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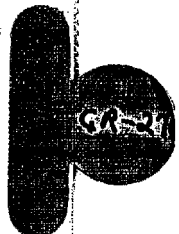
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GEOGRAPHIC INTELLIGENCE REPORT

TRANSPORTATION OF CERTAIN STRATEGIC MINERALS
IN AFRICA SOUTH OF THE SAHARA

Chief, Liaison Division, OGD
Attention: [REDACTED] 25X1A
Chief, Geography Division

15 February 1954

Regrading of Geography Division Report, CIA/RR-GR-27, Transportation of Certain Strategic Minerals in Africa South of the Sahara

1. The classification of the above report shall be Unclassified in accordance with the CIA Regrading Bulletin No. 1.
2. This memorandum supersedes that dated 30 December 1953, from the Chief, Geography Division, to Chief, Liaison Division, OGD, listing reports to be upgraded and including CIA/RR-GR-27.

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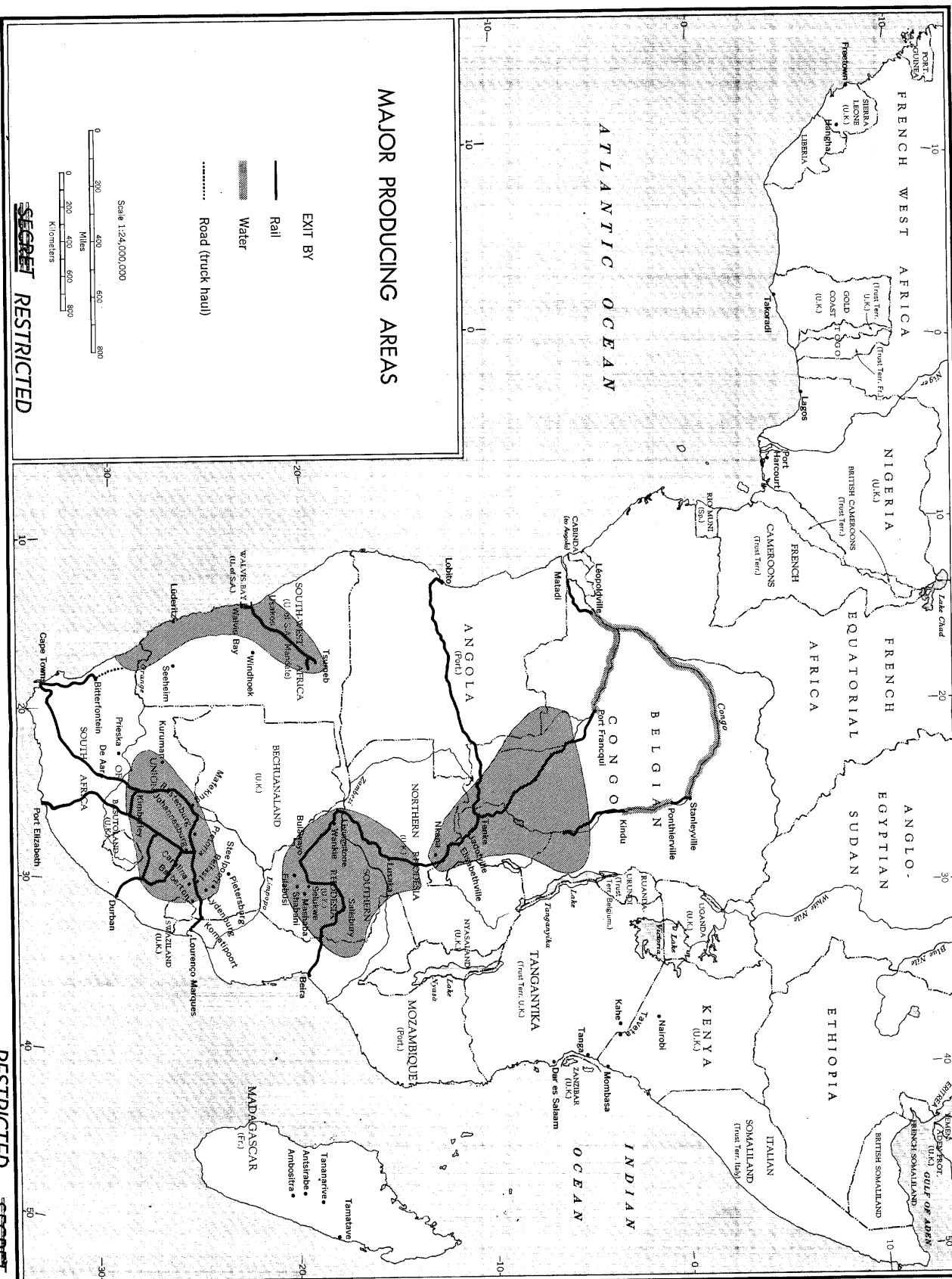
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Major areas



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TRANSPORTATION OF CERTAIN STRATEGIC
MINERALS IN AFRICA SOUTH OF THE SAHARA

SUMMARY

Africa south of the Sahara has become increasingly important in the production of minerals, many of which are of strategic value because of their scarcity or limited availability from other areas.

In this report the maps indicate the principal areas of production and the means and routes of transport, and the text furnishes a brief account of the problems associated with the transport and export for each mineral. Some repetition is unavoidable because a number of strategic minerals move over the same routes and are exported from the same ports.

Since many of the minerals are located in the interior of the continent and their use is almost entirely elsewhere, the exploitation of the minerals is dependent upon some means of transportation. Railroads are most commonly used. With the exception of the Congo and some of its tributaries, the rivers are of little use for navigation. The road system is not well developed, and roads are little used except in the few instances where they serve as "feeder" lines.

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A number of bottlenecks occur along the routes of transportation. These include (1) congestion on the railroads resulting from the large quantities of minerals and other freight they are required to handle, (2) shortage of rolling stock, both locomotives and freight cars, (3) shortage of fuel for operating the trains, (4) inefficiency of labor, and (5) in some cases a shortage of labor. Ports, also, are bottlenecks. Africa south of the Sahara has only a few good natural harbors. Most of the ports are congested, since they were not built to handle the present large volumes of exports and imports. Freight handling equipment is not adequate; storage space is limited; there is not enough docking space for ships; and at some ports there is a shortage of labor.

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I. ASBESTOS

Asbestos is produced in Southern Rhodesia, the Union of South Africa, and Swaziland.^{1/}

In Southern Rhodesia the producing area is in the south central part of the Colony, in the vicinity of Mashaba, Shabani, and Filabusi.^{1/} All of the asbestos produced is shipped over the Rhodesia and Mozambique railroads to Beira for export. The lines, which are single-tracked and have a shortage of equipment, periodically create a serious problem in transportation, since other strategic minerals must be carried over the same railroads to Beira.^{2/} Although the port facilities at Beira have been improved recently through further dredging of the harbor, the installation of machinery for unloading liquid fuels, the construction of another pier and additional storage space, the port may still become congested for short periods of time. Possible alternate routes are the South Africa and Mozambique railroads to ports in South Africa or to Lourenço Marques in Mozambique.

The chief asbestos producing areas in the Union of South Africa are located in the Transvaal and Cape Province. In the Transvaal the producing areas are the Carolina, Barberton, and Lydenburg districts in the east and the Pietersburg district in the north.^{3/} Asbestos produced in these districts is shipped over the South African

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and Mozambique railroads to Lourenço Marques. Asbestos from the Cape Province, which moves over the South African Railways to Cape Town, is produced in a belt extending northward from near Prieska through Griqualand and Kuruman to the Bechuanaland border. ^{4/}
The main difficulties connected with the export of asbestos are shortage of equipment and labor troubles on the railroads. In general, the ports of South Africa present no serious problems in connection with the export of asbestos.

In Swaziland, mining is centered near Havelock in the northwestern part of the territory. The ore is transported from the mine to Barberton by means of an aerial ropeway 12-1/2 miles in length. From Barberton the ore is shipped over the South African and Mozambique railroads to Lourenço Marques. ^{5/} The transport problems are similar to those of the Union of South Africa. The railroads of the Union of South Africa are so interconnected that a number of alternate routes can be used if necessary.

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II. GRAPHITE

Although found in a number of countries of Africa, graphite for export is produced mainly in Madagascar. Graphite is present throughout most of the island, but the only deposits worked are those located in easily accessible regions near the Tananarive-Côte-Est Railway, roads, and waterways. ^{6/} The chief producing area is near the east coast, extending in a north-south zone from Tamatave southward for a distance of approximately 120 kilometers (75 miles). Graphite is mined to a lesser extent in the south-central part of the island, around Antsirabe and Amboitra. ^{7/} Tamatave is the chief port of export.

Problems associated with the production and shipping of graphite are the high cost of rail transportation, the poor condition of highways, and the scarcity of native labor in the graphite-producing area. ^{8/}

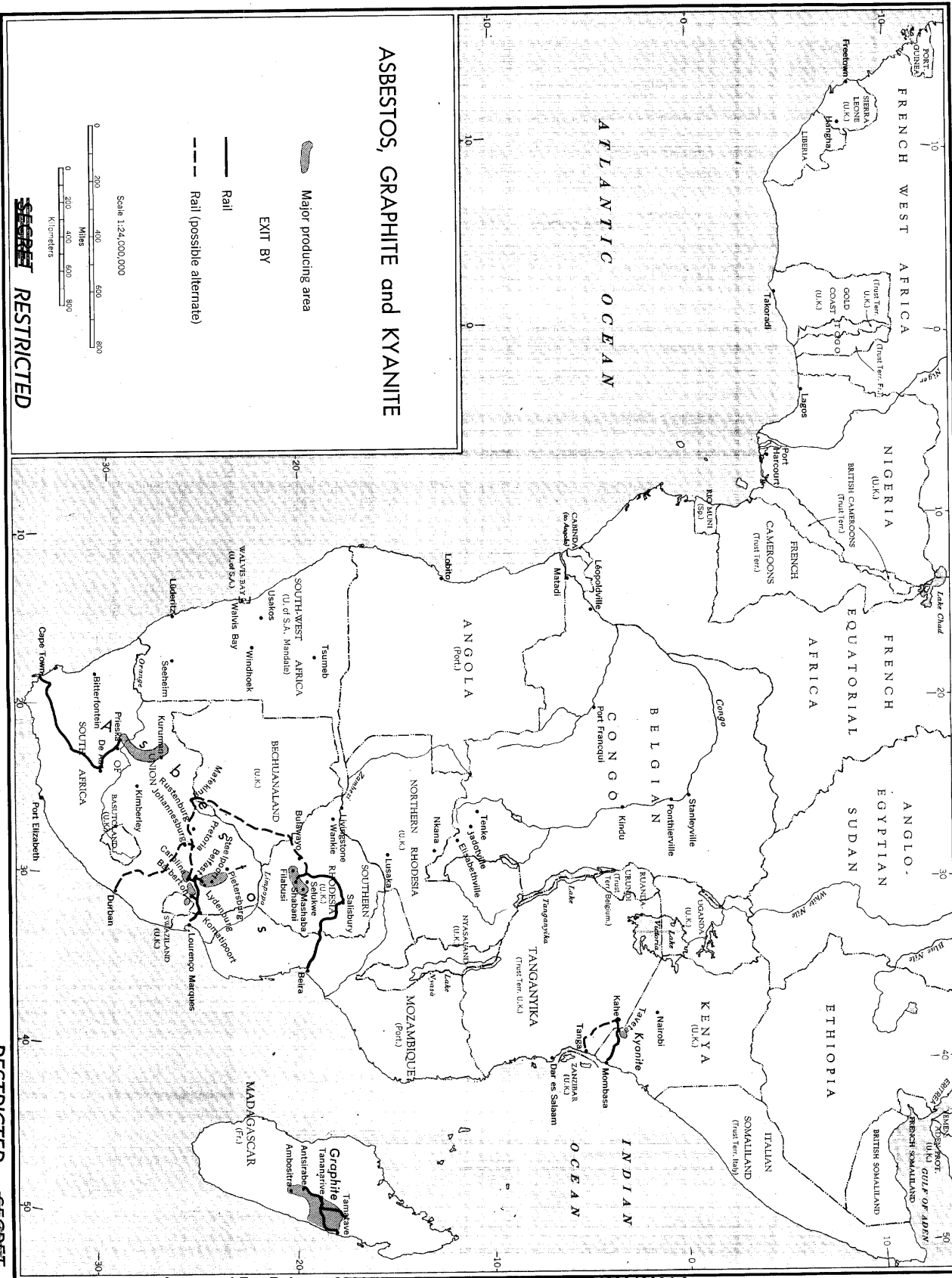
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III. KYANITE

In Africa, Kenya is the sole producer of kyanite in quantity. It is mined in the vicinity of Taveta ^{9/} and shipped over the Kenya Railway to Mombasa for export. The main problem in the export of kyanite appears to be the congestion at the port of Mombasa. The production of kyanite varies greatly. In 1949 the production was more than 23,000 tons, where as in 1950 it was only a little more than 10,000 tons. ^{10/} As an alternate route, the ore could be transported by railroad, via Kahe, to the port of Tanga in Tanganyika.

