

the rest of the Pliocene formations of Norfolk. The latter can hardly be separated from it, and would not be so separated but for the remarkable character of its few included fossils. These indicate such a great increase of cold as to show that the conditions of the Glacial period must now have set in. Hence the Arctic fresh-water bed is classed with the Pleistocene series.

Leda myalis Bed.—This band, nowhere more than 20 feet in thickness, consists of false-bedded loamy sand, loam or clay, and a little gravel, and lies sometimes on the Forest-bed, sometimes on the Weybourn Crag. This unconformability may mark a considerable interval of time. Among the scanty organisms of this deposit the following may be mentioned: *Buccinum undatum*, *Littorina littorea*, *L. rudis*, *Purpura lapillus*, *Tropon antiquus*, *Astarte borealis*, *Cardium edule*, *Cyprina islandica*, *Leda myalis*, *Mya truncata*, *Mytilus edulis*, *Ostrea edulis*, *Tellina balthica*. Some of these shells (the *Astarte*, *Leda*, and *Mya*) are found with the valves united in the position of life. The *Leda* is an Arctic species not known in any of the underlying formations.

Arctic Fresh-water Bed.—Reference may be made here to this deposit which is so intimately linked with that last described. It consists of stiff blue loam, clay, and sand, sometimes more than two feet thick, like the deposits of transient floods. Its plants include a number of mosses, with the dwarf Arctic birch and willow (*Betula nana* and *Salix polaris*, Fig. 454)—a vegetation wherein trees seem to have as completely disappeared as in the Arctic lands. It may indicate a lowering of temperature by about 20° Fahr.—“a difference as great as between the south of England and the North Cape at the present day, and sufficient to allow the seas to be blocked with ice during the winter, and to allow glaciers to form in the hilly districts.”¹⁰⁴ Among the plants a few land-shells have been found such as *Succinea putris*, *S. oblonga*, *Pupa muscorum*, together with some wing-cases of beetles.

Various pebble-gravels occur in different parts of southern England, the true stratigraphical position of which is still undetermined. They are generally unfossiliferous. Some parts of them may be Pliocene. In the southwest, at Dewlish in Dorset, a deposit of sand and gravel has

¹⁰⁴ C. Reid, op. cit. p. 198.