

KIMBERLITES IN BRAZIL: AN INITIAL REPORT.

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Diamonds were first discovered in Brazil in the early 1700's near Diamantina, central Minas Gerais State. Subsequently, other placer deposits were discovered elsewhere and as a consequence Brazil replaced the declining fields of India as the major source of diamonds. This state of affairs continued until the late 1800's and early 1900's when first South Africa and then Zaire (at that time Belgian Congo) became the foremost producers of diamond.

Unfortunately, because of several reasons the search for kimberlite as a primary source of diamonds in Brazil was never given serious consideration. The pioneering studies of Derby (1898), Porcheron (1903) and Hussak (1906) who suggested the existence of kimberlites in western Minas Gerais were largely ignored. Resurgence of this idea occurred in the late 1920's and early 1930's (Maack, 1926; Freyberg, 1932; Oppenheim, 1934) but was not readily received.

The first authenticated kimberlite to be recognized as such was discovered during a general reconnaissance geological survey in south west Piaui State - the Redondao diatreme. (Melo and Porto, 1965) Subsequently, as a result of systematic prospection in Minas Gerais a number of other kimberlitic diatremes were discovered (Barbosa et al., 1976). More recently, an examination of potential kimberlite and diamond prospects in western Minas Gerais has been extended into Mato Grosso, Goias and Rondonia Territory. At present a considerable number of kimberlite occurrences are known in Brazil of which several are diamondiferous.

The kimberlite diatremes of west Minas Gerais range in size from 50 - 500 m in diameter, although a number of narrow dikes also exist. Invariably, the rock is extensively and deeply weathered; a feature that probably contributed to the earlier lack of discovery of these bodies. At this time published geological and mineralogical data are restricted to two kimberlites in Brazil - the Vargem and Redondao diatremes (Melo and Porto, 1965; Svisero et al., 1977).

The major Vargem diatreme is approximately 22 km south-east of Coromandel, Minas Gerais. The diatreme intrudes Bambui metasediments (Upper pre-cambrian), and is capped by lateritic red soils that change with depth to a yellow-

colored material. This yellow ground is brecciated and contains serpentized olivine, red-purple garnets, green diopside and ilmenite. All these minerals display the chemical characteristics of typical kimberlitic minerals (Table 1).

The Redondao diatreme in Piaui State was first identified by Melo and Parto (1965) and is located about 15 km south-east of Santa Filomena. The diatreme is about 1 km in diameter and has intruded Palaeozoic sediments of the Parnaiba basin.

The kimberlite in the diatreme is completely serpentized at the surface but typical kimberlitic garnets can be found (Table 1). Of interest are the xenoliths of crustal and mantle origin that occur within this kimberlite. One such xenolith is a granular garnet-lherzolite whose granular fabric can be recognized in spite of serpentization of the olivine and pyroxene. Garnet, however, remains unaltered and is chemically similar to garnets in xenoliths from South Africa and elsewhere.

At the present time a study of the mineralogy and geochemistry of several other kimberlites is underway and includes the Capao da Erva, Forca, Poco Verde, Santa Clara, Brecha do Santo Antonio, Limeira and several other diatremes.

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TABLE 1. Representative analyses of minerals from Vargem and Redondao kimberlites, Brazil

	Vargem			Redondao	
	CPX.	ILM.	GAR.	GAR.*	GAR.
SiO ₂	54.4	0.07	42.8	42.0	41.8
TiO ₂	0.12	54.1	0.30	0.34	0.19
Al ₂ O ₃	0.21	0.46	21.2	21.1	21.3
Cr ₂ O ₃	0.71	0.59	1.35	3.39	2.68
FeO	4.39	32.6	8.42	5.99	8.13
MgO	16.7	11.4	21.1	21.4	20.7
CaO	22.0	0.02	4.66	4.91	4.89
MnO	0.11	0.27	-	-	0.36
K ₂ O	<0.01	<0.01	<0.01	<0.01	<0.01
Na ₂ O	1.11	0.03	0.05	0.09	<0.01
NiO	<0.01	<0.01	<0.01	<0.01	<0.01
	99.7	99.5	99.9	99.2	100.1

* Garnet in garnet-lherzolite xenolith. All other minerals are from mineral concentrates.