Transportation of Certain Strategic Minerals in Africa South of the Sahara

ASBESTOS
GRAPHITE
KYANITE



ASBESTOS, GRAPHITE and KYANITE

Major producing area

EXIT BY

— Rail

- - - Rail (possible alternate)

Scale 1:24,000,000

0 200 400 600 800 Miles

0 200 400 600 800 Kilometers

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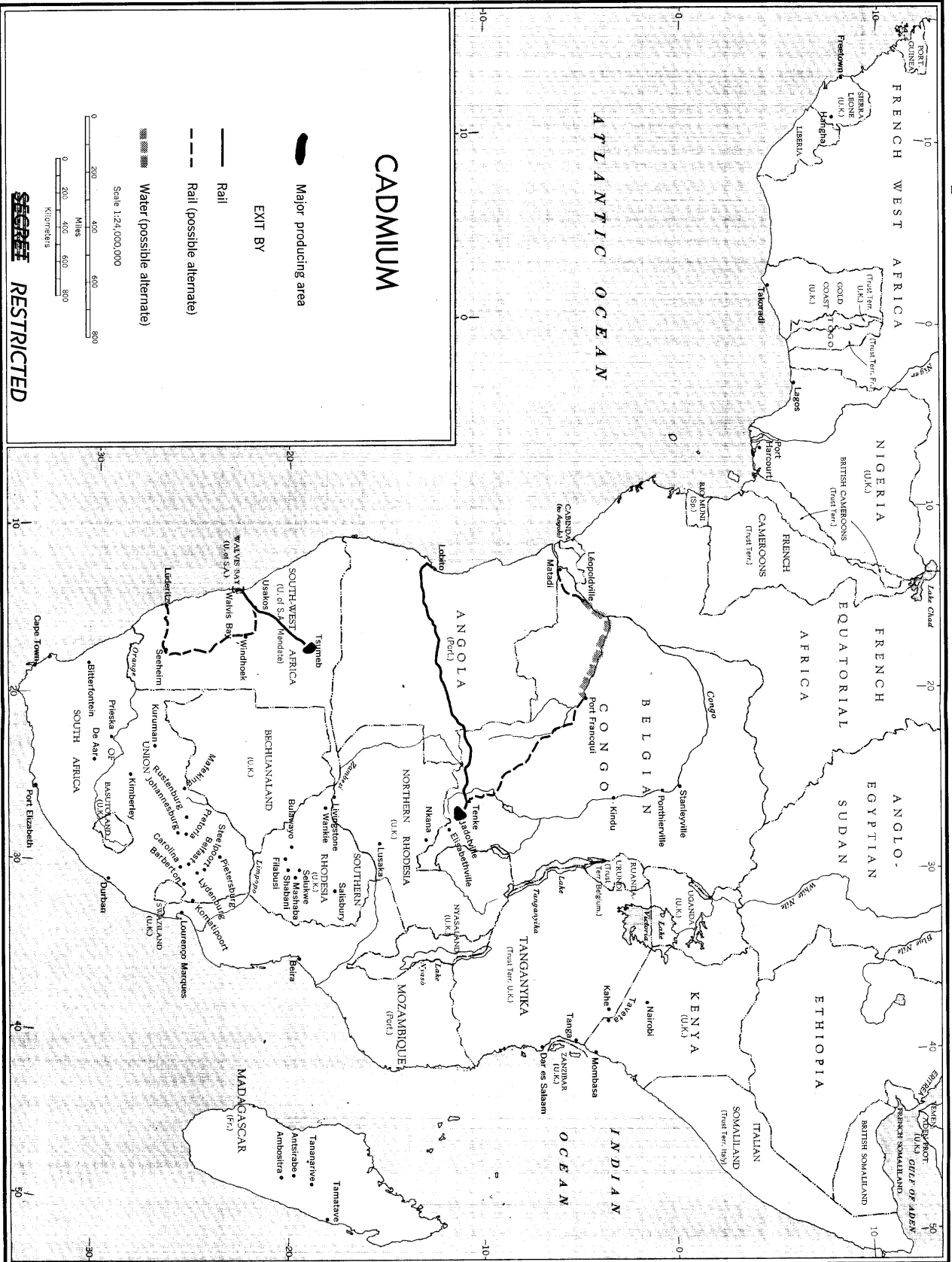
IV. CADMIUM

Cadmium is a product of the Belgian Congo and South-West Africa. In both areas, it is found in connection with other minerals.

Cadmium produced in the Belgian Congo is recovered as a byproduct of roasting zinc concentrates for the manufacture of sulphuric acid. It is shipped over the Benguela Railroad to the port of Lobito, Angola, for export. ^{11/} Though the tonnage is not large, it competes for space with other strategic minerals and products on an already congested railroad and at the crowded port at Lobito. As an alternate, the cadmium could be sent by rail-and-water route to Matadi at the mouth of the Congo River.

In South-West Africa cadmium is found in association with lead and zinc and is exported with the lead and zinc concentrates for smelting overseas. ^{12/} The transport of cadmium in South-West Africa is slowed down because the railroad from the producing area at Tsumeb to Walvis Bay has two different gauges (2' and 3'6"), and because the port of export is congested. The change in gauge occurs at Usakos. The port of Lüderitz could be used instead of Walvis Bay if necessity arises, in which case the cadmium would be routed there from Usakos, via Windhoek and Seeheim.

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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V. CHROMITE

Three areas -- the Union of South Africa, Southern Rhodesia, and Sierra Leone -- produce appreciable amounts of chromite.

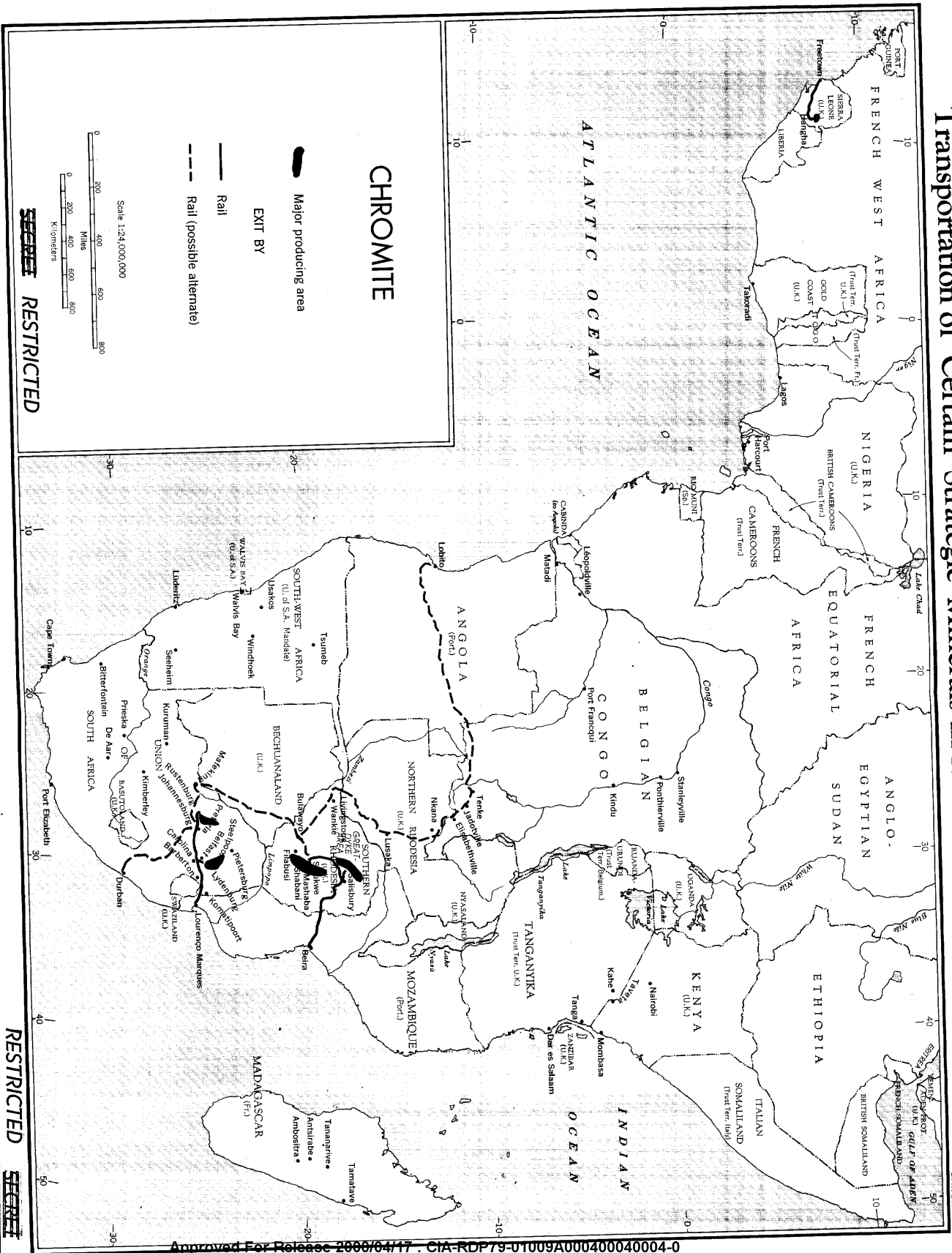
The chief producing areas in the Union of South Africa are located in the Transvaal, in the vicinity of Lydenburg in the east and near Rustenburg in the west. The ore produced in these two areas is shipped over the South African and Mozambique railroads to Lourenço Marques for export. ^{13/} A shortage of railroad equipment and labor difficulties are major causes of transport problems. ^{14/} At present the port of Lourenço Marques is capable of handling all the traffic directed there. Chromite could also be directed to various ports via a number of alternate routes provided by the South African Railways.

In Southern Rhodesia the chromite deposits are divided into two groups: (1) the deposits in the Selukwe and Mashaba areas near the center of the Colony, and (2) the extensive narrow seams occurring along the Great Dyke west and northwest of Salisbury. ^{15/} Chromite from both areas is shipped over the Rhodesia and Mozambique railroads to Beira for export. Lack of adequate railroad facilities and occasional congestion at the port of Beira are major deterrents to increased production and export of chromite. ^{16/} Possible alternates are the rail route to Lobito in Angola and the South African and Mozambique railroads to either Lourenço Marques in Mozambique or Durban in South Africa.

