and Clava are adequately explained without submergence, there is nothing improbable in a 400 foot submergence of the Central Plain of Ireland. Carvill Lewis adopted a 400 foot Irish submergence during the advance of the ice (*Glac. Geol.*, p. 148).

The chief difficulty in the marine origin of Irish boulder clay is its poverty in marine fossils; but the references quoted in my paper show that marine fossils are widely scattered in the Irish drifts. They are rare, and to explain their rarity I quoted from men so experienced in polar biology as Dr. Nansen and Mr. J. Murray to show that under some conditions life is absent from the Polar seas. Dr. Nansen's statements that the floor of parts of the Arctic Sea are lifeless are not refuted by Gran having found the opposite in "samples taken later during the expedition". Similarly, in the Antarctic, Murray's statement that the shore deposits at Cape Royds contain no vestige of life is not refuted by the occurrence of shells elsewhere and in beds which, owing to the scarcity of life along the shore, Hedley and Priestly reject as beaches and attribute to upheaval and upthrust. Even in the Swedish drifts, though shells are usually abundant, the clays are sometimes sterile over large areas.

The marine origin of the Irish boulder clay is a subsidiary issue; the object of my paper was to show by a description of the internal structure and field relations of representative Irish eskers, that the most important were not formed along intra-glacial rivers, but on the margin of the ice, where it ended in a sheet of water. Most of the eskers in fact are kames, not osar. I fully recognize that the evidence for the sheet of water being the sea is less clear than that as to the nature of the eskers. I only advance the view that it was the sea as being more probable than that it was a series of glacial lakes; and there is nothing in Professor Kendall's note to modify that opinion. I regret his adoption of a tone of discussion which seems to me as out of date as the view that all boulder clay may be simply explained as *moraine profonde*.

J. W. Gregory.

THE AGE OF THE SHENLEY LIMESTONE.

Sir,—It is fortunate that the Shenley echinoderms have received expert examination, and our thanks are due to Professor H. L. Hawkins for his note on the subject in your February issue (p. 57). I will, however, ask for temporary suspension of judgment in respect to his deductions as to the age of the deposit.

As the result of recent work, I shall be able to communicate to the Geological Society during the present session a paper containing much new evidence, both stratigraphical and palæontological, to prove that the limestone is in its proper position below the Gault, and that the Gault of the section belongs to the Lower and not, as supposed, to the Upper Gault.

G. W. Lamplugh.

St. Albans.
February 10, 1921.

https://doi.org/10.1017/S0016756800090440 Published online by Cambridge University Press