

consisted of sand, gravel, and mud and was for the most part firm enough to bear us, and such small marshy spots as there were we were easily able to go round. As a general rule the prospect of finding ground firm enough to bear is greater on the slopes facing south than on those to the north, where vegetation is wanting and the moisture is retained longer.

Over a small area on the right bank the grazing, considering the circumstances, was good. Here there were orongo antelopes, but no traces whatever of wild yaks or kulans.

North of the little col is a fairly fine dark-grey crystalline schist, dipping  $41^\circ$  towards the N.  $50^\circ$  E. On the col itself the same rock dips  $55^\circ$  towards the N.  $35^\circ$  E., and south of it  $65^\circ$  towards the N.  $55^\circ$  E. These angles of dip are however not quite certain. But, generally speaking, bare rock is very rare, as on the north side of the range the mountains consist entirely of soft disintegrated materials. There is however gravelly debris in the beds of the streams on the south side of the valley. On the basis of our experience in crossing over these successive parallel ranges of north-eastern Tibet, it may be laid down as a general rule, that hard, bare rock grows continuously less in quantity from north to south. In the Astin-tagh wild, jagged pinnacles and craggy summits predominate; in the Tschimen-tagh softer outlines are more frequent; in the parallel range that we last crossed hard rock was a rarity. On the wide plains of the Tibetan plateau it would be possible to travel for two or even three days without ever once seeing hard rock. It is of course the climate which here plays such an influential rôle. In the Astin-tagh the extremes between the winter and summer temperatures may be more accentuated, but the precipitation is a good deal less. On the highlands there is on the contrary an abundant precipitation and the frost is there probably the most powerful active agent in splitting and breaking down the solid rock. There is a great difference between the day and night temperatures; but within the course of even a few hours, nay often of a few minutes, variations of temperature may occur as great as  $10^\circ$  or more. On the 15th August, after the frosty night, the temperature rose to  $+15^\circ$ . During the day the insolation is great, and the mountain-sides become warm and dry. Beginning at 10 p. m. it rained heavily for a couple of hours, and everything was wet again; the rain penetrates into the narrow crevices of the rock, and then when it freezes during the night the crevices become enlarged and widened, until finally the material refuses any longer to hold together, but breaks, and is washed away by the next shower that comes, which at the same time exposes another layer of the underlying formation to a repetition of the same process. These same agencies are actively at work in all parts of the world where there exist mountains, but here in Tibet the rate of destruction appears to be more rapid than elsewhere, owing to the active agents being more intense and more energetic.

From Camp No. XXVII (alt. 4,919 m.) we saw in the S.  $36^\circ$  W. the culminating summit of the glaciated mass, sending down towards the north-north-east a very broad and short glacier arm, with a number of dirty marginal fissures, especially in the front.

August 17th. Almost due south from Camp No. XXVII we saw in the next parallel range a slight indentation, and beyond it there were no mountain tops vi-