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# Bouldnor Cliff, Isle of Wight

[SZ 375 902]–[SZ 403 919]

## Introduction

Bouldnor Cliff (including Hamstead Ledge and Cliff and 'Yarmouth'; but note that Yarmouth is treated as a separate locality in Chapter 3) exposes the latest Eocene (Priabonian) Bembridge Limestone Formation and the Early Oligocene (Rupelian) Bouldnor Formation. Bouldnor Cliff is important globally as a source of Oligocene birds, as well as reptiles (Benton and Spencer, 1995) and mammals (see Chapter 3). Bird fossils from Bouldnor Cliff were first described by Lydekker (1891), and new materials were announced by Harrison and Walker (1979b). The cliffs are washed by the sea and it is likely that further bird specimens will be found in the future.

## Description

The geology of the site and occurrence of vertebrate fossils are outlined in Chapter 3. The bird fossils probably came from the muds and clays of the Hamstead Member, as did the majority of reptile and mammal specimens.

## Fauna

The Bouldnor Cliff avifauna is summarized here from the review by Harrison and Walker (1979b).

Palaeognathae

?Eleutherornithidae

*Proceriavis martini* Harrison and Walker, 1979b

Anseriformes

Presbyornithidae

*Headonornis hantoniensis* (Lydekker, 1891)

Anatidae

*Palaeopapia eous* (Harrison and Walker, 1976c)

*Palaeopapia hamsteadensis* Harrison and Walker, 1979b

*Paracygnopterus scotti* Harrison and Walker, 1979b

Galliformes

Phasianidae

*Argillipes magnus* Harrison and Walker, 1979b

Pelecaniformes

Pelagornithidae

?*Macrodonopteryx* sp.

Falconiformes

Cathartidae

*Oligocathartes olsoni* Harrison and Walker, 1979b

Gruiformes

Gruidae

*Geranopsis hastingsiae* Lydekker, 1891

The Bouldnor Cliff locality has produced specimens of nine species, of which five are the type materials of species described by Lydekker (1891) and Harrison and Walker (1979b) from Bouldnor Cliff. Bouldnor Cliff is just east of the town of Yarmouth. Some specimens of bird bones are labelled 'Yarmouth', and are likely to be from the western end of the Bouldnor Cliff locality, and relatively low in the sequence.

The flightless ratite bird *Proceriavis martini* Harrison and Walker, 1979b, was based on a partial cervical vertebra and a toe phalanx from Yarmouth (Figure 4.15)a–c. The presbyornithid *Headonornis hantoniensis* (Lydekker, 1891) was described from the Late Eocene sediments of Hordle Cliff, and it is recognized from Bouldnor Cliff from a partial scapula (Figure 4.15)d, a partial coracoid and a partial humerus. The anatid duck *Palaeopapia eous* (Harrison and Walker, 1976c) also was first noted from Hordle Cliff and is represented at Bouldnor Cliff by a coracoid (Figure 4.15)e,f. Two additional anatid ducks, *Palaeopapia hamsteadensis* Harrison and Walker, 1979b, and *Paracygnopterus scotti* Harrison and Walker, 1979b, also were established, based on type material from Yarmouth: a partial scapula and a partial coracoid respectively. The bony-toothed pelecaniform *Macrodonopteryx* was recognized tentatively from Bouldnor Cliff on the basis of a partial radius (Harrison and Walker, 1979b).

The galliform (gamebird) *Argillipes nzagnus* Harrison and Walker, 1979b, was based on a partial tarsometatarsus from Yarmouth and another tentatively referred tarsometatarsus from Bouldnor Cliff (Figure 4.15)g,h. The falconiform *Oligocathartes olsoni* Harrison and Walker, 1979b was based on a partial tar-sometatarsus ((Figure 4.15)i, j) and possibly also a partial coracoid, from Yarmouth and Thorness Bay respectively. The gruiform *Geranopsis hastingsiae* Lydekker, 1891, was founded on a partial coracoid from Yarmouth, as well as other limb bones from Yarmouth and one from Hamstead.

## Interpretation

In the Hampshire Basin, a sequence of over 600 m of clastic sediments, with minor limestones, rests unconformably on the Chalk. These sediments represent a series of transgressions and regressions. Marine conditions predominated from soon after the beginning of the Eocene Epoch, until the end of Mid Eocene times in central and eastern parts of the basin, when non-marine environments became increasingly significant (Daley, 1989; Armenteros *et al.*, 1997).

Three main environments of deposition have been suggested for the Bembridge Marls Member. The lower part of the sequence, the 'Tembridge Oyster Bed', represents the main transgressive phase. Invertebrate faunas are typical of restricted marine conditions and accumulated in an estuary or brackish bay. This facies is overlain by a thick sequence of grey or blue-green clays, which may show laminations. These sediments are thought to have been deposited in brackish lagoons during the early part of a regression episode (Daley, 1972, 1973). Continued regression led to the deposition of the olive, brown and grey clays and associated sedimentary structures such as rootlet horizons and graded silt laminae, indicative of the upper freshwater reaches of a lagoon (Collinson, 1983b).

The ratite *Proceriavis martini* shows affinities with modern ostriches and cassowaries, but the remains are too incomplete for further determination (Harrison and Walker, 1979b). This find of a ratite in England may seem unusual, but such flightless birds are relatively widespread in the Eocene and Oligocene deposits of Europe (Houde, 1988).

