of its mountain valley—as a flat sheet of clear ice, perhaps over half a mile wide and 100 feet thick. Its waters discharge into a valley over 1,000 feet deep with an estimated width of three-quarters of a mile. This valley is excavated entirely in moraine composed, for the most part, of huge subangular blocks with glacial striæ, and belonging to the first epoch, as it has lost all topographical characteristics, having been graded with a surface sloping towards the middle of the Alai and gashed by this great tributary valley. In this valley of discharge there are two terrace levels bearing kettle-holed moraines, and a less definite third terrace below. These, it would seem, belong respectively to the second, third, and indefinite fourth epochs. From out of the valley of discharge its second-epoch moraine spreads clear across the Alai with broad lobes, each composed of conical heaps 100 to 300 feet high. Between the first and second epochs, time enough elapsed for the excavation of this wide valley of discharge to within 200 or 300 feet of its present depth.

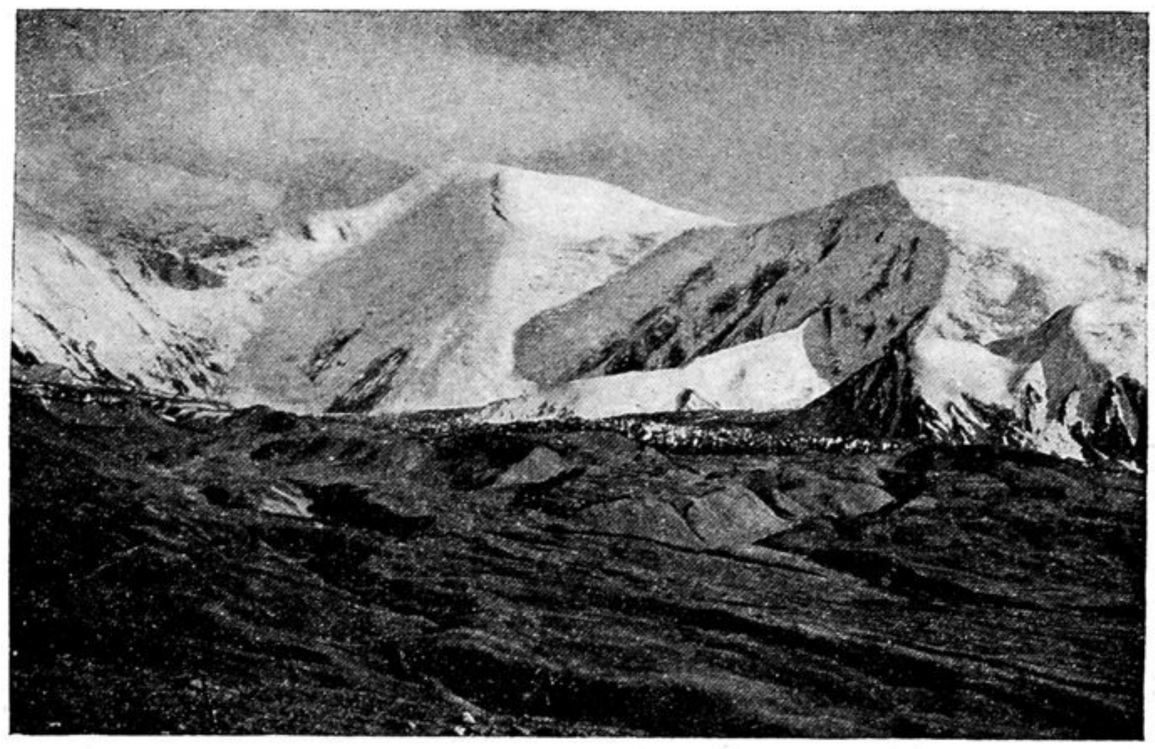

Fig. 440.—The Tokuz Kungei Glacier (Alai Valley).

As a severe buran (snow blizzard) blew up and darkened the region, I was unable to complete my observations on the third and fourth epochs, but it is a locality worthy of careful exploration.

The glaciers of to-day are of a different character from those about Kara Kul. To begin with, the snow-line on this side of the Trans-Alai is only about 13,000 feet, and we find true snow-fields—that feature for which the mountains of Kara Kul are so remarkably in want. There the snow turns to ice as fast as it comes down; but on this side there is more of it and a less arid sun to transform it. Two of the present glaciers studied might almost be called piedmont flows. They descend with a steep grade and spread out fan-shaped upon massive accumulations of moraine, in part at least belonging to the third epoch (a mass that must be from 1,000 to 2,000 feet in thickness), and spread upon the flat floors they have planed over these old moraines, to terminate in wide sheets of pinnacled ice, possibly less than 100 feet in thickness. And these glaciers, like those of Kara Kul, are