

below (fig. 155). The whole series has been much folded along the edge, but appears to lie more nearly in its original position out toward the center of the basin.

The known facts in regard to Zorabad are too few to warrant any hard and fast conclusions as to its history. The most probable hypothesis is that in early Tertiary times apparently a body of shales was deposited under what were presumably marine conditions. At length the water retired and heavy conglomerates and sandstones were deposited either subaerially or in very shallow water of fluctuating depth. Toward the close, or perhaps during the progress of this deposition, earth-movements were in progress which diminished the size of the basin and uplifted its sides, as is shown by the crumpling of the strata along the edge. Eventually the northern border was raised so high that the Heri Rud was checked and the basin was converted into a lake where clayey marls were deposited. It is probable that these movements were contemporaneous with those which uplifted the alluvial deposits southeast of Serakhs and inaugurated the present cycle of erosion, for the cutting of the gorge at Pul-i-Khatun must have proceeded *pari passu* with the draining of the lake which now ensued. After the lake had disappeared the lacustrine deposits were covered with the subaerial gravels which are so common in arid regions. To-day the deepening of the gorge of the Heri Rud has permitted the dissection of both the clays and the gravels. The most notable fact in regard to Zorabad is that we have here on a small scale the same phenomenon which will presently be described in other basins of Persia, and which seems to have taken place in some of the basins of Turkestan. The area of deposition along the edges of the basin is continually in process of folding, and the folding progresses gradually inward.

THE AFGHAN DEPRESSION SOUTH OF THE RUSSO-AFGHAN BOUNDARY.

On the southern rim of the Zorabad basin the Heri Rud enters the ancient lake bed through a deep gorge cut in Cretaceous limestone and probably of nearly the same age as the corresponding gorge of Pul-i-Khatun on the north side. Upstream the river flows through a broad open valley, which is in reality another large basin extending northwest for 60 miles past Turbat-i-Sheikh Jam. The immediate river valley is bounded by the broad terraces cut in gravel and in an underlying deposit of unconsolidated silts. The silts are slightly warped and are truncated by the terraces. They will be described later. Opposite the southeastern corner of the Jam basin, and offset to the south from it, just as the mountain ranges on the two sides of the Heri Rud are offset from one another, lies the basin of Herat, broad at first, but gradually contracting into the stupendous gorge of the upper river. The Jam-Herat basin is bordered on the south by low hills, chiefly of sandstone, beyond which the smooth, white sheet of the "Nemeksar," or playa of Khaf, and the smaller sheets of its neighbors fill the bottom of a depression which is chiefly remarkable for the large number of half-buried mountains which rise on every hand like islands in an archipelago. It seems as though a once mountainous region had been depressed to form a hollow, in which the mountains still stand as of old, although some have been buried in detritus to the waist, others to the neck, and some are doubtless wholly hidden.