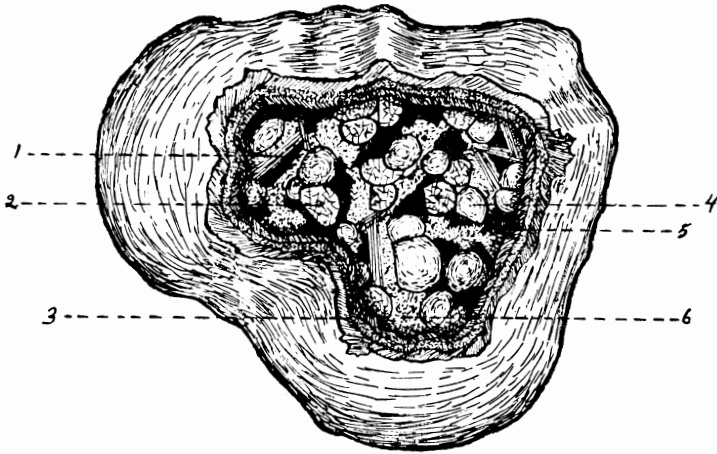


## THE EXCAVATION OF A METEORITE CRATER NEAR HAVILAND, KANSAS.

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In the Proceedings of the Colorado Museum of Natural History (vol. xii, No. 3) a most interesting account (illustrated) is presented of the discovery and excavation of a small meteorite crater recently discovered near Haviland, Kiowa County, Kansas. This little crater is located on the farm



where so many of the "Brenham" or Kiowa County meteorites were gathered between 1885 and 1900. Although the farm was visited by several eminent geologists in the '90s, the small "buffalo wallow" in the midst of the meteorite-sprinkled area seems to have attracted no attention whatever until 1925 when H. H. Nininger visited the farm in the hope of discovering an overlooked specimen of the famous Brenham fall.

The form of the little depression attracted Nininger's attention even though thirty years of wheat farming had almost obliterated its elevated rim, and after several years of negotiating he was finally permitted, in June, 1933, to excavate it in collaboration with the Colorado Museum of Natural History.

The excavation revealed a layer in the form of an inverted oblique cone, heavily impregnated with meteorite fragments—often as many as 50 to 100 per cubic foot. The fragments

ranged in size from less than a gram to 40 kgs. each. The largest found were at the apex of the cone, 11 feet underground.

The Brenham meteorite shower was classified as a pallasite more than forty years ago and the crater specimens evidence clearly their identity as a part of that fall; but nearly all of them have been completely altered so that the metallic constituents are changed to oxides. Some have undergone the change without noticeable rearrangement of their internal structure, but in many of the specimens a very striking metamorphosis has taken place by which the oxidation products have migrated to form a ferrite shell or outer wall within which are nested the olivine spheroids. This type is termed meteorodes by Professor Nininger. In some cases the olivines were found to have broken down to form olivine sand within the ferrite shell and not a few were found in which alteration had gone so far that the center appeared to be merely iron-stained soil.

Two explanations are offered to account for the formation of the crater as found, and free discussion of the problems presented by this discovery is invited by the authors.

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