The Kaali Meteorite Catastrophe

We have evidence that past asteroid or comet impacts have caused mass extinctions such as that of the dinosaurs 65 million years ago. We have also seen movies and read articles about possible catastrophic effects to future civilization from such impacts. These events are hard to grasp, perhaps because we have no record of great human suffering due to such impacts in our history. Some see passages in the Bible or in other traditions (such as the Scandinavian Ragnarok) as indications of past catastrophic events (Gribbin and Gribbin, 1996). One would expect, however, hard scientific evidence that those parts of ancient history were associated with a comet or asteroid impact. Recently, however, researchers in Estonia and Sweden have turned up evidence of a meteorite causing havoc in an Estonian island community (Veski, et. al., 2001).

Scientists studying the geology of an island of Saaremaa, off the coast of Estonia, found evidence that a large iron meteorite, perhaps weighing 1000 tons, fell on this island between 800 and 400 B.C.. Such an impact would unlease a force slightly greater than that of the Hiroshima A-bomb. Archeological records show that at that time the island was densely populated. Little is know of these people as they left no written record.

The evidence for meteorite impact at this time is certain. An impact crater, 350 feet across, called the Kaali Crater, was found. It now forms a shallow lake. At least 8 satellite craters surround the main one. Crater morphology indicate the impact released the energy equilivant to 20 kilotons of TNT. Fragments of meteoritic nickel-iron are associated with the crater, as are beads of glass formed by shock melting of rocks upon impact. High iridium concentrations in the lake sediments are also evidence of meteorite impact. Carbon 14 dating of the peat deposited in the lake and nearby bogs pin-point the impact as occurring between 800 and 400 years BC.

Saarema was densely inhabited then, as it had been for thousands of years before the impact. Many Bronze Age artifacts are found there, as are the remains of towns, fields and fortresses. Cattle and crops formed the basis for the economy. Pollen deposited in nearby fens and bogs allow a detailed re-creation of the vegetation before, during and after impact. Before impact, a number of pollen grains from a variety of cultivated cereals were present, along with tree and herb pollen. At the time of impact, a unique deposit formed. This was a layer of glass spherules, meteorite fragments, rock dust, charcoal and burned stumps. Sediment deposited for the 100 years following impact was quite different from what went before. There was no cereal pollen and little tree pollen found, only an increase of dwarf shrubs. Eventually pollen populations return to their pre-impact character.

Veski et al.'s interpretations of this data paint a stark picture. The people were hit suddenly with the force of a Hiroshima-size explosion. By comparison with Hiroshima, no living thing likely survived within a mile of the crater. Flash burning of vegetation would occur up to 2 miles away, setting the stage for still wider wild fires. All structures up to 6 miles away would have collapsed. That the culture itself collapsed is indicated by the fact that there was no sign of crop cultivation for 100 years after the impact, although there are signs that survivors used the edge of crater in a fortification soon after impact.

One wonders what the survivors must have thought had happened to them, or how they would have described it to others. What influences might this have on stories and legends down to this day?

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References:

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