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DOCUMENTARY SUMMARY OF THE COUNTRY'S SITUATION WITH RESPECT TO:

Beryllium, Cesium, Columbium, Germanium, Hafnium, Rare Earths,
Tantalum, Titanium, Yttrium and Zirconium

(Submitted by the Government of the Republic of the Congo)

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DOCUMENTARY SUMMARY OF REPUBLIC OF THE CONGO'S SITUATION
WITH RESPECT TO THE MINERALS MENTIONED BELOW: ^{1/}

Beryllium, Cesium, Columbium, Germanium, Hafnium,
Rare earths, Tantalum, Yttrium and Zirconium

The Economic Commission for Africa drew the attention of the Directorate of Mines and Geology in the Republic of the Congo (Brazzaville) to the interest that the development of the new metals indicated above could generate. This documentary summary merely gives a picture of what is currently known about the position of these minerals in the country. As this knowledge has not been obtained through intensive research activities, specifically oriented towards economic possibilities, it is therefore impossible to discuss either the importance of reserves or the possibilities of exploitation.

Of all these minerals, it is only the columbo-tantalite which is of principal interest. In point of fact, numerous indications of this ore have been reported at several areas in the country. The known indications, chiefly in the form of alluvial deposits, have not been subject to intensive research aimed at locating primary deposits or discovering deposits that can be exploited.

For instance, according to the references given in a preliminary study, the existence of columbo-tantalite in some gold-bearing alluvia was recognized. The presence of pegmatites upstream from these alluvial concentrations and comparison with deposits in Nigeria and Congo (Kinshasa) (younger granites, or rather pegmatites of older granites) hardly left any doubt as to the origin of the columbo-tantalite of the region in question. The results of this study were rather encouraging considering that this research was not on a large scale. Thus in one of the reserves estimated between 3-4 tons, the tantalum-bearing alluvia discovered were found to be of interesting grade reaching up to 4 kg per m³. Results of recent prospecting (1965-1967) in another region indicated the presence of this same ore in the gravels of some streams. In one of the chemical analyses, the following grades were recorded:

Ta ₂ O ₅	26.80%
Nb ₃ O ₅	46.70%
T ₂ O ₃	4.5%

Furthermore, some indications of alluvial deposits of beryllium have been noted with 13 to 460 kg/m³. Alluvial concentrations of titanium (ilmenite) with reserves ranging from 2,000 to 3,000 tons at the ratio of 120 to 400 kg/m³ have also been reported. With respect

^{1/} By Mr. D. Bayanda, Geologist, Bureau Minier Congolais, (Republic of the Congo).

to germanium, it is found associated with copper sulphides and other sulphides in some mines of the country, at the average ratio of Ge = 0.0022 per cent.

If it is not possible to specify the existence in appreciable quantities of some of these minerals in the Republic of the Congo(Brazzaville), it is hoped however that this Seminar, convened by the Economic Commission for Africa, in which the Republic of the Congo(Brazzaville) is also taking part, would help provide ample information on the geology, prospecting, evaluation, extraction, processing, purification and technical aspects as well as on the utilization, production and commercial prospects of some of these new metals and ores.

DATA FROM THE TECHNICAL REPORT OF THE STUDY ON THE ORIGIN OF MINERALIZATION

Niobo-tantalite in Mayoko.

1. General

(a) Localization

Mayoko is situated 105 km north of the Mossendjo prefecture, in the heart of the Chaillu granite massif covered by a thick equatorial forest. The average altitude of the region is 700 m. The proximity of the Comilog railway accords this mining area particular interest.

(b) Short history

On the Chaillu granite massif, the metamorphic xenolith of Mayoko had already attracted the attention of miners because of its gold-bearing mineralization. Gold mining had revealed the presence of niobium and tantalum mineralization, and about twenty tons of columbo-tantalite had been extracted from alluvia by Mr. Avoine.

The presence of pegmatites above the alluvial concentrations of tantalum and the comparison with the deposits in Nigeria and Congo(Kinshasa) suggests the origin of the mineralization in these pegmatites. Thus in 1956, a prospecting mission from the Directorate of Mines and Geology, led by Mr. Boinean, a geologist, focussed its attention on primary columbo-tantalite. This preliminary study had made it possible to have a better knowledge of the geology and to delineate the pegmatite regions close to the mineralized rivers.

2. Geological description

The Chaillu massif is a granite and granodiorite batholith. On its roof are a few xenolithic bodies of metamorphic rocks. The Mayoko mine is situated in one of these xenoliths.

(a) General geology of the xenolith

The xenolith at Mayoko is in the form of "platings" of metamorphic areas on the granites of the basement. The granite appears in certain streams situated in the centre of the xenolith. From the morphological standpoint, there are three distinct zones.

- The central plateau

Relatively little dissected; area of micaschist with much altered biotite gneiss.

- Marginal chains

They are on both sides of the plateau. The relief is very young. Amphibolite is the dominant rock.