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Sierra Leone produces a small amount of chromite in comparison with the Union of South Africa and Southern Rhodesia. It is mined in the Kenema District in the southeastern part of the Colony and is moved approximately 8 miles by truck to the railhead at Hangha and then 187 miles by 2'6"-gauge railroad to Freetown. 17/
No alternate rail route is available, and so far as is known the port offers no problems.

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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VI. COBALT

Cobalt production in Africa is centered in the Belgian Congo and Northern Rhodesia. These two areas rank first and second in world production, with the Belgian Congo being chief source of supply.

The Union Minière du Haut-Katanga, located in the southeastern part of the Belgian Congo, is the sole producer in the Colony. ^{18/} A number of transport routes of various lengths lead to ports. The most direct route is the Benguela Railroad, over which most of the cobalt is transported. ^{19/} It is an all-rail, single-track, 3'6"-gauge line to the port of Lobito in Angola, a distance of approximately 1,300 miles. This railroad, which crosses southern Belgian Congo and the Portuguese colony of Angola, is badly congested as it also carries copper, manganese, and zinc to Lobito for export.

Alternate routes that could be used in shipping cobalt from the producing area are (1) through the Belgian Congo to the port of Matadi and (2) via the Rhodesia Railways to the port of Beira in Mozambique on the east coast. The first is a rail-and-water route -- by rail from Jadotville to Port Francqui, by water to Léopoldville, and again by rail to Matadi. As a result the route is interrupted twice for transshipment, at Port Francqui and at Léopoldville. In addition,

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the section of railroad from Léopoldville to Matadi is badly congested since it is the only rail line to the port of Matadi. The second route, via the Rhodesia and Mozambique railroads, carries only a limited amount of cobalt ^{20/} from the Belgian Congo. Both railroads are congested because they transport large quantities of minerals from Northern and Southern Rhodesia to Beira. The port, also, is over-crowded at times because of the great volume of freight handled and the inability of the railroad to carry away imports promptly.

Northern Rhodesia, though the world's second largest producer of cobalt, produces only a small quantity compared to the Belgian Congo. The Rhokana Corporation, through its mines near Nkana, is the only current cobalt producer in the Protectorate. ^{21/} Cobalt is shipped over the single-track, 3'6"-gauge Rhodesia Railways to Beira, a distance of approximately 1,500 miles. Like the Benguela Railroad, the Rhodesia Railways also extend through Portuguese territory. The Rhodesia Railways are not at present capable of handling all the available traffic since they are required to carry coal from the Wankie coalfields, as well as copper and cobalt from Northern Rhodesia, and chrome and asbestos from Southern Rhodesia. The railroads are making an effort to relieve the crowding by

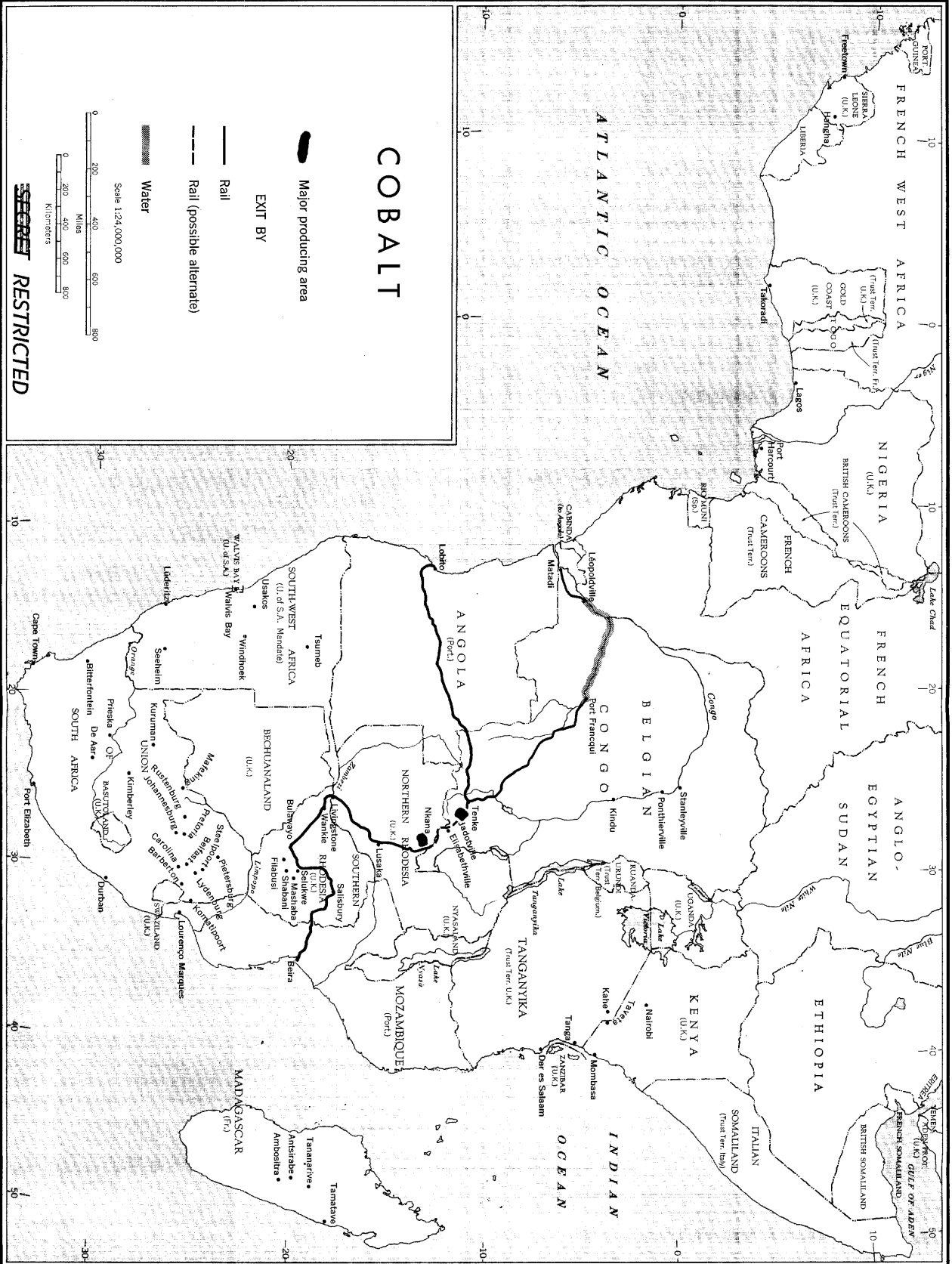
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securing additional equipment. Although the port at Beira may still be somewhat congested at times, improvements have been made, including a new mineral pier, increased storage space, and the deepening of the harbor. 22/

Since the Rhodesia Railways are connected with the railroads of the Belgian Congo and with those of the Union of South Africa, shipments can be made over any of these routes in case of necessity.

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COBALT



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VII. COLUMBITE

Nigeria is the leading producer of columbite in Africa; the quantity produced in the Belgian Congo is too small to be considered in this report. Columbite is recovered as a byproduct of the tin industry in the area around Jos on the Bauchi Plateau in northern Nigeria. ^{23/} It is shipped over the Nigerian Railways to the port of Lagos for export. The lines are single tracked and switches are manually operated. Insufficient sidetracks for passing, shortages of locomotives and other rolling stock, difficulty in securing replacement parts, and the low efficiency of the native workers are serious handicaps to efficient operation of the railroads. An alternate rail route leads to Port Harcourt. Highways can not be relied upon in case of failure of the railroads since the roads are subject to washouts during wet seasons.

Nigerian ports are operating at full capacity, and rail and port facilities at both Lagos and Port Harcourt are pressed to their current limits. With an increase in port traffic, rail services, however, would probably break down before port facilities.

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VIII. TANTALITE

Tantalite is produced chiefly in the Belgian Congo, as a by-product of the tin industry. A small amount is also produced in Nigeria.

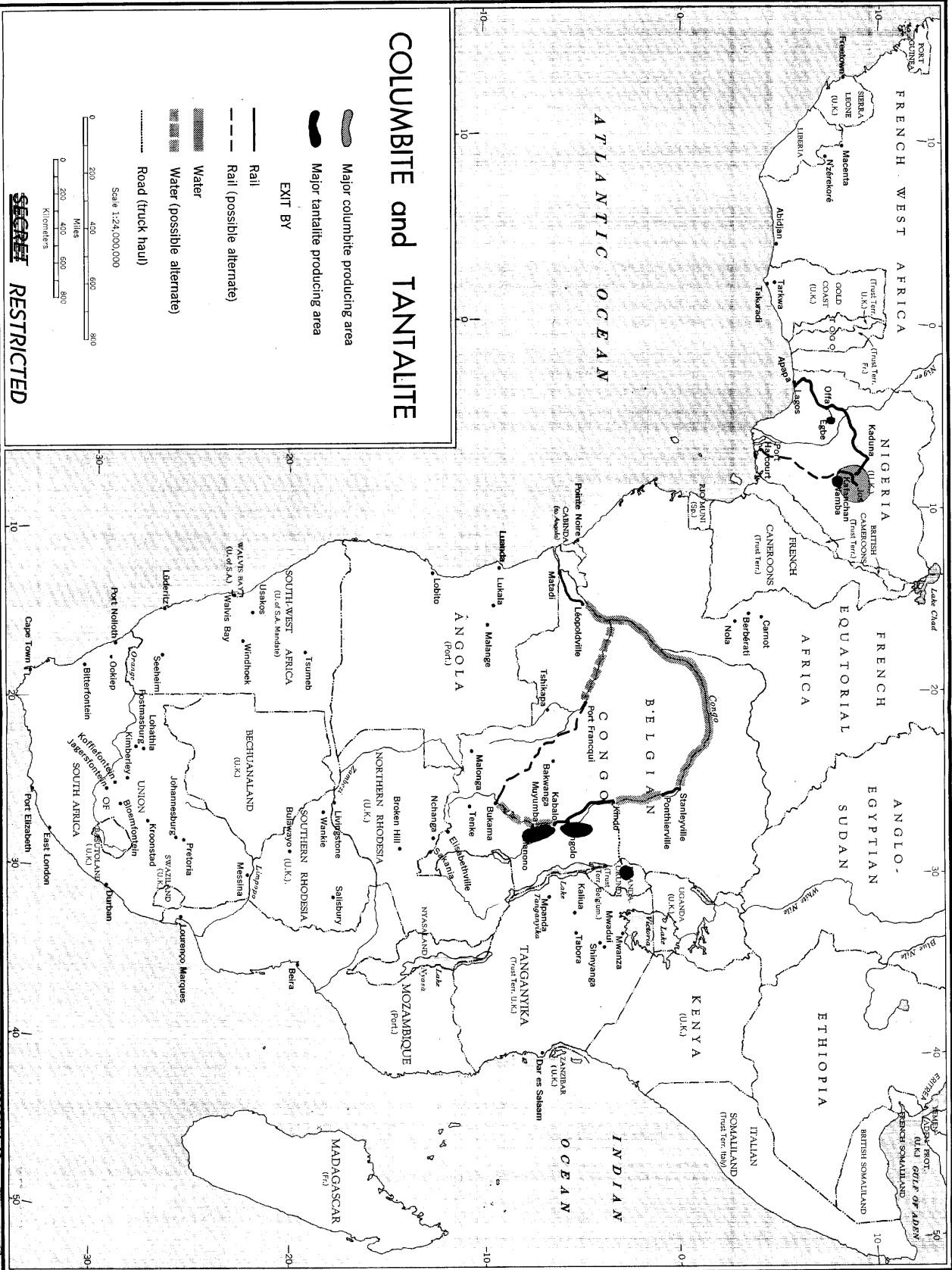
The producing areas in the Belgian Congo are located in the tin mining sections of Kivu and Katanga provinces and in Ruanda-Urundi*. ^{24/} The tantalite is shipped by rail and water via Ponthierville, Stanleyville, and Léopoldville to Matadi for export. This is a slow route with numerous breaks in transportation resulting from transfer from water to rail and from rail to water. An alternate rail-and-water route leads, via Bukama, Port Francqui, and Léopoldville, to Matadi. A serious problem has developed at Matadi, since the port is unable to handle all the traffic arriving there, partly because of space shortage and partly because of the inability of the railroad to carry away the imports promptly.

