

stone, dipping about  $42^\circ$  to the S.W., and resting with an apparent conformity on the denuded surface of the Mountain-limestone, which in this part of the vale has a similar dip. These beds were probably not visible at the time of the Survey, but are now exposed in quarries to the east and west of the road, and have recently been pierced by some pits sunk in search of hæmatite on its western or lower side. They are very distinct in mineral character from both the neighbouring Millstone-grit and the Bunter Sandstone of the vale, and are an exact counterpart of the Permian series of Shropshire.

The Bunter Sandstone is well exposed a mile to the north-west at Garth Gynan, where it dips north-west about  $25^\circ$ , and would appear to be unconformable to the beds at Pentre Celyn, but the junction is not visible.

Although the supposed Permian strata appear to rest conformably to the Mountain-limestone, the extreme thinness of the Limestone at this point, and the absence of the Millstone-grit, which is so largely developed close at hand, would indicate a great erosion of the Lower Carboniferous series before the deposition of the Permian. The Permian strata were here certainly deposited on nearly level Carboniferous Limestone; and if this were its original plane of deposition, the elevation, and probably the great dislocation, must have taken place between the Permian and the New Red period; also a second great erosion before the deposition of the New Red Sandstone. The Mountain-limestone, with its overlying Permian, must have been pitched up some  $15^\circ$  or  $17^\circ$  before the Bunter Sandstone was deposited against them, and then the whole further elevated to the extent of the present dip of the Bunter.

That a great denudation of the Lower Carboniferous series took place before the close of the Permian, is also evident from the large number of fragments of Mountain-limestone that occur in parts of the Permian breccia round the Abbersley Hills, and on the banks of the Avon, near Bristol.

From some facts I have recently observed in Flintshire and Denbighshire, I think the contour of the Mountain-limestone range of North Wales was not materially changed during the Glacial period; but that some further erosion did take place, is manifest from the abundant fragments of Mountain-limestone that occur in the Boulder-clay of the North Welsh coast. Ice-transported blocks of Mountain-limestone, weighing many hundredweights, and Mountain-limestone fossils also, frequently occur in the Drifts and Boulder-clay of the Severn Valley.—I am, &c.

GEORGE MAW.

*To the Editor of the GEOLOGICAL MAGAZINE.*

SIR,—Your Correspondent whose observations appear on page 236 of your Magazine for May falls into a serious error in supposing that the stratified and unfossiliferous clay, which appears upon the surface of the Lower Boulder-clay, at Heaton Mersey, near Manchester, belongs to the Upper Boulder-clay division. Yesterday I paid a visit to the locality, and, after comparing his notes with the sections that are now to be seen, it is evident that they are not

the same sections as those mentioned by Mr. E. Hull, of the Geological Survey, but, on the contrary, are taken from a Brick-croft at a distance of about 300 yards, where nothing but Lower Boulder-clay is to be seen, with a covering of fine sand. The absence of the 'Laminated clays and bed of decomposed vegetation,' in Section No. 1, that your correspondent gives, is owing to its being at a much lower elevation than Section No. 2 that he speaks about, where he says that upon the surface (of what he calls Upper Boulder-clay) 'occurs a boggy soil, with branches of trees, some 3 feet thick.' The difference that exists between the Upper Boulder-clay and the deposit at Heaton Mersey, to which he gives the same name, is so great that a novice would be able to see the distinction. The first is a hard, compact, and unstratified deposit, containing pebbles and striated boulders in abundance; whilst the second is a soft stratified or laminated deposit in which no pebbles nor boulders occur. Another proof as to the difference of the deposit is well shown in the materials that are produced from them. The Boulder-clay is extensively used for brick-making, whilst the laminated clay is used for making earthenware. The following is the section about midway from the top of Grundy Hill; it was taken yesterday:—

Fine laminated sand . . . . .	10 feet.
Layer of peaty matter, about 3 feet thick, composed of decomposed vegetation, containing branches of hazel-trees, trunks, and roots, but not in an upright position . . . . .	1 foot.
Dark-brown laminated clay, now known as 'warp' . . . . .	13 feet.
Lower Boulder-clay, varying in colour from red to bluish, containing striated boulders and remains of <i>Bos primigenius</i> . . . . .	20 feet, and the base not seen.

I may state, that I never before observed the trunks and roots of the hazel-trees in the bed that occurs on the surface of the 'warp,' nor was I ever rewarded with finding the remains of *Bos primigenius* in the Lower Boulder-clay of Heaton Mersey until my excursion yesterday.—Yours, &c. J. WEBSTER KIRKHAM.

LOWER BROUGHTON: May 5, 1865.

*To the Editor of the GEOLOGICAL MAGAZINE.*

DISCOVERY OF FOSSIL SHELLS IN THE SILURIAN SHALES OF DUMFRIESSHIRE.

SIR,—The precise age of the Silurian beds of Dumfriesshire has always been a difficulty with Geologists, because the most diligent search has hitherto brought to light no higher organisms than *Graptolites*, with the exception of some very doubtful and obscure specimens—so obscure that the species could not be determined.

It has been my good fortune to discover several specimens of shells in the Black Shales of Garpel Burn, which runs through a glen about  $2\frac{1}{2}$  miles from the town of Moffat. I only found them after searching the shales on four consecutive days, spending a good