

*kames*, while the prolonged ridges are termed *eskers* or *osars*, excepting their peculiar development in northeastern Iowa, where they are composed chiefly of loess or fine silt and have received the name *paha*, alike whether singular or plural. (1) Kames, as thus defined, usually or often constitute an important part of the terminal moraines, and they are also frequent on many other portions of our drift sheet. Eskers are found likewise both in the vicinity of terminal moraines, sometimes being evidently of closely contemporaneous origin, and also remote from moraine belts. In length the eskers or osars vary from a mile or less to several miles, and in Maine and Sweden they extend in many continuous series, 20, 50, and even 100 miles or more. Their courses are commonly somewhat crooked, like those of rivers, but in general they run in parallelism with the glacial striae and directions in which the ice-sheet moved and carried its boulders and other drift.

The structure of the Pinnacle hills esker is well exhibited near its northeast end, near Monroe avenue, and at various places separated only by short intervals, thence westward to Mt. Hope avenue and cemetery, by excavations for the use of its gravel and sand in road-making and masonry. Less than a quarter of a mile south of Brighton, a cut on the northern slope of the east end of the esker, just east of the north to south road (Arbutus avenue), has a depth of about 30 feet and length of some 12 rods. The upper 10 feet are fine gravel and sand, almost levelly bedded, beneath which the remainder of the section consists of very coarse but distinctly stratified gravel, with a nearly uniform dip of 15° W. S. W. This coarse gravel contains cobbles and rock fragments of all sizes, up to 1½ feet in length, packed closely together, their interstices being filled with finer gravel, sand, and very fine silt. About two thirds of all the stones are much water-worn, so as to have rounded forms; nearly all of the remaining third are somewhat worn, being subangular; and only about a twentieth part are rather sharply angular, with little or no evidence of attrition in their transportation by the glacial river. Fully half of the small gravel, up to six inches in diameter, are Medina sandstone; and about a third of the cobbles and masses from 6 to 18 inches in diameter are Archæan gneissoid rocks. Only four boulders of larger size, none of these exceeding four feet in diameter, were seen in this section.

Close west of this road, nearly opposite to the foregoing and at a distance of 10 to 30 rods southwest from it, a larger excavation,

(1.) W. J. McGee, "The Pleistocene History of northeastern Iowa," in the Eleventh Annual Report of the U. S. Geol. Survey, for 1889-90.