In Nigeria tantalite production is centrally located in the Egbe area. ^{25/} The shipping problems associated with moving tantalite from this area are similar to those associated with columbite.

* Statistics for the Belgian Congo include Ruanda-Urundi, which is a trust territory of Belgium that is administratively united with the Belgian Congo.

Transportation of Certain Strategic Minerals in Africa South of the Sahara

TANTALITE
COLUMBITE



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IX. COPPER

The major producers of copper in Africa south of the Sahara are Northern Rhodesia, the Belgian Congo, the Union of South Africa, and South-West Africa.

In Northern Rhodesia copper comes from four large mines -- Nkana, Mufulira, Nchanga, and Roan Antelope, ^{26/} -- all located in the northern part of the Colony. Copper production is limited to some extent by the amount of coal available from the collieries at Wankie, Southern Rhodesia. The availability of coal depends in part on the capacity of the collieries and in part on the ability of the railroads to transport coal to the copper mines. ^{27/} Another handicap to the export of copper is the long rail haul to Beira -- approximately 1,500 miles -- that the copper ore must take over the single-track, 3'6"-gauge railroads of the Rhodesia and Mozambique lines. At present the Rhodesia Railways are not capable of handling all available shipments of copper since they must compete with coal from Wankie, cobalt from Northern Rhodesia, chromite and asbestos from Southern Rhodesia, and some copper and cobalt from the Belgian Congo, as well as other types of freight. The railroads, however, are endeavoring to alleviate this situation by securing additional rolling stock. Plans have also been made to build an additional railroad to

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Lourenço Marques, via Pafuri. ^{28/} Port congestion due to lack of space and increased shipping has, in the past, been an additional handicap in the export of copper as well as other minerals and freight. Current improvements, however, such as deepening the harbor, increasing storage space, and constructing an additional pier, are easing the congestion. Possible alternate routes that could be used are (1) railroads across southern Belgian Congo and Angola to Lobito and (2) the rail-and-water route via Sakania, Tenke, Port Francqui, Léopoldville to the port of Matadi.

The copper producing region of the Belgian Congo is in Katanga Province in the southeastern part of the Colony. ^{29/} This area and the copper area of Northern Rhodesia are practically continuous and may be called the "Copper Belt." Since metallic copper, rather than the ore, is exported the problem of fuel or electricity for smelting is important. The Belgian Congo, though relying to some degree on coal or coke from the collieries at Wankie in Southern Rhodesia, has developed hydroelectric power for the operation of machinery and for smelting in electric furnaces. A considerable amount of copper is shipped over the all-rail route of approximately 1,300 miles to the port of Lobito, Angola. Unfortunately, movement is slow because the railroad has more freight available than it can handle readily.

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Furthermore, port facilities at Lobito are not extensive enough to take care of all the freight.

Alternate routes of transport are (1) the all-rail route over the Rhodesia Railways to Beira and (2) the rail-and-water route to the port of Matadi, which is approximately 1,700 miles long and requires transfers of freight at several points. Even with this handicap, the Matadi route has become increasingly important.

The copper producing areas of the Union of South Africa are located in the vicinity of Ookiep in Cape Province and around Messina in the Transvaal. ^{30/} The copper from the Messina region in the northern Transvaal is shipped over the South African and Mozambique railroads to Lourenço Marques for export. Copper produced at Ookiep is trucked to the railhead at Bitterfontein for transport to Cape Town. ^{31/} Transportation is a factor limiting production, since the railroads are not capable of handling all the available freight. Because of the extensive railroad net in South Africa, various alternate routes are possible in case of emergency.

The copper producing area in South-West Africa is located in the vicinity of Tsumeb. ^{32/} The copper is moved over 2'- and 3'6"-gauge railroads to Walvis Bay for export. The use of the two gauges and overcrowding on the narrow-gauge railroad constitute the chief

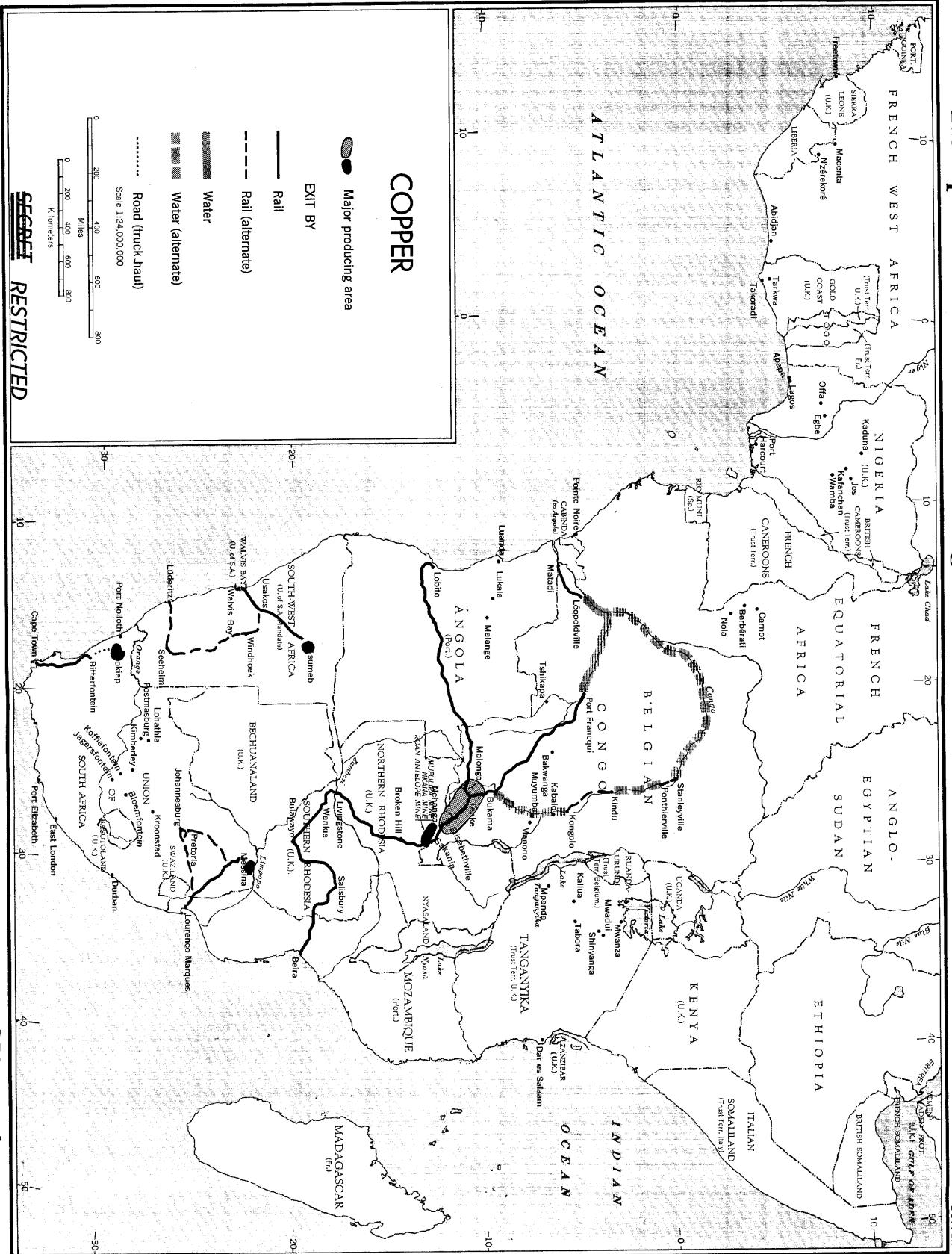
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transportation problems, 33/ but congestion at the port also creates a problem. In case of emergency the port of Lüderitz could be used in place of Walvis Bay by routing the copper from Usakos, via Windhoek and Seeheim, to Lüderitz.

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COPPER



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X. DIAMONDS

Production of diamonds is more widely distributed in Africa than that of any other strategic mineral. Varying amounts are produced in the Belgian Congo, the Union of South Africa, Angola, South-West Africa, Sierra Leone, the Gold Coast, French West Africa, French Equatorial Africa, and Tanganyika. ^{34/} Some of the diamonds mined are valuable as gems and others for industrial purposes. ^{35/} In specific areas, however, one type or the other generally predominates. The diamonds found in the Belgian Congo, the Gold Coast, and the French areas are largely industrial stones. ^{36/} In other producing regions the quantities available as gems or for industrial purposes vary considerably.

In the Belgian Congo the Bakwanga field is the leading producer of industrial diamonds and the Tshikapa field of gems. The diamond mines in the Kimberly, Jagersfontein, and Koffiefontein areas produce mostly gems, whereas the Premier Mine near Pretoria produces some of the finest industrial diamonds in the world. ^{37/} The Angola field, in the northeast part of the Colony, is really a continuation of the Tshikapa area of the Belgian Congo and produces mostly gems. ^{38/} In Sierra Leone, both gems and industrial stones are produced, the industrial stones being more important. ^{39/} In Tanganyika, gem stones are more important. ^{40/}

