

longing to the historic and prehistoric ages, including a Romano-British enamelled bronze brooch, of the same pattern as one found in the Victoria Cave; fragments of pottery, human bones and teeth, and bones of both wild and domestic animals.

The distribution of the remains found in the Church Hole Cave agreed generally with that above described; traces of human occupation and remains of the *Hyæna* occurred both in the cave-earth and in the red sand and clay. The bones found indicated the following animals:—Lion, Polecat, *Hyæna*, Fox, Wolf, Bear, Reindeer, Irish Elk, Bison, Horse, Woolly Rhinoceros, Mammoth, and Hare—all common to both the cave-deposits, except the Lion, which was found only in the cave-earth, and the Polecat, of which a single jaw occurred in the red sand. The latter contained a larger proportion of the remains than in the Robin Hood Cave, but, as in the latter, the quartzite implements were more abundant in the lower strata of the deposits. Among the articles of human workmanship was a perfect and well-shaped bone needle. The superficial soil of the Church Hole Cave also contained articles of the historic and prehistoric age, including a bronze fibula, fragments of pottery (one mediæval), and bones of man and animals. From the presence of these objects in the surface-soil the author inferred that the caves of Creswell Crags, like those of Yorkshire and elsewhere, were used as places of refuge by the Brit-welsh during the conquest of the country by the English.

After noticing the conditions of the fossil bones found in the caves, the author proceeded to remark upon the general results of the explorations with regard to their Pleistocene fauna, and concluded that there is no evidence from these or other caves in this country to prove that their faunas are either pre- or interglacial, and that we have no proof of the existence of pre- or interglacial man in Britain.

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#### CORRESPONDENCE.

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##### THE MAGNESIAN LIMESTONE AND NEW RED SANDSTONE IN THE NEIGHBOURHOOD OF NOTTINGHAM.

SIR,—Assuming that I am one of the “local geologists” referred to by Mr. Aveline in his notice on the above subject, published in the April Number of the *GEOLOGICAL MAGAZINE*, I must, speaking for myself alone, take exception (1) to his definition of my position, and (2) to the necessity for the inference that he draws from facts in themselves not open to question. In a paper on the Permians of this district, *Q. J. G. S. Nov. 1876*, I briefly referred to a series of sandstones, marls, and breccia, that I had long since noticed in the neighbourhood of Nottingham to intervene between the typical Lower Bunter (*f*<sup>1</sup>) and the Middle Permian marls (*e*<sup>3</sup>). On account of their combining the textural characters of both these sub-formations, it became extremely difficult to relegate them to one or the other; and some geologists were inclined to class them as passage-beds. In the above paper and accompanying section it was

my intention to refer to, but not to sanction this idea, as an impartial critic will, I think, readily perceive. To speak candidly, these beds require further study before their precise relationship can be satisfactorily determined.

While by no means prepared to affirm that "a perfect conformity exists between the Magnesian Limestone and the New Red (meaning Bunter) Sandstone in the N.E. of England." I differ widely from Mr. Aveline, in his view that there is proof of a great break between these formations. In support of this position, he cites the successive overlaps of the Upper Permian Marls and Limestone, Middle Marls and Lower Limestone, by the Bunter Sandstone, going south, from the district north of Worksop, to the latitude of Nottingham.

But has it ever occurred to him that all these cases may be of the nature of conformable overlaps? My own experience of the Marl Slate, Lower Magnesian Limestone, and Middle Marls of this district, founded on accumulated data, not attainable in Mr. Aveline's time, convinces me that there is a general tendency in these sub-formations to attenuate *inter se*, as also to become coarser in texture, when followed from the north or north-east towards the south or south-west. To cite one or two instances of this. The attenuating Lower Magnesian Limestone, which, for the last few miles of its southern extension, has become in great part a flaggy, sandy, and even conglomeratic rock, dies out as a coarse brecciated littoral deposit. The Middle Marls<sup>1</sup> have just previously faded away. Simultaneously, the Marl Slate series has diminished from 60 or 70 feet of shales (mostly), to 20 feet of sandstones (mostly), and from that to *nil*, when the basal Permian, a coarse brecciated rock, comes directly beneath the last degraded relic of the Magnesian Limestone.<sup>2</sup> These facts in my opinion point to the existence of an inter-Permian marginal barrier immediately to the south, and somewhat more remotely to the west, and to successive synchronous increments of subsidence in the opposite directions.

