Lamproites in India

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The Majhgawan diamond mine and nearby Hinota pipe. Madhya Pradesh are classified here as olivine lamproites and not kimberlites. These bodies, therefore, comprise a newly recognised province of diamondiferous olivine lamproites which are extremely rare worldwide.
Other intrusions in India have been proposed as lamproites (e.g., Paul and Sarkar 1984; Bergman and Baker 1984; Reddy 1987). Information for relevant localities is reviewed (Table 1).

Rocks from *Majhgawan* and *Hinota* are lapilli tuffs. The juvenile lapilli are composed of olivine macrocrysts and phenocrysts set in glassy groundmasses containing mica, vesicles, apatite and altered perovskite. The petrographic classification of these rocks is problematic because of their glassy nature and paucity in primary minerals. Various features, however, are atypical of kimberlites and more typical of lamproites. These include the occurrence of glass, in particular of scoriaceous juvenile lapilli, the complex shapes of the olivine macrocrysts (probably imposed morphology) and phenocrysts (crystal aggregates) and polysynthetic twinning in the phlogopite. Also phlogopite compositions (high TiO_2 contents, 5.3-7.3 wt.%) and whole-rock compositions (e.g., high Ba, 3634-27300ppm) are more similar to lamproites than kimberlites. These rocks are very similar to those found at Ellendale and Argyle (Western Australia), Prairie Creek (Arkansas) and Kapamba (Zambia). The apparent paucity of mantle-derived xenoliths and xenocrysts at Majhgawan is also similar to that noted in the other lamproites. These data suggest therefore that Majhgawan and Hinota are not kimberlites but should rather be classified as lamproites. The samples examined are hence classified mostly as glassy olivine lamproite lapilli tuffs although some autolithic breccias may be present.

The *Wajrakarur/Lattavaram* bodies (Andra Pradesh) are composed mostly of mica-bearing monticellite kimberlite. Contamination by late-stage xenolith digestion produces pectolite- clinopyroxene-bearing kimberlite. Texturally. the bodies are predominantly hypabyssal but pelletal tuffisitic kimberlite breccia (diatreme- facies) is present in the

largest body. They probably represent the root zones of substantially eroded diatremes. Pipes 1, 3. 4 and 6 are typical kimberlites and contain some diamond and relatively common mantle-derived xenoliths and xenocrysts. Pipes 2 and 5 display some petrographic features (e.g., paucity of olivine macrocrysts, probable melilite pseudomorphs) which are not typical of, but do not preclude their classification as, kimberlites. Pipes 2 and 5 also appear to be devoid of diamond, mantle-derived xenoliths and xenocrysts. These differences are not sufficient to suggest that these two pipes represent a different rock type such as lamproite. They are, rather, more extreme varieties of kimberlite.

Lamprophyre dykes both at *Chelima* and in the *Gondwana Coalfields* could include lamproites. Information for *Angor*, *Banda* and *Jungel* suggests that they are not kimberlites or lamproites. Insufficient information is available for the intrusions at *Zangamrajupalle*, *Maddur* and *Warangal* to comment further but it is doubtful whether they are kimberlites or lamproites.

It is noteworthy that the only confirmed lamproites (Majhgawan) and kimberlites (Wajrakarur/Lattavaram) constitute the only known primary sources of diamond in India. They are Proterozoic and similar in age to other lamproites, kimberlites and related rocks worldwide. The tectonic setting of these provinces may also be similar to those elsewhere. The Wajrakarur/Lattavaram kimberlites occur well within Dharwar craton. while it appears that the lamproites (Majhgawan/Hinota) may occur towards the margin of the Aravalli craton and might even be associated with a rift. Although there are numerous published papers on the "kimberlitic" bodies of India this review shows the great need for new detailed petrological studies of many of these localities.

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Table 1 Summary

Locality	Name	Ages	Published Classifications	Classification this study
1	Majhgawan	1135my	kimberlite	ol lamproite lapilli tuff
1	Hinota		kimberlite	ol lamproite lapilli tuff
2	Angor		kimberlite peridotite ol-pyroxenite-gabbro	not kimberlite ?peridotite-gabbro
3	Jungel	919my	kimberlite ?metavolcanics	not kimberlite
4	Gondwana Coalfields	110my	lamproites lamprophyres	should be investigated may include lamproite
5	Wajrakarur P1		kimberlite	mica-bearing hypabyssal kimberlite and pelletal tuffistic kimberlite breccia
5	Wajrakarur P2	840my	lamproite kimberlite	hypabyssal monticellite kimberlite
5	Lattavaram P3	933my 956my	kimberlite	hypabyssal monticellite kimberlite (*/-phlogopite)
5	Lattavaram P4	926my 1023my	kimberlite	hypabyssal mica-bearing monticellite kimberlite contaminated to pectolite-cpx-bearing kimberlite
5	Muligiripalle P5		lamproite kimberlite	hypabyssal melilite- and monticellite-bearing phlogopite kimberlite contaminated to pectolite-cpx-bearing kimberlite
5	Wajrakarur P6		kimberlite	altered hypabyssal kimberlite
6	Chelima	1340my	minette kimberlite/ carbonatite lamproite	minette or lamproite requires further study
7	Zangamrajupalle		kimberlite	requires further investigation
8	Maddur		ol-lamproite	reported data does not support classification as lamproite, further study necessary
9	Warangal		kimberlite/ carbonatite	reported data unusual for kimberlite or lamproite

