.

Dans le cas de la production de véhicules automobiles, deux catégories sont à considérer: le montage complet ou la construction partielle. Les véhicules commerciaux légers sont montés avec des éléments importés selon des procédés qui, à Salisbury, à Nairobi ou à Tananarive, sont les mêmes qu'en Europe, sauf que l'automatisme y est moins poussé, les opérations n'étant pas exécutées à la chaîne, par exemple, et la division du travail étant moins systématique. De toute manière, on y utilise les mêmes gabarits pour exécuter les soudures, les perçages et les boulonnages. Les opérations de fabrication proprement dites se limitent essentiellement aux carrosseries d'autocars, de camions et de véhicules commerciaux lourds dont les chassis sont importés; on construit aussi des remorques dont les roues et les essieux sont importés. L'Ouganda a commencé à monter des bicyclettes et produira un assortiment de plus en plus large des éléments nécessaires (85 pour 100 dans cinq ans).

6. Dans tous les pays africains, c'est l'atelier de réparation du matériel ferroviaire qui est l'établissement de constructions mécaniques le plus important et le plus grand. A Nairobi, à Bulawayo, à Djibouti, à Tananarive, par exemple, les ateliers principaux

entretiennent et réparent le matériel roulant (locomotives, wagons de marchandises) selon un programme déterminé; les éléments dont l'usure est rapide, comme les sabots de frein, les boîtes d'essieux et les ressorts sont fabriqués dans la fonderie, la forge et l'atelier de mécanique de l'établissement. Dans certains pays, la Rhodésie et Madagascar, par exemple, les ateliers fabriquent des wagons de voyageurs et des wagons de marchandises dont les roues et les essieux sont importés; dans d'autres pays, comme au Kénya, la fabrication des wagons se borne au montage d'éléments tous importés.

7. Le Kénya (Mombassa), Madagascar (Diego-Suarez) et l'Île Maurice (Port-Louis) possèdent des cales sèches et des cales de construction, qui leur permettent de réparer et de fabriquer des navires (3.000 tonnes environ au maximum pour la construction). A Kisumu, sur le lac Victoria, des installations existent pour la construction de bateaux de 1.000 tonnes au maximum; au Burundi, sur le lac Tanganyika, un chantier est équipé pour construire des bateaux de 100 tonnes.

8. Dans la sous-région d'Afrique de l'est, c'est le secteur de la fabrication des machines qui est le moins développé de toutes les industries de travail des métaux (moins de 10 pour 100 du marché dans les pays les plus industrialisés); cette situation s'explique par le fait que les marchés nationaux ouverts aux machines spécialisées qu'utilise l'industrie ne sont pas assez vastes. Dans ce domaine, l'activité la plus importante est celle de la réparation des machines importées; il s'agit d'ailleurs d'une activité manufacturière, étant donné qu'elle fait intervenir le moulage, le forgeage et l'usinage de pièces de rechange. La production de machines neuves est limitée en général aux accessoires d'usage courant, tels que vannes et pompes, auxquels s'ajoute le matériel destiné aux grandes industries de base de l'Afrique, à savoir matériel de broyage pour les mines, matériel de traitement des produits agricoles (canne à sucre, graines oléagineuses, sisal, etc.). Le Kénya et la Rhodésie fabriquent des machines agricoles tractées (charrues légères et wagonnets) à l'exclusion des disques et des roulements à billes; le Kénya en outre monte des moteurs

diesel et en fabrique des éléments, dont l'assortiment s'élargira de plus en plus. La construction de tracteurs est envisagée en Ouganda. En Rhodésie, on monte des machines à coudre et l'on en fabrique une partie des éléments.

9. En ce qui concerne les industries électromécaniques, il n'en existe qu'en Rhodésie (17,3 millions de dollars de production en 1964), à Madagascar, dont toute la production a été utilisée pour la fabrication locale de récepteurs de radiodiffusion (1,2 million de dollars), au Kénya et en Zambie, dont la production (780.000 dollars et 620.000 dollars respectivement) a été absorbée principalement par les travaux de réparation. En 1964, la production de la Rhodésie s'est répartie comme suit, en valeur: 9,2 millions de dollars de récepteurs de radiodiffusion (la quasi totalité des éléments étant fabriqué sur place), 5,26 millions de dollars d'appareillage électrique et de transformateurs, 2,13 millions de piles et accumulateurs, 770.000 dollars de réfrigérateurs de ménage et 420.000 dollars de lampes et ampoules électriques. Quant aux autres pays de la sous-région, ils ne produisent pratiquement pas d'articles électro-techniques.

