

recessions; and this was one means by which the moraine ridge was widened and rendered irregular in height and surface.

The foregoing figure of part of a moraine on Cape Ann, Mass., from a paper by Shaler, though belonging to a later part of the Glacial history, shows the common appearance of such moraines at the present time.

A great feature of the epoch was the amount of water discharged, making new channels by erosion and giving the streams in the region of melting great transporting and eroding powers. The Delaware, Susquehanna, Ohio, and other streams were flooded; and the Mississippi derived waters not only from the Ohio with its many tributaries and from the icy heights of the Rocky Mountains, but also through the Missouri from British America, far north of Montana, perhaps from the upper portion of the Saskatchewan. Distribution of the transported material supplied by the melting ice, and erosion by the loaded waters went forward, therefore, with unwonted energy.

With the continent at its high level, the flooded rivers over all the continent dug out their channels, during the time of maximum ice, often to great depths; then at the melting the channels were filled with till, and, over the till, with fluvial beds of sand or gravel. The Mississippi valley received then its earlier deposits of loess, over lake-like regions along its course, while other portions of the valley had their coarser deposits.

South of New England, the retreat was short. On Long Island, then probably 500 feet high, the eroding waters carried off seaward the terminal moraine of the south shore for 70 miles of its length, and dropped till over the denuded surface; then later waters covered it with sand and fine gravel; for there are no bowlders or till to be seen over the even slopes, although abundant elsewhere on the island. So also the waters that descended the north slopes of the island from the moraine belt, cut out of the morainic accumulations and underlying Cretaceous formation a number of short, steep valleys, and left them similarly under fluvial sand-beds as the top-dressing, with no bowlders over their surface; and the valleys, after the Champlain subsidence — which restored the waters of the Sound to their place — became the deep and capacious harbors of the north coast.

During the epoch when the Mississippi was receiving waters, by the Missouri, from the melting in progress through a thousand miles from south to north, with other floods from the ice and snows to the east and the glacier regions in the Rocky Mountains, the deposition took place, of what has been named the *Lafayette* formation — the Orange sand formation of Hilgard. As shown by Hilgard, the Lafayette was a widespread flood-made formation, extending along the great valley of the continent, the Mississippi, south of its junction with the Missouri, from southern Illinois to the Gulf. Its eastern border passes near Cairo through western Kentucky and Tennessee, and the northeast corner of the Mississippi, and, according to L. Johnson, reaches the shore of Mobile Bay in Alabama. Its western border crosses Arkansas and Louisiana into Texas.

The formation is described as consisting mostly of rust-colored or reddish siliceous sand-beds. Near the great river channels, notably that of the