Legend: ol - olivine: cpx - clinopyroxene

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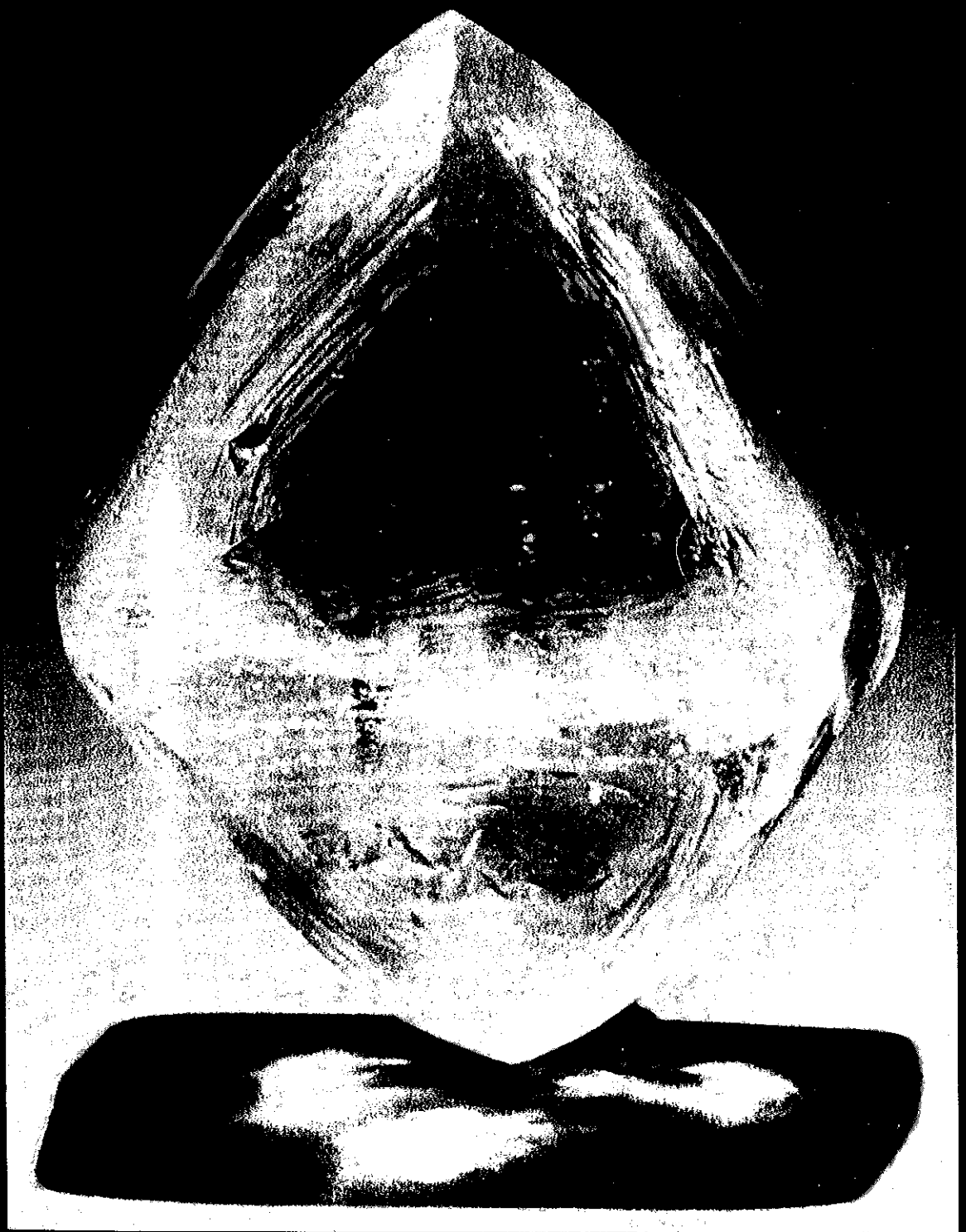

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