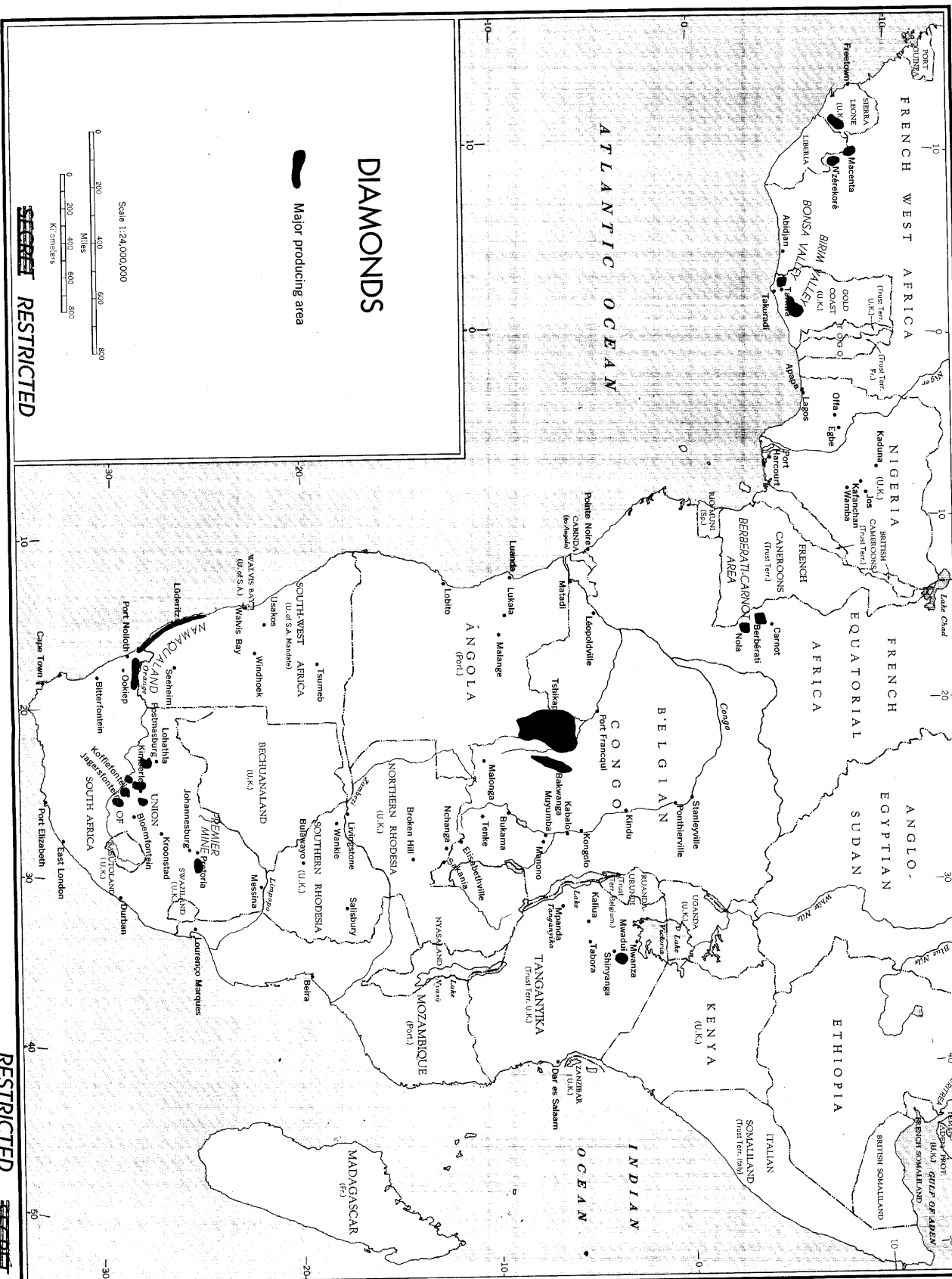
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The value of diamonds is such that no particular method of transportation predominates; some move by rail to ports; others are flown to ports or even to destinations outside Africa. In the Belgian Congo, diamonds are forwarded by regular and frequent air shipments to Léopoldville, and from there it is presumed they go to Antwerp. ^{41/} Diamonds from Angola are sent by car to Tshikapa and flown to Léopoldville and on to London. ^{42/} In the Union of South Africa, industrial diamonds are transported by air. ^{43/}

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DIAMONDS



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XI. LEAD

The parts of Africa south of the Sahara that produce lead in appreciable quantities are Northern Rhodesia, South-West Africa, and Tanganyika.

In Northern Rhodesia, lead as well as zinc and vanadium are produced in the vicinity of Broken Hill. ^{44/} Practically the entire output is exported through the port of Beira. A problem associated with the export of lead is the difficulty of transportation, the trackage and equipment of the Rhodesia Railways being inadequate for handling the available freight, which consists largely of strategic minerals. ^{45/} Furthermore, the port of Beira is not able to take care of the traffic promptly at all times. Port conditions, however, have been improved through the construction of a new mineral pier and increased storage space and the dredging of the harbor. As an alternate, the rail route through southern Belgian Congo and Angola to Lobito could be used.

The producing area of South-West Africa is located around Tsumeb. ^{46/} The lead is shipped over the 2'- and 3'6"-gauge railroads to Walvis Bay for export. The main difficulties in transportation are the change in the railroad gauge at Usakos, the overcrowding of the narrow-gauge railroad section between Tsumeb and Usakos, and congestion at Walvis Bay. ^{47/} Luderitz, an

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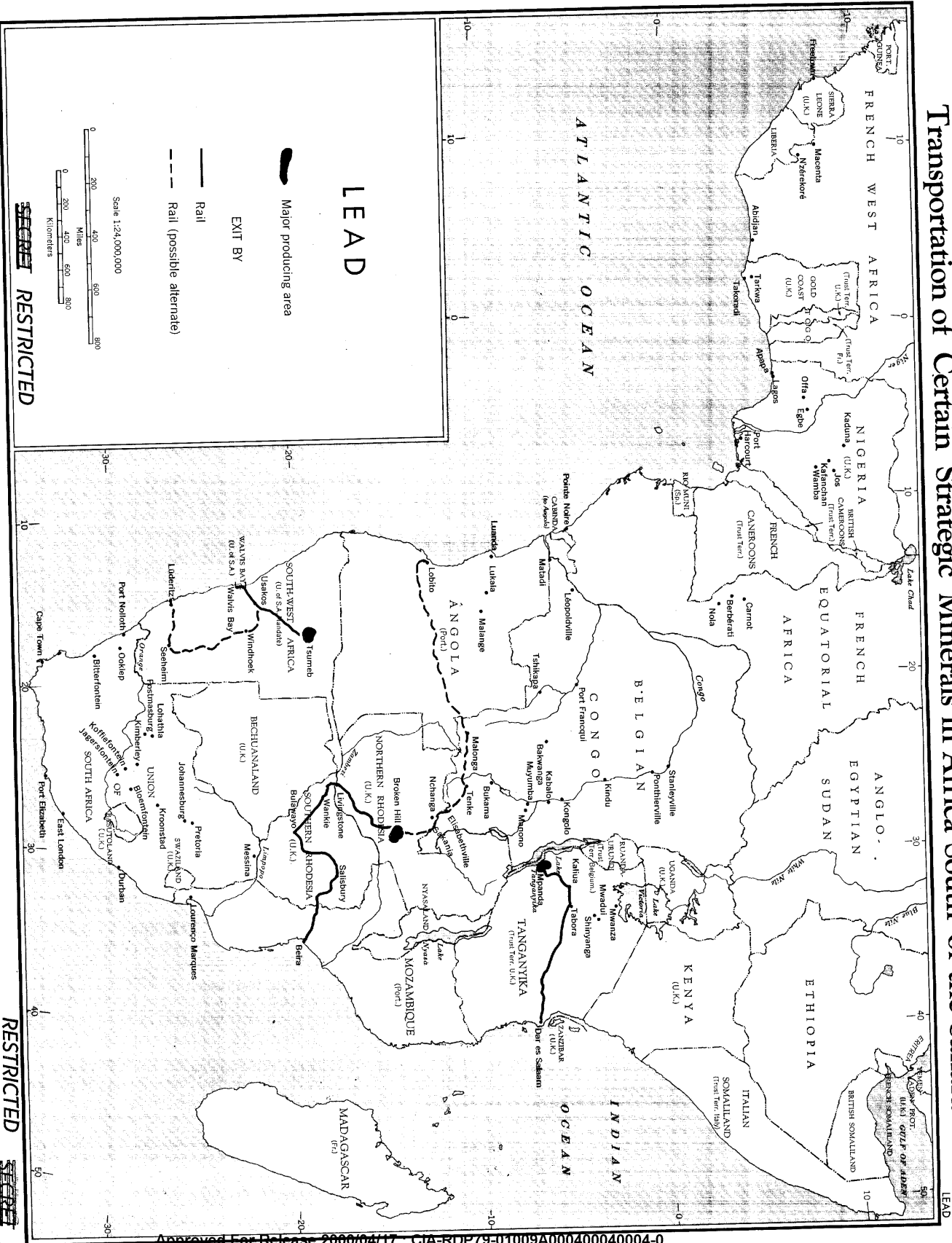
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alternate port, can be reached by rail from Usakos, via Windhoek and Seeheim.

Another area that has attained some prominence in the production of lead is the newly-developed Mpanda area in Tanganyika. Ore from Mpanda is shipped over the Tanganyika railroads to Dar es Salaam for export. 48/

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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XII. MANGANESE

In Africa south of the Sahara, manganese production in appreciable quantities is centered in the Union of South Africa, the Gold Coast, the Belgian Congo, and Angola.

In the Union of South Africa, manganese is produced in the vicinity of Postmasburg, approximately 100 miles west of Kimberly. It is shipped over the South African Railways to Durban for export. The producers face the problem of inadequate transport facilities. Railroad cars are in short supply, and an insufficient number is assigned to carry the manganese to Durban. ^{49/} The railroad connections are such that, in the case of emergency, shipments of manganese could be routed to a number of ports, such as East London or Port Elizabeth.

Manganese is produced at Nsuta, near Tarkwa, in the southwestern part of the Gold Coast, approximately 40 miles northwest of Takoradi. ^{50/} The ore is transported by rail to Takoradi, which is the only deep-water port of the Gold Coast. ^{51/} The inability of the railroad, however, to handle all the traffic offered, the small size of the harbor, and the inadequate port facilities are limiting factors in the export of manganese from the Gold Coast. This situation will be remedied in the near future since the railroad between Takoradi and Tarkwa, the manganese mining center, is being double tracked.

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The extensive improvements that are also being made on the port include lengthening the deep-water quay, and the construction of additional timber wharves, storage sheds, and warehouses.

In the Belgian Congo the chief manganese-producing area is located at Kisenge near Malonga in the southern part of the Katanga Province. ^{52/} The product, destined almost entirely for export, is shipped over a spur railroad from the mines to the Benguela Railroad and then to the port of Lobito in Angola. ^{53/}

A major problem in the export of manganese from the Belgian Congo is the difficulty in handling the output. Because of a shortage of equipment the railroad has not been able to take care of all the freight consigned to it. The port of Lobito is also overcrowded because of insufficient space and equipment and a shortage of labor for stevedoring. Steps have been taken to remedy these conditions through the acquisition of additional rolling stock and the improvement of port facilities. In case of necessity, manganese ore from the Belgian Congo could be routed to the ports of Beira in Mozambique or Matadi in the Belgian Congo. ^{54/}

The manganese-producing area of Angola is situated near Lucala, approximately 150 miles east of Luanda on the Malange Railway.

