
Auclaye, Surrey

[TQ 168 388]

Introduction

Part of a network of Weald Clay arthropod GCR sites (see also GCR site reports for Smokejacks Pit and Clockhouse Brickworks), this early Cretaceous site (earliest Barremian, c. 130 Ma) in the Mole Valley, Surrey, has produced a diverse fauna of insects belonging to eight different orders.

Description

This disused brick pit 500 m west of Clockhouse exposes strata that lie in the upper part of the Weald Clay interval between British Geological Survey bed numbers 3a and 3c (the Okehurst Sands and Billingshurst Sands respectively), in the basal Upper Weald Clay of earliest Barremian age, c. 130 Ma (Jarzembowski, 1991; Rasnitsyn *et al.*, 1998, see (Figure 4.66)). In the past, some 9–12 m of grey, laminated mudstone were worked for brick making.

Fauna

The fossils occur mainly in phosphatic concretions that are brown externally and blue-grey in the centre. Splitting the concretions has revealed various insect fossils, some small plant remains including charcoal (fusain) and wood, occasional fish scales, bones and egg cases, coprolites and isopod remains. Carapaces of a conchostracan (clam shrimp) are locally abundant, but lamellibranchs and ostracods are rare, suggesting ecological opportunism on a variable-salinity mudplain.

Trace fossils in the form of thin burrows of the worm *Cochlichnus* also occur and are sometimes associated with insect remains. Other vertical, pyritized, tubular trace fossils probably record the past presence of wetland plants.

The phosphatic preservation of the Wealden insects shows the greatest amount of detail known for fossil insects with the exception of preservation in amber. Thus the best-preserved Wealden dragonfly (odonatan) known, *Valdaeshna surreyensis* Jarzembowski, 1988, was found here (see (Figure 4.69), from Jarzembowski and Nel, 1996b). Its preservation has allowed reconstruction of an insect unlikely ever to be found fossilized in amber. This extinct hawker enjoys its own subfamily Valdaeshninae (Bechly *et al.*, 2001). Other true dragonflies found here include a new species of the late Mesozoic family Aeschnidiidae (Fleck and Nel, 2003) and the widespread (i.e. found at the other Wealden localities) small darter *Cretaneophya strevensi* Jarzembowski and Nel 1996. Damselflies include another widespread species *Cretarchistigma greenwoodi* Jarzembowski *et al.*, 1998.

In addition to Odonata, insects recorded —mainly from wings — include:

Coleoptera (Beetles)

Blattaria/Blattodea (Cockroaches and cockroachoids)

Hemiptera (Bugs)

Othoptera (Crickets and grasshoppers)

Diptera (True flies)

Hymenoptera (Wasps)

Neuroptera (Lacewings)

Mecoptera (Scorpionflies)

Trichoptera (Caddisflies)

Further, unique finds of Raphidioptera (snakeflies) and Isoptera (termites) have been recorded since the graph drawn in Jarzembowski (1991). The predominance of Coleoptera and Blattodea over other orders is typical of the Weald Clay (Jarzembowski, 1995). As Isoptera had separated by this time, true cockroaches are present as well as the usual Palaeozoic–Mesozoic cockroachoids (Figure 4.67) and (Figure 4.68), the long-ranging blattarian *Elisama molossa* Westwood).

The four most common orders of insects found at Auclaye (Blattodea, Coleoptera, Hemiptera and Orthoptera) have forewings modified for protection (elytra/tegmina). The Orthoptera include crickets, bush crickets and grasshoppers (although grasses had not yet appeared) and have been monographed recently (Gorochov *et al.*, 2006).

