Dumbleton and Alderton, Gloucestershire

[SP 006 345]

Introduction

The village of Dumbleton lies between the northern flank of Alderton Hill and the Vale of Evesham to the north. Dumbleton and Alderton have been treated as two separate localities in the literature (e.g. Brodie, 1845a) but Dumbleton Pit is actually less than 100 m east of Alderton Hill Quarry (Dr M.J. Simms, pers. comm.). This composite site is critically important for the study of Lower Jurassic (early Toarcian age, *c.* 182 Ma) insects and has provided the type species of important genera of Mesozoic dragonflies *Heterophlebia* and *Liassogomphus.*

Description

The Upper Lias outlier caps the summit of Alderton Hill in the northern Cotswolds (Figure 4.30). Pale limestone nodules from the so-called 'Fish and Insect Beds' (Dumbleton Member) of Toarcian age, Harpoceras falciferum Biozone and H. exaratum Subzone have been known to contain abundant fish and some insect fossils since the mid 19th century (Wright, 1865, p.156). Some important fish fossils from here are recorded by Dineley and Metcalf (1999, p. 380).

Fauna

Dumbleton Pit and Alderton Hill Quarry, survived for the purposes of fossil collecting into the late twentieth century (Simms *et al.,* 2004, p. 186).

The Fish Bed here is about 4 m above the base of the Upper Lias. Insects occur in brown-weathering, blue-centred, early diagenetic nodular limestone 5–20 cm thick associated with fish and other marine fossils (including gastropods) plus occasional plant fossils. No comparable limestone bed was exposed on Dumbleton Hill (contra Brodie, 1845a).

Insects from the Alderton GCR site include:

Odonata (dragonflies) e.g. *Heterothemis brodiei, Heterophlebia buckmani* (Brodie, 1845a; Carpenter, 1992; Nel *et al.,* 1993, see (Figure 4.33) and (Figure 4.34));

Blattodea (cockroaches);

Orthoptera ('grasshoppers' and crickets) e.g. crickets (Zeuner, 1939);

Grylloblattida (rock crawlers) e.g. *Geinitria carpentieri* (Zeuner, 1939);

Hemiptera (bugs) e.g. cicadas;

Neuroptera (lacewings) e.g. *Actinophlebia intermixta,* (Tillyard, 1933, see (Figure 4.33));

Archeosmylus complexus; (Jarzembowski, 1999)

Coleoptera (beetles)

Diptera (true flies) e.g. crane-fly (Tillyard, 1933, see (Figure 4.34))

Mecoptera (scorpionflies) e.g. Tillyard, 1933, (see (Figure 4.35))

Amphiesmenoptera (Trichoptera plus Lepidoptera) e.g. *Necrotaufiusparvidus;* (Tillyard, 1933, see (Figure 4.36).)

The entomofauna has not been monographed but the dragonflies are relatively well known. In addition to showing sexual dimorphism, they are also recorded from the continent. Thus *Heterophlebia buckmani* (Brodie) is known from Germany and Luxembourg (Nel *et al.,* 1993) and the famous Posidonia Shale of Holzmaden; *Heterothemis brodiei* (Buckman) is also known from Germany plus the Posidonia Shale of Switzerland (Ansorge, 2003). Blattodea have been revised recently by Vršanský and Ansorge (2007).

The Lower Toarcian insects were preserved as part of a transgressive Oceanic Anoxic Event in the European epicontinental seas under calm conditions resulting in fine-grained, micritic limestone formation in the absence of sediment bioturbation (Ansorge, 2003). The insect remains are mainly just the wings of good fliers (although articulated specimens do occur) drowned during dispersal flights or blown off course by offshore winds. It seems that few insect remains were washed down by rivers because aquatic larvae and ground-dwelling arthropods are either absent or rare.

Those ground-dwelling arthropods that do rarely occur include crickets and grylloblattidans.