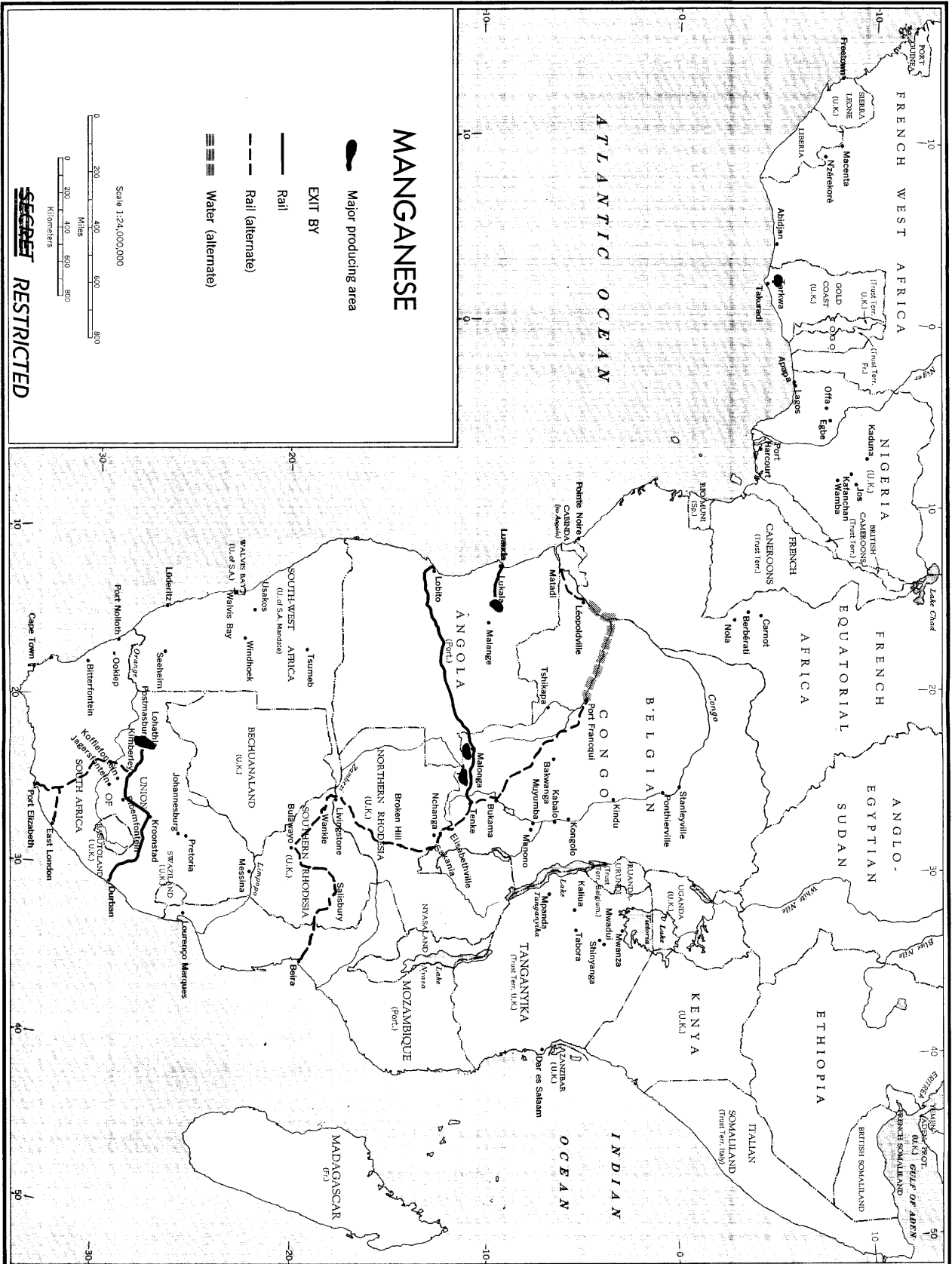
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It is shipped over the Malange Railway to the port of Luanda for export. Unless the production of manganese shows a sudden marked increase, the railroad and port facilities appear capable of handling the traffic. There is no alternate rail route from the mines to Luanda, but highways could be utilized in emergency.

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Transportation of Certain Strategic Minerals in Africa South of the Sahara

MANGANESE



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XIII. MICA

Mica production in Africa is confined largely to Madagascar, the Union of South Africa, Southern Rhodesia, and Tanganyika.

Madagascar is a leading producer, being the principal world source of phlogopite mica. The main area of production is in the southern quarter of the island. ^{55/} The mica is transported by trucks from the producing area to Fort Dauphin for export. ^{56/}

A problem associated with mica production in this area is the prevalence of cyclones, which in the past have caused considerable damage to mines, buildings, roads, and port facilities. ^{57/}

The mica-producing area of the Union of South Africa is located in the Letaba District near Mica in the eastern Transvaal. ^{58/} The mica is shipped over the South African and Mozambique railroads to Lourenço Marques, for export. Overcrowding on the South African Railways occasionally delays shipments.

Southern Rhodesia produces a small amount of mica in the Miami area, approximately 70 miles northwest of Sinoia. ^{59/} The mica, which is produced for export, is transported by truck to the railhead at Zawie and then by rail over the Rhodesia and Mozambique railroads to Beira. Railroad congestion due to inadequacy of trackage and equipment and the occasional congestion at Beira are the chief problems confronting the producers of mica.

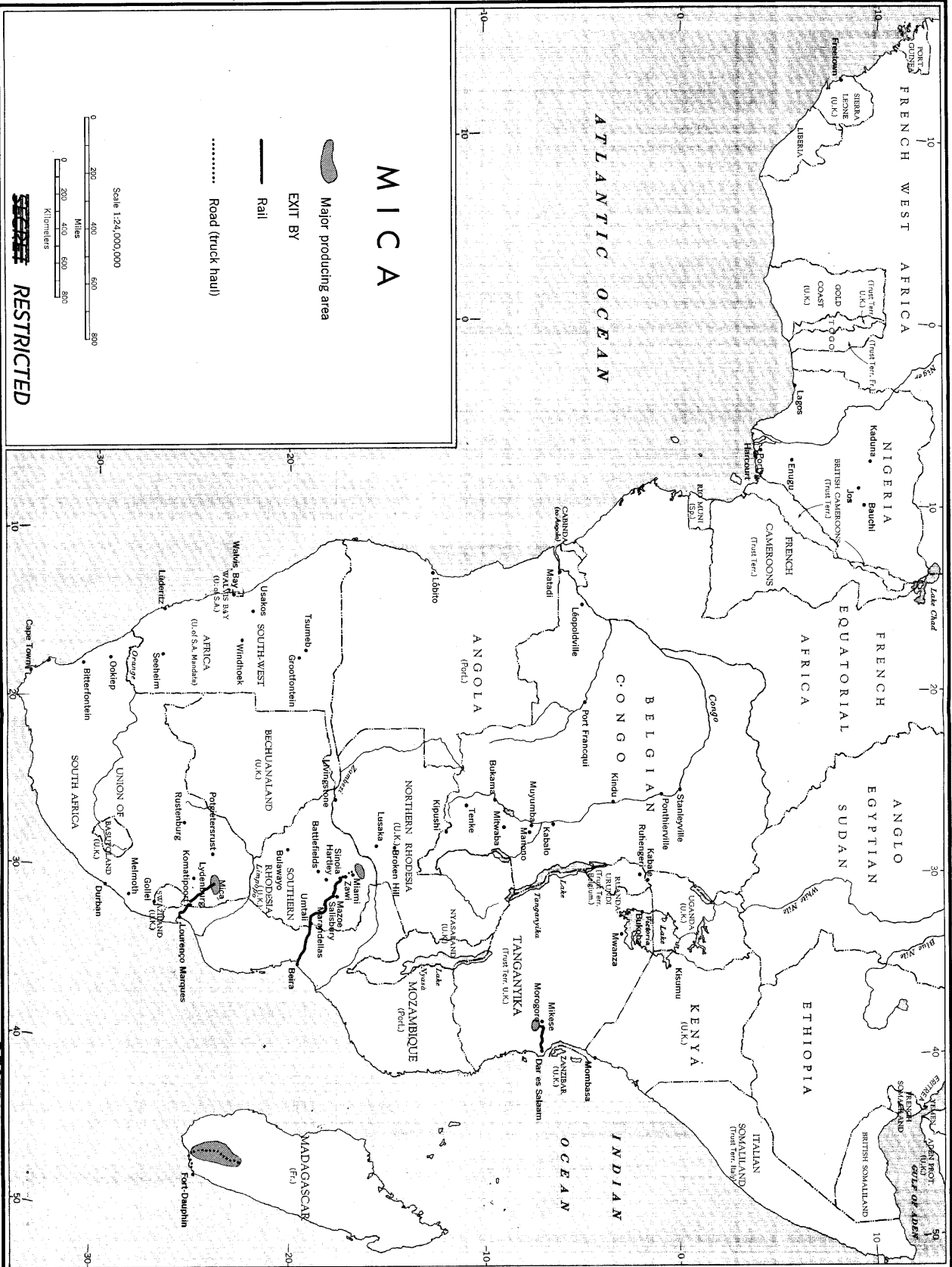
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In Tanganyika mica is produced at mines situated near Mikese and Morogoro in the Eastern Province. 60/ It is shipped over the Central Railway of Tanganyika to Dar es Salaam for export.

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Transportation of Certain Strategic Minerals in Africa South of the Sahara



MICA

- Major producing area
- EXIT BY
- Rail
- Road (truck haul)

Scale 1:24,000,000

0 200 400 600 800
Miles

0 200 400 600 800
Kilometers

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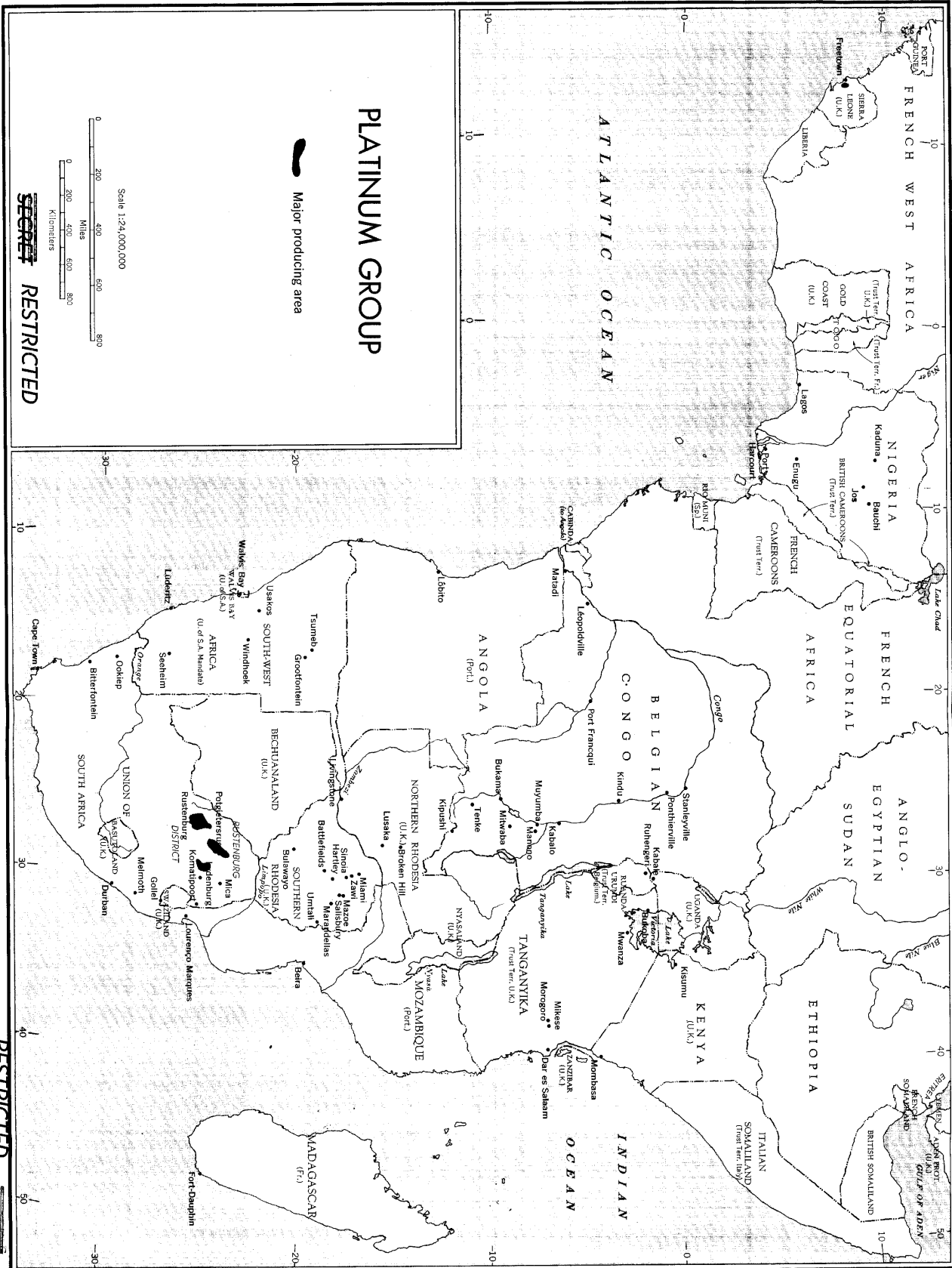
XIV. PLATINUM GROUP

The most important and the only producer of platinum products in quantity in Africa is the Union of South Africa. The principal deposits are found in the Transvaal -- in the Rustenburg, Lydenburg, Potgietersrust, and Waterburg districts. The most productive of these districts is the Rustenburg. ^{61/} Platinum products take two forms, platinum concentrates and platinum-bearing copper and nickel matte. The entire output of concentrates and matte of the Rustenburg district is shipped to England for refining. ^{62/}

There are no special problems in the transportation of platinum. The value of the platinum concentrates, is such that they may be transported by air as well as by rail. The matte is probably shipped by rail to Lourenço Marques for export.