Generally, the aquatic orders (Odonata, Trichoptera) are uncommon in the Weald Clay. Three species of the latter have been described from Auclaye — more imagoes than from the other Weald Clay localities (Sukatsheva and Jarzembowski, 2001). Water bugs are uncommon in the Wealden strata (unlike in the Purbeck strata) and include a rare belostomatid (toe-pincher bug) from Auclaye belonging to an unusual subfamily Stygeonepinae, previously found in Early Cretaceous calcareous formations at Las Hoyas (Spain), Solnhofen (Germany) and in the British Purbecks (Jarzembowski and Coram, 1997: fig 10, see (Figure 4.71)). Immature stages of insects are also uncommon in the Wealden but a rare bug larva (homopteran) has also been found at Auclaye ((Figure 4.71)c).

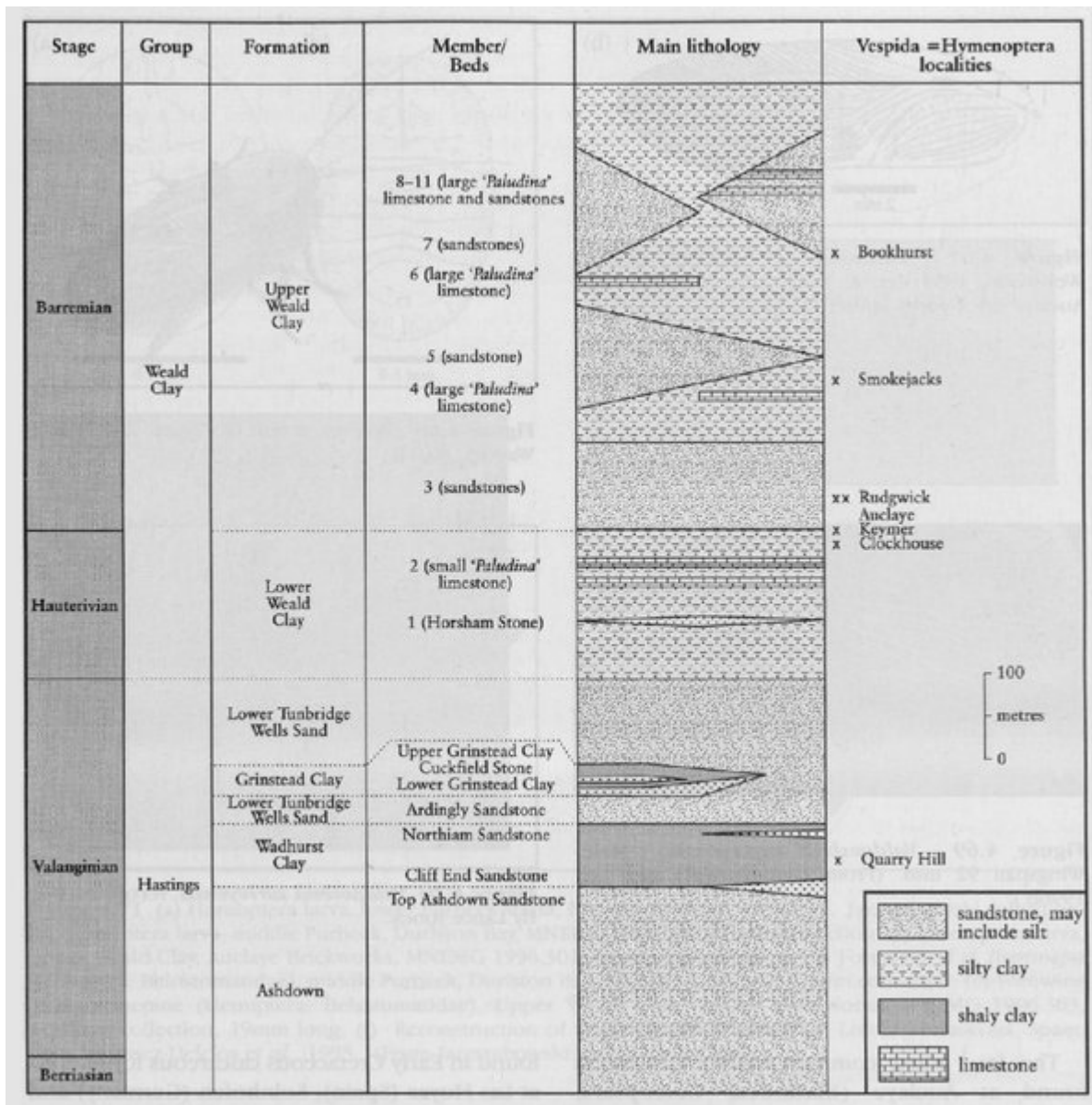
Interpretation

Insect remains are generally less abundant at Auclaye than at Clockhouse Brickworks, but body parts appear to be more common, suggesting less sorting and a quieter water body at Auclaye Brickworks. Many of the body parts remain to be identified hence the long 'indet.' column in Jarzembowski (1991). It is likely, however, that they probably belong to orders already recorded from here. Hymenoptera include articulated specimens, for example, the parasitoid *Manlaya capelensis* Rasnitsyn & Jarzembowski and the digger wasp *Archisphex boothi* Jarzembowski. The latter is allied to bees and presages these important pollinators Jarzembowski, 1991; Rasnitsyn *et al.*, 1998). These species also illustrate the varied geographical affinities of the Wealden fauna, that is *Archisphex* is endemic to the Wealden area, whereas *Manlaya* is typically Asian.

