

NOTES

“SHIVA CRATER”

The mysterious disappearance of great life forms at the K-T boundary is a burning problem. What led to the destruction of several life forms is still an unresolved issue. Shankar Chatterjee of the Texas Technical University, USA and Dhiraj K. Rudra from the Indian Statistical Institute, Calcutta have analysed this problem in a research paper published in the Memoir of the Queensland Museum, 39(3); pp. 489-532, Brisbane. They have come forward with the idea that a 600 km long, 450 km wide and 12 km deep oblong crater whose one half can be identified at the western margin of India around the Bombay High. The other half of the crater according to them is located at the Amirante arc (basin) of Seychelles; both the segments being equidistant from the Carlsberg ridge. They have named this crater as the “Shiva Crater” (so named after the Hindu God of destruction - Lord Shiva). The authors have painstakingly collected huge amount of data pertaining to Deccan volcanism, palaeomagnetism, dinosaur palaeontology, and related aspects besides tracing ideas about the K-T problem and impact craters around the world.

Of the two proposed causes for faunal extinction at the K-T boundary, the authors prefer the meteorite impact theory. They preclude the possibility of the meteorite impact triggering Deccan volcanism for they point out that the floor of the crater is made up of Deccan basalts and it was nearly 1 m.y. older than the impact. The “impact” proponents have been looking for possible K-T impact sites. The Chicxulub structure in the northern coast of Yucatan Peninsula of Mexico is a possible candidate. Exactly antipodal to the Chicxulub crater is the Shiva crater. When the two halves of the crater are joined together they form an oblong structure (SW-NE) almost resembling a “teardrop” probably created by a low angle projectile which was approximately 40 km in diameter which could excavate a 600 km long, 450 km wide and 12 km deep crater.

The synchronous events of initiation of spreading along the Carlsberg ridge, the emplacement of flood basalts and similar Palaeomagnetic anomalies on both sides of the Carlsberg ridge are suggestive of a mega impact event at around 65 Ma (based on $^{40}\text{Ar}/^{39}\text{Ar}$ ages). Also, the authors have made use of the valuable oil exploration drilling data of Bombay High and Amirante Basin which is indicative of a deep crater-like basin. Conclusive evidences for the existence of impact crater-like melt rocks, breccia ejecta spread, shock quartz, tektites, iridium-rich layers, tsunami deposits are lacking. 5 km thick Tertiary sediments have covered the crater and the rest of the tell-tale evidence. Notwithstanding these constraints the authors have done well to conceptualise the impact of an extra-terrestrial object which raised huge dust clouds leading to a “nuclear winter” thereby affecting and eventually destroying all the well established life forms including dinosaurs. Conditions were probably further complicated by the subsequent extensive flood eruptions of Deccan in India (also in Seychelles).

Critical evidence for both the Shiva and the Chicxulub craters has come from petroleum prospecting because the sediments overlying the central peak of a complex crater formed a domal structural trap. The Shiva crater is thus visualised as the site for the largest oil field in India. According to the authors, this immense crater affected global climate, chemistry of the world's ocean, a biotic crisis and perhaps even the production of oil traps.

The concept of Shiva crater is sure to stimulate interest and aid in the exploration for oil along the West Coast of India.