Transportation of Certain Strategic Minerals in Africa South of the Sahara

PLATINUM GROUP



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XV. TIN

Tin is produced in two parts of Africa -- the Belgian Congo and Nigeria.

The tin-producing areas of the Belgian Congo are in the eastern part of the Colony and in Ruanda-Urundi. The main area is a belt extending in a southwest-northeast direction from approximately 1° to 10° South latitude. There are a number of deposits in this belt, but the principal producing mines are around Mitwaba and Manono. ^{63/} Important concentration plants and smelters are located at Manono, where the concentration plants and the electrically operated smelters reduce the tin ore to either tin concentrates or pig tin. In some cases the tin ore is merely concentrated and then sent to Belgium for smelting. ^{64/} Manono was formerly connected with the port of Mayumba on the Lualaba River by a 60-centimeter railroad 52 kilometers (32 miles) long. Service on the railroad has been discontinued, and the products are now carried by trucks. From Mayumba to Matadi, the port of export, the tin moves over a rail-and-water route totaling approximately 2,000 miles by water and 630 miles by rail. ^{65/}

Difficulties encountered in exporting tin from the Belgian Congo are long distances from the mines to the port of export, breaks in transportation along the rail-and-water route, and congestion at the

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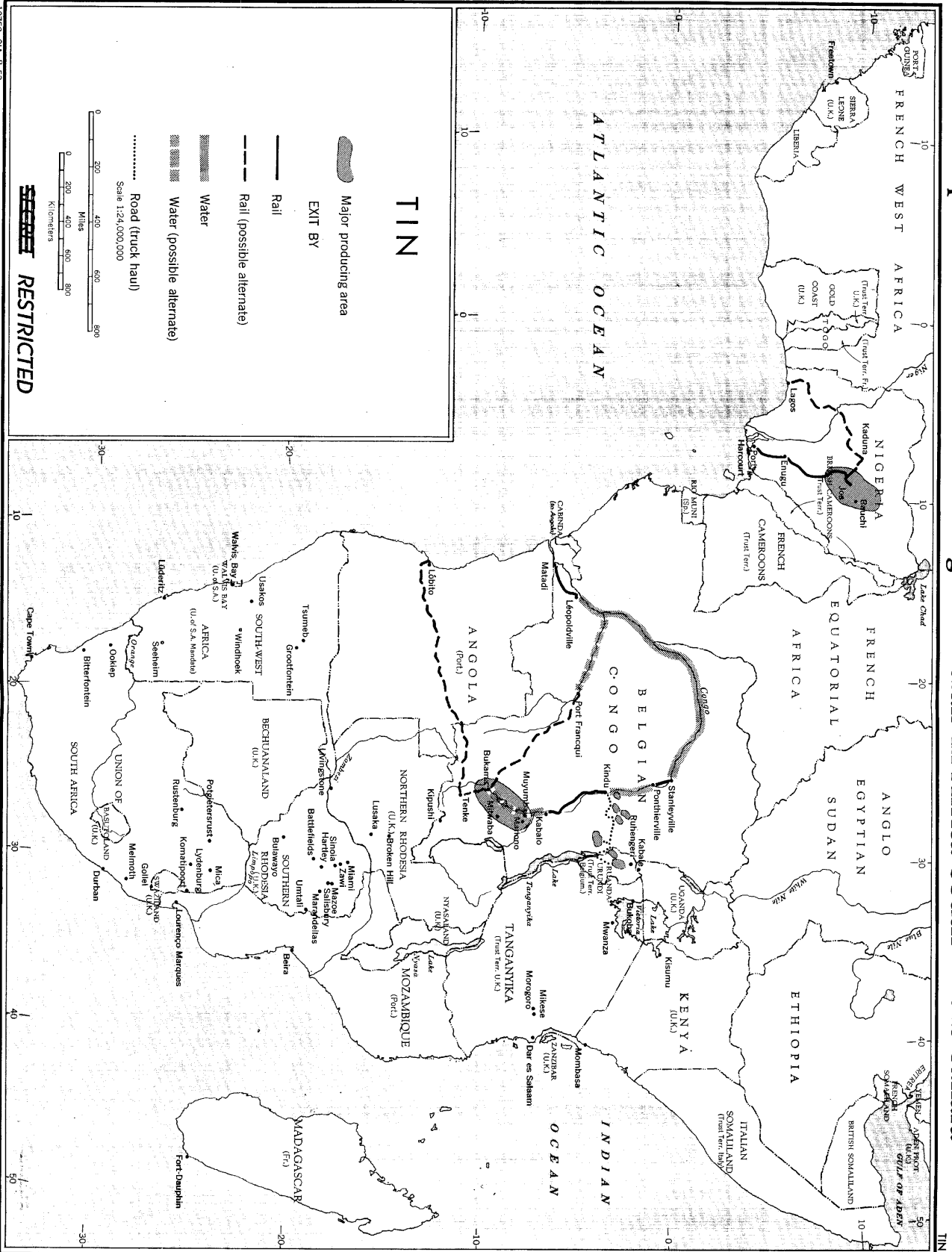
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port of Matadi resulting from shortages of dock space and the inability of the railroad to carry away the imports promptly. As a possible alternate, the water-and-rail route to Lobito in Angola could be used.

The areas in Kivu and Ruanda-Urundi are of secondary importance. Difficulties of transport and insufficient electric power tend to hold down production in these two areas.

The important tin deposits in Nigeria are located on the Bauchi Plateau, centering around Jos. ^{66/} The tin is shipped from Jos over the 3'6"-gauge, single-track Nigerian Railway to Port Harcourt for export, a distance of approximately 500 miles. The train crews are native Africans of low efficiency; railroad equipment is poor; sidetracks for passing are insufficient, and there is shortage of rolling stock and spare parts. All of these factors seriously handicap the operation of the railroad. ^{67/} Port Harcourt is now working at full capacity. If port traffic were to be increased, it is probable, however, that rail services would breakdown before the port facilities. ^{68/} As an alternate in case of necessity, the rail route to Lagos, via Kaduna, could be used.

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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XVI. TUNGSTEN

The Belgian Congo, Southern Rhodesia, Uganda, and the Union of South Africa produce small quantities of tungsten. There is considerable variation in production of tungsten from year to year, owing to fluctuations in demand. During emergencies or periods of stress, when demands are greater than normal and prices higher, tungsten is mined in areas that otherwise would not be producing.

Tungsten is found in Maniema District of Kivu Province in the Belgian Congo, and also near Ruhengeri in Ruanda-Urundi. ^{69/}
As far as can be determined the ore is transported by truck to ports on the Congo River and then by rail and water to Matadi for export. Slow transportation and overcrowding at Matadi present the same problems for tungsten as for other products shipped by this route.

Tungsten-bearing minerals have been found in the Hartley, Mazoe, Bulawayo, Umtali, and Marandellas Districts of Southern Rhodesia. ^{70/} They are shipped over the Rhodesia Railways to Beira for export. Competition with other minerals for space on railroads and for use of port facilities at times creates a serious export problem.

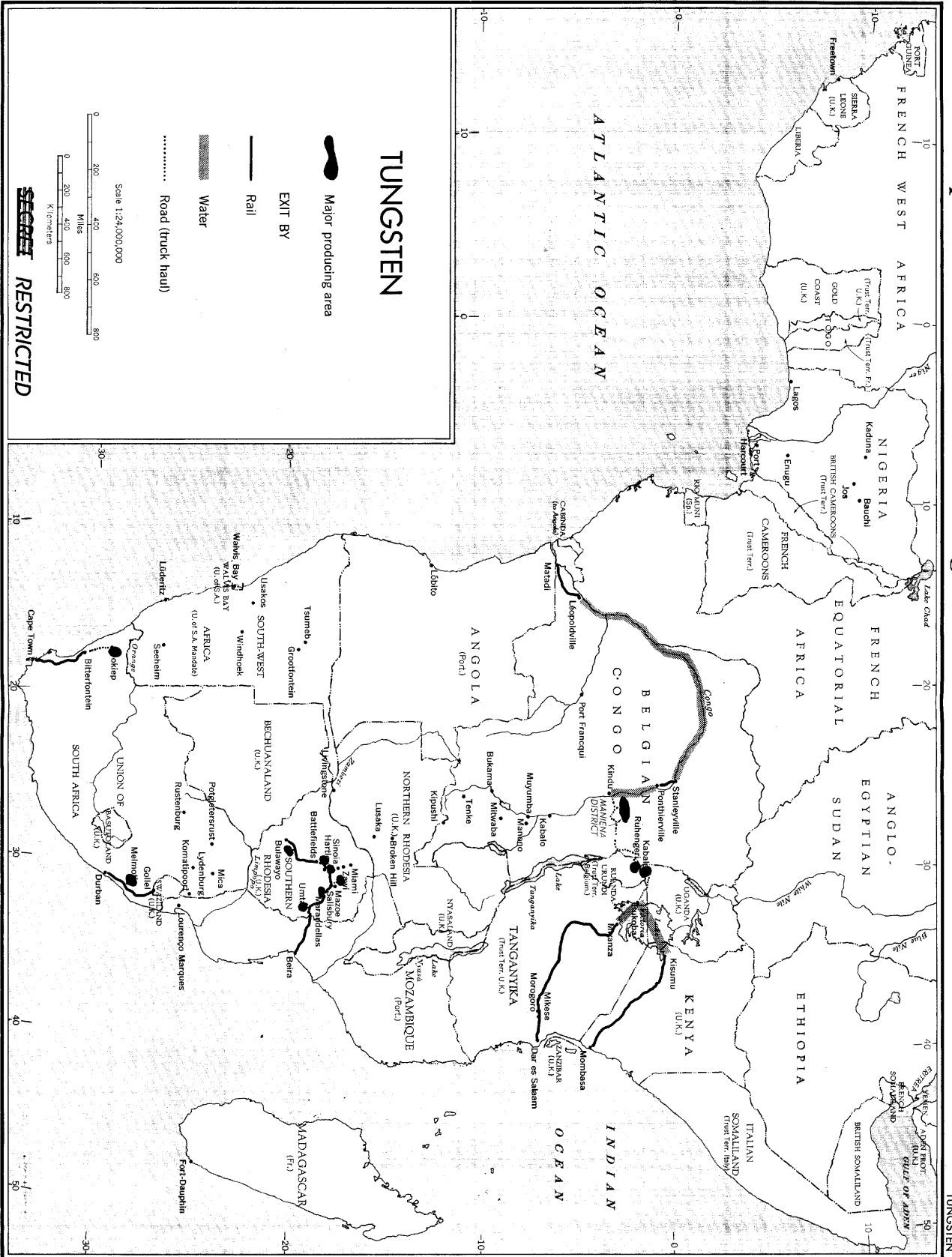
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The tungsten mines of Uganda are located near Kabale in the Kigezi District in the southwest corner of the Protectorate. ^{71/}
The ore is transported by truck through Uganda, via Kagera Port, to Bukoba on Lake Victoria. From here it crosses the lake either to Kisumu or to a Tanganyika port, depending upon the boat service, ^{72/} and continues by rail to Mombassa or Dar es Salaam. Both crowded railroads and congested ports present problems for the export of tungsten from Uganda.

