

WE often see a certain cause at work, and then its effect;—and the effect may be and is, doubtless, in many instances, peculiar to the cause. In Switzerland glaciers are known to have rounded and converted into "hummock"-shaped forms the rocks over which they have passed; whilst the rocks which were imprisoned in the ice, and used as tools to scour the rocky bed over which they moved, have in their turn also received a definite impression.

Hummocky tracts of land like those in Switzerland are to be seen in Scotland, Newfoundland, and other countries. Mounds of debris, filled with scratched stones like those produced by a modern glacier, are to be found in many places. These and other appearances, which are peculiar to ice-action, are ascribed to it as their originators; for, whether they be of Permian or Pleistocene age, their origin would seem to be identical.

By studying the effects of modern volcanic outbursts, similar paroxysms can be shown to have occurred in bygone ages,—and it is only by having a knowledge of the present, that any true knowledge of the past can be obtained.

The action of ice upon the surface of the earth has been spoken of in all Manuals and Text-books of Geology. De la Beche, Lyell, Ramsay, Huxley, Geikie, and others, all discuss it in its various forms.

The fact that existing glaciers had once a wide extension was not however observed earlier than 1821, when M. Venetz advanced the opinion with regard to those of the Alps. In 1836 these ideas were strengthened by the observations of M. Charpentier; but it was not until the distinguished naturalist Agassiz—fresh from the same Alpine school, where so many geological truths have been demonstrated—visited Scotland in 1840, that the curious rock-markings in that country were successfully shown to be identical with those produced by the glaciers of Switzerland.

Glaciers have been regarded from many points of view, and have been studied both mathematically and physically. Their effects have been noted, and they are now universally admitted to have been great tools in the modelling if not in the actual formation of the surface configuration of the earth. They were first suggested and shown to be a means of solving the puzzles of drift, rounded rocks, strange scratchings, and boulders, and ever since take the precedence of all other ice.

Their offspring, the Icebergs, have also been studied, and their work has been duly chronicled. The manner in which they bear rocks to warmer seas, and strew them broad-cast over the bed of the ocean, and even the way in which they may have aided in modelling a rising area, has long been dwelt on; but, being less important tools in Nature's workshop than their parents the Glaciers, deservedly without such emphasis. There is, however, another form of ice, which, from its unassuming appearance, although touched on by a few, has apparently taken too low a place in the rôle of actors with which it plays. This is the Coast-ice.