

CORRESPONDENCE

Ludlow stratigraphy at Ludlow, Shropshire

SIR – The chronostratigraphy of the Ludlow Series has recently been revised (Holland *et al.* 1980) to divide it into two stages, an early Gorstian Stage and a later Ludfordian Stage. This simplification is welcome as these units correspond to the two major cycles of sedimentation at Ludlow recognized in the sedimentology, macropalaeontology and palynology (Phipps & Reeve, 1967; Lawson, 1975; Dorning, 1981 *c*).

A revised lithostratigraphy was also proposed by Holland *et al.* (1980), with formation names corresponding to the earlier informal units (Holland, Lawson & Walmsley, 1963) which are based on a combination of local macrofossil assemblages and local lithologies, and not lithostratigraphical in concept. However, the Lower Leintwardine Beds cannot be defined solely on the basis of differences in lithology at the described standard sections, and the boundaries at the bases of the Middle Elton Beds, Upper Elton Beds, Upper Bringewood Beds and Upper Whitcliffe Beds cannot be traced to other Welsh Borderland localities.

In view of these shortcomings in the current terminology, some changes are proposed which should clarify the lithostratigraphy. The Lower Elton, Middle Elton and Upper Elton Beds should be grouped as the Elton Formation, with the Middle Elton and Upper Elton Beds as the Middle Elton Member and Upper Elton Member of the Elton Formation. The characteristic lithology of the Lower Elton Beds crops out widely in the Welsh Borderland; the lithologies of the Middle Elton and Upper Elton Beds are a local development.

The Aymestry Formation is a well-established lithostratigraphical unit, referred to as the Aymestry Limestone by Alexander (1936), and named the Aymestry Formation in Phipps & Reeve (1967). At Ludlow two members can be recognized, the Lower Bringewood Member and the Upper Bringewood Member, with bases equivalent to the bases of the Lower Bringewood Beds and Upper Bringewood Beds.

The base of the Lower Leintwardine Beds is defined in Sunnyhill Quarry (SO 4953 7255) (Holland *et al.* 1963, fig. 13) at the shale parting 'C' between beds 'B' and 'D', where there is a change in the shelly macrofauna, but no distinct change in lithology. A distinct lithological change occurs between beds 'H₃' and 'I', 2.5 m higher. The base of the Upper Leintwardine Beds is equally ill-defined lithologically and Holland *et al.* (1963, p. 116) stated that 'in the standard section on the Whitcliffe, the Upper Leintwardine Beds show the same thinly bedded calcareous siltstones, with their characteristic honeycomb weathering, as are found in the bulk of the Lower Leintwardine Beds'. The following changes are proposed to clarify the lithostratigraphy: the Lower Leintwardine and Upper Leintwardine Beds should be grouped together as the Leintwardine Formation, with a base at the base of bed 'I' in Sunnyhill Quarry. The base of the Ludfordian, by definition, remains at the base of bed 'D'. The lithology of the Leintwardine Formation at Ludlow is similar throughout, but in many other Welsh Borderland localities a distinctive unit consisting of calcareous siltstones and mudrock with lenticular beds of shelly limestone is present towards the top of the Leintwardine Formation. It is proposed that this should be named the Woodbury Member of the Leintwardine Formation, equivalent to the Woodbury Shale Member of Phipps & Reeve (1967, p. 350). The descriptive name 'Shale' is omitted as most of the unit is not shale. The use of the Sunnyhill Formation of Antia (1980), described as a grouping of the Lower and Upper Leintwardine Beds is considered confusing as the base is ill-defined on lithology.

The Lower and Upper Whitcliffe Beds have similarities in lithology; certain beds of similar lithology are recorded from both the Lower and Upper Whitcliffe Beds. Antia (1980) introduced the name Overton Formation for the grouping of the Lower and Upper Whitcliffe Beds without naming a type section. The type section is named herein at the Whitcliffe, Ludlow. The Overton Formation at Ludlow has two members corresponding to the Lower and Upper Whitcliffe Beds, the Lower Whitcliffe Member and Upper Whitcliffe Member of the Overton Formation.

The following table compares the previous and proposed lithostratigraphical units at Ludlow:

Holland <i>et al.</i> 1980	Proposed lithostratigraphy	
Upper Whitcliffe Form. } Lower Whitcliffe Form. }	Overton Form.	{ Upper Whitcliffe Member Lower Whitcliffe Member
Upper Leintwardine Form. } Lower Leintwardine Form. }	Leintwardine Form.	
Upper Bringewood Form. } Lower Bringewood Form. }	Aymestry Form.	{ Upper Bringewood Member Lower Bringewood Member
Upper Elton Form. } Middle Elton Form. } Lower Elton Form. }	Elton Form.	{ Upper Elton Member Middle Elton Member

The biostratigraphy of the type Ludlow is well documented; palaeontological and palynological zonations have been described for the shelly macrofossils and graptolites (Holland, Lawson & Walmsley, 1963; White & Lawson, 1978) and the acritarchs and chitinozoa (Dorning 1981*a*, 1981*b*). The graptolite and chitinozoa zones have greater value in correlation of deep water sediments, while the acritarch and shelly macrofauna zones have greater application in the correlation of shallower shelf sediments. A properly defined lithostratigraphy, together with the existing multiple biostratigraphy will hopefully aid the understanding of Ludlow geology in the type area and Welsh Borderland. I thank R. Aldridge, C. Holland, David Siveter, Derek Siveter, V. Tucker and D. White for comments.

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