

was a period of heavy precipitation, but no colder than now. Otherwise, no lake could have existed, for even now it is frozen nine months out of twelve. We have to face a climate as warm, if not warmer than now, and ascribe the greater ice accumulation to more snowfall. Indeed, it appears unlikely that any moisture to speak of could reach a region so isolated by range beyond range of the world's highest mountains, if the climate were much colder. On the other hand, there would probably be more precipitation now if it were warmer, and it would have to be a great deal warmer to raise the effect of melting seriously. An ordinary temperature of 10° F. in midsummer nights on the lake-shore means a very low average for higher portions.

It is sometimes difficult to separate moraines of the third epoch from those of the second, whose higher portions they overlie. Those on the east barely reached the plain and did not quite fill the second-epoch gorges in the first-epoch moraine, but must have lasted nearly as long as the second, for their moraines



Fig. 437.—A Glacier Northeast of Kara Kul.

reach a great thickness. During this epoch the lake appears to have stood at the 120-foot level, and these beaches are worn fully as long as those of the second epoch. The third epoch, therefore, appears to have lasted for the same order of time as the second, though its glaciers were only half as long. In fig. 436, the fourth-epoch moraine is seen as a mass of loosely piled angular blocks overlying the third-epoch moraine of which the smooth surface forms the base of the picture.

Long after these three had come to a close, there came a fourth advance to about one-half the distance of the third, but of far less than half the same duration, for its moraines are insignificant when compared to them. And this one came to a close so recently that its moraines have suffered scarcely any surface weathering, whereas those of preceding epochs have been much worn by wind; even the third one can be ridden over, while granite moraines of the first epoch have been smooth-planed into mosaic floors, the interspaces filled with the arkose residuum of long