

whole way down the Karakash river for about twenty-four miles. After this the road follows, in a somewhat north-westerly direction, a small stream leading to the Sanju-(or Grimm-) Pass. Here the rocks are chiefly true mica schist, in places full of garnets. Near, and on, the pass itself chloritic and quartzose schists prevail, in which veins of pale green jade occur, numerous blocks containing this mineral having been observed near the top of the pass. All the strata are very highly inclined, often vertical, the slopes of the hills, and in fact of the entire range, being on that account rather precipitous, and the crests of the ridges themselves very narrow.

To the north of the Sanju Pass we again meet with metamorphic, mostly chloritic schists, until we approach the camping place Tám, where, distinctly bedded, sedimentary rocks cap the hills of both sides of the valley. They are dark, almost black, silky slates, resting unconformably on the schists, and are overlain by a grey, partly quartzitic sandstone, passing into conglomerate. The last rock contains particles of the black slates, and is, therefore, clearly of younger age. Some of the conglomeratic beds have a remarkably recent aspect, but others are almost metamorphic. In none of the groups, the slates or sandstones or conglomerates, have any fossils been observed; but they appear to belong to some palæozoic formation. They all dip at from 40° to 50° towards north-east, extending for about one and a half miles down the Sanju valley. Here they are suddenly cut off by metamorphic schists, but the exact place of contact on the slopes of the hills is entirely concealed by débris. The schists are only in one or two places interrupted by massive beds of a beautiful porphyritic gneiss, containing splendid crystals of orthoclase and biotite; they continue for about eighteen miles to the camp Kiwáz. On the road, which often passes through very narrow portions of the valley, we often met with old river deposits, consisting of beds of gravel and very fine clay, which is easily carried off by only a moderate breeze, and fills the atmosphere with clouds of dust. These old river deposits reach in many places up to about one hundred and fifty feet above the present level of the river, which has to be waded across at least once in every mile.

At the camp Kiwáz the hills on both sides of the valley are low, composed of a comparatively recent looking conglomerate, which in a few places alternates with beds of reddish, sandy clay, the thickness of the latter varying from two to five feet only. These rocks strikingly resemble those of the supra-nummulitic group, so extensively represented in the neighbourhood of Mari. They decompose very readily, covering the slopes of the mountains with loose boulders and sand, under which very little of the original rock can be seen. Near the camp the beds dip at about 40° to north-east, but about one mile and a half further on a low gap runs parallel to the strike, and on the other side of it the beds rise again, dipping with a similar angle to south-west, thus forming a synclinal at the gap. Below the conglomerate there crops out a grey, often semi-crystalline limestone, containing in some of its thick layers large numbers of *Crinoid* stems, a *Spirifer*, very like *S. striatus*, and two species of *Fennestella*. Following the river to north by east, this carboniferous limestone again rests on chloritic schist, which, after a mile or two, is overlain by red sandstone, either in horizontal or very slightly inclined strata. Both these last named rocks are very friable, easily crumbling between the fingers, particularly the latter, from which the calcareous cement has almost entirely been dissolved out. At Sanju the red sandstones underlie coarse grey calcareous sandstones and chloritic marls, some beds of which are nearly exclusively composed of *Gryphæa vesicularis*, many specimens of this most characteristic middle cretaceous fossil being of enormous size. The *Gryphæa* beds and the red sandstones are conformable to each other, and although I have nowhere seen them interstratified near their contact, there is strong evidence of their being both of cretaceous age. Both decompose equally easily, and the *Gryphæa* beds have indeed in many places been entirely denuded. They have supplied the greater portion of the gravel and beds of shifting sand, which stretch in a north-easterly direction towards the unknown desert-land.

On the road from Sanju to Yarkand, which first passes almost due west and after some distance to north-west, we crossed extensive tracts of those gravel beds, and of low hills almost entirely composed of clay and sand, though we only skirted the true desert country. Locally, as, for instance, near Oi-tograk and Boria, pale reddish sandstones crop out from under the more recent deposits, but they appear to be younger than the cretaceous red sandstones underlying the *Gryphæa* beds; the former most probably belong to some upper tertiary group. Among the sandy and clayey deposits I was not a little surprised to find true *Loess*, as typical