Interpretation

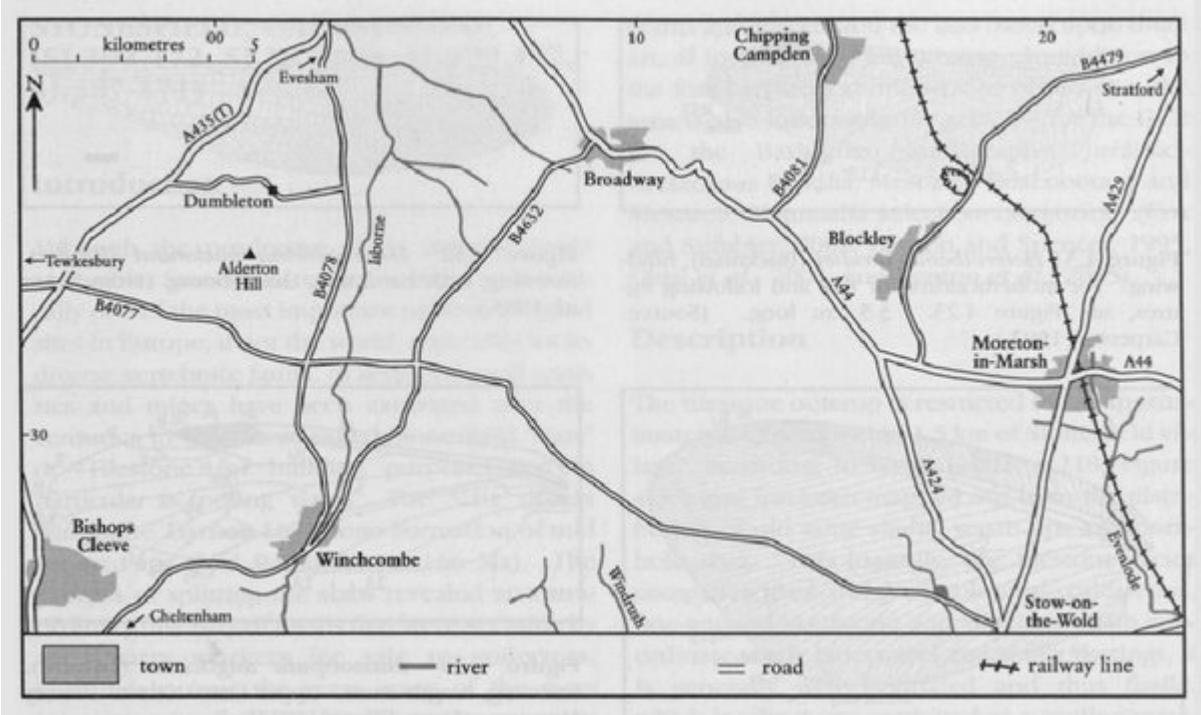
The insects probably lived on the London–Brabant Massif (Ansorge, 2003: fig.1) which was evidently well vegetated, judging by the presence of plant-feeding insects such as 'grasshoppers' and plant bugs. Flying insects included forms capable of migration (dragonflies) and those that were perhaps capable of swarming, for example extinct orthopterans such as the Elcanidae and amphiesmenopterans such as the Necrotaulidae. The caddisfly-like necrotauliids (actually stem Amphiesmenoptera) were possibly terrestrial (and not aquatic) as larvae. Cockroaches and some beetles fed, on rotting vegetation, the former inhabiting different ecological niches with different size leaf litter. Predatory insects such as Odonata, Mecoptera and Neuroptera were not top predators as they, in turn, were preyed upon by pterosaurs whose remains have been found in the Posidonia Shale.

Alderton is the most productive site in the UK for Upper Liassic insects and has yielded some of the youngest Liassic insects in the UK. The British Lower Jurassic strata are renowned for their insects, a fossil record that extends down into the Upper Trias. The quarry is thus part of a network of sites that include Charmouth (Lower Lias) and Aust Cliff (Rhaetian).

