Shower of meteoric stones in the neighbourhood of the village Kuznetzovo, West Siberia, on May 26, 1932.

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[Communicated by Dr. L. J. Spencer, F.R.S.; read November 9, 1933.][1]

At the end of October 1932 information was received at the West Siberian Museum in Omsk that in May 1932 a meteorite fell in the village of Kuznetzovo (Кузнецово), 140 km. east by north from Omsk. On November 3–7, together with my assistant P. Serov, I investigated the matter on the spot. In March 1933 some further information was received, and I am now able to make the following preliminary communication.

The small village of Kuznetzovo (55° 12′ N., 75° 20′ E. of Greenwich) is situated in the western part of the Tatarsk (Татарск) district, 12 km. NE. of the Koloniya (Колония) station on the Trans-Siberian Railway. The country for a considerable distance around Kuznetzovo is level and typical of the forest-steppe zone of the West Siberian lowland.

On May 26, 1932, between 5 and 6 p.m. (local time), with the sky absolutely cloudless, a large bolide passed from west to east over the neighbourhood of Kuznetzovo. Its passage was accompanied by a buzzing noise which lasted for some time and resembled the sound of a flying aeroplane. Then were heard at short intervals deafening detonations resembling the firing of big guns. Some people counted ten detonations, others heard fewer. In the sky there appeared a small dark cloud with three times the apparent diameter of the moon, and several stones fell on the surface of the earth. The front part of the air-wave produced by the passage of the meteorite caused a brief whirlwind which rocked the tops of birch trees in a small wood near the village. It was also noted that the ground shook, window-panes rattled, and hanging articles began to swing.

[1] Translated from the Russian typescript by B. P. Uvarov, Department of Entomology, British Museum of Natural History.

Sounds resembling the firing of guns were heard in the villages Ivanovka (Ивановка), Medvezhya Griva (Медвежья Грива), Ermolaevka (Ермолаевка), Dmitrievka (Дмитриевка), and others within a radius of 20 km. In the village of Orlovo (Орлово), 20 km. to the west of Kuznetzovo, a black streak was observed in the sky moving eastwards.

On the south-eastern margin of the village of Kuznetzovo the fall of one stone was witnessed by a boy Michael Ivanov, eleven years of age, and his mother Natalya, who was working in her vegetable

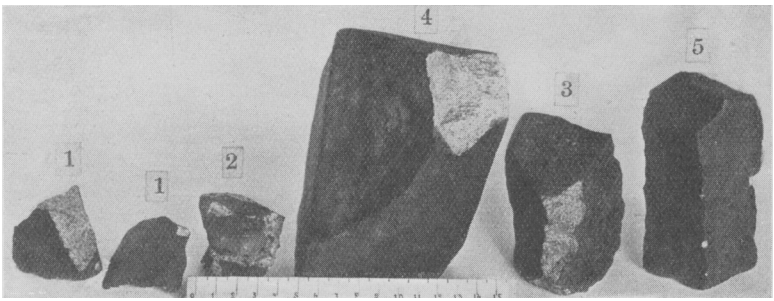

FIG. 1. Group of stones recovered from the Kuznetzovo shower. (Scale of centimetres.)

garden. They saw a black object flying towards them, rotating in the air, and making a whistling noise. When it came nearer it made, according to the boy, a noise 'like two million rising pigeons'; his mother said 'like many large birds'. This stone (no. 1) fell two metres from the place where the small children of the Ivanov family were playing. It made a small oblique hole in the ground and then rebounded for a distance of 17 cm. The grass in the hole was scorched, and the meteorite was still warm when picked up ten minutes later. It weighed 2 kilograms.

Stones nos. 2, 3, 5, and 6 were found on the second and third days after the fall in the same south-eastern part of the village. No. 4 was found in the steppe near the farm Sladkoe (Сладкое), 3 km. NE. of the village, only because a horse had stumbled against it. According to later information two more stones were found in Kuznetzovo; no. 7 weighing about ½ kg. and no. 8 weighing about 16 kg. In addition to these it is rumoured that 'many stones have been found'. It is quite possible that other stones have been found and hidden by the inhabitants of the village, and that some have

fallen and remained buried in the ground in the steppe outside the boundary of the village.

