

EXCERPTS

Cornet (1894)

p. 260: "I have had the opportunity to visit seven important malachite deposits. If one considers that most of them were met with on our journey, or close to it, one ought to conclude that they are extremely abundant in the area and that we have only visited a small part."

p. 261: "The ore occurs in small masses, nuclei, thin discontinuous layers, impregnations, fracture and stratification joint fillings, in siliceous shales, sometimes talcose, generally lightly coloured, either hard or friable, and when layered, and alternating with the shales, as a rather peculiar rock: a decayed, vuggy quartzite, penetrated by crystallized quartz. It seems thus that chalcopyrite was deposited together with abundant silica. The malachite occurs normally with dense limonite, sometimes with "kupferpecherz" (a mixture of limonite and chrysocolla), and other accessory minerals."

UMHK(1956)

p. 54: "In August 1903, prospectors Hook and Burton discovered gold at Ruwe, associated with platinum; they were thought to have discovered a true auriferous and platiniferous district".

Buttgenbach (1904, a. b. c)

[A series of successive reports, in which the first data on the discovery, lithology, stratigraphy, systematic trench and shaft samplings, metal contents and compositions are given. Most of the data are dealt with more completely in Buttgenbach (1905 and 1908) without many modifications. It is noteworthy that silver had been determined for these reports, along with gold and platinum, but not palladium. These printed reports seem to have been brochures aimed at investors, just before the chartering of the UMHK. The fact that these reports had been published is probably indicative of the need to inform the Belgian and international publics on a possibly major economic discovery,

resulting from Belgian overseas enterprises which were highly controversial in the beginning (UNION MINIERE, 1956)].

Special Nr. 25, sent on Dec. 27th, 1903 from Lukonzolwa, p. 293: "I have collected at Ruwe 12 samples...which have been panned; they all yielded gold colours, but no nuggets; the bottom of the pan contained also small grey particles, very heavy, which could be Precious Metal-containing sulfides." [This rare description, never resumed by Buttgenbach in his later papers, could apply to the panning concentrate of black mottramite and palladinite, which comprises the main part of the Buttgenbach-Maredsous sample].

Buttgenbach (1905)

p.438: "I should stress in addition that Ruwe is the only platinum deposit discovered up till now in Africa." [Indeed, this discovery was made several years in advance of the South African and Ethiopian ones.]

p. 445: "This layer N°5 has been crosscut by Well N° 1 at a depth of 18 meters, with a thickness of 3 meters. An analysis made on a sample from the hanging wall has detected Au=5.14 g/T and Pt=56.56 g/T; another sample taken at the side wall gave Au=3.43 g/T, without Pt; a third one, taken in the middle, gave Au 10.29 and Pt=1.48 g/T." [The highly variable distribution of the two precious metals is obvious here. This point is also dealt with on p. 448, where separate analyses show again the absence of correlation between the gold and platinum values. The high variability of the values for the different metals is also noteworthy, and should be kept in mind when comparing with our data obtained on separate particles, and not on bulk samples].

p. 446: "The general mean of all analyses is: Au=10.815 g/T, Pt=11.951 g/T. Palladium has also been recognized, sometimes with very high concentrations, but with a mean of 2 g/T." [This is one of the few mentions of the presence of palladium in Ruwe. The ratio of Pd/Pt is nearly 6/1. But nothing is said about the analytical methods used to distinguish platinum and palladium.

It is believed that Studt was the analyst. [A picture of Studt's field laboratory can be found here as a frontispiece, in which a précision balance, muffle furnaces, crucibles and numerous reagent bottles are to be seen.]

p. 446: "When this ore is washed by panning or by sluicing, one collects a very fine sand of brown colour, containing numerous particles with a metallic shine. A general analysis of that concentrate yielded the following: Pd=1k.210/T, Pt=0k.020, Au=0k.320 and Ag=0k. 620." [The brown sand was at first described by Buttgenbach (1904) as limonite, but later on correctly determined as a copper-lead vanadate, but nevertheless called "descloizite" or "psittacinite", instead of "mottramite", which shall be used here. This panning concentrate was collected at the same location as the one obtained in 1933 by Schuiling, and which reached us].

1906: Chartering of the Union Minière du Haut Katanga (UMHK) by King Leopold II.

Studt et al.(1908):

[This is the most complete description of the Ruwe geology by the three authors Cornet, Studt and Buttgenbach. Several gold nuggets are depicted and studied, but the procedures of platinum determination are not detailed. Two opposing ore deposition theories have been proposed by Studt and by Buttgenbach: according to the latter, the precious metals came from the leaching of the locally silicified rocks, later dubbed "RSF" (roches siliceuses feuilletées= foliated siliceous rocks, now dated as lower Roan), whereas Studt was of the opinion that the metals came from the destruction of presently vanished veins of Devonian age, intruded after the deposition of the Mines Series].

