News from the Moon and Mars : preliminary examinations of two new Saharan finds. J. A. Barrat[1], Ph. Gillet[2], A. Jambon[3], V. Sautter[4], M. Javoy[5], E. Petit[5] and M. Lesourd[6], [1]Université d'Angers, Faculté des Sciences, 2 bd Lavoisier, F-49045 Angers Cedex (barrat@univ-angers.fr) ; [2]E.N.S. Lyon, Dept. de Sciences de la Terre, 46 allée d'Italie, F-69364 Lyon cedex 07 ; [3]Université de Paris VI, Labo. Magie, 4 pl. Jussieu, F-75252 Paris Cedex 05 ; [4]MNHN, labo. de Minéralogie, 61 rue Buffon, F-75005 Paris ; [5]IPG Paris, Labo. Géochimie des Isotopes Stables, 4 pl. Jussieu, F-75252 Paris Cedex 05 ; [6]SCIAM, 2 rue Haute de Reculée, F-49045 Angers Cedex.

Introduction: We report on the discovery of two achondrites recovered from Sahara (Morocco) last november : a lunar basalt and a basaltic shergottite. These two stones are still unnamed. In this abstract we present preliminary results based upon petrographic observations, electron microprobe analyses and micro-Raman spectrometry of polished sections. Geochemical work is in progress and additional data, including major, trace elements and O-Sr-Nd isotopic compositions will be presented during the conference.

Lunar basalt: This stone (156 g) was collected in the Khter n'Aït Khebbach area. It strikingly resembles NWA032, another lunar meteorite described last year [1]: olivine, pyroxenes and chromite phenocrysts occur in a groundmass of elongate pyroxene and calcic plagioclase crystals radiating from common nucleation sites (Fig. 1); the phase compositions are the same than those reported for NWA032 but shock melt veins were not recognized in our section. We conclude that these two meteorites are likely paired.

Basaltic shergottite: The location of its find is unknown. This small stone (28 g) is nearly totally covered with fusion crust. It is a coarse-grained basalt consisting mainly of pyroxenes and plagioclase converted to maskelynite (fig. 2). Accessory minerals include merrillite, chlorapatite, pyrrhotite, Fe-Ti oxides, fayalite and silica.

Pyroxenes are subhedral to euhedral. The largest grains are up to 3 mm in length and display a very complex zoning (Figs 3 and 4): the core is Mg-rich pigeonite ($En_{70}Fs_{26}Wo_4$), surrounded by Mg-rich augite ($En_{41}Fs_{29}Wo_{30}$), and finally zoned toward a Fe-rich pigeonite rim ($En_5Fs_{84}Wo_{11}$). Their FeO/MnO ratios are similar to those in other martian basalts. Pyroxferroite has not been detected yet. The same kind of zoning and a similar behavior of minor elements in pyroxenes (e.g. Al, Ti) were previously described in other basaltic shergottites such as EETA79001B and QUE94201 [2 to 4].

Maskelynites are interstitial to pyroxenes and typically lath-shaped. They display small offshoots (occuring as smooth and irregular branches in the neightboring pyroxenes) and contain sometimes pyroxene fragments separeted from the bordure and drifted into the maskelynite. Microprobe analyses were carefully made using a defocused beam of 10 micrometers in diameter and probe current of 8 nA to minimize volatile loss, and no clear zoning has been detected. The compositions are homogeneous (An46-50 Ab 52-48 Or about 2, average An 48.4 Ab49.4 Or2.2). These observations suggest that this maskelynite is a dense quenched glass in agreement with Chen and El Goresy [5].

Merrillite occurs as rounded interstitial grains (the largest is up to 0.1 mm in length) and contains a significant amount of FeO (about 5 %). They are often rimmed by a 6-40 micrometers thick mixture of fayalite (Fa about 95), silica, accessory Fe-Ti oxides and pyrrhotite. These intergrowths suggest that the late stages of crystallization occured at an oxygen fugacity close to the FMQ buffer.

Silica occur mostly as irregular grains included in maskelynite or between maskelynite and pyroxene, typically surrounded by radiating cracks. They resembles the silica grains recently described in Shergotty by Sharp et al. [6]. Raman spectroscopy measurements show that these silica represent a mixture of dense silica glass and stishovite.

We dedicate the discovery of this meteorite to Pr. Théodore Monod (1902-2000) who has spent many years in Sahara searching for a giant meteorite.

