

land; how much beyond that limit the submergence reached has still to be determined.

Large moraines, showing that glaciers descended to the line of the present sea-level in the northwest of Scotland. Some of the moraines rest upon the 50-foot marine terrace.

Erratic blocks, chiefly transported by the first ice-sheet, but partly also by the later glaciers, and partly by floating ice during the period of submergence.

Sands and gravels—Kame or Esker series, sometimes containing terrestrial organisms, sometimes marine shells.

Upper boulder-clay—rudely stratified clays with sands and gravels.

Till or lower boulder-clay (bottom moraine of the ice-sheet)—a stiff stony unstratified clay, varying up to 100 feet or more in thickness. Bands of fine sand, finely laminated clays, layers of peat and terrestrial vegetation, with bones of mammoth and reindeer, also in some places fragmentary or entire Arctic and boreal marine shells, occur either in the till or between it and the upper boulder-clay. Till spreads over the lower grounds, often taking the form of parallel ridges or drums.

Ice-worn rock surfaces.

Over a great part of England and Ireland the drift deposits are capable of subdivision as follows:

4. Moraines (North Wales, Lake District, etc.) and raised beaches.
3. Upper boulder-clay—a stiff stony clay or loam with ice-worn stones and intercalations of sand, gravel, or silt. It occasionally contains marine shells. It possibly does not come south of the Wash.
2. Middle sands and gravels, containing marine shells. At Macclesfield (1200 feet above the sea) there have been found *Cytherea chione*, *Cardium rusticum*, *Arca lactea*, *Tellina balthica*, *Cyprina islandica*, *Astarte borealis*, and other shells now living in the seas around Britain, but indicating perhaps by their grouping a rather colder climate than the present. *Corbicula fluminalis* abounds in some gravels which underlie the upper boulder-clay. South of the Wash it is found in similar deposits overlying the lower or "chalky boulder-clay." In