Highlights of the UCLA Meteorite Gallery

Geology Building room 3693

The most common meteorites to fall are the chondrites. The Gallery has a number of these specimens in Cases 1 and 2. The chondrites are the oldest rocks in the Solar System – they are older than the planets. Their compositions are similar to that of the Sun except that they are depleted in the most volatile elements such as H, He, C and O. The best preserved chondrites are those picked up just after they fell. Note especially the observed falls from La Criolla (Argentina), Bruderheim (Canada), Murchison (Australia), and Allende (Mexico).

The iron meteorites are the largest objects found in meteorite museums. This is because they are tough survivors. They resist breakup during collisions in space, fragmentation when they enter the atmosphere (at about 60 times the speed of sound), and mechanical and chemical weathering on the Earth's surface. Our Clark Iron, a 357 lb (162 kg) mass of the Canyon Diablo meteorite, is the centerpiece of the Gallery. It has a striking shape produced by a combination of erosion during atmospheric passage and weathering loss of iron sulfide nodules which produced the deep holes on the south side. Two other big irons are the 811 lb (368 kg) Gideon (Nabibia) and the 326 lb (148 kg) Camp Wood (USA), on loan from the Utas family; the 811 lb Gibeon is the largest iron in California outside of Barstow. These three irons can be touched by the visitors.

Competing with the big irons are three back-lit pallasites in Case 3 of the Gallery. (Pallasites shown in normal light are in Case 1). These beautiful rocks are samples of the core-mantle boundary of an asteroid that melted. The yellow transparent mineral is olivine, the main constituent of the Earth's mantle and of most asteroidal and planetary mantles. The opaque phase (shiny in reflected light) is metal from the asteroidal core. The Schlazer family donated these pallasites to the UCLA Meteorite Collection in 2013.

Melting of asteroids that were initially chondrites produced phase separation into metal (the core) and olivine (the abundant, dense part of the silicate fraction). It also produced low-density silicate melts that rose buoyantly to form basalts at the asteroid surface. These basalts are closely similar to lavas produced by many terrestrial volcanoes. In Case 7, we have examples of melted meteorite rocks from the near-surface regions. The common meteorite basalts are called eucrites. Case 7 also contains samples of once-molten rocks from the Moon and Mars.

Because it is fun to learn about the meteorites that have been recovered near home, in Case 6 we show a selection of meteorites from California. At the bottom of the same case are "meteorwrongs". Because of the unusual appearance of these specimens, members of the public have conveyed them to us hoping they were meteorites.

Impacts have affected every meteorite. Some impacts generated enough heat to melt the target rock. In Case 4 we have some outstanding examples of meteorites that have been partly melted or broken apart and pieced back together by impacts. Especially striking is the observed fall from Portales Valley, NM. Here we see thick metal veins that have filled cracks in an ordinary chondrite; because the chondrite retained its structure, we infer that the metallic melt was generated somewhere else (but perhaps only a meter or so away).

In Case 5 we show some fine examples of tektites and Libyan Desert Glass (which is also a form of tektite). Tektites are not meteorites but melted terrestrial soils. The energy source that melted the tektites and transported them for small or large distances was the accretion to Earth of an asteroid or cometary mass. Tektites come in two forms: splash forms (or, better, spin forms) are once-molten blobs that solidified into glass while spinning high in the Earth's atmosphere; others are fragments of a melt sheet that flowed on the Earth's surface before chilling to a glass. We show very attractive examples of each; note the different shapes of the two kinds of tektites and the difference in Libyan Desert Glass between the dense green layers and the porous, foamy white layers.