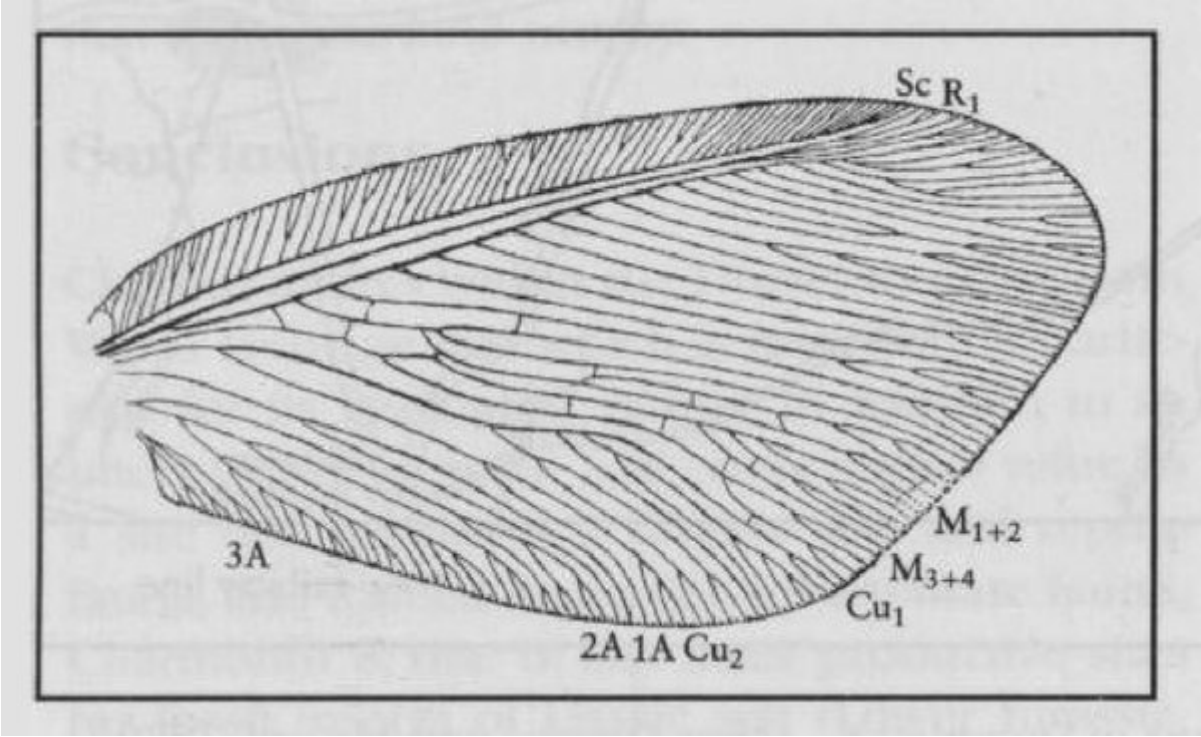
Conclusion

The conservation value of the Dumbleton and Alderton GCR site lies in the palaeontological significance of its insect fauna. The type specimens and species of some important Mesozoic dragonfly genera (*Heterophlebia* and *Heterothemis*) were found in the Upper Lias strata of Lower Jurassic age (Lower Toarcian, *c.* 185 Ma) which are exposed here. Face clearance of the disused clay pits on Alderton Hill would enhance their geological potential.