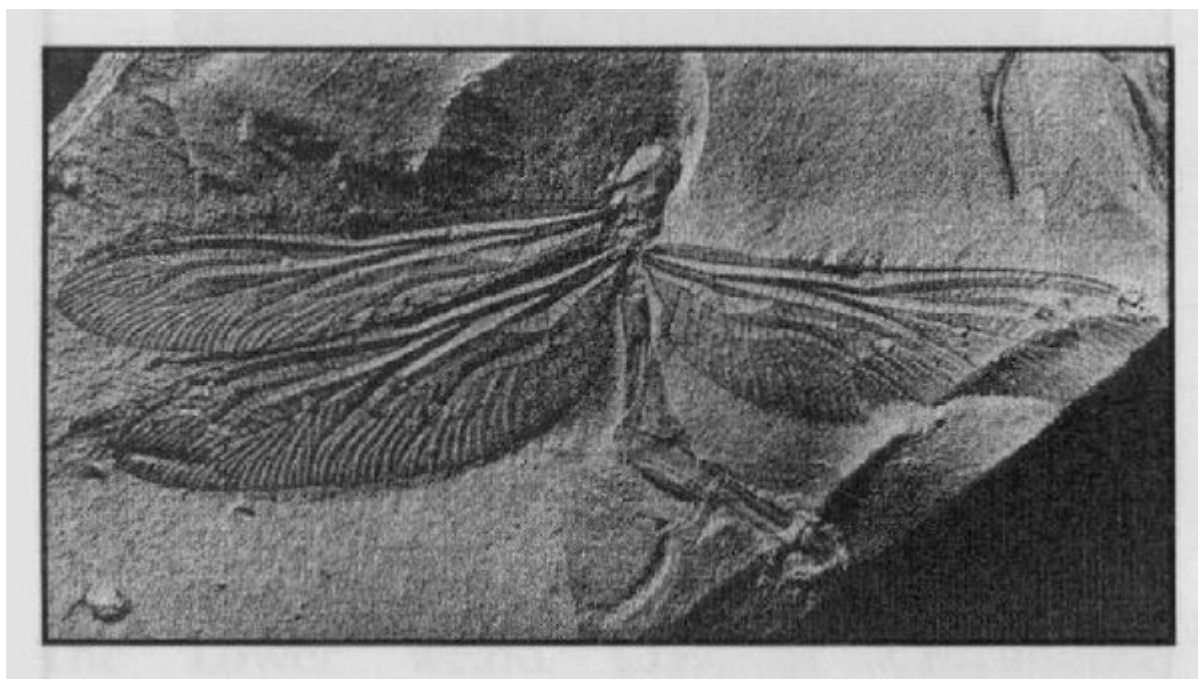
Conclusions

Part of a network of Wealden,—early Cretaceous, sites in southern England, Auclaye Brickworks' conservation value lies in the high fidelity of preservation and diversity of fossil insects obtained from the Weald Clay here. Representatives of eight different orders have been found. The Auclaye site lies stratigraphically between the Clockhouse and Smokejacks brickworks GCR sites. Together, the three localities preserve a representative insect fauna of the Upper Wealden (Hauterivian–Barremian) of the UK. This Wealden insect assemblage is the first intensively studied assemblage of Cretaceous insects and comprises a world-renowned early Cretaceous entomofauna

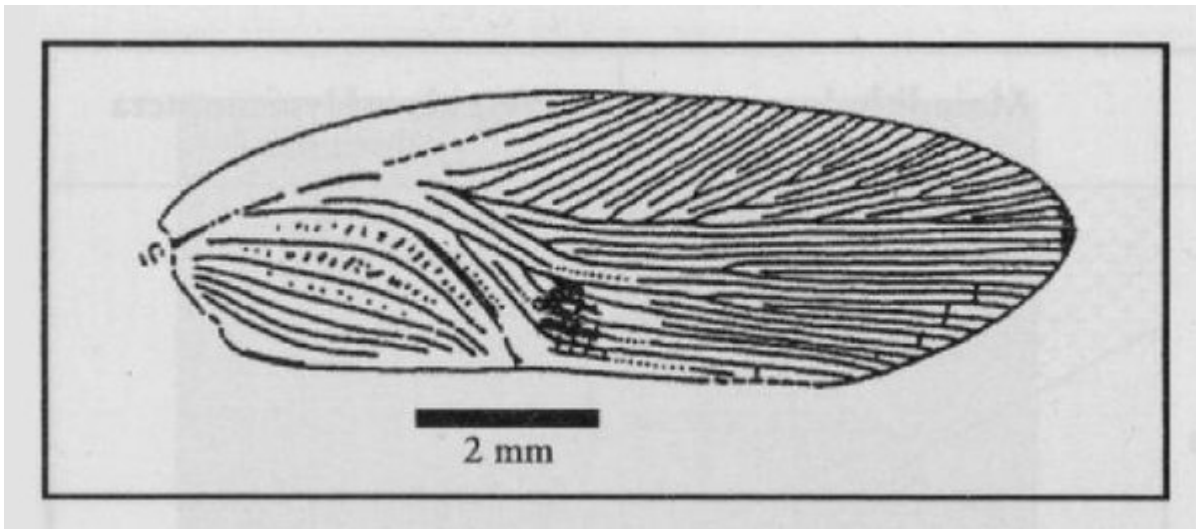
[References](#)



