Teffont Evias, Wiltshire

[ST 990 311] and [ST 994 309]

Introduction

Teffont Evias and the adjacent Vale of Wardour site of Dinton are both key sites in the history of British palaeoentomology. Lying on the north bank of the River Nadder, west of Salisbury, Teffont Evias (Figure 4.50), like the Dinton site, was originally excavated for limestone from the Purbeck beds in the early part of the 19th century. This Lower Cretaceous (Berriasian, *c.* 144 Ma) stone in the quarry has yielded several new insect species to that pioneer of the study of British fossil insects, the Reverend P.B. Brodie, who described them in his groundbreaking book (Brodie, 1845b). Since then, fossil insects have also been recovered from some nearby outcrops of the Purbeck limestone that also have potential for future finds.

Geological setting

In southern England the beginning of Purbeck times (corresponding approximately to the end of the Jurassic Period (see above), was marked by a regression in which the marine conditions that had dominated the region for most of the Jurassic Period were replaced by marginal marine (lagoonal), or non-marine, environments which persisted until the return of fully marine conditions in early Aptian times. The region comprised a complex of massifs bordered by the steadily widening Proto-Atlantic Ocean to the west, the Boreal Sea to the north-east and the Tethys Ocean to the south. Sediment was deposited in variably inundated basins between the massifs, those of the Vale of Wardour in the Pewsey Basin or South Midlands Shelf. Elsewhere in southern England, Purbeck sediments were deposited in the adjacent and, to varying degrees, interconnected Wessex and Weald basins to the south and south-east respectively. In addition to the fossil arthropod importance of this site, the area is also selected for the GCR for the Portlandian–Berrisian selection category.

Description

The insects found by Brodie occur in Lower–Middle Purbeck (Lulworth Formation) limestones, originally called 'Liar' by quarrymen in the early 19th century; the insects are associated with the biozonal ostracod *Cypridea granulose* (Figure 4.51). The insect-hearing 'Lias' beds are no longer permanently exposed, although they were temporarily re-exposed by English Nature as part of a their 'Facelift' programme in 2002 and could be re-opened again in the future.

Higher (Durlston Formation) Purbeck strata are still accessible in a somewhat degraded old quarry face. Among these, a fine-grained, cream-weathering, limestone (the 'white-fissile limestone' of Andrews and Jukes-Brown (1894, and probably the lateral equivalent of Brodie's Insect Limestone at Dinton) has recently yielded fossil insect, isopod, fish and plant material.

Also, in recent years, new fossil insects, including the narrow-winged, protozygopteran 'dragonfly' *Saxomyrmeleon keatingei* Nel and Jarzemboski, 1998 ((Figure 4.52) and (Figure 4.53)) have been recovered from relatively soft creamy-grey micrites in the lower part of the Lulworth Formation in an old railway cutting at ST 993 309, and from the *Archaeoniscus* Bed within the Durlston Formation at an old unnotified quarry at Dashlet [ST 992 303] by Teffont railway cutting.

Fauna

Five orders of insect are represented: the Odonata (dragonflies and damselflies), Hemiptera (plant bugs), Neuroptera (lacewings) (Figure 4.54), Diptera (true flies) and Coleoptera (beetles). Several taxa (e.g. the lacewing family Kalligrammatidae, (Figure 4.54)) which is not known from the Purbeck strata elsewhere in the UK — but typical of the Tithonian Solnhofen plattenkalke.

