Both pestle and mortar should be sent to a commercial heat treating house to be carburized to a depth of at least $\frac{1}{8}$ inch and hardened to 62–64 Rockwell C. It is not necessary to harden the sleeve although it may be cyanided.

After heat treating the mortar is chucked in the lathe and the diameter of the projection is ground with a tool post grinder to a tight, but re-

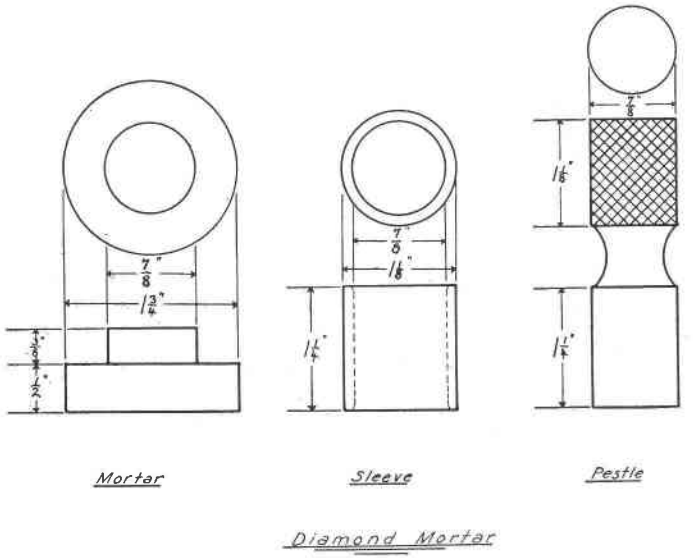

FIG. 1

movable, fit to the sleeve. The face of the projection should be ground true to the side at the same chucking. The pestle is also chucked and the diameter of the grinding end reduced about .005 inch, or a working fit in the sleeve. The face of the pestle should also be ground true with the side.

A NEW LOCALITY FOR GREENOCKITE CRYSTALS IN BOLIVIA

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Greenockite is a rare mineral in the Bolivian tin deposits. It has been described only from Llallagua by S. Gordon (1). The mineral forms coatings of minute red crystals, resembling vanadinite in colour, upon quartz, marcasite, cassiterite and on the wall rock, almost always associated with wavellite. The crystals are exceedingly minute, rarely measuring as much as 0.1 mm. They vary greatly in habit from pyramidal to thick tabular and prismatic. Cyclic twins are common. Gordon ascribes the formation of the mineral to supergene solutions. The source of the cadmium may have been from the wurtzite or sphalerite which has relaced pyrrhotite.

Recently I found a second occurrence of greenockite in Bolivia, which is remarkable for the larger size and the rich red colour of the crystals. The crystals are probably the finest ever found of this rare mineral.

The crystals were found in the Asunta tin-silver mine, 4 kms. northeast of San Vicente, a silver district in the Sud Chichas province, Department of Potosi. Here, lode-like bodies of a mineralized breccia in Ordovician metamorphosed shales pass in depth into real veins. In a first stage of mineralization, quartz, yellowish fine-grained cassiterite, and pyrite have been formed. In a second stage, the "Veta Chica," a small silver vein cutting the breccia, was formed. The vein has a complex mineralization with pyrite, dark grey fine-grained cassiterite, stannite, alunite, miargyrite, canfieldite(?), barite, franckeite, and greenockite. Franckeite is the most common mineral of the second stage. It is also found in the vugs and fissures of the brecciated shales outside of the vein.

In the fissures and small vugs the greenockite crystals form coatings upon pyrite, franckeite, canfieldite(?), and on the wallrock. They are 0.5 to 2 mm. in size, have a strong adamantine luster, and are generally of a deep red, garnet-like colour, but I also found crystals resembling realgar in colour. Some of them are covered by earthy orange greenockite and partially replaced by it.

All crystals are dihexagonal pyramids, sometimes twinned with twin plane parallel to (0001). Cyclic twins are absent.

I found the mineral in the 56 m. and 150 m. levels. It is obviously a hypogene mineral, the latest in the paragenesis. The source of the cadmium has not been determined. Sphalerite and wurtzite do not occur in the vein which contains the greenockite crystals.

Reference

1. Gordon, Samuel G., Greenockite from Llallagua, Bolivia: *Notulae Naturae of the Acad. of Nat. Sci., Philadelphia*, No. 1 (1939).