WHAT'S IN A NAME? SUGGESTIONS FOR REVISIONS TO THE TERMINOLOGY OF KIMBERLITES AND LAMPROPHYRES FROM A GENETIC VIEWPOINT.

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Our understanding of the petrogenesis of alkaline rocks has been considerably advanced by the application of modern methods of analysis to the determination of the chemical and isotopic composition of rocks and minerals. Unfortunately, these advances have not been matched by changes in our approach to the terminology of alkaline rocks. Modal classifications have remained essentially unchanged since the nineteenth century. This terminological legacy hinders our understanding of the actual genetic relationships between diverse groups of alkaline rocks and unfortunately leads to inappropriate petrogenetic speculation.

Why do we attempt to classify rocks?. One reason is to give a particular assemblage of minerals a name, this being a convenient way of informing other petrologists of the occurrence of this assemblage in some particular geological context. However, a particular assemblage of minerals arises from the operation of petrogenetic processes acting upon a particular magma type and is not a fortuitous random association. Correct classification of rocks is thus vital if the object of the exercise is ultimately to understand petrogenesis. In the past different names have been applied to the same mineral assemblage or the same name is applied to rocks which differ in their mineralogy. Commonly this has led to the "recognition" of incorrect associations and to suggestions of consanguineity where none exists. The proposal that many alkaline rocks may be grouped in a lamprophyre clan is but one example of this approach to terminology.

Existing IUGS-sanctioned non-genetic classifications are unsatisfactory for many alkaline rocks e.g., minettes versus phlogopite sanidine lamproites or carbonatites versus calcite kimberlites. Consequently mineralogical-genetic classifications are proposed in which the name of given alkaline rock is based upon; (1) the total mineral assemblage present, (2) compositional data for these minerals and (3) in some instances the whole rock isotopic composition. The objective of this approach is to identify the parental magma which has given rise to a suite of rocks. Hence, alkaline rocks are assigned to petrological clans. Individual rocks are not considered or named in isolation from other rocks in a given suite. The specific parental magma type is reflected in the nomenclature by a clan name e.g. kimberlite, lamproite, melilitite etc. Modally diverse, but consanguineous, members of a clan are described by modal varietal compound names e.g. olivine phlogopite lamproite, leucite diopside lamproite.

Application of this approach to rocks which contain diamond suggests that there are three genetically-distinct upper mantle-derived magmas which are capable of transporting diamond xenocrysts; kimberlite (formerly group I kimberlite), orangeite (formerly group II kimberlite) and lamproite. Group II kimberlites are renamed as they apparently form a petrological clan that is genetically-unrelated to group I kimberlites. The rocks now known as group II kimberlites were originally termed (micaceous) kimberlites on the basis of the presence in them of diamond. It is unlikely that if this group of rocks were discovered today they would be termed kimberlites as they have few mineralogical similarities with archetypal group I kimberlites.

The term lamprophyre was introduced as a field term in the nineteenth century to describe hypabyssal rocks that are rich in mica. Usage was confined to describing the macroscopic appearance of the rocks. Subsequently, the term was broadened to include any dike rocks containing mafic phenocrysts (mica,amphibole, pyroxene) set in a felsic groundmass. The term was, and still is, used indiscriminately in this descriptive manner without regard to the nature of the associated rocks and/or tectonic setting of the occurrence. Recently, diverse lamprophyric rocks, kimberlites and lamproites have all been considered to be members of a "lamprophyre clan". However, the P/T conditions of generation and/or source regions of the magmas which formed these rocks are very different and it follows that the rocks cannot be genetically related. Further, as the concept of a petrological clan requires that members of the clan be consanguineous it is evident that the concept of a "lamprophyre clan" is petrologically unsound as there is no universal lamprophyre magma type.

Application of mineralogical-genetic terminology to diverse rocks described as lamprophyres confirms that many varieties are derived from genetically-unrelated magma types. Mica-rich rocks of lamprophyric aspect are commonly found as modal variants of rocks formed from several distinct magma types. They represent rocks that have formed under water-rich or other special conditions relative to other members of the clan. It is proposed here that such rocks be assigned to a "lamprophyre facies". Thus, phlogopite diopside lamproite belongs to the lamprophyre facies of the lamproite clan, whereas sannaite, monchiquite and camptonite are lamprophyric facies of the alkali basalt clan. This concept preserves the original meaning of the term "lamprophyric' and has no genetic connotations.

The lamprophyres facies concept is illustrated by the following examples:

ALKALINE OLIVINE BASALT CLAN

Facies	Rock
Extrusive(lava)	Basalt
Hypabyssal	Diabase
Plutonic	Gabbro
Lamprophyric hypabyssal	Sannaite, Camptonite, Monchiquite.

Petrographically different members of the lamprophyre facies result from formation under different volatile, P/T conditions and cooling rates, hence some are heteromorphs. In this clan different facies are easily related to the site and style of crystallization and the lamprophyric facies is entirely hypabyssal. In contrast in other clans, lava flow or plutonic facies may be of lamprophyric character e.g. the minette lavas of the basanite clan and the phlogopite perovskite pyroxenites of the melilitite clan, respectively.

GROUP 1 KIMBERLITES

Facies	Rock
Crater	Epiclastic and pyroclastic kimberlite
Diatreme	Tuffisitic or volcaniclastic kimberlite
Hypabyssal	monticellite calcite kimberlite
Lamprophyric hypabyssal	phlogopite apatite kimberlite

In some group I kimberlites simple modal enrichment of phlogopite confers a "lamprophyric aspect" to the rocks. These cases are relatively uncommon and the majority of group I kimberlites have no macroscopic or microscopic lamprophyric character. Note that lamprophyric facies group I kimberlites do not grade in a petrogenetic sense or mineralogical/genetic classification into group II kimberlites or minettes, although the latter may have some gross modal similarities.

LAMPROITE CLAN

Facies	Rock
Lamprophyric lava	diopside phlogopite lamproite
Hypabyssal	leucite diopside lamproite
Lamprophyric hypabyssal	leucite diopside transitional madupitic lamproite.
Plutonic	richterite sanidine lamproite.

Further examples may be devised with respect to the group II kimberlite, basanite (minettes), melilitite (alnoites, aillikites), nephelinite and "andesitic" (minette, spessartite, kersantite) clans.

Lamprophyres have typically been stigmatized as orphans of dubious and unfathomable antecedents; thus they are consigned by many to the petrological waste basket. Consideration of lamprophyres as a group without regard to their diverse parentage has hindered understanding of their genesis. By adopting the lamprophyre facies concept and using mineralogical/genetic classifications, it is now possible to show that lamprophyres are merely derivatives of common magma types. Using these principles petrologists are hopefully now in a position finally to put this neglected but ubiquitous group of rocks into their correct petrological context.