THREE NEW CHONDRITES FROM WESTERN NAMIBIA; Arch M. Reid, Petr Jakes, University of Houston and Lunar and Planetary Institute, Houston TX, Michael Zolensky, NASA Johnson Space Center, Houston TX, and Roy Miller, Geological Survey, Windhoek, Namibia.

Recent exploration activities aimed at meteorite recovery have targeted areas based on climatological, geomorphologic, and geologic factors. The ideal target for meteorite recovery is characterised by some combination of rapid meteorite burial and recent deflation of cover sediments or ice, absence of significant fluvial activity and low levels of bioturbation, extremely cold climate, high aridity, stable surface conditions over extended periods, minimal sedimentation rates, and prolonged deflation of surface material. These conditions are probably best met in polar locations. However, meteorite recovery targets should also occur along the Tropics of Cancer and Capricorn, where the incidence of solar radiation is high, and stationary high pressure regions exist. Multiple meteorite discoveries have been reported from the southwest United States, the Sahara, Western Australia, and Chile. We report here the discovery of meteorites in a potentially productive meteorite recovery area in west-central Namibia.

The Namib Desert is a long narrow desert region in western Namibia, extending approximately 2000 km from the Olifants River in northwestern South Africa to the Carunjamba River in southern Angola. The age of the Namib surfaces in the searched regions is subject to controversy, but is generally believed to be at least 5Ma (1). Aridity is high in the interior, but there is significant humidity along the Atlantic coastal margin.

In June 1991 we performed reconnaissance searches in four major regions of western Namibia: 1) along the fan delta of the Omaruru River, north and east of Henties Bay; 2) along terraces to the south of the Swakop River, east of Swakopmund; 3) on deflation surfaces east of Walvis Bay, close to the border with South Africa; and 4) on deflation surfaces and inter-dune corridors within the Namib Sand Sea, west of Tsondabvlei and south of Gobabeb. The Gobabeb meteorite, described by Fudali and Noonan (2) was recovered from a sand dune in this area. All four areas are characterised by ancient land surfaces with significant deflation in an arid climate. For three of the selected areas no finds were made despite their apparent suitability. In the region east of Walvis Bay, three ordinary chondrites were recovered. The reasons for success in that area are not yet clear, but may be related to aridity (which increases with distance from the coast), to more efficient initial burial, to more recent deflation, to all of these factors, or to luck. Absence of meteorites adjacent to major dunes may be related to the slow movement of dunes, which do retain some moisture. The presence of rock varnish, with embedded quartz grains, on some of the meteorites surfaces increases the difficulties of recognition.

We recovered the three meteorites from a large deflation surface east of the town of Walvis Bay, South Africa, just within the border of Namibia at 23° 5.0'S, 14° 42.9'E. Each meteorite was well exposed at the surface and all three were discovered in a series of foot-searches covering in all an area of approximately 4 sq km. In the other three areas approximately 9 sq km were searched without success.

The largest of the three meteorites (temporary name RM2072) is a single severely weathered stone that weighed 1.039 kg. The interior surface is cracked, with thin pervasive iron oxide veinlets. RM2072 is a H-group chondrite with olivine of constant composition, Fo80.9. Other major silicates are orthopyroxene, Wo1.3En81.9Fs16.8, clinopyroxene, Wo47.1En46.7Fs6.2, and plagioclase.
Or6.3Ab80.5An13.2. Minor chromite and phosphate also occur along with troilite and metal. Chondrules in RM2072 are generally poorly defined and the meteorite is probably an H6.

Meteorite RM2134 is a single specimen that weighed 0.902 kg. It is the least weathered of the three, and still retains fusion crust. The interior surface shows prominent chondrules, up to 2 mm in diameter. RM2134 is an L-group chondrite with homogeneous olivine, Fo76.6, and orthopyroxene Wo1.3En77.9Fs20.8. A few pyroxene grains are multiply twinned, and apparently are clinobronzites. Chromite, troilite and metal are also present, and some chondrules carry very fine-grained devitrified glass. The meteorite is not highly metamorphosed and may be an L4 or L5.

The third meteorite was recovered as 27 small fragments spread over an area of approximately 2 square yards. The largest pieces weighed 0.401 kg (RM2131), and 0.362 kg (RM2132). RM2132 is weathered with many fine oxide veins. Well-developed chondrules range up to 1mm diameter. This is also an L-group chondrite with homogeneous olivine, Fo75.4. Both orthopyroxene, Wo1.2En76.3Fs22.4, and clinopyroxene, Wo45.3En46.2Fs8.5, are present with no clinobronzite. Chromite, troilite and metal are also present, and at least one chondrule carries isotropic, homogeneous, high silica glass(?). Though weathered, chondrules are readily distinguished and the meteorite is probably an L5. Samples RM2134 and RM2132 are similar and were found in the same general area, but may not be paired. RM2132, besides being more highly weathered, does not appear to carry clinobronzite, and has slightly less magnesian olivine and pyroxene: olivine is Fo76.6 (sd 0.48) in RM2134 and Fo75.4 (sd 0.42) in RM2132; the enstatite content of orthopyroxene in RM2134 is En78.0, and is En76.3 in RM2132.

The vast size of the potential catchment area and the recovery of three new meteorites, by an expedition that did not involve many total man hours, suggests that additional meteorite searches in western Namibia may be very rewarding.

Acknowledgements: We thank Justin Wilkinson for critical assistance in site selection, and the Kanagawa Museum of Natural History in Yokohama and the Geological Survey of Namibia for their invaluable support.