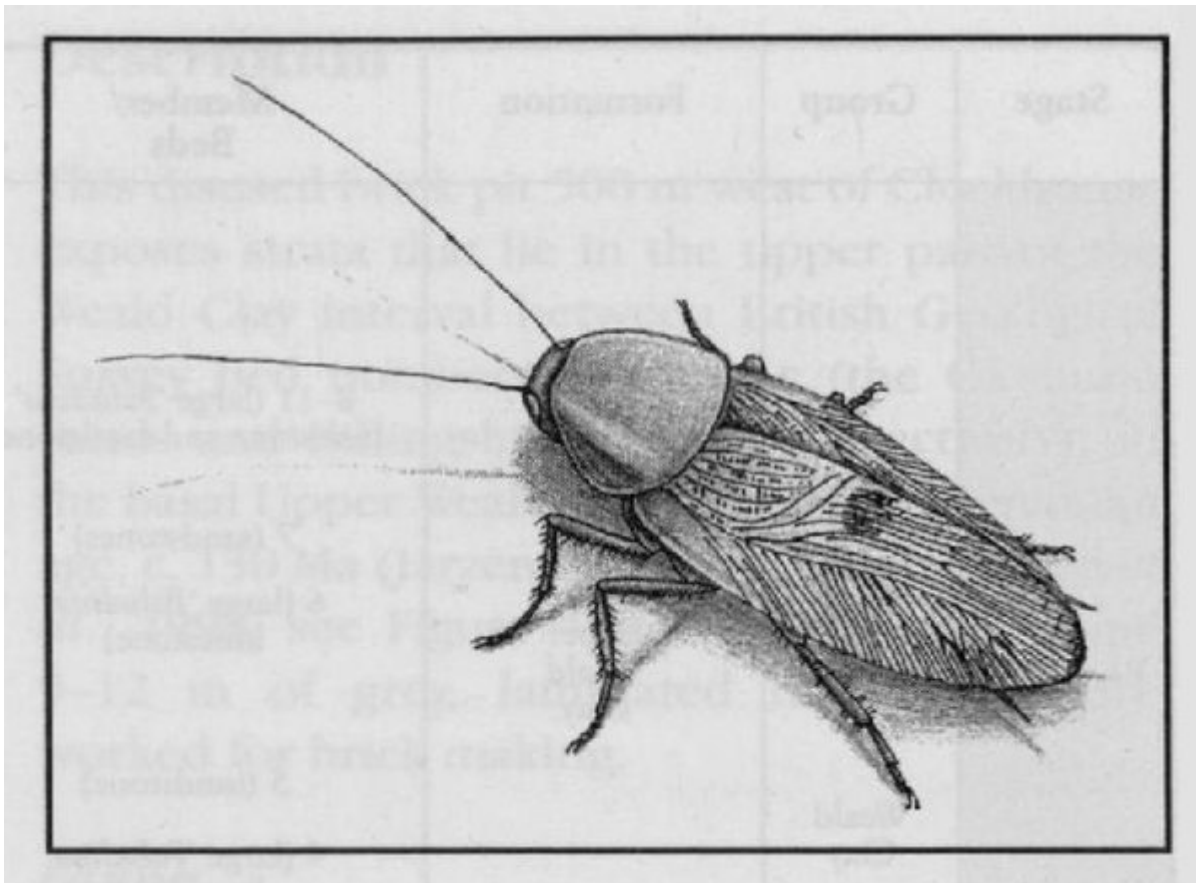
(Figure 4.66) The stratigraphy of the Wealden Supergroup of the Weald, showing the localities (pits) where *Vespida* have been found. (From Rasnitsyn et al., 1998.)