Interpretation

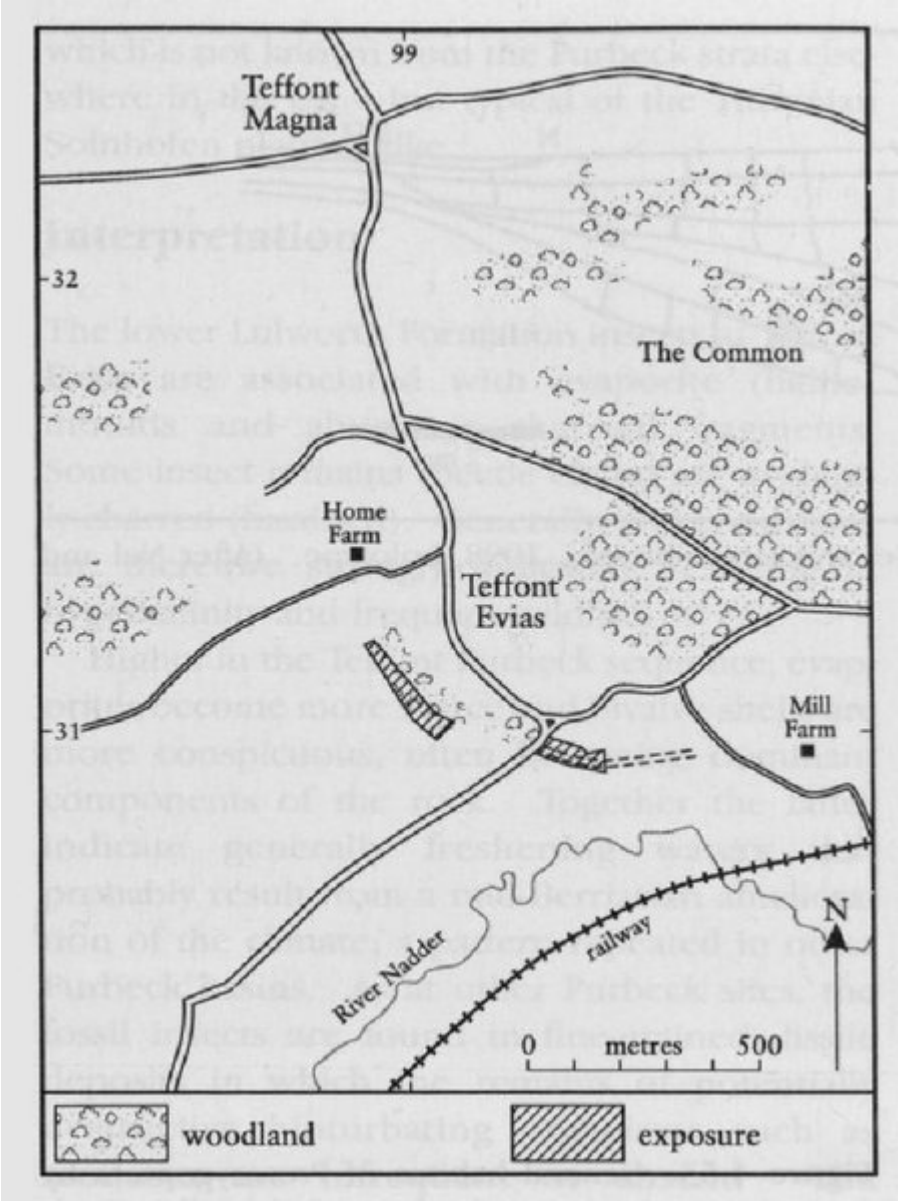
The lower Lulworth Formation insects at Teffont Evias are associated with evaporite (halite) moulds and abundant charcoal fragments. Some insect remains (beetle elytra) are evidently charred (fusained). Generally, arid conditions are therefore strongly indicated, resulting in hypersalinity and frequent wildfire.

Higher in the Teffont Purbeck sequence, evaporites become more scarce and bivalve shells are more conspicuous, often becoming dominant components of the rock. Together the latter indicate generally freshening waters that probably result from a mid-Berriasian amelioration of the climate; a pattern repeated in other Purbeck basins. As at other Purbeck sites, the fossil insects are found in fine-grained, fissile deposits in which the remains of potentially destructive bioturbating organisms such as molluscs are infrequent or absent. The restriction of molluscs in the lower part of the Purbeck sequence can probably be best explained by hypersalinity: in higher insect beds by factors such as isolation, salinity fluctuations or water impermanence. For example, the cypridiid ostracods associated with the 'Lias' insects may indicate relatively fresh, but impermanent, water conditions.

