

CORRESPONDENCE.

DR. CROLL'S THEORY OF THE ICE AGE.

SIR,—As Mr. Culverwell's articles in the *MAGAZINE* and the review of Dr. James Geikie's new edition of "The Great Ice Age" have recalled attention to Dr. Croll's celebrated theory, it may be interesting to your readers to hear the opinion of the great astronomer Adams upon the question. In turning over some old letters only yesterday I came upon one dated 28th February, 1866, which I received from him on the subject, in which, after some remarks upon Herschel's art. 184, of which he says he is "not inclined to think there is much in it," he wrote: "I do not myself believe in the change of eccentricity of the earth's orbit being a cause of climatal changes on the earth. The effect, if any, would depend only on the *square* of the eccentricity; and this always remains so very small, that I believe the effect on the earth's mean temperature would be almost insensible. Depend upon it, geologists who look in this direction for the cause of Glacial epochs are entirely on the wrong tack. It seems to me much more likely that the actual act of emission of heat from the sun is variable, than that the change of eccentricity of the orbit should have any sensible effect."

If this be the case, Croll's theory is reduced to Adhémars', who, in his *Révolutions de la Mer*, 2nd edition, 1860, published his view that Glacial epochs were caused by the mere alternate presentation of the north and south poles of the earth to the sun, owing to the precession of the axis; no reference being made by him to changes of eccentricity. It is remarkable that Croll did not know of Adhémars' work when he first published his theory. I had heard two friends talking about it at a meeting of the Geological Society, which led me to buy the book, and finding no allusion to Adhémars in Croll's papers, I drew his attention to it.

In what I have now written I do not wish it to be thought that I am expressing any opinion of my own upon the subject, but I think these matters of ancient history may prove of interest to your readers.

O. FISHER.

HARLSTON, CAMBRIDGE, 7th February, 1895.

PROFESSOR HULL AND THE CAMBRIAN AGE OF THE
CHARNWOOD CLASTICS.

SIR,—I do not think that Professor Hull's letter in last month's *GEOLOGICAL MAGAZINE* will do much to convince students of the older rocks that the Charnwood clastics are of Cambrian age. He relies chiefly upon the authority of Sedgwick and Jukes. The views of these eminent men on matters coming within their knowledge would undoubtedly carry great weight with the younger generation; but it would be the height of rashness to suggest that they would have continued to adhere to their opinion had they