

us that, throughout a wide area in Siberia, the boundary cliffs of the lakes and rivers consist of alternate layers of earthy materials and ice, in horizontal stratification ;\* and Mr. Middendorf informed us, in 1846, that, in his tour there three years before, he had bored in Siberia to the depth of seventy feet, and, after passing through much frozen soil mixed with ice, had come down upon a solid mass of pure transparent ice, the thickness of which, after penetrating two or three yards, they did not ascertain. We may conceive, therefore, that even at the period of the mammoth, when the Lowland of Siberia was less extensive towards the north, and consequently the climate more temperate than now, the cold may still have been sufficiently intense to cause the rivers flowing in their present direction to sweep down from south to north the bodies of drowned animals, and there bury them in drift ice and frozen mud.

If it be true that the carcass of the mammoth was imbedded in pure ice, we may suppose the animal to have been overwhelmed by drift snow. I have been informed by Dr. Richardson, that, in the northern parts of America, comprising regions now inhabited by many herbivorous quadrupeds, the drift snow is often converted into permanent glaciers. It is commonly blown over the edges of steep cliffs, so as to form an inclined talus hundreds of feet high ; and when a thaw commences, torrents rush from the land, and throw down from the top of the cliff alluvial soil and gravel. This new soil soon becomes covered with vegetation, and protects the foundation of snow from the rays of the sun. Water occasionally penetrates into the crevices and pores of the snow ; but, as it soon freezes again, it serves the more rapidly to consolidate the mass into a compact iceberg. It may sometimes happen that cattle grazing in a valley at the base of such cliffs, on the borders of a sea or river, may be overwhelmed, and at length enclosed in solid ice, and then transported towards the polar regions.

The foregoing investigations, therefore, lead us to infer that the mammoth, and some other extinct quadrupeds fitted to live in high latitudes, were inhabitants of Northern Asia at a time when the geographical conditions and climate of that continent were different from the present. But the age of this fauna was comparatively modern in the earth's history. It appears that when the oldest or eocene tertiary deposits were formed, a warm temperature pervaded the European seas and lands. Shells of the genus *Nautilus* and other forms characteristic of tropical latitudes ; fossil reptiles, such as the crocodile, turtle, and tortoise ; plants, such as palms, cocoa-nuts, the screw-pine, the custard-apple, and the acacia, all lead to this conclusion. This flora and fauna were followed by those of the miocene formation, in which indications of a southern, but less tropical climate are detected. Finally, the pliocene deposits, which come next in succession, exhibit in their organic remains a much nearer approach to the state of things now prevailing in corresponding

\* Reboul. *Geol. de la Période Quaternaire*, who cites *Observ. sur la Sibérie*, *Bibl. Univ.*, Juillet, 1832.