Conclusion

Although at the time of writing largely obscured, the original Lower Cretaceous site of Teffont Evias (*c.* 140–145 Ma) is a key one in the history of British palaeoentomology. Its conservation value is largely derived from the diverse fauna of fossil insects obtained from here in the past and described in the first major study of British fossil insects by the Rev. P. B. Brodie. However, the recovery of new fossil insects from both this and adjacent outcrops in recent years shows that there is still considerable potential for future finds. The historical and scientific importance of the insects from here, combined with the stratigraphical and wider palaeontological interest in the site and adjacent outcrops, makes this one of the most important Purbeck localities outside the typical area of Dorset.

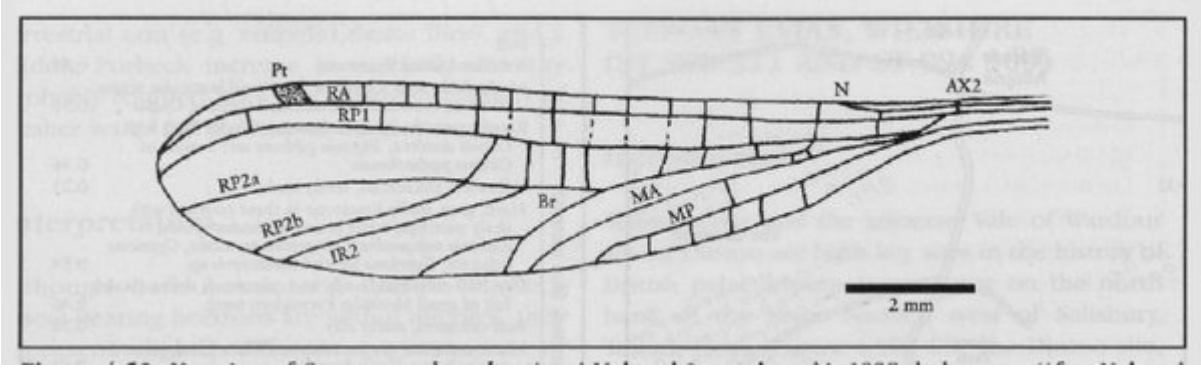
References



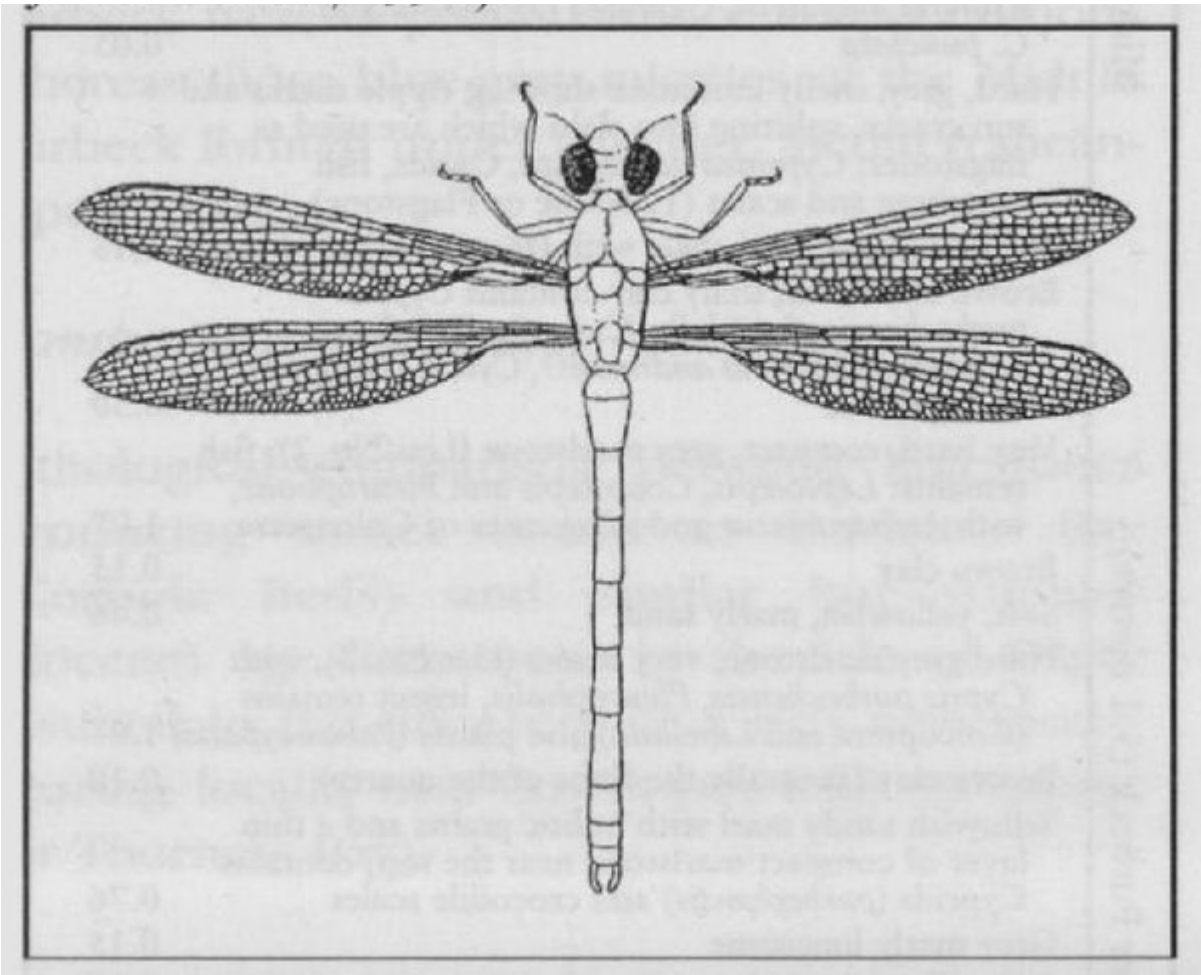
(Figure 4.50) Location sketch map for the Teffont Evias GCR site.

