# Chapter 4 British Tertiary fossil bird GCR sites

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## Introduction

A general description of Tertiary stratigraphy and the British sedimentary setting of that time is provided in Chapter 3, and an outline of bird evolution is given in Chapter 1.

## Bird evolution in the British Tertiary Sub-Era

The time-span represented by the stratigraphical units that have produced bird fossils, from the Early Eocene to Early Oligocene sedimentary record, encompasses some major changes in bird faunas. Most of the British fossil birds belong to modern orders, although there are a few surprises, such as the early Oligocene ostrich *Proceriavis.* Most modern groups, from ducks and game birds to gulls, falcons and kingfishers, are represented as fossils, but the commonest birds today, the Passeriformes — perching birds or songbirds — are poorly known, because they radiated explosively in the Miocene Epoch, and sediments of that age are virtually absent in Great Britain. A possible early passeriform is *Primoscens,* from the London Clay Formation. Archaic bird groups are also represented, in particular the 'toothed' Odontopterygiformes of the Eocene Epoch. The main characters of the different Tertiary bird groups are given by Feduccia (1999) and, more briefly, by Benton (2005), and these two general books provide good introductions to the wider literature on bird anatomy and the fossil record of birds.

The fossil record of birds from Great Britain is good, including over 60 species, but the record is not so rich as that of mammals (see Chapter 3). It is often said that birds have an impossibly bad fossil record, but this is incorrect (Unwin, 1993), and people are often surprised at how much is known about the early history of the modern groups. The avifauna of the Early Eocene London Clay Formation appears to be as rich as in any modern temperate-climate location (Walker, 1980). However, in view of the tropical nature of the climate recognized to have existed in southern England, it is highly unlikely that the fossil record has sampled the full diversity of birds at the time.

Fossil birds were first reported from the London Clay Formation as long ago as 1825 (Koenig, 1825), and numerous other Victorian accounts were given of new specimens from that stratigraphical unit (e.g. Owen, 1841b, 1870, 1873, 1878; Bowerbank, 1854; Lydekker, 1891; Andrews, 1899) and occasionally from other Tertiary units (e.g. Newton, 1886). There was then a long gap of time during which very little research was done on British fossil birds, until the extensive and fruitful co-operation of Colin J.O. Harrison and Cyril A. Walker in the 1970s and 1980s (Harrison, 1971, 1980b, 1982a–c, 1983, 1984a,b, 1985, 1986; Harrison and Walker, 1971, 1972, 1975, 1976a–c, 1977a,b, 1979a,b; Walker, 1980). More recently, Gareth Dyke has begun a programme of description of new materials from the London Clay (Dyke and Cooper, 2000; Dyke, 2001a,b; Dyke and Waterhouse, 2001; Dyke and Gulas, 2002).

## British Tertiary bird sites

The distribution of fossil birds in Great Britain was outlined by Walker (1980), but a number of further records have been published since then. Nonetheless, this work forms the basis for the county-by-county summary of fossiliferous bird sites given here. Fossil birds are found in many of the same Tertiary units that yield mammal specimens, but there is more emphasis on the London Clay Formation, which is, surprisingly perhaps, richer in birds and reptiles than it is in mammals.

Fossiliferous sites (Figure 4.1) are located predominantly in extensive coastal sections, most of them in the London Clay Formation along the northern and southern banks of the Thames Estuary, and others along the south coast of Hampshire and the north and north-western coasts of the Isle of Wight. Other sites have been quarries or temporary construction sites. An outline of the main locations is noted here, together with the name of the fossiliferous unit. Localities are arranged according to their occurrence in the London Basin (Middlesex, Suffolk, Essex, Surrey, Sussex, Kent,

Hertfordshire, Berkshire) or the Hampshire Basin (Hampshire, Isle of Wight, Dorset).

GREATER LONDON: St James's Park, London ([TQ 29 79]; *Pediorallus barbarae;* division C, London Clay Formation; Wetherell, 1836; Walker, 1980): Chalk Farm, Primrose Hill, railway tunnel ([TQ 266 841]–[TQ 277 842]; *Proherodius oweni* type specimen; Early Eocene divisions B–C, London Clay Formation; Lydekker, 1891; Harrison, 1979; Harrison and Walker, 1977a, 1978; Dyke, 2001b): Abbey Wood (see GCR site report)

SUFFOLK: Orford ([TM 415 500]; *Diomedea anglica;* early/mid Pliocene Coralline Crag; Lydekker, 1891): Foxhall, near Waldringfield ([TM 11 52]; *Diomedea;* mid Pliocene Red Crag; Lydekker, 1886).

