NEW SAMPLES FROM THE MOON: THE ROLE OF LUNAR METEORITES AS EVIDENCE FOR NEW VIEWS OF THE MOON.

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The rocks and soils brought back to Earth by the 6 manned Apollo Missions of the USA and the 3 automated Luna Missions by the Soviet Union have formed the basis for extensive research of the Moon, resulting in much of what we know today. However, these rocks represent a sampling from but a small region of the Moon (<10%) and have presented us with a biased view. Indeed, the remote sensing results from the Clementine and Prospector data have given us a larger, more comprehensive picture of the regolith of the Moon. However, the theories, ideas, axioms, and truths of the Moon have received considerable additional support and extension from the "ground truths" supplied by 'new' lunar samples, in the form of meteorites.

For the several years, meteorites long-ago blasted off the Moon have been found on the blue ice of Antarctica. However, more recently, many more lunar meteorites, as well as martian and other unusual extra-terrestrial rocks, are being found in the desert regions of north Africa and southwest Asia. These regions present an entirely new setting in which the dark meteorites stand out by contrast from their surroundings. Effectively, when viewed with binoculars from a distance, a black spot in the sand can be; a) a 'coke can' [alcohol is verboten there], b) a reminder that a camel has stopped there recently, or c) a dark-colored rock, hopefully a meteorite. Several groups of entrepreneurs have established expeditions that search the desert sands, with their sparse vegetative cover, much the way others search the blue ice at the poles of the Earth.

Literally thousands of meteorites, including dozens of new lunar rocks, have been discovered in the deserts, each weighing from a few grams to well over a kilo. But, most importantly, they come from places on the Moon that have not been sampled by the missions of the 70's. Several of these lunar meteorites have no counterparts in the Apollo and Luna collections. Indeed, many are thought to have been derived from the farside of the Moon and present us with entirely new lithologies. In some of these lunar meteorites that consist of breccias of ancient regolith, we have found entirely new minerals, giving us positive evidence for ideas that one might have suspected from Apollo studies.

We at the Planetary Geosciences Institute in Tennessee have been fortunate to have Russian colleagues who are involved with the identification of many of these unusual lunar meteorites. The science that they have rendered will be reviewed, along with new concepts concerning the space-weathering formation of regolith on the Moon, as well as reinforcing evidence for remote-sensing discoveries of the last decade.