Middle Purbeck (4.4 metres)	Soil	
	Rubble of white limestone	0.30
	Marly shale with a layer of 'beef' and lenticular seams of chert, crowded with silicified shells of *Cyclas*	0.30
	Rough, greyish, sandy limestone (Cinder Bed) with *Ostrea distorta*, *Trigonia gibbosa* and a spine of *Cidaris purbeckensis*	0.46
	Yellowish, calcareous, sandy shale	0.23
	Hard, grey, shelly limestone in three courses, with shaly partings; turtle bones, *Hybodus* spines, *Estheria subquadrata*, *Cypridea punctata*, *Cyprione bristovii*, *Cyprione* sp. and *Metacypris* sp.	0.84
	Dry, buff-coloured, sandy and calcareous shales (Scale) full of small *Modiola*; Pycnodont teeth	0.46
	Buff-coloured, marly clay	0.20
	Hard, compact, grey marlstone (White Lias), jointed vertically, no fossils found	0.61
	Dark grey or black shale with *Mesodon macropterus*, *Estheria andrewsii*, *Cypridea fasciculata* and *C. punctata*	0.05
	Hard, grey, shelly limestone showing ripple marks and sun cracks, splitting into slabs which are used as flagstones; *Cypridea fasciculata*, *Cyclas*, fish vertebrae and scales (Tilestone or Flagstone)	0.46
	Yellowish laminated shale with layers of crushed shells	0.18
	Brown and black, shaly clay contains *Cypris purbeckensis* plentifully, *C. fasciculata* (less common), *Estheria andrewsii*?, *Cyclas* and scales of *Lepidotus*	0.30
Lower Purbeck (5.1 metres)	Very hard, compact, grey marlstone (Lias No. 2); fish remains: *Leptolepis*, *Coccolepis* and *Pleuropholis*, with *Archaeoniscus* and wing cases of Coleoptera	1.07
	Brown clay	0.15
	Soft, yellowish, marly sand	0.46
	Hard grey marlstone, very heavy (Lias No. 3), with *Cypris purbeckensis*, *Pleuropholis*, insect remains (Coleoptera and *Libellula*) and plants (*Palaeocyparis*)	1.07
	Brown clay (generally the floor of the quarry)	0.10
	Yellowish sandy marl with oolitic grains and a thin layer of compact marlstone near the top; contains Cyprids (*purbeckensis*) and crocodile scales	0.76
	Grey marly limestone	0.15
	Soft yellowish marl	0.20
	Grey marlstone (or Lias), with vertical jointing	0.38
	Soft sandy marl	0.15
	Hard grey and brown marlstone, compact and heavy, with ochreous patches and markings	0.61+

