

CHAPTER XLVI.

THE GLACIATION. KRAPOTKIN. SOME RECENT EXPEDITIONS.

There exists a whole literature on the glaciation of the Himalayas and Karakorum, and several specialists on physical geography have in later years directed their attention to the question of glacier movements and their relation to precipitation, monsoons and other meteorological elements. The Geological Survey of India, and several private scholars, as Mr. DOUGLAS FRESHFIELD and M. CHARLES RABOT have devoted much attention to the problem, collected and compared materials. It would take us too far to enter upon this question here, and it is better to wait until more definite and reliable results may be gained from richer material of a sufficiently long period of observations. In this connection I will only mention two or three contributions to the solution of the problem.

In 1903 Professor DAVIS, and Messrs. HUNTINGTON and R. W. PUMPELLY travelled in Central Asia. Their exploration proved the existence of several successive glacial epochs in the mountains of High Asia during the glacial period.¹ »Each of these epochs of glacial expansion must have had its echo in a corresponding expansion of the water area, and in a reaction on the climate of the basin region itself in the direction of local precipitation and amelioration of the desert conditions.»

The processes reviewed by the Americans were found to have been operating with fluctuating intensity since Tertiary time. The maximum of intensity existed probably as a consequence of the glacial period. Glacial epochs were accompanied by swollen rivers with broad flood-plains, expansions of the seas with extensive marshes, and by great extents of loess-steppes. During interglacial epochs the conditions were reversed, and subsequent to the last glacial epoch there began the general trend towards the present condition of aridity — a trend that was interrupted by oscillations, in some of which the aridity may have exceeded that of to-day — a process in which the seas, while responding to the oscillations, have in the main shrunk gradually to the volumes compatible with the present equilibrium between precipitation and evaporation. Parallel with this progress toward

¹ Raphael Pumpelly: *Explorations in Turkestan*, 1904. Vol. I. Washington 1908, p. 6 *et seq.*