10. Ci-après une liste des industries recommandées comme pouvant être créées dans la sous-région :

A. Industries à créer dans le cadre des pays

i) Pour chacun des pays :

- Eléments de construction légers et meubles métalliques
  Fonderie et mécanique générale
  Coutellerie
  Décolletage (clous, vis, boulons)
  Montage d'autocars et de camions, construction de carrosseries
  Accumulateurs au plomb
  Galvanoplastie

ii) Pour la plupart des pays :

Bicyclettes
Outillage agricole
Ustensiles creux
Quincaillerie
Pompes

Machines à meuler
Machines agricoles
Accessoires pour véhicules automobiles
Boîtes en fer blanc
Câbles basse tension pour l'intérieur des bâtiments
Petits réchauds électriques

B. Industries à créer dans un cadre multinational

Réservoirs, chaudrières, bouteilles à gaz,(2) - Rhodésie ou Zambie Kénya
Cordages et câbles en fils métalliques (3) - Zambie, Kénya, Rhodésie
Toiles et treillis métalliques (2) - Zambie, Kénya
Machines à coudre (2) - Rhodésie, Kénya
Machines de traitement des denrées alimentaires (3) - Kénya, Rhodésie, Tanzanie
Machines de terrassement (4) - Kénya, Rhodésie, Zambie, Tanzanie
Wagons de marchandises (2) - Rhodésie, Kénya
Fourneaux de ménage (2) - Kénya, Tanzanie
Machines de levage (3) - Kénya, Rhodésie, Zambie
Appareils et instruments de pesage (3) - Kénya, Rhodésie, Zambie
Tréfilerie (2) - au voisinage des aciéries
Récepteurs de radiodiffusion (montage)
Réfrigérateurs de ménage
Lampes et ampoules électriques
Transformateurs
Chauffe-eau électriques

C. Industries à créer dans le cadre de la sous-région

Eléments de construction lourds et éléments de ponts - Zambie
Grillages métalliques - Kénya, Rhodésie ou Zambie
Lames de rasoir - Tanzanie
Générateurs de vapeur - Rhodésie, Zambie ou Kénya
Tracteurs - Tanzanie
Machines à écrire et machines à calculer - un pays quelconque (Kénya)
Vannes et soupapes - Zambie
Remorques - Tanzanie
Voitures particulières - Tanzanie

Roues et essieux (matériel ferroviaire)- au voisinage des aciéries
Tours, perceuses, filières,
Cisailles - Kénya, Tanzanie ou Zambie
Machines de l'industrie textile - Kénya
Moteurs électriques
Démarreurs
Ventilateurs électriques
Câbles isolés
Réflecteurs
Piles sèches
Machines à laver de ménage

Le document E/CN.14/INR/89 recommandait que des études de rentablité soient entreprises en vue de la détermination de la capacité et de l'emplacement des industries électromécaniques à créer dans la sous-région d'Afrique de l'est. Le document E/CN.14/INR/90, de son côté, formulait les propositions suivantes quant à la capacité et à l'emplacement des usines à créer pour les industries des éléments de construction et des articles métalliques, des machines non électriques et du matériel de transport. Sont indiqués également les investissements en capital fixe en millions de dollars et l'emploi :

A. <u>Eléments de construction et articles métalliques</u>

i) Eléments de construction lourds pour ponts et bâtiments:
Une usine, en Zambie, 10.000 t/an; 1,2-1,4 ($), 300 employés

ii) Eléments de construction légers :
1 en Ouganda, 1.000 t/an, 0,09-0,1 ($), 60 employés
1 au Kénya, 2.000 t/an, 0,17-0,19 ($), 100 employés
1 en Tanzanie, 3.000 t/an, 0,24-0,26 ($), 140 employés
1 en Rhodésie, 8.000 t/an (usine existante)

iii) Réservoirs, cuves et bouteilles à gaz :
1 au Kénya { 5.000 t/an réservoirs / 2.000 t/an bouteilles } 0,8-1,0 ($), 300 employés

1 en Rhodésie ((10.000 t/an réservoirs) / (5.000 t/an bouteilles)) 1,5-1,7 ($), 400-500 employés

iv) Boîtes en fer blanc et récipients analogues :

1 en Ouganda, 40-50 t/an, 0,015-0,020 ($), 30-40 employés

1 à l'Île Maurice, 60-70 t/an, 0,020-0,025 ($), 35-45 employés

1 au Malawi, 100-150 t/an, 0,030-0,045 ($), 40-50 employés

1 au Rwanda (mêmes données que pour le Malawi)