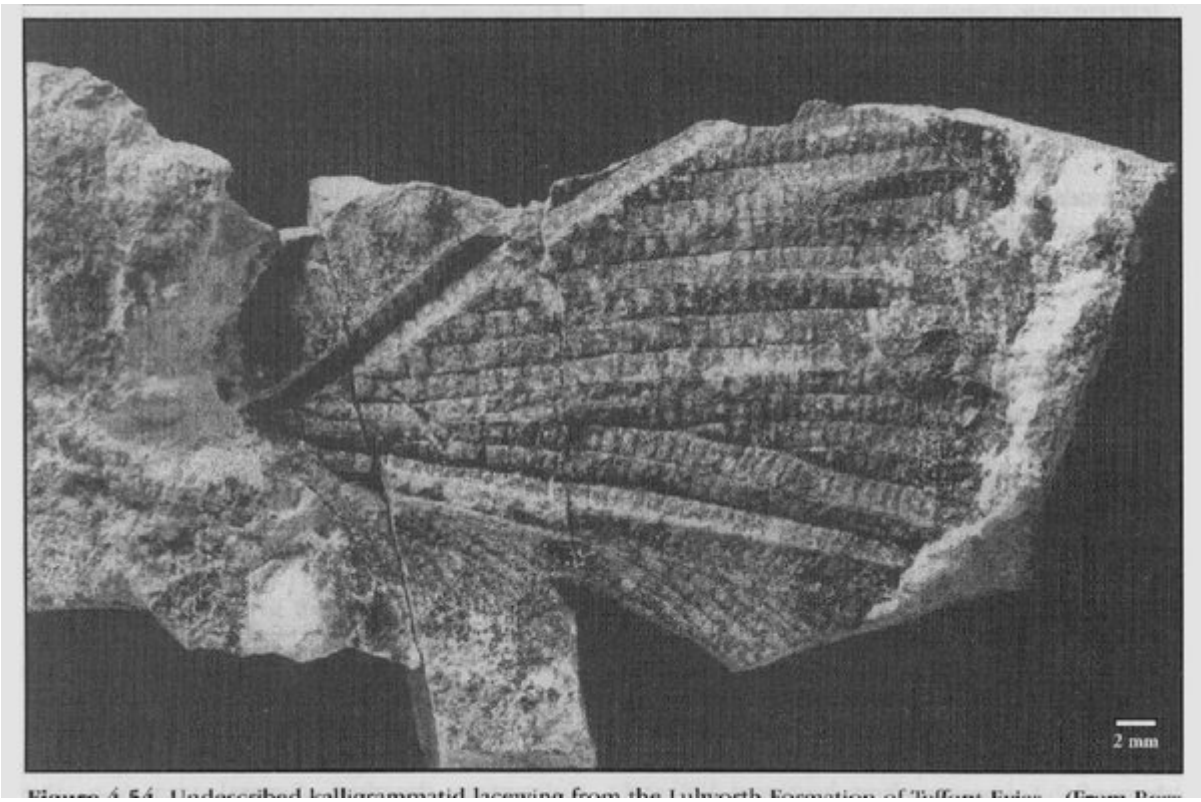
(Figure 4.51) Section of Teffont Evias quarry metricated. (After Andrews and Jukes-Brown, 1894.)



(Figure 4.52) Venation of Saxomyrmeleon keatingei Nel and Jarzembowski, 1998, holotype. (After Nel and Jarzembowski, 1998.)



(Figure 4.53) General habitus of Protozygoptera by Carlo Pesarini, courtesy Professor J.-C. Gall. (From Nel and Jarzembowski, 1998.)



(Figure 4.54) Undescribed kalligrammatid lacewing from the Lulworth Formation of Teffont Evias. (From Ross and Jarzembowski, 1996.)