The areas of tungsten production in the Union of South Africa are centered around Ookiep (Namaqualand) in Cape Province and Melmoth in Natal. ^{73/} The tungsten produced at Ookiep is transported by truck to Bitterfontein and then by rail to Cape Town. The ore produced at Melmoth is transported over road and railroad to Durban for export. In case of emergency the ore could be routed over the South African Railways to other ports in the Union.

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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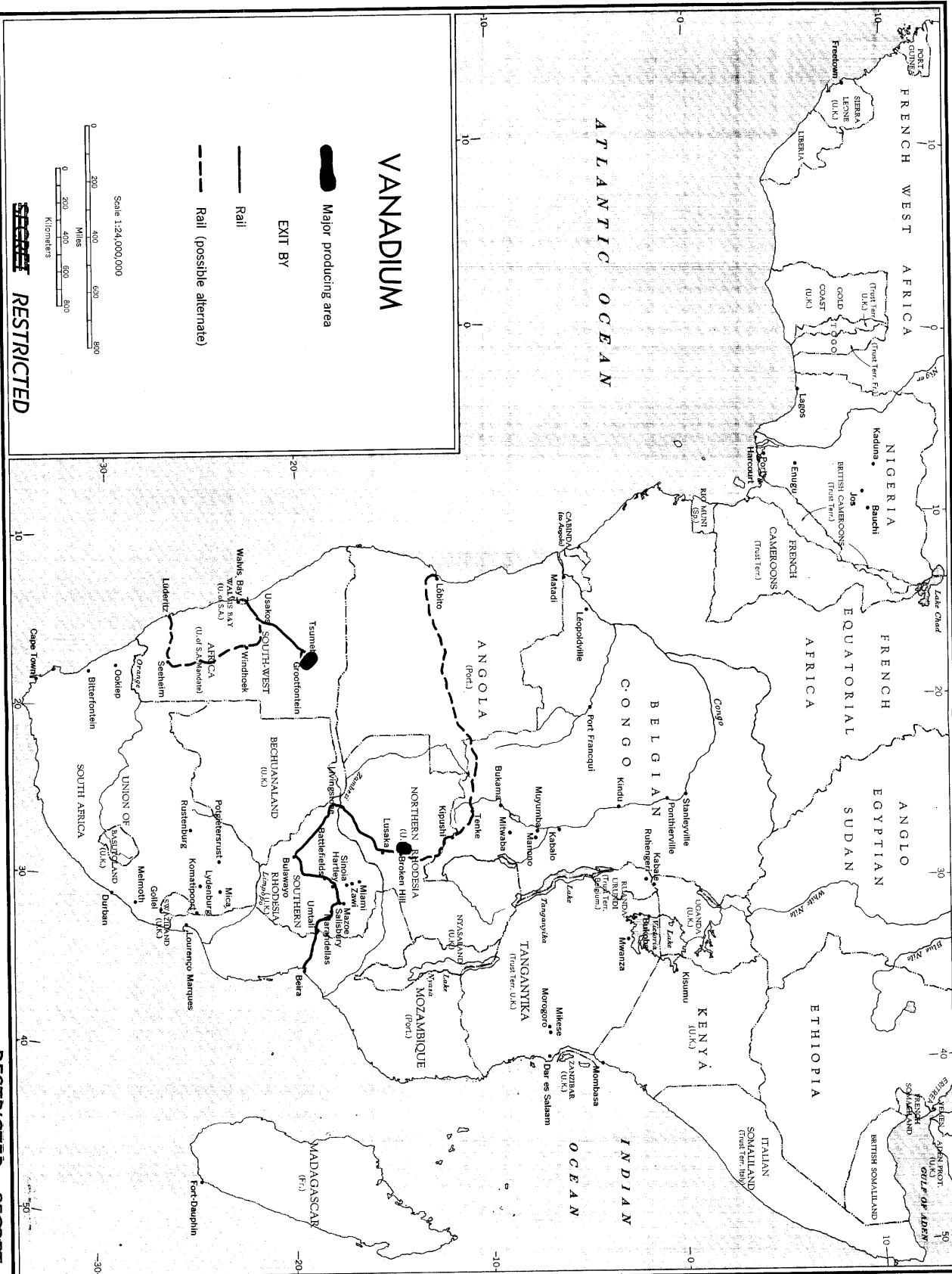
XVII. VANADIUM

Vanadium is produced in Northern Rhodesia and South-West Africa.

The producing area in Northern Rhodesia is located near Broken Hill. ^{74/} The vanadium destined for export is shipped over the Rhodesia Railways to Beira. The problems encountered in the export of vanadium include the inability of the railroads to handle all available traffic and the periodic overcrowding of port facilities at Beira that results from the shortage of port equipment and the inability of the railroad to handle the incoming freight. The Benguela railroad provides an alternate route to Lobito, Angola.

The producing area in South-West Africa is in the vicinity of Grootfontein and Tsumeb. ^{75/} Difficulties encountered in the movement of vanadium from the producing area to Walvis Bay, the exporting port, are the change in railroad gauge from 2' - to 3'6" at Usakos and the overcrowded state of the railroad between Grootfontein and Usakos. In case of emergency Lüderitz, could be used as an alternate to Walvis Bay by routing the vanadium from Usakos to Lüderitz, via Windhoek and Seeheim.

Transportation of Certain Strategic Minerals in Africa South of the Sahara



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XVIII. ZINC

In Africa south of the Sahara, zinc production in appreciable quantities is limited to the Belgian Congo, Northern Rhodesia and South-West Africa.

The Belgian Congo is the leading producer in Africa. Zinc is mined near Kipushi in Katanga Province in the southeastern part of the Colony, where it is found in association with other minerals. ^{76/} Practically all of the zinc is exported, with the larger part moving over the Benguela railroad to the port of Lobito, Angola. A small amount is transported over the Rhodesia Railways to Beira, ^{77/} and some may go to Matadi over the Belgian Congo rail-and-water route from Jadotville. In an emergency, zinc could be exported over any one of these routes. In export, however, zinc is in competition with other strategic minerals for the use of railroads whose capacity is insufficient to handle all the traffic. Furthermore, the ports are at present limited in their capacities for handling exports.

In Northern Rhodesia, zinc is found in the Broken Hill area. ^{78/} It is shipped over the Rhodesia and Mozambique railroads to Beira for export. As in the case of zinc from the Belgian Congo, it is in competition with other strategic minerals for shipping on

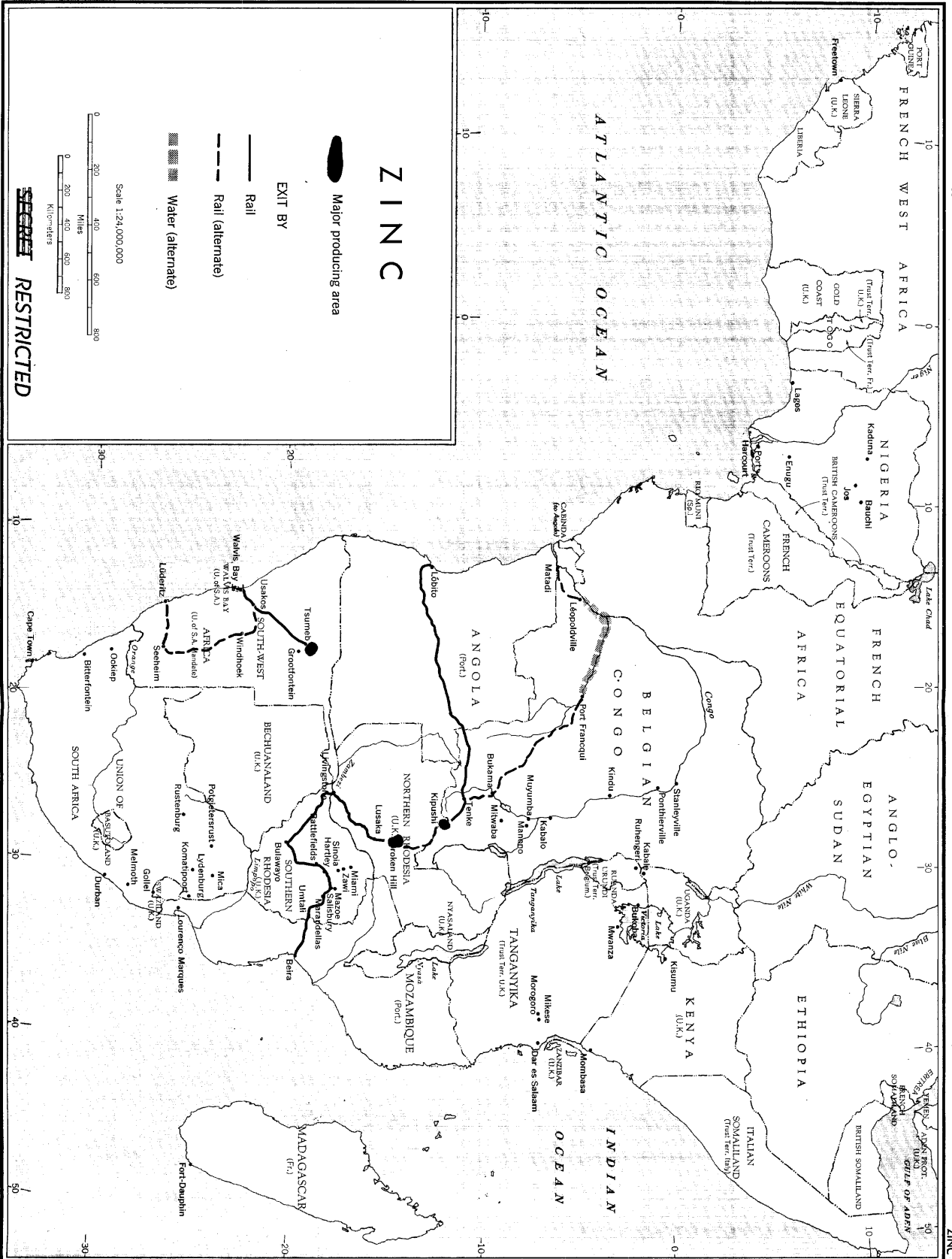
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the railroads and from the port. Possible alternate outlets are the all-rail route to Lobito and the rail-and-water route to Matadi.

The area of zinc production in South-West Africa is limited to the vicinity of Tsumeb, where zinc is found in association with other minerals. ^{79/} It is transported over 2'- and 3'6"-gauge railroads to Walvis Bay for export. Transportation problems are created by the change in railroad gauge at Usakos and congestion on the section between Usakos and Tsumeb. An alternate port of export is Lüderitz, which is the terminus of a railroad from Usakos, via Windhoek and Seeheim.

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Transportation of Certain Strategic Minerals in Africa South of the Sahara



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APPENDIX A

GAPS IN INTELLIGENCE

Source material required for locating areas of mineral production in this study is readily available. Information concerning the transportation and movement of minerals is not so plentiful, especially on some of the more valuable and scarce products such as diamonds and platinum. By examining transportation and mineral reports, however, most of the data required were found.

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APPENDIX B

SOURCES AND EVALUATION OF SOURCES

1. Evaluation of Sources

The sources used in preparation of the report were many and varied in nature. Official publications issued by the United States and by the governments of the foreign countries concerned or their colonies were useful and reliable. Economic and mineral reports and despatches forwarded by United States Foreign Service personnel provided reliable information of value especially for recent developments in the production and transportation of minerals and for improvements in port facilities.

Maps were particularly useful for showing the location of production areas and of transportation routes. Among the best of these were the German maps showing the location of minerals. Maps CIA 11798, Railroads of Tropical Africa, 1950; and 11799, Railroads of South Africa, 1950, were especially valuable for plotting the transportation of minerals by railroad.

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