

back from whose front it rises sharply 100 feet or more. It is of the same material as all the others, but is decidedly fresher in form. The hills and hollows are very clearly defined, though all are well covered with grass, and some of the kettles contain water. Where the Taka Su traverses the moraine it has cut a flood-plain about 100 yards wide, on the sides of which are steep, ungraded walls, disclosing the structure of the underlying deposits. Here it is seen that the moraine lies upon a considerable deposit of gravel. The same feature is seen in a number of other cases, where water-laid gravel underlies moraines of various ages. This shows that previous to the formation of such moraines there was a time of aggradation, probably due to the increasing load of the stream which heralded the advance of the ice. As soon as the stream leaves the fourth moraine and enters the third there is a sudden and very marked change in the character of the flood-plain, which expands abruptly to five or six times its former width. This is not due to change in material, for the moraines are alike in composition; nor is it due to the less thickness of the deposit which is cut through in the older moraine, for if this were the case the broadening would be gradual and funnel-shaped instead of sudden and at right angles. Moreover, in the older moraine the flood-plain is not limited by steep stream-cut walls as it is above, but by gently sloping, sinuous shores rather than banks; for the moraine is half-drowned in flood-plain gravel, so that the kettles form deep bays and the hills form islands and promontories. The gravel which drowns the third moraine seems to belong to the same epoch as that which underlies the fourth, although lack of time made it impossible to trace one into the other. Apparently at the end of the third glacial epoch the ice retreated above the upper limit of the terraces, and normal stream erosion proceeded far enough to cut into the underlying rock along the terraced portion of the valley, and to cut a broad swath through the latest moraine. Then, as the interglacial epoch drew to a close, there seems to have been an increase in the load of the streams. As a result, the whole valley was aggraded, and in the region of the moraine the aggradation was so great that it not only filled the valley eroded in the moraine, but caused the gravel to overflow and cover the adjacent parts of the moraine itself. Meanwhile the glacier was advancing. In its upper course it doubtless widened and deepened the valley, but near the front it ceased to erode and flowed on top of the gravel and the earlier glacial deposits, there forming a new moraine, the fourth of our series.

The youngest of the old moraines is a small one far up the valley, close to that which is now being formed. There is nothing to prove that it does not mark merely a stage in the retreat of the fourth glacier. The other moraines, however, seem to represent epochs and not stages, so that, judging from analogy and even without the evidence of the Kan Su moraine (p. 193) the fifth moraine ought to represent a glacial advance following a retreat. It is noticeable that each moraine is smaller than its predecessor and, except for the older ones, of which the ends are cut off, each moraine extends to a less distance downstream than its predecessor. The amount of erosion in the successive interglacial epochs also grows less and less.