($n = 152$); low-Ca pyroxene, $Fs_{8.4–27.8}$ ($n = 68$); excellent preservation of glass in chondrules; shock stage, S1; weathering grade, W2. Specimens: main mass owned by Dr. R. McKenzie, WRP, Pty. Ltd, Pretoria, 0001 South Africa; type specimens, four pieces totaling 192.7 g, *TM*.

Lucerne Valley 013, classification

Lucerne Valley (LV) 013 has now been classified by A. Rubin (*UCLA*) as L5, shock stage S2, weathering grade W3. LV 013 is probably paired with LV 014 and LV 016.

Morávka ~49°36' N, 18°32' E

North Moravia, Czech Republic
Fell 2000 May 6, 11:51:52 U.T.
Ordinary chondrite (H5)

After a bright fireball was observed in the Czech Republic, Poland, and Slovakia, and a sonic boom was heard in northern Moravia, a 214 g stone that had passed through a spruce tree and landed in a garden was collected. Two other pieces weighing 329 and 90 g were collected later in May and in June. The fall was videotaped, allowing the calculation of orbital parameters (P. Spurný, J. Borovička, Z. Ceplecha, *CAS*): $a = 1.85 \pm 0.10$ AU, $e = 0.47 \pm 0.03$, $q = 0.9823 \pm 0.0012$ AU, $Q = 2.7 \pm 0.2$ AU, $\Omega = 46.2580°$, $\omega = 203.5° \pm 1.0$, $i = 32.2° \pm 0.8$. Mineralogy and classification (P. Jakeš and J. Frýda, *CUP*): olivine, $Fa_{19.2}$; low-Ca pyroxene, $Fs_{16.9}$; high-Ca pyroxene, $Fs_{6.2}Wo_{44.3}$; see also Borovicka *et al.* (2000). Specimens: main mass, *CAS*.

Northwest Africa 002 and 014–018, corrections and additions

The masses of these meteorites were reported incorrectly in *MetBull* 84. The correct masses are NWA 002 = 234.4 g, NWA 014 = 4 g, NWA 015 = 5 g, NWA 016 = 22 g, NWA 017 = 78 g, and NWA 018 = 86 g. The mean and range of Fa of olivine in NWA 014 and 016 were also stated incorrectly. The correct data are: NWA 014, $Fa_{20.4(18.2–25.8)}$; NWA 016, $Fa_{19.9(15.1–30.3)}$. M. Ivanova (*Vernad*) reports that NWA 002 is a partly melted EL6, shock stage S5, with 0.97 wt% Si in kamacite, pyroxene composition of $Fs_{0.63}$, and plagioclase composition of $An_{10.6}$.

Northwest Africa 033–820, see Saharan meteorites from Morocco and surrounding countries

Northwest Africa 047

Northwest Africa
Purchased 2000 April
Achondrite (monomict eucrite)

A 5200 g stone was purchased in the town of Erfoud. Mineralogy and classification (J. Barrat, *UAng*; P. Gillet, *ENSL*): a breccia containing numerous clasts of subophitic basalt in a gray, medium-grained, recrystallized matrix; contains plagioclase ($An_{85–88}$), pigeonite ($Fs_{60.0}Wo_{5.6}$, $n = 13$) with exolved clinopyroxene ($Fs_{30}Wo_{42}$, $n = 8$), tridymite (determined by Raman spectrometry), ilmenite, and chromite; phases identical in composition in matrix and clasts. Specimens: 53 g plus polished section, *ENSL*; main mass, *Carion*.

Northwest Africa 049

Northwest Africa
Purchased 2000
Achondrite (eucrite)

A 276 g stone was purchased in Morocco. Mineralogy and classification (J. Barrat, *UAng*; P. Gillet, *ENSL*): contains centimeter-sized ophitic clasts in a brecciated matrix; pyroxenes in clasts are zoned with Mg-rich cores, $Fs_{32.3}Wo_{5.9}$ to $Fs_{52.7}Wo_{7.3}$; clasts contain numerous veinlets of olivine, $Fa_{78–82}$; matrix contains pyroxene with variable thicknesses of exsolution lamellae, with or without olivine; this eucrite is probably polymict. Specimens: 23 g plus two thin sections, *ENSL*; main mass, *Carion*.

