## ARE BOWLDER CLAYS MARINE?

bowlder clay elsewhere recognized in the western part of the plains,<sup>1</sup> but it is probably the latter. Microzoa were found only in the three samples from the Saskatchewan Valley In giving the results of his examinations Mr. Wright writes as follows:

"In the clays from Victoria (1, 2 and 3) I find foraminifera (and Radiolaria) and I am of opinion that they are contemporaneous with the clay and not derived from Cretaceous strata—I judge by the general resemblance of the foraminifera to those we find in British bowlder clay. The foraminifers in the Cretaceous rocks of Canada may possibly be different to those which occur in the rocks of this age with us—I have never seen Cretaceous microzoa from Canada and so can give no opinion on this subject.

"Our chalk foraminifera are invariably of a dull white chalky appearance, the tests alone being calcareous, the interior being usually siliceous. On the other hand, our bowlder clay foraminifera differ in no respect from recent specimens, except in being usually smaller in size, the species being such as are now met with in shallow water around our coasts.

"All the species which I have been able to identify in the clays you sent me, are referable to recent species, and with the exception of *Cristellaria Italica* and *Rotalia orbicularis*, have been found in British bowlder clay. *Nonionina depressula* is the most abundant form in our bowlder clay, and it is instructive to find the species, so common with us, also occurring in your clay.

"Bolivina lævigata, Cristellaria Italica, as also some of the other specimens, have the clear hyaline luster of recent specimens. If Cretaceous, we would expect to find Globigerina Cretacea and Textularia globulosa plentiful."

The above references to Cretaceous foraminifera, are explained by the fact that Mr. Wright's attention had been called, when the specimens were sent, to the probable existence of such forms in the bowlder clays.

In replying to the letter from which I have just quoted, half a dozen specimens of Cretaceous foraminiferal material from the

<sup>1</sup>Cf. Bull, G. S. A., Vol. VII, p. 60.

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