Buttgenbach, in: Studt et al., (1908)

p. 64: "In the brown ore [descloizite] obtained by washing, the Precious Metals occur in the native state, mostly as microscopic grains; 1/5 can be extracted by amalgamation, but the remaining is so tenuous that it is lost during washing, together with other

metals". [Non-amalgamable oxidic compounds of Pt and Pd were of course not considered.]

p. 66: "I own a unique sample weighing 12 grams, composed of a Pt nugget surrounded by Au. However, this is the only find of visible Pt at Ruwe".

p. 69: [After noticing that one layer N°5 at Ruwe contained Au, Ag, Pt and Pd, whereas the overlaying eluvium contained Au and Ag, but no Pt or Pd, Buttgenbach goes on asking]: "If the surficial deposit is due to a mere mechanical sorting of the auro-platiniferous layer, why are Pt and Pd never found in it? Is this observation not a proof that gold and silver were acted upon by chemical actions [and were reprecipitated later], but that Pt and Pd went unaffected by the same actions?" [Buttgenbach could of course not foresee that, on the contrary, Pt and Pd were indeed so affected by these actions that they were quite completely oxidized to palladinite and Pt-Pd-Fe-oxyhydroxides. Even more, he was probably expecting that primary Pt and Pd were in the native state, whereas they were actually present as selenides and tellurides. He was comforted in his hypothesis that gold was reprecipitated by his observation of very numerous gold spherules, in addition to spiny nuggets.]

Ball & Shaler (1914):

[This review paper of the Congolese mineral wealth includes a chapter on the Ruwe and Musonoi gold and platinum deposits. The data are largely based on Buttgenbach's already published accounts, but also on less accessible reports from the Tanganyika Company Limited (T. C. L). This paper is among the very rare ones which have drawn the attention of a large readership on Central Africa platinum].

p. 633-635: RUWE GOLD DEPOSIT.

p.634: "The relative amounts present [of gold, silver, platinum and palladium] are indicated by the following average content (per cubic meter) of a considerable quantity of ore: Au=12.39 grams; Pt and Pd=3.43; Ag=8.27 grams. The metals occur for the

most part in microscopic particles, but upon washing crushed rock, grains of both gold and platinum and globules of gold 1 mm in diameter are seen....These minerals [psittacinite, vanadinite, cupriferous descloizite, pyromorphite and malachite] form the "green concentrates", which are a good value indicator. Pt, Pd and Ag values increase and decrease together, but Au is independent from the others. The Pt- and especially the Pd- contents increase with depth."

p.634: "The nuggets [of Au] contain no platinum, and Au is to Ag as 200 to 1. Pt nuggets are rare, but small grains in instances are attached to the Au nuggets, and Pt is sometimes surrounded by Au". [This latter observation refers obviously to the 12 gram nugget].

p. 635: "A deposit similar to Ruwe is said to have been found at Musonoi in beds folded into a syncline. The ore carries up to 8.4 grams Au and 8.6 grams Pt."

Buttgenbach (1925)

p.94: " I own a small nugget of Pt attached to a Au nugget, which was found at Ruwe; this is the only genuine native Pt sample found in Congo. The pair of nuggets weighs 880 milligrams". [The 12 gram nugget is no more alluded to. This 880 mg nugget was lost during the bombing of the University of Liege during WWII.]

Richet (1933): [A typed report, which condenses field observations and metal determinations, compiled from documents written and published by Buttgenbach, and from T.C.L. reports. The mine of Dikulwe is mentioned here for the first and last time in the literature available to us, and the attention is mostly evoted to Musonoi. The frequent association of gold with green mottramite (descloizite) is made clear. At Musonoi, and rather surprisingly, platinum has not been determined in the gold concentrates obtained by panning of surficial materials, but rather in hard rocks met with during the underground works. Cellular quartzite contains 8.6 g/T of gold and 8.5 g/T of platinum. Stratified

sandstone (Richet points out that these correspond with what was later designed as "Roches siliceuses feuilletées"=Foliated siliceous rocks) contains 15.55 g/T gold and 10.35 g/T platinum].

