

The Chrono List of Bad Meteorites

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Introduction: Since the formation of the Solar System, each planet has been exposed to interplanetary matter. Planets with solid surfaces as well as their satellites and even asteroids keep traces of meteorite bombardment, and their surfaces are dotted with impact craters of various sizes. The Earth was also subject to these effects, but the presence of soil, vegetation, erosion led to the disappearance of most craters.

The problems of asteroid-comet hazard have been much discussed lately. The result of the Earth's collision with a huge meteorite or comet can affect the climatic conditions on the planet. But these events occur infrequently. The last time such a phenomenon probably led to the dinosaur's extinction and a sharp cooling. Falls of small meteorites occur much more often. Most of them fall into the ocean, seas, deserts, dense forests and other sparsely populated areas, however, the probability of a meteorite entering the area of human activity is still non-zero.

Methods: We have systematized the available official information on cases of damage to property or human health by an extraterrestrial substance, in order to assess whether this threat is significant to humanity.

For the first recorded incident of damage by a meteorite, we take a record of a Franciscan monk killed by a meteorite in 1654 (according to the British Museum meteorite catalog [1]). This catalog was taken as the basis for the search and verification of information about the fall of "bad" meteorites before 1966. Later data were checked for regular releases of the official Meteoritical Bulletin, available online [2].

We selected reports of direct damage to buildings (for example, a roof was punched), or property (for example, a car), or damage caused to persons or animals. It should be mentioned about many cases when a meteorite fell directly near a person (up to 1 meter, as for the Thika meteorite in Kenya, 2011), but since there was no harm, these messages are not included in the table. Also not included are reports of meteorites falling on agricultural fields, edges of roads, football fields, etc. Also, the table does not include the Tunguska cosmic phenomenon, due to the absence of the detected meteoric substance.

Results and discussion: Systematized information about these events was published in Russian in 2008. It was concluded that for the entire time of registration of meteorite falls only a few dozen cases of cosmic substances penetrating the human environment were recorded. There are several unreliable cases of a meteorite hitting a person, but most often meteorites fall into the rooftops, causing local damage of different buildings.

The fall of the Chelyabinsk meteorite significantly changed the picture at that time. Unprecedented destruction occurred as a result of the shock wave. A lot of windows were broken in the regional center Chelyabinsk and nearby settlements. People were injured by glass fragments. According to media reports, a total of 1,613 people came to the hospitals of the Chelyabinsk region with wounds, of which 69 were hospitalized. The roof is damaged and the brick wall of the warehouse of the zinc plant is destroyed. The damage described was not the result of exposure to a meteorite directly, but is related to its flight in the atmosphere. So Chelyabinsk meteorite should certainly be included in the list, and work on the list of "bad" meteorites should be continued.

On the poster, we present a table containing information on such cases to date. In compiling the table, we took as a basis the information provided by the electronic and printed Meteoritical Bulletin. To date (April 2019), 123 bad meteorites have been recorded in meteoritic catalogs, there are 6 cases of a meteorite killing animals, 6 cases of a meteorite hitting humans, 3 of which are fatal, 7 meteorites damaged cars. If we take the total number of recorded meteorite falls over 1300 (falls, not including finds), then in about every tenth visible fall, the meteoritic substance directly affects a person and his property.

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References: [1] Hey M.H. Catalogue of meteorites (3d Edition)//British Museum, London, 1966.

[2] The Meteoritical Bulletin, [electronic resource] <https://www.lpi.usra.edu/meteor/>.