- The quartzite cover

Two quartzite areas; the first area bordering the southern chain possesses an iron ore deposit on Mount Lekoumou (5 million tons reserve).

(b) Tectonics, facies and mineralization

The tectonic orientation of the entire N'GOE xenolith differs from the north-south granite. The central plateau is considered as a graben and the southern chain as a horst, broken perpendicularly in its general trend.

The xenolith is formed by a para-metamorphic mass of oligist quartzites, of pyroxeno-amphibolites, of feldspathic amphibolites with garnets and biotite gneiss. Under a microscope, these facies present a classical granoblastic structure.

In mineralization, gold, columbo-tantalite, radio-active ores, diamond, iron and beryl form the principal resources of the region.

Gold: mined in alluvia and still won locally by washing.

Columbo-tantalite: 20 tons have been mined in alluvia.

Diamond: rare, but stones discovered are 0.10 and 0.25 carat.

Iron: known deposit on Mount Lekoumou (5 million tons reserve).

Beryl: presence noted in the contact zone north of the massif.

Radioactive minerals: some indications sampled by the rate meter.

(c) Geology of the pegmatites of the Mayoko xenolith

External pegmatites: Contain at times fine crystals of tourmalines in gneissose granites.

Intermediate pegmatites: Somewhat rare and made up of quartz measuring about a centimetre, of large (2 to 5 cm³) somewhat muscovite plates and of pink, unaltered feldspars.

Internal pegmatites: Situated on the amphibolite-gneiss contact. They are above the tantalum-bearing streams. Quartz is rare; the micas are often absent, paste of Kaolinized feldspar speckled with altered tourmaline.

(d) General observations (southern chain)

On the whole no trace of tantalum has been discovered in these pegmatites.

- the tantalum-bearing streams are those flowing down from the northern and southern slopes of the southern chain.
- the outcrops of pegmatites are situated on the bed of the streams near the heads, rising from this chain.
- the general direction of the alignment is the tectonic direction of the xenolith W. 60° .
- the columbo-tantalite is found only over some hundreds of metres from the head of the streams where the crystals are of the order of a centimetre.

Results:

This mission conducted by the Bureau Minier Congolais (BUMICO) made it possible to complete the geological survey of the entire metamorphic xenolith at Mayoko. Excavations in the interior of these pegmatites (66 m of galleries and 214 pits) did not reveal the columbo-tantalite mineralization in the area. However, the excavated volume compared with the overall volume was so small that no negative conclusion can be drawn. The problem of the origin of the columbo-tantalite mineralization at Mayoko remains therefore unsolved.

In conclusion, the mineralization at Mayoko has been noticed up to now only in its alluvial and eluvial forms. Some pits on the stream showed concentrates predominantly of tourmaline, hematite and ilmenite.

Bibliographic references

Bibliography: Provisional report on the completion of mission (1964); document of the Bureau Minier Congolais: Research on the origin of columbo-tantalite mineralization in Mayoko (unpublished).

DATA FROM THE TECHNICAL REPORT OF THE STUDY ON COLUMBO-TANTALITE
MINERALIZATION IN THE GARABINZAM AREA AND THE ELOGO-SOUANKE REGION

I. General

In pursuance of the financing agreement signed between the Government of the French Republic and the Government of the Republic of the Congo, the BRGM was empowered by the Government to carry out a mineral prospecting mission and geological surveys in the northern portion of the Republic of the Congo. The columbo-tantalite mineralization is situated in the following two areas:

1. Garabinzam area

This is about 150 km west of Souanké. It is a granito-gneissic region where the only relief is that of small lateritic plateaux on top of the alluvia of a vast marshland. Of these plateaux in the region, only the Etiouk-Mayé on the Garabinzam-Alat track possesses a principal interest with respect to columbo-tantalite.

(a) Etiouk-Mayé Plateau

With an area covering about 10 km², the plateau consists principally of more or less feldspathic amphibolites, quartzites, leptynites, micaschists and veins of pegmatoid quartz with muscovite. An alluvial prospecting by lines of pits in the streams gave concentrates mainly of columbo-tantalite (1 kg/m³) with traces of scheelite. Gold exists in small quantities - there are traces of Cahnite and tourmaline in all the pits. Other minerals are either minerals of crystalline rocks, (garnets, zircon, rutile, monazite) or of amphibolite, (amphibolite, epidote). Iron is reported in the regional survey and seems a priori the most interesting.

In conclusion, the report stressed that the Etiouk-Mayé sector which seems interesting, would be worth studying in greater details.

2. Elogo-Souanké area

It is a quartzite-sandstone sub-horizontal plateau with an altitude of about 700 m. It disguises an eruptive complex made up of two granite anticlines bounding a faulted syncline. EW gneissic and ultrabasic amphibole. The complex is uncovered in the valleys.

Prospecting of these formations shows that gold is associated with the granitization of the whole, irregular veins cut the ultrabasic and amphibolites. Gold was mined up to 1960. Columbo-tantalite has been reported in the minerals of the quartzo-pegmatite suite of the granitization, but with low grades.