1 à Madagascar, 300-400 t/an, 0,085-0,110 ($), 100-140 employés

1 en Ethiopie, 400-500 t/an, 0,100-0,130 ($), 140-180 employés

1 au Kénya, 800-1.000 t/an, 0,190-0,240 ($), 240-290 employés

1 en Zambie, 1.000-1.500 t/an, 0,250-0,370 ($), 300-600 employés

1 en Rhodésie, 1.500-2.000 t/an, 0,350-0,440 ($), 360-480 employés

1 en Tanzanie, 2.000-3.000 t/an (usine existante)

v) Tréfilerie (cordages, câbles, tringles pour pneumatiques):

Une usine, pays non encore spécifié, 40.000-50.000 t/an, 4,8-6,0 ($), 500-600 employés

vi) Tréfilerie (grillages, treillis, toiles métalliques):

Une usine, pays non encore spécifié, 30.000 t/an, 2,4-2,7 ($), 180-220 employés

vii) Cordages et câbles en fils métalliques:

1 au Kénya, 10.000-15.000 t/an, 1,2-1,5 ($), 200-250 employés

1 en Zambie, 15.000 t/an, 1,5-1,7 ($), 200-250 employés

1 en Rhodésie, (mêmes données que pour la Zambie)

viii) Treillis et toiles métalliques:

1 au Kénya, 7.000-8.000 t/an, 1,0-1,4 ($), 200-300 employés

1 en Zambie (mêmes données que pour le Kénya)

ix) Grillage:

Une usine, en Rhodésie, 8.000-10.000 t/an, 1,0-1,2 ($), 200-300 employés

x) Décolletage (clous, vis, écrous, boulons ...):

6 usines (Ethiopie, Kénya, Tanzanie, Zambie, Rhodésie et Madagascar), 10.000 t/an de capacité, 1,5-1,7 ($), 150 employés (pour chacune)

xi) Outils à main [illegible] tranchants et forés :
1 en Ethiopie, 2000 t/an, 0,6-0,8 ($), 300-400 employés
1 en Rhodésie, 2.000-3 000 t/an, 0,8-1,0 ($), 450 employés
1 au Kenya, 5.000 t/an, 1,5-1,8 ($), 600-700 employés
1 en Tanzanie (mêmes données que pour le Kénya)
1 en Zambie (mêmes données que pour le Kénya)

xii) Outillerie :
Quatre capacités sont proposées :
a) 20-25 t/an, 0.030-0,040 ($), 10-15 employés
pour le Burundi, le Rwanda, le Malawi et l'île Maurice

b) 100-150 t/an, 0,120-0,180 ($), 40-60 employés
pour l'Ethiopie, l'Ouganda, la Tanzanie et Madagascar

c) 250-300 t/an, 0,230-0,270 ($), 100-150 employés
pour le Zambie

d) 300-400 t/an, 0,250-0,300 ($), 120-170 employés
pour le Kénya et la Rhodésie

xiii) Ustensiles ouverts et ustensiles émaillés :
5 usines (Kénya, Tanzanie, Zambie, Rhodésie et Madagascar)
2.000-3.000 t/an de capacité, 0,6-0,9 ($), 100-150 employés (pour chacune)

xiv) Fourneaux de cuisine :
2 usines (Kénya et Tanzanie), 1.000-1.500 t/an, 0,070-0,100 ($), 80-100 employés (pour chacune)

B. Machines non électriques

i) Moteurs à combustion interne :
2 usines (Kénya et Zambie), 8.000-10.000 t/an, 1,8-2,0 ($), 150-200 employés (pour chacune)

ii) Chaudières à vapeur :
Une usine, en Ouganda, 6 000-8.000 t/an, 0,5-0,8 ($), 150-200 employés

iii) Tracteurs :
Une usine, en Tanzanie, 10.000-15.000 unités de 25 cv, 4,5-6,0 ($), 2.000-3.000 employés

iv) Machines [illegible] et instruments aratoires (charrues en métal, [illegible]) :
Six usines (Éthiopie, Kénya, Ouganda, Tanzanie, Zambie et Rhodésie), 500-700 t/an, 0,090-0,100 ($), 60-70 employés (pour chacune)

v) Machines agricoles de moissonnage, battage, semailles:
Une usine au Kénya, 7.000-8.000 t/an, 0,8-0,9 ($), 150-170 employés

vi) Machines de bureau, machines à écrire, machines à calculer simples :
Une usine au Kénya, 200-250 t/an, 0,3-0,4 ($), 300-400 employés