Northwest Africa 176

Possibly near Morocco/Algeria Border
Found 1999
Iron meteorite with silicate inclusions (ungrouped)

A 2 kg stone was purchased in Morocco by Geoffrey Cintron. Classification and mineralogy (K. Keil, E. Scott and M. Liu, *UHaw*): a fresh iron with lightly shocked (S1) greenish-yellow polymineralic silicate inclusions (40 vol%) 1–10 mm in size; olivine, $Fa_{11.4\pm0.3}$; orthopyroxene, $En_{85.9\pm0.8}Fs_{11.4\pm0.6}Wo_{2.7\pm0.4}$; clinopyroxene, $En_{51.8\pm1.9}$ $Fs_{5.9\pm0.7}Wo_{42.2\pm2.4}$; plagioclase, $An_{49.9\pm2.7}Ab_{46.5\pm2.2}$ $Or_{3.6\pm0.7}$; weathering grade, W0. Metal composition (J. Wasson, *UCLA*): Co = 0.413 wt%, Ni = 8.66 wt%, Cu = 318 ppm, Ga = 17.7 ppm, Ge ≈160 ppm, As = 9.12 ppm, Ir = 3.56 ppm, Au = 0.853 ppm. Oxygen isotopes (R. Clayton and T. Mayeda, *UChi*): silicate inclusions, $\delta^{17}O = -6.5‰$, $\delta^{18}O = -2.5‰$. Oxygen isotopes and bulk chemistry show that this is an ungrouped iron closely related to the Bocaiuva iron with silicate inclusions. Specimens: main mass with G. Cintron, 164 Scooter Lane, Hicksville, NY 11801, USA; type specimen, 68 g, *UHaw*.

Northwest Africa 468

Northwest Africa
Year of find unknown
Iron meteorite with silicate inclusions (ungrouped)

A 6100 g meteorite was purchased in Tucson, Arizona, in 2000 January by David Gregory from a Moroccan dealer who had bought it originally in Alnif, Morocco. Classification and mineralogy (J. Wasson and A. Rubin, *UCLA*): an ungrouped iron with chemical affinities to IAB irons and possibly related to the Antarctic iron Grove Mountains 98003; bulk metal composition, Cr = 2300 ppm, Co = 0.719 wt%, Ni = 11.85 wt%, Cu = 263 ppm, Ga = 31.0 ppm, As = 22.8 ppm, Sb = 0.431 ppm, W = 0.65 ppm, Ir = 2.75 , Pt = 4.0 ppm, Au = 2.21 ppm; contains massive silicate inclusions, with average mineral compositions of olivine, $Fa_{4–7}$, low-Ca pyroxene, $Fs_{8.6–9.4}$, high-Ca pyroxene, $Fs_{3.7}Wo_{45.4}$, plagioclase, $An_{78.7}Or_{2.6}$. Oxygen isotopes (R. N. Clayton and T. Mayeda, *UChi*): silicate inclusions, $\delta^{17}O = +0.18‰$, $\delta^{18}O = +3.01‰$, $\Delta^{17}O = -1.39‰$. Specimens: main mass with D. Gregory, 230 First Avenue, Suite 108, St. Thomas, Ontario, Canada; type specimen, 61.6 g, *UCLA;* 185 g, *ROM*.

Northwest Africa 470 31°59.0' N, 4°11.2' W

Morocco
Found 1999
Carbonaceous chondrite (CH)

A meteorite weighing 62.9 g was purchased from nomads by S. Afanasiev during an expedition to the Er Rachidia region of the Moroccan Sahara in 2000 April. Mineralogy and classification (M. Ivanova and M. Nazarov, *Vernad;* M. Petaev, *CfA*): fusion crust is blackish-brown; there are two populations of chondrules, one with cryptocrystalline textures, 20–50 μm in size, the other with porphyritic olivine-pyroxene or barred olivine textures, >50 μm in size; matrix