

occupied by a solid bed of rock. To this it may be replied, in the first place, that the masses which have been engulfed may have been of such enormous size as to give the impression, where they are only imperfectly exposed, of perfect continuity and connection with the adjacent cliffs. But, again, this grand cataclysm may have taken place at a time when the granitic mass was still in a semi-plastic condition below, although, perhaps, quite consolidated at the surface and for some distance down. In this case it is not impossible, certainly, that the pressure from above may have united the yielding material together, so that all traces of the fracture would be lost, except in that portion of it which affected the upper crust. If the bottom of the Yosemite did "drop out," to use a homely but expressive phrase, it was not all done in one piece, or with one movement; there are evidences in the valley of fractures and cross-fractures at right-angles to these, and the different segments of the mass must have been of quite different sizes, and may have descended to unequal depths.

In the course of the explorations of Messrs. King and Gardner, they obtained ample evidence of the former existence of a glacier in the Yosemite Valley, and the cañons of all the streams entering it are also beautifully polished and grooved by glacial action. It does not appear, however, that the mass of ice ever filled the Yosemite to the upper edge of the cliffs; but Mr. King thinks it must have been at least a thousand feet thick. He also traced out four ridges in the valley which he considers to be, without a doubt, ancient moraines. One of these ridges is a low and narrow band of fragments of rock and rounded boulders, extending from the base of the Half Dome in a curve down the valley, and up again to the debris under the Washington Column. This seems to be the terminal moraine of the Tenaya Creek glacier.

A well-defined medial moraine extends from the foot of the western end of the Half Dome out into the valley, in a slight curve. Another one was formed between the glaciers descending from the cañon of the Merced and the south fork, and remains now as a large pile of debris extending down the valley.

A terminal moraine, according to Mr. King, extends across the Yosemite Valley from the cliffs just below the Bridal Veil Fall, curv-