ESSEX: Grange Farm, South Ockendon [TQ 611 833]–([TQ 615 833]; *Eostrix vincenti,* type specimen, a small gamebird, a pigeon and a small wader; Early Eocene division A, London Clay Formation; George and Vincent, 1978; Harrison, 1980b, 1983): Ongar ([TL 562 024]; *Pediorallus barbarae* type specimen, *Litoripes medius;* Early Eocene division C, London Clay Formation; Daniels, 1971; Harrison and Walker, 1977a; 1979a; Walker, 1980): Walton-on-the-Naze (see GCR site report): Burnham-on-Crouch (see GCR site report).

SURREY: Croydon ([TQ 340 655]; *Gastornis klaasseni,* type specimen; Early Eocene Woolwich Shell Beds, Woolwich Formation; Klaassen, 1883; Newton, 1886; Walker, 1980).

SUSSEX: Bognor Regis (see GCR site report).

KENT: Herne Bay [TR 187 683]–([TR 197 684]; *Pediorallus barbarae;* Early Eocene division B, London Clay Formation; *Pseudodontornis tenuirostris;* Early Eocene Oldhaven Formation; Cooper, 1977; Walker, 1980; Harrison, 1985): Warden Point and the Isle of Sheppey (see GCR site report).

BERKSHIRE: Arborfield ([SU 767 654]: possible bird bone; Early Eocene London Clay Formation; Cooper, 1976a).

HAMPSHIRE: Yateley ([SU 826 611]; *Litoripes medius;* early Middle Eocene (Lutetian) Earnley Formation, Bracklesham Group; James and Ward, 1976; Curry *et al.,* 1978; Walker, 1980): Highcliffe and Barton ([SZ 367 899]; *Villetus grandis,* type specimen and *Villetus waltoni,* type specimen; late Middle Eocene (Bartonian) Barton Clay Formation; Burton, 1929; Harrison and Walker, 1976c, 1977a; Walker, 1980): Dummer's Copse, Westend, near Southampton ([SU 4585 1546]; rolled and broken bird limb bones; Early Eocene Wittering Formation, Bracklesham Group; Kemp, 1984; Bone *et al.,* 1991): Hordle Cliff (see GCR site report): Lee-on-the-Solent (see GCR site report).

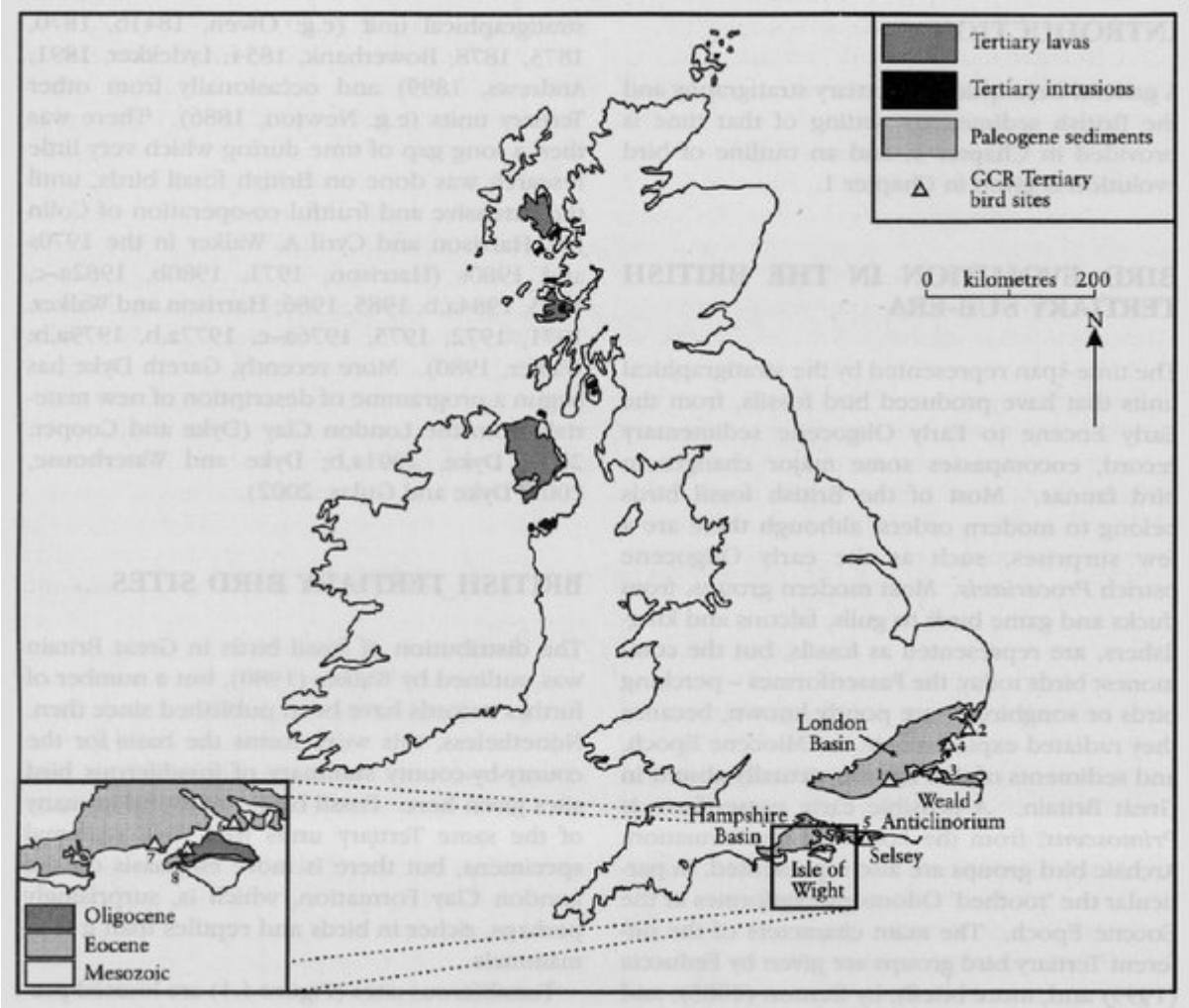
ISLE OF WIGHT: Yarmouth (SZ 367 899; *Proceriavis hamsteadensis, Paracygnopterus scotti, Oligocathartes olsoni, Argillipes nzagnus, Geranopsis hastingsiae, Palaeopapia hamsteadensis;* Early Oligocene Bembridge Marls Member of the Bouldnor Formation; Lydekker, 1891; Harrison and Walker, 1979b; Dyke, 2001b): Thorness Bay ([SZ 464 945]; *Oligocathartes olsoni,* mould of feather; Early Oligocene Bembridge Marls Member; Daley, 1973; Daley and Edwards, 1974; Jarzembowski, 1976; Harrison and Walker, 1979b; Walker, 1980): Burnt Wood, Thorness Bay (SZ 442 930; *Headonornis hantoniensis;* Early Oligocene Bembridge Marls Member; Lydekker, 1891; Daley, 1973; Walker, 1980): Bouldnor Cliff (see GCR site report).