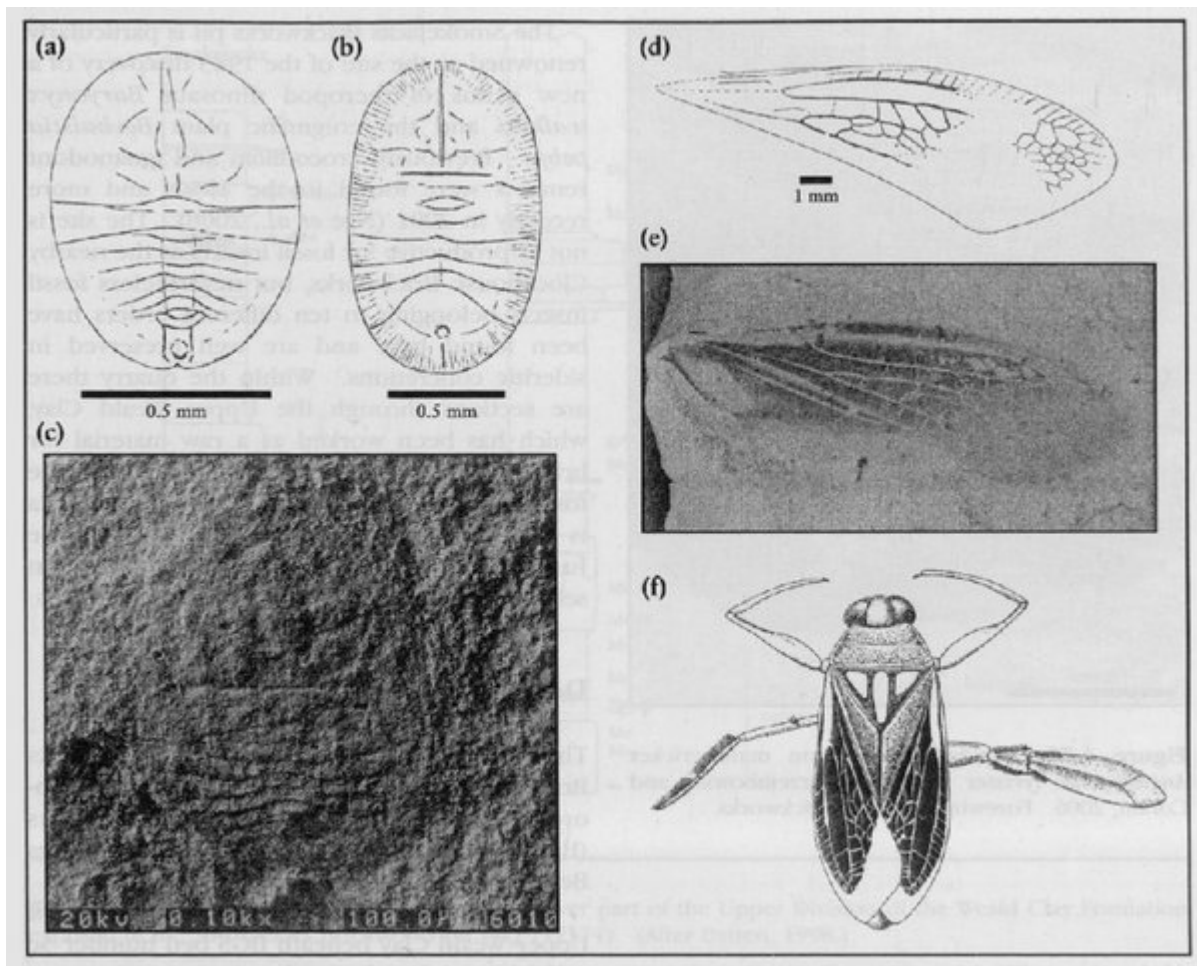
(Figure 4.69) *Valdaeshna surreyensis*. Male. Wingspan 92 mm. (From Jarzembowski and Nel, 1996b.)



(Figure 4.67) Forewing of *Elisama mollosa* Westwood, 1854 det. A. Ross. Upper Weald Clay, Auclay Brickworks. (After Jarzembowski, 1999b.)



(Figure 4.68) Reconstruction of (Figure 4.67). (From Watson, 2001.)



(Figure 4.71) (a) Homoptera larva, lower Purbeck strata, Poxwell, MNEMG 1996.299, Jarzembowski collection. (b) Homoptera larva, middle Purbeck, Durlston Bay, MNEMG 1996.300, Comm collection; (c) Homoptera larva, Upper Weald Clay, Auclaye Brickworks, MNEMG 1996.301, Goodman collection; (d) Forewing of c.f. *Iberonepa* Hemiptera: Belostomatidae), middle Purbeck, Durlston Bay, MNEMG 1996.302, Comm collection; (e) Forewing of stygeonepine (Hemiptera: Belostomatidae), Upper Weald Clay, Auclaye Brickworks, MNEMG 1996.303, Woollard collection, 19mm long; (f) Reconstruction of stygeonepine (*Iberonepa*), Lower Cretaceous, Spain, from Martinez-Delclòs et al, 1995. (From Jarzembowski and Coram, 1997.)