I do not believe that any of the above rock series ever stretched appreciably further south than they do now. Extending this reasoning to the Upper Magnesian Limestone and uppermost Permian Marls (as to which my data is admittedly more limited), I would suggest that they never extended appreciably further south than they respectively do now, and that their southerly disappearance is due to analogous causes. Successive increments of subsidence in a north-easterly direction will account for these phenomena. Inter-Bunter-Permian denudations will not. Small local irregularities undoubtedly exist between the Lower Bunter and (the

<sup>1</sup> The persistent outcrop of this thin and denudable series between the Magnesian Limestone and Lower Bunter formations negatives the idea of any great amount of denudation between these two periods in this neighbourhood.

<sup>2</sup> It thus appears that the Magnesian Limestone overlaps its own Marl Slate base, with which it appears to be perfectly conformable. Yet no one supposes there is a "great break" between them. Had, however, this overlap been concealed by a cloak of Lower Bunter, that formation, and not the Magnesian Limestone, would have been credited therewith, and the fact cited as an additional proof of the great break between the Permian and New Red Sandstone periods.

marginal) portions of certain of the Permian sub-divisions owing to the minor oscillations, resulting in partial failures of deposition and paltry denudations, to which all shallow-water deposits of limited thickness are liable. These were, however, probably mostly inter- rather than post-Permian. Such, for instance, are the cases mentioned in the Survey Memoirs, near Mansfield and Tadcaster, where Middle Permian Marls rest on an eroded surface of the Lower Magnesian Limestone, which at the former place is full of false bedding, and at both exhibits signs of having been sufficiently close to the surface to have locally curtailed or even entirely excluded the deposition of the Middle Marls. I would insist on the importance of discriminating between what is the result of contemporaneous influences (great and small), and what of subsequent causes, in limiting the extension of the Permian formations. If we consent to exclude all evidence that is not provably post-Permian, I think we have yet to learn the grounds for considering that there was in the above district any "considerable break" between the Permian and the Bunter.

It is with no small gratification that I find so eminent a Government Surveyor as Mr. Aveline is willing to admit that the great break in this district is, as I have laboured in my paper to show, at the bottom and not at the top of the Permians, and that he has become converted to the opinion that the "Lower Red Sandstone" is a myth.

E. WILSON.

NOTTINGHAM, 15th April, 1877.

#### MONOGRAPH ON BRITISH CARBONIFEROUS GANOIDS.

SIR,—Will you kindly permit me, through the medium of your Journal, to correct and apologize for a very awkward blunder, which occurs in the first part of my monograph on British Carboniferous Ganoids, recently published by the Palæontographical Society? In the Introduction I have advocated the retention of the *Dipnoi* as a distinct order of fishes; but at p. 41, in a manner unaccountable to myself, for I certainly did not mean it, I have included them as a suborder of the *Ganoidei*. That this "slip of the pen" was not detected in the revision of the proofs must have been due to an amount of carelessness, of which I am justly ashamed.

April 2.

R. H. TRAQUAIR.

#### CARBONIFEROUS GANOID FISHES.—ERRATA.

Page 7, line 24,	delete "which."
" 12 "	11, for "Egerton" read "Agassiz."
" 14 "	3, for "interclavicular" read "infraclavicular."
" 16 "	28, insert a "(" before "Etonichthys."
" 28 "	34, for "or" read "on."
" 38 "	31, for "centre" read "centra."
" 41 "	34, delete "Suborder I. Dipnoi."
" 41 "	35, for "II." read "Suborder I."
" 41 "	36, for "III." read "II."
" 42 "	4, for "IV." read "III."
" 42 "	5, for "V." read "IV."