

Britain is continuing in three series (Well Catalogue Series, Research Reports, and Hydrogeological Reports), and consideration is being given to a fourth series dealing with instrumental and similar matters. Publication of hydrogeological maps has also been started with the issue of that for North and East Lincolnshire and will be extended to cover the major ground-water provinces.

Overseas activities are now being undertaken by the Water Department for the first time and although the scale of the present programme is small, it is intended that this important aspect of overseas applied geology shall not be neglected.

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#### PRE-CAMBRIAN AND LOWER PALAEOZOIC ROCKS OF CO. WEXFORD

SIR,—In a recent paper (*Geol. Mag.*, **104** (3), 213–221, 1967) we quoted a note by J. W. Baker in the *Welsh Geological Quarterly* (**1** (3), 17) in which he stated that the Rosslare Series and its metamorphisms were “pre-Ordovician and not Pre-Cambrian (as previously supposed)”. A subsequent issue of the same Journal (**1** (4), 14), issued after our paper had gone to press, contained an erratum to Baker’s note: it should have read “the Rosslare Series and its metamorphism is Pre-Cambrian not Cambrian as previously supposed”. Baker and we, therefore, agree that the Rosslare Series (= Rosslare Complex) is Pre-Cambrian.

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#### THE SILURO-DEVONIAN BOUNDARY

SIR,—International agreement on the best horizon at which to draw the Siluro-Devonian boundary may be obtained at the International Symposium on the Silurian and Devonian at Leningrad in 1968. In view of the trend of opinion expressed in much recent literature it seems unlikely that the horizon selected will be at or even close to the horizon which has long been accepted as the Siluro-Devonian boundary in the Welsh Marches of Britain, the area where the Old Red System was first defined by Murchison. Indications are that a faunal horizon which will be correlated with some level near to the Downtonian/Dittonian boundary may well be agreed, and, if so, its application to this country will be essentially an academic palaeontological exercise. Historical justification for such a choice will be virtually non-existent, and this may be of little significance to the palaeontological argument, but a recent paper (Holland, 1965) and subsequent discussion of it (Tarlo, 1965) suggest

that some British palaeontologists have already done disservice to the international debate by attempting to show or to imply that the historical interpretation of the type area gives far more latitude to the reforming stratigrapher than is really the case. It is the purpose of this note to refer to reviews of the Siluro-Devonian boundary problem by O. T. Jones (1929) and E. I. White (1950), to re-state the earliest definition of the base of the Old Red Sandstone, and thereby to show that no horizon which is far above the base of the Tilestones of Mynydd Eppynt can have historical backing as a boundary between the Silurian and Devonian systems.

In the *Handbook of the Geology of Great Britain* (Evans and Stubblefield, 1929, pp. 113–117) O. T. Jones gave a useful historical review of the evolution of the use of Lapworth's Downtonian division of the Silurian. In this he pointed out slight errors made by H. de Dorlodot (1912) and L. D. Stamp (1923) in their reading of Murchison's exposition of the Silurian/Old Red System boundary. His criticisms are directed almost exclusively at their misquotation of Murchison's stratigraphy of Downton Gorge, which was one of the sections where that author (1839, p. 181) believed he had identified the correlatives of the Tilestones of Mynydd Eppynt. Jones' remarks are still valid, but they would have been much more justified if the Downton area was the only place where one could be sure of Murchison's intentions, or if the "Bur Stones" of the Tin-mill section are indeed the correlatives of the Tilestones. If, however, neither of these conditions holds good, much of the edge is removed from his comments on the mistakes of de Dorlodot and Stamp. He may fairly be said to have given prominence to a minor error in their interpretation of history while failing to present a properly balanced correct interpretation.

E. I. White (1950) gave an exhaustive review of the history of the Siluro-Devonian boundary controversy which had by then become somewhat chaotic. In a well reasoned argument he came down in favour of grouping the Downtonian, with its base at the base of the Ludlow Bone Bed, as the lowest part of the Old Red Sandstone for palaeontological as well as historical reasons. Like Jones, his remarks on the earliest history were fair only in the context of the Downton section, and did nothing to restore the imbalance fostered by that review; also he stressed the ambiguities in Murchison's work rather than the consistencies. Nevertheless, his advocacy of the Ludlow Bone Bed as the base of the Devonian seemed to accord so well with stratigraphical and historical truth that, so far as this country was concerned, a Siluro-Devonian boundary problem had almost ceased to exist.