vii) Perceuses:
Une usine, en Zambie, 2.000 t/an, 0,300-0,320 ($), 130-150 employés

viii) Scies à métaux:
Une usine, en Tanzanie, 1.000 t/an, 0,100-0,120 ($), 50-60 employés

ix) Machines à affûter les outils :
5 usines (Kénya, Ouganda, Tanzanie, Zambie et Rhodésie), 200 t/an, 0,050-0,060 ($), 15-20 employés (pour chacune)

x) Tours:
Une usine, au Kénya, 3.000 t/an, 0,450-0.500 ($), 300-350 employés

xi) Machines pour l'industrie textile:
Une usine, au Kénya, 8.000-10.000 t/an, 1,2-1,5 ($), 800-1.000 employés

xii) Machines à coudre de ménage:
2 usines (Kénya et Rhodésie), 50-60 t/an, 0,5-0,6 ($), 250-300 employés (pour chacune)

xiii) Machines de terrassement:
4 usines (Kénya, Tanzanie, Zambie et Rhodésie), 5.000-6.000 t/an, 0,3-1,6 ($), 150-180 employés (pour chacune)

xiv) Fraiseuses:
2 usines (Kénya et Rhodésie), 4.000-5.000 t/an, 0,6-0,7 ($), 130-150 employés (pour chacune)

xv) Concasseurs de pierres :
Une usine, en Ouganda, 6.000-10.000 t/an, 1,0-1,3 ($), 130-160 employés

xvi) Articles de robinetterie :
Une usine, en Zambie, 3.000-5.000 t/an, 0,5-0,7 ($), 120-170 employés

xvii) Pompes légères et pompes de ménage, fixes:
5 usines (Ethiopie, Kénya, Tanzanie, Zambie et Rhodésie) 2.000-3.000 t/an, 0,400-0,550 ($), 140-180 employés (pour chacune)

xviii) Pompes de dimensions moyennes :
4 usines (Kénya, Tanzanie, Zambie et Rhodésie), 3.000-4.000 t/an, 0,6-1,1 ($), 160-200 employés (pour chacune)

xix) Appareils et instruments de pesage :
4 usines proposées, deux capacités :
a) 1.500-2.000 t/an, 0,3-0,4 ($), 100-120 employés pour l'Ethiopie et l'Ouganda
b) 3.000-4.000 t/an, 0,5-0,6 ($), 180-220 employés pour la Zambie et la Rhodésie

xx) Treuils de levage :
4 usines (Kénya, Tanzanie, Zambie et Rhodésie), 4.000-5.000 t/an, 0,5-0,6 ($), 140-180 employés (pour chacune)

C. Matériel de transport

i) Wagons de marchandises :
2 usines (Kénya et Rhodésie), 12.000-15.000 t/an, 1,0-1,2 ($), 200-250 employés

ii) Roues complètes
Une usine, en Rhodésie, 8.000-10.000 t/an, 2,0-2,3 ($), 100-150 employés

iii) Wagons de voyageurs :
Une usine, en Tanzanie, 60.000-70.000 unités/an, 20-25 ($), 6.000-8.000 employés

iv) Autobus (autocars), véhicules commerciaux lourds, camions (montage):

5 usines (Kénya, Ouganda, Tanzanie, Zambie et Rhodésie), 6.000-8.000 t/an, 0,3-0,4 ($), 60-80 employés (pour chacune)

v) Pièces détachées de véhicules automobiles (rechanges):

6 usines (Ethiopie, Kénya, Ouganda, Zambie, Rhodésie et Madagascar), 2.000-3.000 t/an ($), 200-300 employés (pour chacune)

vi) Bicyclettes:

11 usines proposées, 5 capacités différentes :

a) 20.000 unités/an, 0,06 ($), 50-60 employés pour le Kénya, le Rwanda, le Burundi, le Malawi et l'île Maurice

