

United States are illustrations of this. The early condition of Turkestan and northern Persia, during much of Pliocene time, may well have been one in which at first forests existed, at least on the piedmont hills and plains, while the rest of the region that was not still occupied by the residuary seas consisted of broad grassy steppes extending to Europe and of interior areas of deserts. Parallel with the growing elevation of the moisture-intercepting mountains progressed the regional desiccation. The progressive effect of this would be continued shrinkage of the water areas, conversion of much of the central plains into deserts, narrowing of the grass-covered zones towards the mountains, and change in the character and extent of the forested areas. After the Miocene sea had been shut off from the ocean, it dried up, as is shown in the Sarmatic strata by the widespread deposits of gypsum and salts resulting from the evaporation of the saline waters.

That the basin was reoccupied more than once by a more or less extensive land-locked sea is shown in successive formations characterized by changes in organic forms, and by old beach and water lines. There is little doubt that these expansions of the water area record the climatic changes that mark the advent and phases of the glacial period. An effect of these changes, which were of mundane extent, was doubtless an increase of precipitation over a large part of the central region. In the glacial period a large part of Russia west of the Ural Mountains was covered to a depth of several thousand feet by ice, a large part of which in melting went toward filling the central basin.

Our exploration in 1903, as shown in the reports of Professor Davis and Messrs. Huntington and R. W. Pumpelly, has proved the existence of several successive glacial epochs in the mountains of High Asia during the glacial period, and that glaciers existed on a greatly extended scale throughout the mountains bordering the great basin on the south and east. Each of these epochs of glacial expansion must have had its echo in a corresponding expansion of the water area, and in a reaction on the climate of the basin region itself in the direction of local precipitation and amelioration of the desert conditions.

During the glacial and interglacial phases of the glacial period, there must have existed a continuity of broad and alternately tundra and grass-covered steppes along the whole length of Central Asia into Europe.

The great "central" basin-system resembles the ocean in that it is the sink into which all the solid and dissolved products of the destruction of the surrounding country are brought. In the ocean all such detritus is classified by gravity, wave-action, and currents, which distribute the graded material over wide areas. On the dry surface of the desert plains this classification and distribution is begun by the rivers and finished by the winds. While in the ocean the sand is deposited to become stratified beds of sandstone, and the clays to form ultimately beds of slate, in the arid basin the sand accumulates in moving hills, and the finest silts are borne off by the winds to form the remarkable and economically important deposits of loess.

For the general reader, I will explain that loess is, with slight exceptions, the most important soil in the world, owing to its great depth, its fertility, and