From these potential locations, eight are selected as GCR sites for their fossil bird remains (Figure 4.1), five being Early Eocene in age (Abbey Wood, Walton-on-the-Naze, Warden Point, Burnham-on-Crouch, Bognor Regis), one Middle Eocene (Lee-on-Solent), one Late Eocene (Hordle Cliff) and one Early Oligocene (Bouldnor Cliff). Three of these sites (Abbey Wood, Hordle Cliff, Bouldnor Cliff) are also selected for the GCR for their fossil mammals, and full descriptions of the geology are given in Chapter 3 and not repeated here.

1. Abbey Wood, Greater London [TQ 480 786]. Early Eocene (Ypresian) Blackheath Beds.
2. The London Clay Formation
3. Walton-on-the-Naze, Essex [TM 263 230]–[TM 268 245]. Early Eocene (Ypresian) Harwich (division Al) and Walton (division A2) members, London Clay Formation.
4. Bognor Regis, West Sussex [SZ 920 979]–[SZ 924 983]. Early Eocene (Ypresian) Aldwick Beds (division B), London Clay Formation.

5. Warden Point and the Isle of Sheppey, Kent [TM 263 230]–[TM 268 245]. Early Eocene (Ypresian) London Clay Formation, divisions C–E.
6. Burnham-on-Crouch, Essex [TQ 290 968]–[TQ 922 966]. Early Eocene (Ypresian) London Clay Formation, division D.
7. Lee-on-the-Solent, Gosport, Hampshire [SU 551 016]–[SZ 569 999]. Middle Eocene (Lutetian) Selsey Formation and Elmore Member, Barton Clay Formation.
8. Hordle Cliff Hampshire [SZ 254 925]–[SZ 270 921]. Late Eocene (Priabonian) lbtland Bay Member, Headon Hill Formation.
9. Bouldnor Cliff; Isle of Wight [SZ 375 902]–[SZ 403 919]. Early Oligocene (Rupelian) Hamstead Member, Bouldnor Formation.

## References




*(Figure 4.1) Map showing the distribution of Tertiary rocks in Great Britain. GCR Tertiary bird sites: (1) Abbey Wood; (2) Walton-on-the-Naze; (3) Warden Point and the Isle of Sheppey; (4) Burnham-on-Crouch; (5) Bognor Regis; (6) Lee-on-the-Solent; (7) Hordle Cliff; (8) Bouldnor Cliff*