beds of Central Wales are quite as metamorphic-looking as much of the "gnarled series" of Anglesey. We are presented in that island with as complicated a piece of geology as Great Britain can show, and no little field-work must be patiently prosecuted before the problems can be solved.

According to my view, Dr. Callaway has misapprehended some of the most important sections. In a short paper printed in this MAGAZINE last March, I pointed out that the Nebo sections described by him as unconformable junctions of "Ordovician shales" on granitoidite are really faulted junctions of shales against the basement bed of the Cambrian. This at Nebo is a very compact fine-grained grit, which Dr. Callaway has mistaken for granitoidite. At Bryngwallen quarry, near Llanerchymedd, a precisely similar grit may be seen passing down into a quartz conglomerate not distinguishable from that of Twt Hill, and passing up into a fossiliferous sandstone containing *Orthides*, the whole section included in some 30 or 40 feet.

R. D. ROBERTS.

CLARE COLLEGE, CAMBRIDGE, *Nov.* 7, 1881.

THE "LOWER KEUPER SANDSTONE" OR "BASEMENT BEDS."

SIR,—While thanking Mr. Wilson for his support of much that I have said on these rocks, I must correct a slight misapprehension with regard to my views. I do not hold the "theory of a great break" at the base of the Waterstones attributed to me, but merely point to the recurrence of lines of erosion at this and other horizons in the Trias to show that they are no evidence of want of conformability; on p. 6 I use the words "though there is no unconformability," etc.

I do, however, believe that a great change of physical conditions commenced at this period, and that, judging by its effect upon the nature and distribution of the deposits, this was the most important change that took place in the British region during the Triassic era. For I consider the theory that the Bunter was upheaved into dry land and denuded, before the Keuper was deposited, far from being proved.

Mr. Wilson states that "At the close of the Bunter period elevation took place, in the Midlands certainly, if not generally throughout the country, accompanied by extensive and long-continued denudation." The evidence for this elevation and denudation consists in the fact that the Keuper Basement Beds rest on Pebble Beds near Nottingham, but on Lower Mottled Sandstone at four miles distance, the inference being that at least 200 feet must have been denuded away.

But it must be borne in mind that the Bunter deposits thin away to the south-east, as though deposited against a shelving shore, and that Nottingham stands on the margin of the area over which these shingles were originally spread. The inference therefore that the Pebble Beds must have been denuded away in those places where they are absent below the Keuper is unsafe, for they probably never extended so far. It is true that the disappearance of the Pebble

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.

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