

## CHAPTER XVIII.

## THE GLACIAL PERIOD IN NORTH AMERICA.

POST-GLACIAL STRATA CONTAINING REMAINS OF MASTODON GIGANTEUS IN NORTH AMERICA—SCARCITY OF MARINE SHELLS IN GLACIAL DRIFT OF CANADA AND THE UNITED STATES—GREATER SOUTHERN EXTENSION OF ICE-ACTION IN NORTH AMERICA THAN IN EUROPE—TRAINS OF ERRATIC BLOCKS OF VAST SIZE IN BERKSHIRE, MASSACHUSETTS—DESCRIPTION OF THEIR LINEAR ARRANGEMENT AND POINTS OF DEPARTURE—THEIR TRANSPORTATION REFERRED TO FLOATING AND COAST ICE—GENERAL REMARKS ON THE CAUSES OF FORMER CHANGES OF CLIMATE AT SUCCESSIVE GEOLOGICAL EPOCHS—SUPPOSED EFFECTS OF THE DIVERSION OF THE GULF STREAM IN A NORTHERLY INSTEAD OF NORTH-EASTERLY DIRECTION—DEVELOPMENT OF EXTREME COLD ON THE OPPOSITE SIDES OF THE ATLANTIC IN THE GLACIAL PERIOD NOT STRICTLY SIMULTANEOUS—EFFECT OF MARINE CURRENTS ON CLIMATE—POST-PLIOCENE SUBMERGENCE OF THE SAHARA.

ON the North American Continent, between the arctic circle and the 42nd parallel of latitude, we meet with signs of ice-action on a scale as grand if not grander than in Europe; and there also the excess of cold appears to have been first felt, at the close of the tertiary, and to have continued throughout a large portion of the post-pliocene period.

The general absence of organic remains in the North American glacial formation, makes it as difficult as in Europe, to determine what mammalia lived on the continent at the time of the most intense refrigeration, or when extensive areas were becoming strewed over with glacial drift and erratic blocks, but it is certain that a large proboscidean now extinct, the *Mastodon giganteus* Cuv., together with many other quadrupeds, some of them now living and others extinct, played a conspicuous part in the post-glacial era. By its frequency as a fossil species, this pachyderm represents