

Brazilian Platinum Potential

FIRST MEETING ON THE PLATINUM GROUP ELEMENTS

Although reports on palladium from Brazil date back to 1803, the year this metal was discovered by William Hyde Wollaston, serious exploration for the platinum group elements in this country only took off in the last decade, in response to the increasing international demand for these metals. The immense territorial extent of Brazil and its diverse geotectonic regions present a tremendous potential for platinum group elements to occur in a variety of different geological environments. Now that exploration and academic research on a variety of different geological settings with potential to host platinum group element deposits has been ongoing in Brazil for a number of years, this specialised meeting on the platinum group element was most opportune.

The meeting took place from 12th to 14th April 1993 at the University of Brasilia and was held under the auspices of the Brasilia Chapter of the Brazilian Geological Society, being organised by a team chaired by Professor Hardy Jost. Of the 30 papers presented, 20 dealt with platinum group element occurrences in Brazil, the others with analytical techniques and reviews of deposits elsewhere in the world.

In the late 1980s exploration was stimulated by a decision of the state-owned Companhia de Pesquisa de Recursos Minerais to evaluate the platinum group elements potential of Brazil. Several geological settings of priority were identified including layered intrusions of the Bushveld, Stillwater and Great Dyke type; gabbroic intrusions related to flood basalts and smaller intrusions of ancient greenstone belts.

Preliminary results, largely restricted to the discovery of small nuggets of platinum group minerals in pan concentrations of soils overlying layered intrusions, were reported at the meeting. The most promising of these have been obtained from the early Proterozoic Serra da Onça layered intrusion on the Amazon Craton, located about 650 km south-west of Belém in the State of Pará. Although platinum group

minerals have been located in soils overlying serpentinite, pyroxenite and gabbro their primary source has not been detected yet.

Exploration by the private sector and academic research has been concentrated on the three large layered intrusions of Niquelândia, Cana Brava and Barro Alto which are situated in a 350 km belt in central Goiás. The layered intrusions are of middle Proterozoic age but have all undergone very extensive metamorphic alteration later. Exploration is hampered by the alteration of the original textures of the rock, the presence of extensive shear zones, uncertainties in the behaviour of the platinum group elements during metamorphism at high temperatures and pressures, as well as by the deep weathering and laterisation of soils overlying parts of the intrusions. No platinum group element mineralisation of note has been found, although the potential of these intrusions has not yet been fully evaluated.

Minerals of platinum group elements have been documented from chromite layers in the lower part of the Niquelândia layer intrusion. Of interest is the presence of oxides and hydroxides of ruthenium and iridium in combination with iron, chromium and aluminium which are considered to have been formed by laterisation during deep weathering, which affected large areas of Brazil in the Cenozoic Period.

Also of interest, not only from an academic perspective but also from the point of view of the mobility and transport of platinum group elements during geological processes, is the rather widespread association of palladium with gold mineralisation. In the case of the Quadrilátero Ferrífero of Minas Gerais, it is suggested that both palladium and gold were remobilised from Archean rocks where these elements occur in very low concentrations. These elements were then transported as chlorine complexes in hydrothermal fluids and deposited as a variety of gold-palladium and palladium-mercury-arsenic-antimony bearing minerals, together

with gold, in veins and fracture systems. A similar palladium-gold association recorded from Cavalcante in Goiás is more problematic, however, in that no suitable source for the palladium has yet been identified.

Several other papers dealt with the association of platinum group minerals and chromite in a number of smaller layered intrusions and ophiolites, while one paper speculated on the platinum group element potential of intrusions associated with basalts in the Paraná Basin by pointing out the similarities of their geological setting with those of the Insizwa intrusion of South Africa and the Noril'sk-Talnakh region

of Russia, north of the Arctic circle in Siberia.

The vast majority of papers were presented in Portuguese. Fortunately, a dedicated conference organiser translated all the extended abstracts into English, not only for the benefit of the mere handful of non-Portuguese speakers at the conference but also for wider circulation. Copies of the volume of extended abstracts, and a guide to the field trip to the Niquelândia layered intrusion (in Portuguese only), are available from Professor Hardy Jost, Department of Geosciences, University of Brasília, Caixa Postal 04421, 70919 Brasília, Brasil.
G.v.G.

New South African Platinum Mine

After just two years of development work, the first permanent open-cast platinum mine in South Africa has recently been brought on stream by Potgietersrust Platinums, a subsidiary of Johannesburg Consolidated Investments. Located on the Platreef orebody, at the farm Sandsloot to the north-west of the town of Potgietersrus in the northern Transvaal, this development by PPRust is planned initially to produce some 200,000 tonnes of ore per month. The ore has a similar mineralogy to that of the Merensky Reef and flotation mill concentrates will be toll-smelted and

refined by Rustenburg Platinum Mines.

Annual production of platinum group metals is expected to be: 170,000, 165,000 and 13,000 ounces of platinum, palladium and rhodium, respectively, while in addition significant amounts of gold, nickel and copper will be recovered. Open-cast mining will extend to a depth of 250 metres, and the estimated reserves of 88 million tonnes are sufficient to last for about thirty years at the planned rate of extraction. Furthermore, increased platinumiferous reserves have been found in satellite orebodies located close to the main pit.