Thoreau & du Trieu de Terdonck (1933)

p. 14: "PRECIOUS METALS-The presence of Precious Metals in the Chinkolobwe deposit has been recorded at the very beginning of the investigations. Gold flakes can be obtained by panning the hard rocks, either in the uranium mineralized zone or elsewhere. Pitchblende shows sometimes native gold as coatings and as thin crevice fillings. The analysis of the residues of ore treatment shows that there is additional Pd and accessoryly, Pt. One has also recently found a faulted zone, slightly mineralized in U, Cu, Co and Ni, and showing noteworthy contents of Au and Pd. Au is in its native state, but as for Pd, it has not been possible until now to determine its speciation." [This faulted zone refers to the chloritites.]

Vanden Brande (1935)

p.66: "The Precious Metal mineralization is unevenly distributed in the Mines Series: investigations have disclosed the existence of alluvial flats of detritus derived from the Mines Series, and containing Precious Metals."

Buttgenbach (1947)

p. 35: "At Shinkolobwe, black oxides found in the washing concentrates also contain Pd. This metal, as well as Pt, are present as oxides or sulfides, and this should also be the case at Ruwe." [This probably refers to the same material described by Thoreau and du Trieu (1933), but the hypothesis of palladium oxides or sulfides is no where supported by analysis, although postulated as early as 1904 by Buttgenbach himself. The hypothesis perhaps comes from indications given by UMHK mineralogists and metallurgists, who had probably already suspected a correlation between palladium and selenium in sulphidic ores].

Marthoz (1955)

p.21: "Since the origins, the Katanga production of Pt was 270 kg and that of Pd was 1200 kg."

p.41: "Finally, the uranium ores of Shinkolobwe contain Au, Pt and Pd which are recovered after the extraction of the uranium oxide."

Robert (1956)

p. 436: "The treatment of the U and Ra ores from Shinkolobwe allow for the recovery of small quantities of Pt and Pd. The [residual] products entrusted by UMHK to the "Société Générale Métallurgique de Hoboken" for refining yielded the following metals in 1953: Pt=873 grams, Pd=7464 grams. Samples from 1954 yielded Pt=831 grams and Pd=4656 grams (+ Pb, Ag and Ge)."

Derricks & Vaes (1956)

p. 116 (§ 43): "U is always associated with Co and Ni, but it contains also Au and Pd in noteworthy quantities. These metals are quite commonly met with in small quantities in the deposit as a whole. Higher concentrations are sometimes found in uraninite and, between Levels 57 and 114, in a layer of laminated chloritic rock at the contact between the RAT [Roches Argilo-Talqueuses] and the RSF [Roches siliceuses Feuilletées] (Fig. 16)." [Compare with Thoreau and du Trieu (1933), and Buttgenbach (1947)].

p.126: "Palladium: We have examined a sample very rich in Pd; that sample came from the stocks. Pd is here present as metallic, greyish-white grains, which are insoluble even in aqua regia. A chemical analysis has detected sulfur in that mineral." [Native Pd and Pd sulfides are soluble in aqua regia, and there is probably a confusion between the name of the element and the mineral "native palladium". The observed insolubility is perhaps that of Pd selenides and tellurides. No details are given on the method of determination of palladium in these grains].

p. 126 (§106): "The chloritic layer near the RSF contained a black oxide enriched in Pd". [cf. Thoreau and du Trieu (1933), and Buttgenbach (1947) who referred to the same material].

p.127: "In uraninite, Au occurs as fine flakes and rodlets, as well as nearly submicroscopic colours. Au frequently replaces veinlets of vaesite. In one vein, it was found replaced by melonite. One sometimes notices small Au grains in the sulfides of the central part of the mine, but it is mostly abundant in the seleno-sulfides of Level 114. In the surficial parts of the mine, Au occurs also in panning concentrates of the lowermost rocks of the Mines Series, and in a chloritic layer at the contact with the RSF (§43)". [cf. Jedwab et al., 1999].

Demesmaeker et al., 1963:

p. 92: "Uraniferous ore (torbernite and yellow salts) locally forms small pockets. It includes also Cu, Pb and U selenides [sic], as well as precious metals and vanadates. Indeed, gold, platinum and palladium have been mined near the surface in some parts of the Musonoi-North Ridge. That ore assayed 28 g/T Au, 36 g/T Pd and 10 g/T Pt."

NOTICE EXPLICATIVE (1974)

p. 75: "Zaire [Congo] yields small quantities of Pt. Some deposits and prospects are related to stratiform deposits of the Copper Belt."

p. 76: "In Shaba [Katanga], Au-Pt-Pd-V associations are known in the Musonoi, Ruwe and Shinkolobwe deposits."

p.76: "Small quantities of Pt and Pd have been recovered from the residues of the treatment of the Shinkolobwe ore. Recovered amounts were: in 1953, 875 g. Pt and 7464 g. Pd; in 1954, 831 g. Pt and 4656 g. Pd." (cf. Robert, 1956).