NAMING LUNAR MARE BASALTS: QUO VADIMUS? Graham Ryder, Lunar and Planetary Institute, 3303 NASA Road One, Houston, TX 77058.

The nomenclature of lunar mare basalts is inconsistent, complicated, and arcane. It reflects in part the limitations of our understanding of the basalts. It more reflects the piecemeal progression made in lunar science i.e. a new field opened up in several rapid steps without standard paradigms for mutual comparison. The nomenclature is subject to a stifling influence of historic accident.

At present, there is no classification of lunar mare basalts. *Luna 24 VLT* and *A12 olivine* basalts are merely labels for specific suites ; a classification is inclusive (all have a place) and exclusive (all have only one place). The answer to "how should rocks be classified?" is far from trivial, for it demands a fundamental choice about nature and ordering. Classification functions as a primary tool of perception, opening up ways of seeing things, sealing off others. Lacking a classification, mare basalt petrology appears immature with little consensual perception of the qualities and significances of the basalts. The appearance may not be the reality, but it demonstrates a need for a functioning, communicatory classification, in particular for the dissemination of ideas and the furtherance of studies.

Inconsistency of current nomenclature: Names are inconsistent both among lunar rocks, and between lunar and terrestrial rocks. Samples are labelled by elements, chemistry with tags, chemistry cast into mineralogy, or a mineralogical attribute (respective examples A14 VHK, A17 high-Ti Group B^1, A15 quartz-normative, A-12 pigeonite). Such inconsistency is bound to lead to confusion. Chemical descriptions mean different things in mildly different contexts: A *low-K* Fra Mauro basalt (not a basalt!) contains slightly more K than an Apollo 11 *high-K* basalt. *High-alumina* means more than about 11% Al2O3 for mare basalts, but 21% for highlands "basalts". Volcanic KREEP basalts,~18% Al2O3, are not (usually) qualified with "high-alumina". Yet for terrestrial basalts, high-alumina means more than ~17% Al2O3. Further, even *very-low*-titanium mare basalts have titanium abundances (~0.5-1.5% TiO2) as great as typical terrestrial basalts. Thus parallels between lunar and terrestrial nomenclatures are non-existent (reinforced by the fact that a mare basalt composition found on earth would be too ultramafic to name *basalt* at all). A separate type of name exists for mare basalt glasses, which are identified by site, color, and a letter for any subsequent distinctions e.g. A15 Green Glass C.

Arcane character of current nomenclature: While the inconsistencies cited above by themselves make nomenclature arcane, a greater source of difficulty is the common use of

acronyms such as VHK and VLT. Most of these are partly chemical acronyms, but degrading the symbol Ti to T (for instance) makes them unintelligible and devoid of information even to the intelligent, educated non-expert.

Towards a classification of lunar mare basalts:
Classifications have functions. A major one must be communication i.e. a name for a mare basalt provides a common understanding of what the basalt is. For the small number of suites currently available, the present labels may work (though inefficient and insufficient); with continued recognition of more basalts, Antarctic meteorite samples, polar orbiter data, sample returns, and lunar base studies, labels will become increasingly inefficient.

To establish a useable classification, there must be some criteria for relationships. Petrologists need to decide what the most significant characters are, and how these can be translated into a classification. The common distinction on the basis of Ti (the major element with the greatest variation) may or may not be appropriate. It remains to be established that the use of Ti is of fundamental value both in relating basalts to each other and in communication, or merely an historical accident or response to its variance.

A great deal of discussion among interested parties will be required to arrive at a clear, functional, consistent classification of mare basalts. A classification would need to be such as could be used by a range of workers including remote sensing specialists, and thus would need to be hierarchical, according to what data is available. Acronyms should be eliminated, but some form of coded classification of use in computer data bases could be a useful supplement to a classification. There are several key questions to address: 1) do we know enough about mare basalts to yet formulate a classification, or is the field indeed too immature? 2) should basalts should be classified at the suite scale (presupposing quite a lot of information about several samples) or at the hand sample scale, and how would such classifications satisfy remotely sensed information? 3) how should chemistry and texture be balanced in any classification; should texture merely be a qualifier? 4) are there truly natural divisions among mare basalts? If not, can arbitrary divisions still facilitate communication?

Any classification must avoid a detailed genetic base. Obviously the genesis might be debatable or the consensus change, but more importantly, there is not "an" origin for a given mare basalt. It has an origin going back to lunar formation, and combining source production, crystallization, source mixing, partial melting, assimilation, and so on. It would be difficult to incorporate 5% assimilation into a genetic classification.