METEORITE STERLITAMAK - A NEW CRATERFORMING FALL

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Meteorite Sterlitamak fell on May 17, 1990 at 23^h20^m of LT (17^h20^m GMT) and formed the crater on just sown wheat field located 20 km westward from the Sterlitamak town. Many inhabitants in South Bashkiria have seen very bright fireball moved from south to north at the slope of about 45^o to the horizon. Witnesses located at the distance of 2 km from the crater state that the fireball was shined during all path up to the Earth surface, after that several explosions have been heard. In the evening on May 19 the fresh meteorite crater was found. The fresh crater was 4.5 - 5 m in depth and had sheer walls of about 3 m in height below which the conical talus with the hole in the center has been. Some large blocks of bed rock up to 50 cm in size have been on the bottom of crater. The crater has had equal rim of 60-70 cm in thickness and clear radial ejecta. The rim and ejecta are composed of brown loams which are well defined on the the black soil.

Our field team went to the crater on May 23, six days after its formation. Unfortunately, the crater rim was disturbed and compacted by visitors and the crater itself was partly filled up by material of rim up to the depth of about 3 m. Fortunately the radial ejecta have generally been preserved. The overall view of the crater is shown on the Fig. 1. The western wall of the crater was composed of well-preserved bed rock with clear bedding-plane parting with the dip of 25 - 30^o from the center of crater. A large slip block of autogenic breccia with relatively large clods of bed rock was observed at the eastern wall of the crater. During crater excavation we have observed clear allogenic breccia composed of mixture of brown loam and black soil at the depths up to 5 m.

Before excavation of the crater we collected about 2 dozens of iron meteorite fragments and mapped the ejecta. The results of mapping are presented on the Fig.2 and 3. The boundaries of crater edge and the most distant ejecta were mapped using geodesic equipment. After that the region of radial ejecta was pegged out on 8 sectors and the the boundaries of rays and continuous ejecta were mapped using the tape-line. It is necessary to note the rays of more than 10 m in length are splitted and form sometimes a net structure. The southern rays are shorter but more thick than nothern and eastern ones and are well defined in the relief.

During excavation of the crater at the depth of about 8 m we are recovered two fragments of the individual by weights of 6.6 and 3 kg which are broken off from the main mass of the meteorite during its movement within the ground. Meteorite was classified tentatively as medium octahedrite. Based on regmaglipts size we estimated a maximum size of the meteorite fallen as 1 meter.

For estimation of impact parameters we used the simultaneous solution of deceleration equation for spherical body and scaling law for impact and explosion cratering. The estimates show that under entry velocity of 11 - 20 km/sec the final impact velocity was 2-3 km/sec with the body diameter of 0.8-0.9 m and mass 2-3 tons. The energy of impact is estimated as $5-10*10^{16}$ ergs which is equivalent to 1.5-2 tons of TNT.

Main mass of the meteorite up to 1 m across is now in the crater. The work on its recovery is continued.

METEORITE STERLITAMAK: Petaev M.I. et al.

Fig. 1. Sterlitamak crater and NE ejecta.

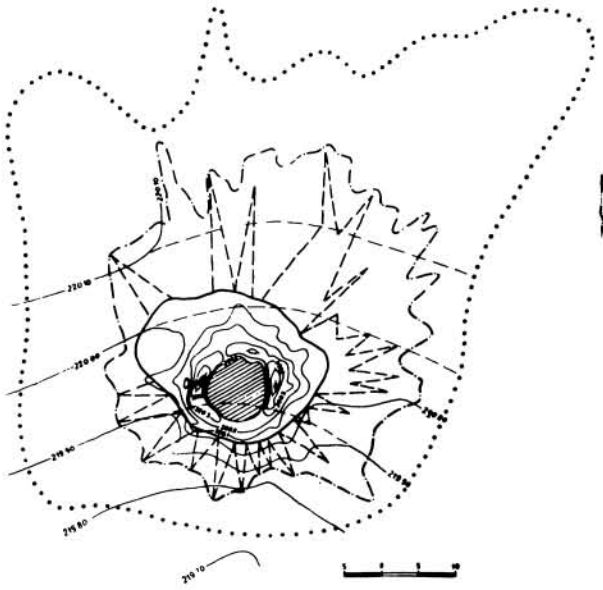

Fig. 2. Topography of crater ejecta Dotted line - boundary of most distant egecta, dash-doted - boundary of radial ejecta, dashed - outlines of rays, solid - external boundary of rim, contour lines are numbered.

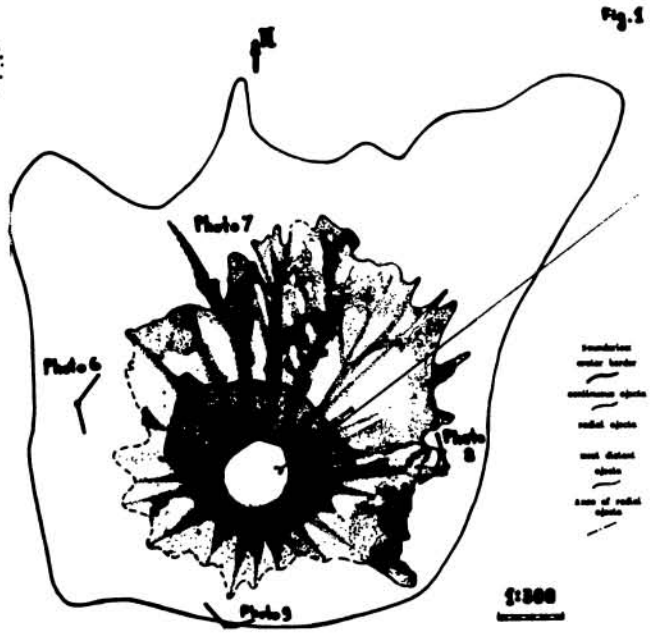

Fig. Distribution of ejected material Density of points corresponds to amount of material in the rays.