

plateau, known to the Kirghiz as the "Arpa," 3,000 meters in altitude, overlooked by serrated ranges and traversed by low hills (1900, 125). Almasy, who traveled somewhat farther east in 1900, gives "syrt" as the Kirghiz name of the plateau, which he describes as occupied by highland meadows (1901, 254). In Friedrichsen's thorough review of all that has been written about these mountains, there is no clear statement concerning the plateau-like quality of the inner region; but it may be inferred from the statement that the general law of vertical relief in the Tian Shan is an increase of absolute height accompanied by a decrease of relative height in passing from north to south (1899, 209). In Friedrichsen's account of his own exploration, however, there is an explicit statement. He traversed the syrt or highland southeast of Issik Kul at an altitude of 3,000 meters, and found it to be an extended, gently inclined plain in which the granite, gneiss, and steep clay slates are broadly truncated, above which the snowy ranges (4,000 meters) rise with relatively small relief, and below which deep, canyon-like valleys are eroded by the Sary-jass River and its tributaries. He recognized it to be a "Denudationsfläche" or peneplain (1903, 99).

The deformation that the great peneplain has suffered in that part of its area which is now mountainous seems to have involved late or post-Tertiary movements of relatively local uplift, as in the Bural-bas-tau; or of much broader uplift, as south of Issik Kul; or of moderate warping, as in the branch of the Dsungarian Ala-tau; or of block faulting and tilting, as about the west end of Issik Kul. This is consistent with the account of the Tian Shan furnished to Suess by Mushketof, in which it is stated that the earlier deformation of these mountains was not before the Trias, and that the final configuration of the ranges was given in post-Tertiary time. The latter statement is based on the occurrence of Tertiary strata at great altitudes, no mention being made of the evidence from peneplanation (Suess, 1897, i, 619).

It is noteworthy that there is no general evidence of crustal compression in the later deformation that the Tian Shan seems to have suffered. True, the vertical strata and the vertical cleavage of slates imply that the region suffered a strong compression in some time previous to peneplanation; but the existing Tian Shan ranges, so far as they are described, are not the result of that ancient compression. They are due to a later system of deformation that gives little evidence of compression. The contrast between the earlier Tian Shan system and the present ranges is similar to that pointed out by Gilbert between the Appalachians and the Basin ranges of Utah and Nevada:

In the Appalachians corrugation has been produced commonly by folding, exceptionally by faulting; in the Basin ranges, commonly by faulting, exceptionally by flexure. The regular alternation of curved synclinals and anticlinals is contrasted with rigid bodies of inclined strata, bounded by faults. The former demand the assumption of great horizontal diminution of the space covered by the disturbed strata, and suggest lateral pressure as the immediate force concerned; the latter involve little horizontal diminution, and suggest the application of vertical pressure from below. * * * In the case of the Appalachians the primary phenomena are superficial; in that of the Basin ranges they are deep-seated, the superficial being secondary; that such a force as has crowded together the strata of the Appalachians—whatever may have been its source—has acted in the ranges on some portion of the earth's crust beneath the immediate surface; and the upper strata, continually adapting themselves, under gravity, to the inequalities of the lower, have assumed the forms we see (1875, 61, 62).