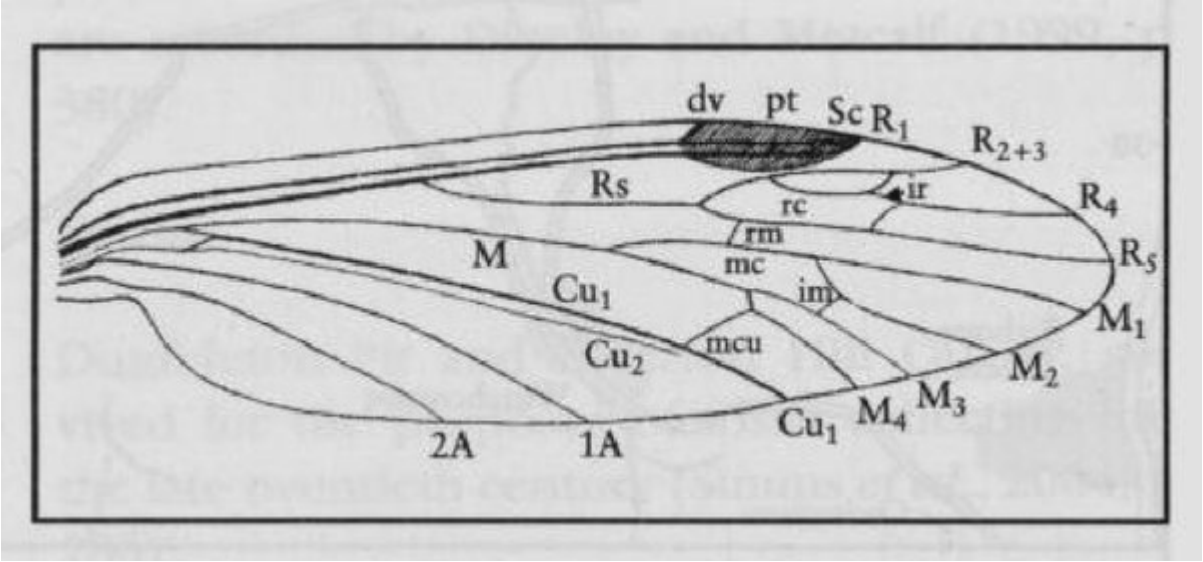
References



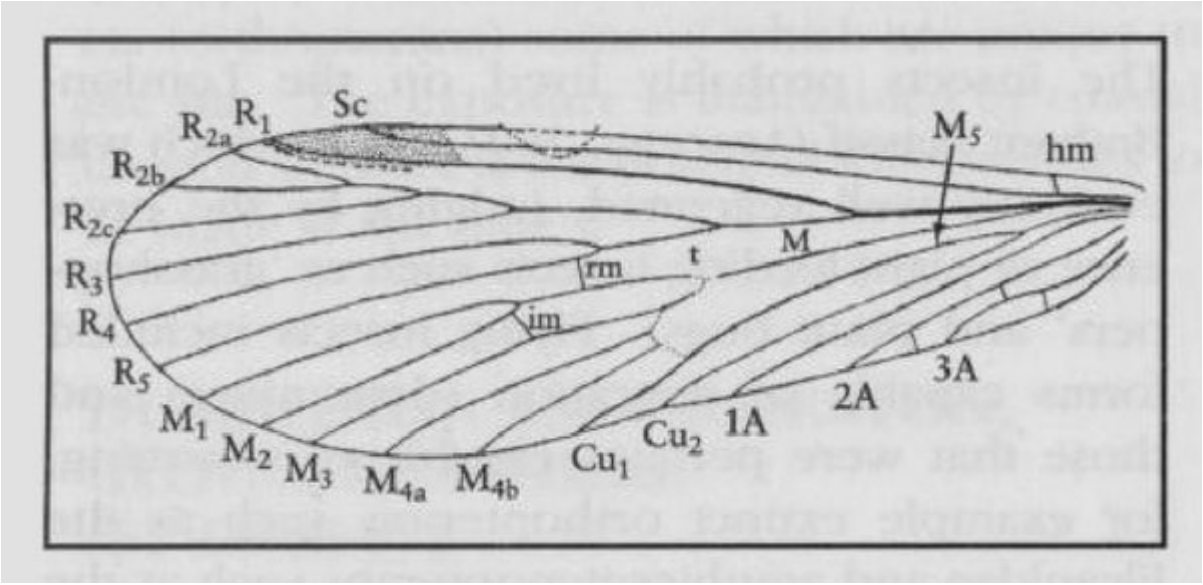
(Figure 4.30) Sketch map of the area around the village of Dumbleton. (After Dineley and Metcalf, 1999.)



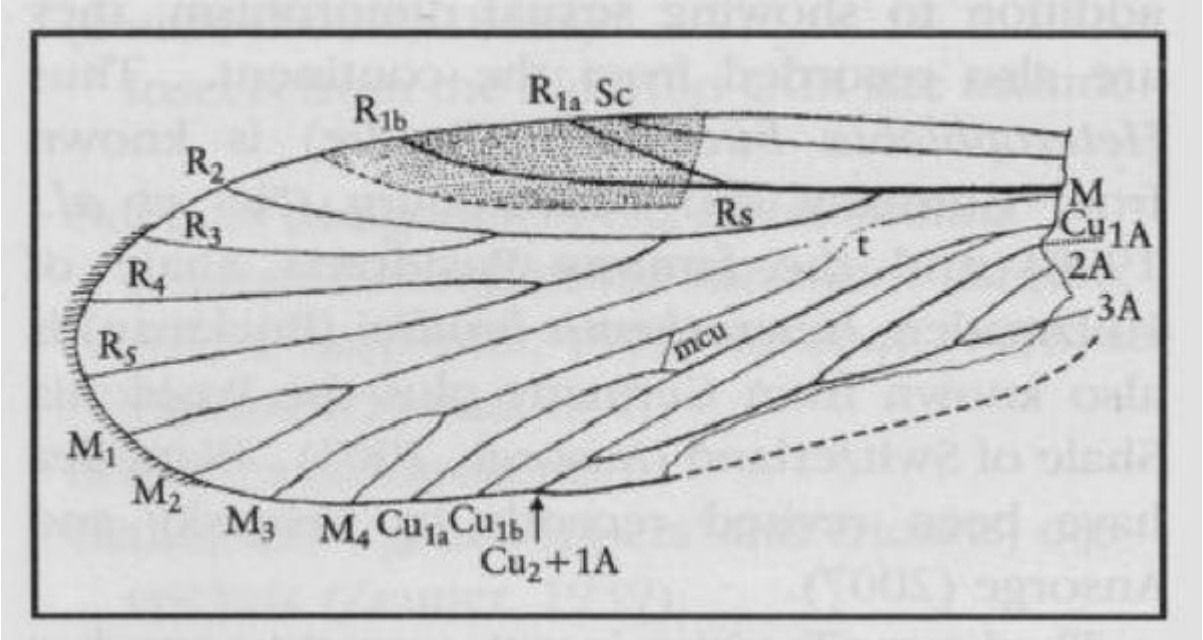
(Figure 4.33) Actinophlebia intermixta (Scudder), forewing. Length, 1 lmm, Upper Lias. Natural History Museum 1.11346. (From Tillyard, 1933.)



(Figure 4.34) Liassotipula anglicana (Tillyard), forewing, length 8mm. Upper Lias. Natural History Museum. (From Tillyard, 1933.)



(Figure 4.35) Orthophlebia brodiei (Tillyard), forewing, length 10.7 mm. Upper Lias. Natural History Museum 1.15017. (From Tillyard, 1933.)



(Figure 4.36) Necrotaulius parvulus (Geinitz), forewing, length 3.5 mm. Upper Lias. Natural History Museum, 1.15014. (From Tillyard, 1933.)