Visiting the Hoba Meteorite

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Southern Africa is fortunate to contain some very interesting impact sites, such as the Tswaing crater North of Pretoria, South Africa, and the inaccessible Roter Kamm in the Diamond Area just North of the Orange River. The Hoba meteorite in Namibia is very special, being the largest iron meteorite known, and still lies where it fell. While on a holiday in Northern Namibia recently, our family group took the opportunity to examine this remarkable piece of iron and nickel.

About 40 years ago, Don Fernie (1967) wrote an article for the Journal of Royal Astronomical Society of Canada about a trip from Cape Town to the site (claiming to only be the second astronomer to have visited it). In those days, it seems to have been quite an adventure, with very bad roads to contend with. Today, there are tarred roads all the way to Grootfontein and beyond. It is an easy detour when visiting the Etosha Pan game reserve via the Namutoni Gate. The gravel side-road to the meteorite branches off the road to Tsumeb (and Namutoni) just outside Grootfontein. We found its surface in good condition, perhaps thanks to the fact that Hoba is now something of a tourist destination. The area is pretty, with mountains nearby, and sustains farming, having a moderate rainfall of about 75 cms per year.

The name of the meteorite, also known as the Hoba West meteorite, comes from the farm on which it lies. The land immediately around the meteorite was donated by the farmer, a Mr Englebrecht, and Rössing Uranium gave funds for its development to the National Monuments Council in 1985. The entrance area, shop and toilets are attractively constructed out of local stone and the surrounds contain many interesting plants. There are a few rather disinterested officials who presumably look after the site and take the entrance fee of N$10 (R10) per person. Windhoek lager and cool drinks are available in the shop, and there is a shady stoep with picnic tables. A path

Family group posing on top of spaceship Hoba, which measures nearly 3m along its edge.

through the indigenous vegetation leads to the hollow in which the meteorite rests. Originally, only its top protruded out of the ground, but a small amphitheatre has been excavated to expose its sides and some of the bottom.

Close-up of edge of meteorite, showing places where pieces have been removed.

The shape of the meteorite, which is almost a rectangular block, is quite unusual compared to more typical specimens, which are usually irregular and often elongated. The dimensions across its top are 2.95 x 2.84 metres and its height varies from 75 cm to 1.22 m. It weighs about 60 tons. Its composition is 82.4% iron, 16.4% nickel and 0.76% cobalt and is specifically an ataxite, a very hard meteorite with a high nickel content (information from a fact sheet available at the site). Small pieces have been removed from time to time by scientists, souvenir hunters and vandals. When polished flat they reveal the characteristic "Widmanstätten" crystalline patterns.

The dating of the fall of the meteorite was a very complex process involving many assumptions. Ground water and minerals from the surrounding terrain covered it with a limestone "calcrete" layer afterwards. The outer 30cm of the sides and bottom have been weathered into "iron shale". From an analysis of a surface sample, McCorkell et al (1968) concluded from the abundances of various constituents formed by cosmic rays while the meteorite was still in free space that the sample was originally 30 to 40 cm below its surface. This gives an idea of the reduction in its size that occured during its fall through the atmosphere. From the decay of the radioactive isotope Ni^{59}, whose abundance at the time of the fall could be estimated, the time elapsed since then is less than about 80,000 years. ☆

Fernie, J.D., 1967 JRASC, 61, 127.

McCorkell, R.H., Fireman, E.L., D'Amico, J., Thompson, S.O, 1968 Meteoritics, 4, 113.