The peasants of Kuznetzovo did not regard the stones fallen from the sky with any superstitious awe, although they were alarmed by the unexpected and rare phenomenon. They dealt with them in a practical manner; and mistaking the inclusions of troilite for gold,

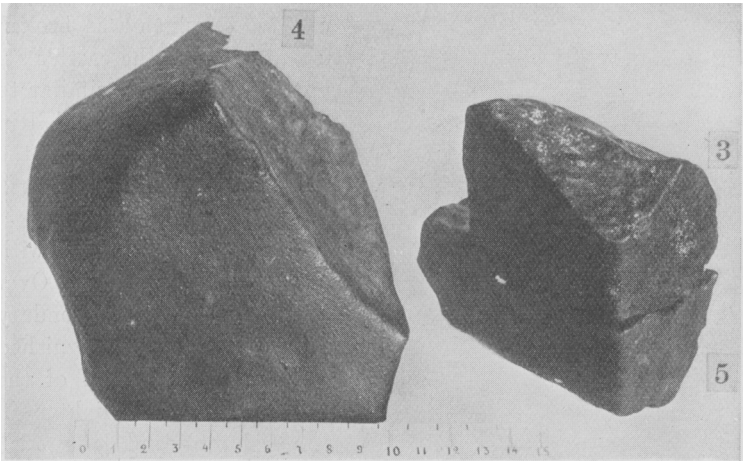

FIG. 2. Another view of the three larger stones recovered from the Kuznetzovo shower, showing nos. 3 and 5 fitted together. (Scale of centimetres.)

they heated the stones in the fire, ground them to powder, and washed in water to obtain the gold, but without success.

We succeeded in bringing to Omsk from Kuznetzovo three complete stones only slightly damaged, namely nos. 3, 4, and 5, weighing 547·2, 2538, and 655 grams respectively; two fragments of no. 1 weighing 99·05 and 75·95 grams; and fragments of no. 2 weighing 132·2 grams, a total of 4047·4 grams (fig. 1).

According to my estimate from the data obtained the total weight of the eight known stones is about 23 kg. But, as mentioned above, some stones may have remained with the peasants or buried in the ground; and therefore this weight must be regarded as a minimum for the whole shower. Even so the Kuznetzovo meteorite is the largest stony meteorite that has been observed to fall in Siberia.

The Kuznetzovo stones in our possession are irregular polyhedra, bounded either by more or less flat or by curved surfaces, which meet in sharp or somewhat rounded edges. The surfaces are marked

by pits (' piezoglypts ') of unequal size and varying form. Each stone has one prominently flat surface without any noticeable pits, a feature which appears to be of some significance. Stones nos. 3 and 5, which fell about 330 metres apart, fit together on their flat crusted surfaces (fig. 2). Apparently these, as well as some of the other pieces, formed part of one cosmic mass, which was broken up on entering the earth's atmosphere. This is similar to the Butsura meteorite (fell in India on May 12, 1861) the pieces of which could be fitted together.

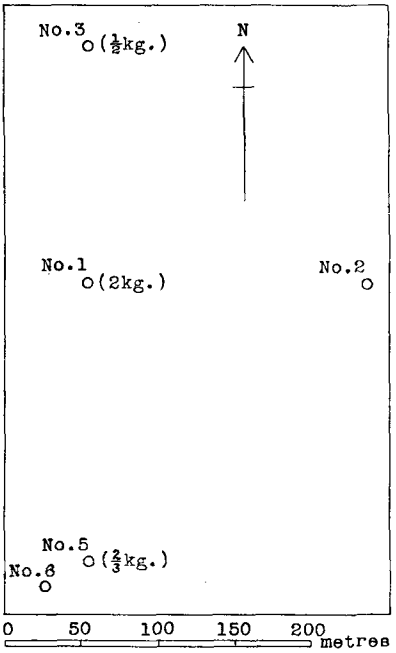

FIG. 3. Distribution of stones found in the SE. portion of the village of Kuznetzovo. [No. 4 (2½ kg.) was found at a distance of 3 km. to the NE. The positions of nos. 7 and 8 not known.]

The stones are covered with a thin dull black crust. Over this primary crust a secondary crust may be distinguished with a lens on most of the surfaces. This is lighter in colour, bubbly and slaggy with reticulated markings, and in places streaky with small drop-like formations. On stone no. 4 one surface has a blackish-brown crust; and the dull black crust on the large flat surface shows several silver-white grains (1 mm. and less) of nickel-iron. On stone no. 1 the crust inside a pit is dark greenish-grey with a shining glassy surface.

The material of the stones is greyish-white, friable, and fine-grained. It shows minute chondrules of olivine and occasional small balls (up to 2 mm.) apparently of bronzite. Numerous small yellow inclusions of troilite are scattered through the mass. The specific gravity of the 99·05-gram portion of stone no. 1 was determined by hydrostatic weighing to be 3·52.