b) 60.000 unités/an, 0,16 ($), 130-150 employés pour l'Ouganda et Madagascar

c) 100.000 unités/an, 0,27 ($), 200-250 employés pour l'Ethiopie

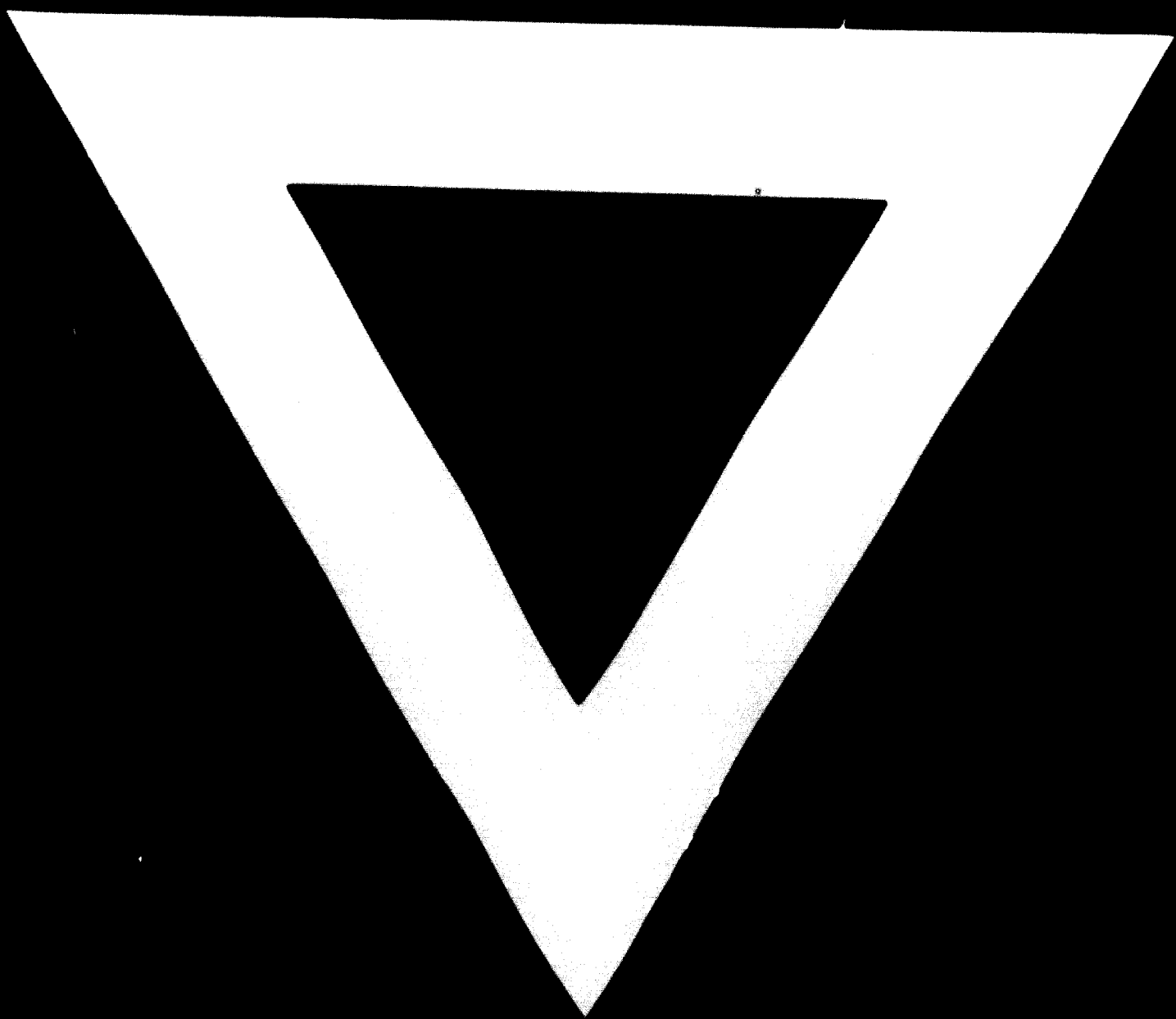
d) 200.000 unités/an, 0,50 ($), 330-360 employés pour la Tanzanie et la Zambie

e) 300.000 unités/an, 0,70 ($), 450-500 employés pour la Rhodésie

Les usines proposées ci-dessus permettraient aux pays de la sous-région d'atteindre les productions totales suivantes dans les domaines des éléments de construction et des articles métalliques, des machines non électriques et des matériels de transport, les investissements en capital fixe et l'emploi étant en outre indiqués pour chaque pays :

Pays	Production t/an	Investissements milliers de $ E.U	Emploi
Ethiopie	20.450	5.300	1.710
Somalie	---	---	---
Kénya	133.500	21.860	7.010
Ouganda	33.700	4.600	1.280
Tanzanie	172.550	42.170	15.030
Burundi	220	100	75
Rwanda	195	145	125
Malawi	375	145	125
Zambie	92.200	18.970	4.980
Rhodésie	218.300	29.870	4.260
Madagascar	17.150	3.950	950
Total	688.935	127.270	35.665

N.B.: La Côte française des Somalis et l'Île de la Réunion ne figurent pas dans le document E/CN.14/INR/90.



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