Analyses of two samples give the following results:

Ta_2O_5	Nb_2O_5	TiO_2
12.0	65.7	0.6
14.9	61.45	0.85

Among the basic minerals, only nickel enters slightly into the geochemical analysis, the peridotites appearing only in small spots in the valleys.

3. Alluvial prospecting

A study of alluvial gravel concentrates from the upper basins of Lekoli and Lebango gives grades above 50 g/m³. The columbo-tantalite in this region seems to be associated with the greisenification of a quartzitic diorite massif.

The study of the alluvial concentrates gives the following composition in heavy minerals:

Gold, columbo-tantalite, ilmenite, magnetite, hematite, rutile, zircon, disthene, tourmaline, garnet, staurotite, gahnite, monazite, epidote, siderite, anatase and marcasite. Only gold and columbo-tantalite are of interest.

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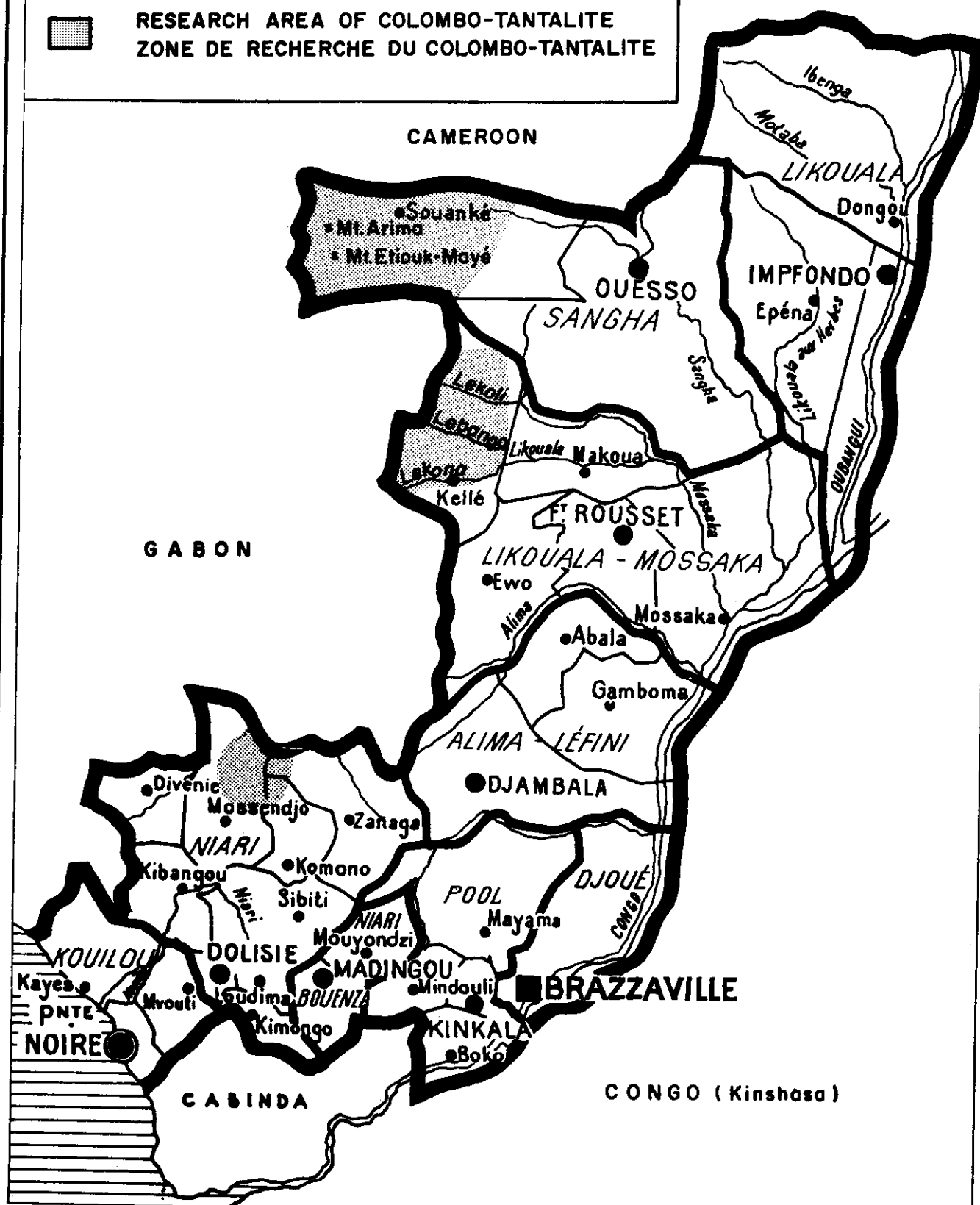
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CONGO (BRAZZAVILLE)

CENTRAL AFRICAN
REPUBLICRESEARCH AREA OF COLOMBO-TANTALITE
ZONE DE RECHERCHE DU COLOMBO-TANTALITE

CAMEROON

GABON



CONGO (Kinshasa)