References: [1] Grossman J.. (2000) *Meteoritical Bull 84* [2] McSween Jr H. et al. (1996) *Geochim. Cosmochim. Acta,* 60, 4563-4569 [3] Mikouchi et al. (1998), *Meteoritics & Planet. Sci.,* 33, 181-189 [4] Mikouchi T. et al. (1999) *Earth Planet. Sci. Lett.,* 173, 235-256 [5] Chen M. and El Goresy A. (2000) *Earth Planet. Sci. Lett.,* 179, 489-502 [6] Sharp T.G. et al. (1999) *Science,* 284, 1511-1513

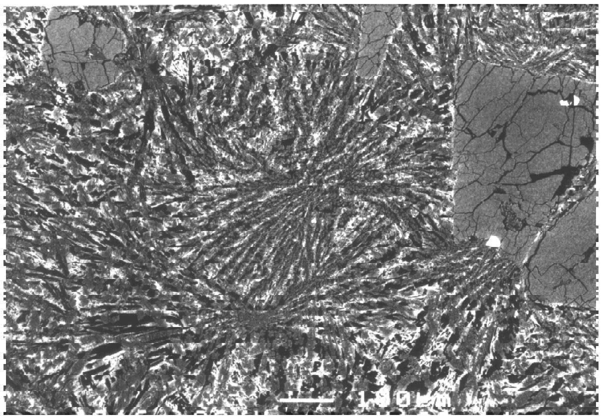

Fig. 1. Backscattered electron image of the new lunar meteorite displaying olivine phenocrysts and the stucture of the groundmass.

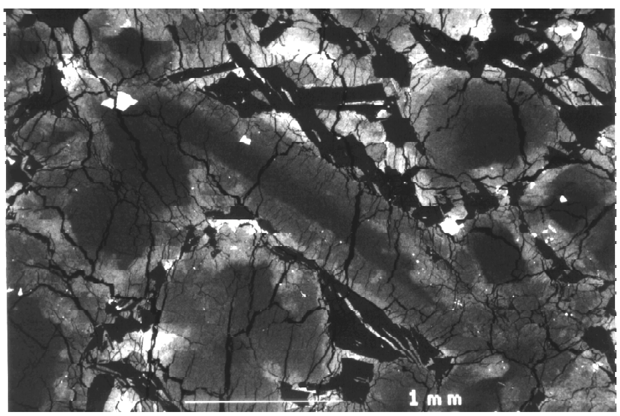

Fig. 2. Backscattered electron image of the new Saharan shergottite. Large gray crystals are zoned pyroxene, and dark grey phase is maskelynite. Fe-Ti oxides and pyrrhotite appear white.

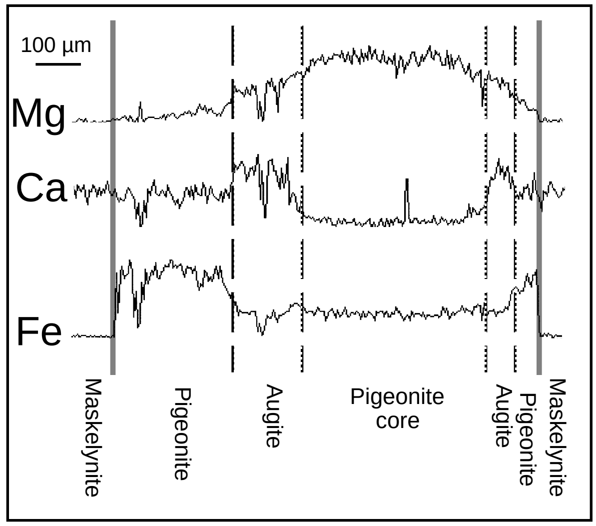

Fig. 3. Composition profiles obtained on a large pyroxene crystal.

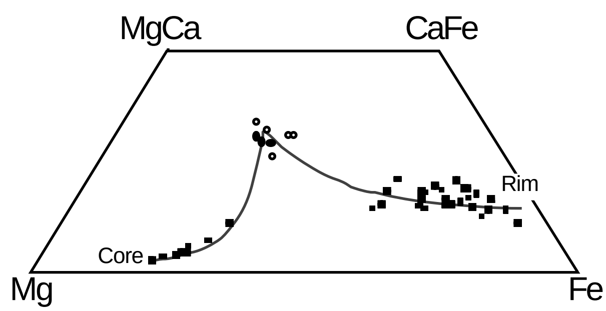

Fig. 4 Quadrilateral pyroxene compositions of the new Saharan shergottite.