Historically one cannot usefully go further back than the "Table of Stratified Deposits" accompanying the abstract published by Murchison in 1834 in which the base of the Old Red Sandstone was defined before the Silurian System had been named. When one considers the imprecision and circumlocution which characterized most pre-Carboniferous stratigraphical work in that era it is abundantly clear from the table and the text that the author's intention is to define the Tilestones of Mynydd Eppynt as the basal part of the Old Red Sandstone with the boundary between that formation and the "Grauwacké" at their base. The paper is sufficiently brief and unqualified to put this fact beyond dispute and E. I. White's (1950, p. 59) assessment of the paper cannot be regarded as fair. The text and table and localities mentioned are not ambiguous and, when read in conjunction with later details in Silurian System, constitute as precise historical data as one can ever hope to find in a pre-Victorian mid-Palaeozoic paper. Indeed why it should have provoked such comments as "The chart accompanying the paper does not make the line of division any clearer . . ." (White, 1950, p. 59) is beyond the writer's comprehension.

Besides the localities given for the Tilestones in the type area (Pontarlleche, Cwmdwr, and Clyro Hills) two other localities are given for their equivalents elsewhere, Tin-mill Copse, Downton, and Clun Forest. The reference in the subsequent "memoir" (The Silurian System) to "Bur Stones" (p. 181) not Tilestones, at the base of the Old Red Sandstone at Tin-mill indicates that

Murchison regarded the "Bur Stones" as not quite typical Tilestones, but later writers have tended to dwell on details of the Downton section and to overlook abundant references to, and illustrations of other localities such as Cwmdwr in the type area and Clun Forest elsewhere. Silurian System makes it clear (pp. 183, 191, 602-3 and Plate 3) that if Murchison had any type sections in mind for his "Beds of Passage" or "Basal Beds of the Old Red Sandstone" these sections were Horeb Chapel (Cwmdwr) and Felindre (Clun Forest). In a historical context these places must be given at least equal weight with the Downton area and not be relegated to a limbo for areas where, it is implied, Murchison did not really know what he was talking about.

The Cwmdwr section (Straw, 1930, pp. 89-91; Potter and Price, 1965, pp. 386-8) is now so well known as to require little further comment, but it is important that Murchison chose to illustrate it because it is not complicated, as the Sawdde section is, by the presence of the Silurian Trichrüg Beds, the age of which was for so long a source of error. In Clun Forest it is perhaps not widely known that, in the upper Teme valley, there is one section only to which the locality-name "Felindre" could have been applied and from which Murchison could have obtained the fauna mentioned on p. 191 and illustrated in plate 3 of Silurian System. The section is in Stonehouse Dingle (Earp, 1940, p. 7) on the south side of the village. The fauna illustrated could have come from no other formation than the *Platyschisma helicites* Beds (Earp, 1938, p. 135), and Murchison's recognition of the identity of these strata with the Tilestones of Cwmdwr, 50 miles away, must be regarded as among the most perceptive strokes of pioneer correlation. Its validity stands today no less firmly than when made more than 130 years ago.

The base of the *Platyschisma* Beds of Clun Forest is as close to the horizon of the Ludlow Bone Bed as any horizon is capable of identification in a facies which lacks the bone bed, and the base of the Tilestones of Cwmdwr is at the same horizon. Thus, over the greater part of his terrain Murchison drew a system boundary virtually at the base of the Downtonian as now defined. Only in a restricted area, illustrated by the Tin-mill section, can the boundary be said specifically to exclude from the Old Red Sandstone a few feet of strata which are now regarded as the basal part of the Downton Series.

It is not proposed to discuss what led Murchison later to raise the base of the Old Red Sandstone to the top of the Tilestones, but comments by White (1950, p. 60) are not convincing. It is probable that Murchison recognized that most of the Tilestones of Mynydd Eppynt lay slightly lower in the sequence than the "Bur Stones" of Downton and probably equated more closely with the underlying Downton Castle Sandstone. Having put the latter at the top of his Upper Ludlow Rock he certainly wished to keep it as the uppermost stratum of his Silurian System. As he had repeatedly emphasized that his "Basal Beds of the Old Red Sandstone" were also "Beds of Passage" into the underlying Silurian System he seems to have felt free to make what was, after all, not a major adjustment to his original system boundary. That he made the adjustment is a fact, but it in no way disturbs the historical fact that his original base of the Old Red System was the base of the Tilestones of the type area of Mynydd Eppynt.

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