Beds takes place somewhat rapidly, but this is noticeable all along their south-easterly margin, and "conglomerates and coarse conglomeratic sandstones are notoriously local formations, suddenly swelling out into great masses, and as rapidly dwindling down again, or disappearing altogether," as Prof. Geikie remarks (Old Red Sandstone of Western Europe). I think also that the irregularity of the surface presented by Pebble Beds to the succeeding formations, as well as their rather abrupt disappearance, may be accounted for by the peculiarities of the deposit and of the position of the area under consideration.

The local occurrence of the Keuper Basement Beds at Nottingham is, I believe, attributable to the same causes, and not to their having suffered partial removal by denudation. As I remarked in my paper, they have approximately the same distribution as the Bunter, and it was not until the commencement of the Waterstone period, that the old limits of the Bunter deposits began to be exceeded. For this reason and others which I stated, I consider that the base of this formation, conformable as it is to the underlying rocks, constitutes a most important horizon in the Trias. A. STRAHAN.

WREXHAM, *Nov. 8th*, 1881.

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## DR. CALLAWAY AND THE WEXFORD LOWER PALÆOZOIC ROCKS.

SIR,—This writer in his paper on these Wexford rocks (GEOL. MAG. November, 1881) adopts the principle of the Archæan geologists, which I must again protest against, which is rushing to conclusions without a proper previous examination. In Donegal we are now told that undoubtedly there are Laurentian rocks, while in reality the question there has not been worked out since Jukes first suggested they were Laurentian rocks; and now Dr. Callaway states my work is all wrong, without first seeing it. As stated by him, anxious to arrive at the truth I pointed out all places where anything was to be seen, and specially the sections that were most important, and of the latter I specially called his attention to the Crossfarnoge section, and those on the Saltee Island. To get to the latter there may be a little trouble; but in my course through life I have always found nothing important can be done without some trouble. Under present circumstances I could not answer Dr. Callaway; he does not know my work; and until he does, it would be unfair to expect he could understand it. Furthermore, before he could understand Wexford, where so few rocks are exposed, he would have to examine an area where they are better seen. There could be no better field than Hiar-connaught, where, on account of the absence of Drift, the rocks in places can be studied as if laid down on a map.

I am at a loss to understand where Dr. Callaway learned that I have changed my opinion as to the age of the rocks north of the Carboniferous trough south of Wexford town. Those rocks were called Cambrians by Jukes, and a short time after I first saw them, I found *Oldhamia* in them. That I am aware of, I published no

"views" on the rocks until after the examination of years, and the views first published are those I believe in still. In the *Times* report of the Brit. Assoc. Meeting, York, an Archæan geologist called me a geological Ishmael. I think, however, if he had called me a Knox or a Luther or a Calvin, this name would have been more appropriate; my hand not being against every one; but only against those that promulgate errors.

Ovoca, *Nov. 4th*, 1881. G. H. Kinahan.

## RATE OF DENUDATION OF LAND BY RIVERS.

Sir, — Mr. Tylor's astounding calculation, that during the "Pluvial" period "the mean denudation" of the land was *nine inches per annum, or 729 times its present rate*, has filled me and probably other geologists with profound astonishment. Having just perused Mr. Darwin's most excellent book on Mould and Earthworms, it has occurred to me to ask Mr. Tylor to suggest what became of earthworms during his "Pluvial" period. Mr. Darwin calculates that ten tons of earth per annum per acre is frequently brought to the surface in the form of worm casts, and that the superficial soil has passed *again and again through the bodies of the worms.* Nine inches of soil over an acre of land would weigh, at a carter's estimate of one cubic yard to the ton, not less than 1210 tons.

No mould could possibly form under these circumstances, except perhaps in deltas, as it would be removed 100 times as fast as made. But I am really understating Mr. Tylor's estimate, as his nine inches of denudation means solid rock, or nearly double, or say 2000 tons per acre per annum. T. Mellard Reade.

Park Corner, Blundellsands,
*Nov. 9th*, 1881.

## LAURENTIAN (?) ROCKS, IRELAND.

Sir,—In the epitome of the paper read on these rocks at the Brit. Assoc. York, by Prof. Hull, you end it by stating that I suggest there are Laurentian rocks in the Co. Tyrone. I cannot understand why I am to be made an advocate in favour of the present Laurentian mania. More especially as in my paper read before the Royal Irish Academy, and in a recent paper in the Geol. Mag., I believe I have brought forward good reasons for supposing these Tyrone rocks to be of Cambrian age. G. Henry Kinahan.

Ovoca, *Nov. 5.* 1881.

## MISCELLANEOUS.

The Geological Survey.—In the Geological Magazine for January, 1881, we drew attention to some recent Parliamentary statements concerning the Geological Survey. Since then Mr. Mundella has announced that the solid Geological Survey of England and Wales on the one-inch scale will be completed in two years and a half, while a considerable portion of the solid and superficial Survey of Ireland will be completed in seven, and that of Scotland in eleven years. He was informed that the re-survey for superficial geology of those areas of England which were originally surveyed for solid geology alone, would take about twenty years. It was hoped that within the next few months the re-organization of the staff for remaining surveys would be completed, and no efforts would be spared to finish the work at as early a date as possible.—*Standard*, Aug. 19.