The three ducks *Palaeopapia eous* (Harrison and Walker, 1976c), *Palaeopapia hamsteadensis* Harrison and Walker, 1979b, and *Paracygnopterus scotti* Harrison and Walker, 1979b, are respectively comparable in size to a true goose of the genus *Branta*, the shelduck *Tadorna ferruginea* and a whistling duck of the genus *Dendrocygna*. Note, however, that Dyke (2001b) was not convinced that *Palaeopapia* has any diagnostic anseriform characters, nor whether *P hamsteadensis* belongs to the genus. Dyke (2001b) was also unconvinced by the limited material of *Paracygnopterus scotti*, referring it also to *Ayes incertae sedis*.

The gamebird *Argillipes magnus* Harrison and Walker, 1979b, was about the size of a domestic fowl *Gallus gallus*. The falconiform *Oligocathartes olsoni* Harrison and Walker, 1979b, was assigned to the family Cathartidae, containing today the New World vultures.

The birds are mainly representative of terrestrial and freshwater environments, except for the possible pelecaniform bony-toothed bird *Macrodonopteryx*, a thorough-going marine form best known from the Early Eocene London Clay Formation, and perhaps the presbyornithid *Headonornis hantoniensis* (Lydekker, 1891), a large wading bird (Harrison and Walker, 1979b).

### **Comparison with other localities**

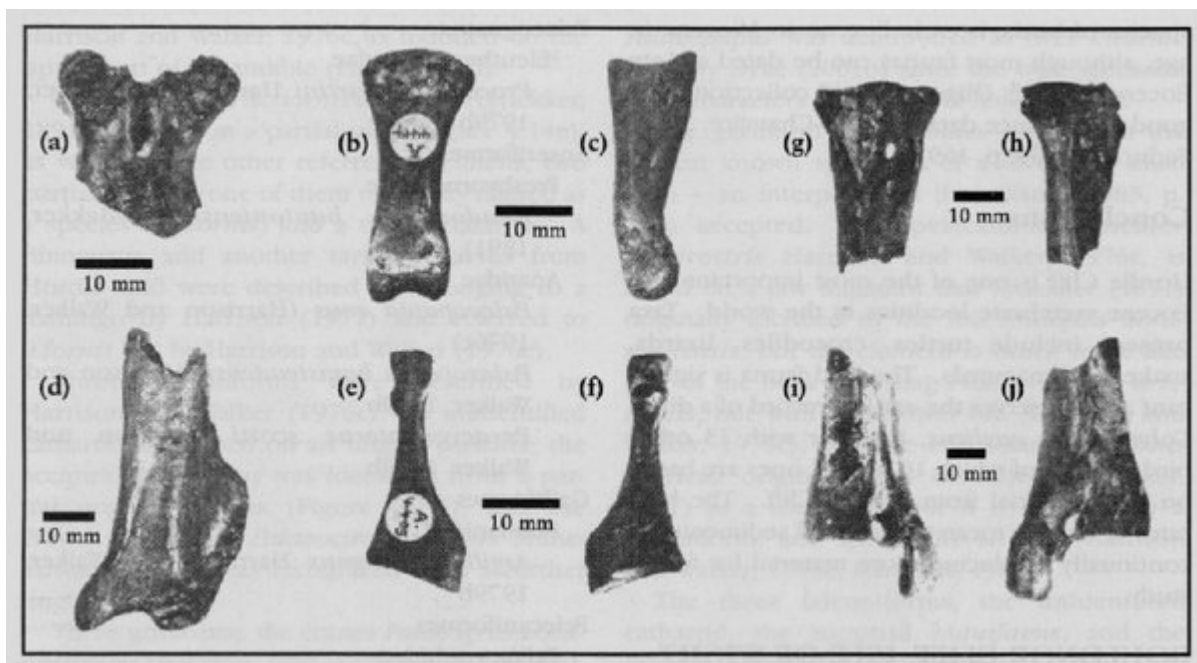
Early Oligocene bird fossils have been reported from the Hamstead Member of Bouldnor Cliff, (including Yarmouth) and Thorness Bay, on the Isle of Wight. No other British early Oligocene site can be compared with Bouldnor Cliff. Farther afield, an avifauna of six species has been reported from the Early Oligocene Boom Clay of the Rupel region in Belgium (Harrison, 1980a). Thirteen species have been recorded from another Early Oligocene locality in Belgium, Boutersem, of very similar age to that of the Upper Hamstead Member of Bouldnor Cliff (Mayr and Smith, 2001). The fauna comprises ducks, rails and shorebirds. There is only slight overlap with Bouldnor Cliff in that the duck *Paracygnopterus* occurs at both localities.

The presence of some of the Bouldnor Cliff bird taxa (*Headonornis hantoniensis*, *Palaeopapia eous*) in the Late Eocene record of Hordle Cliff indicates faunal continuity between the two time periods. Two of the genera (*Macrodonopteryx*, *Argillipes*) are also known from the Early Eocene London Clay Formation.

### **Conclusions**

Bouldnor Cliff, near Yarmouth on the Isle of Wight, has yielded one of the best early Oligocene bird faunas in Europe and possibly the world. Nine bird species have been reported, of which five are type specimens of species named from the site. The cliffs are undergoing erosion, and the site has great potential for future finds.

### **[References](#)**



(Figure 4.15) Bird fossils from the Early Oligocene Bouldnor Formation of Bouldnor Cliff, Isle of Wight. (a—c) Bones of the eleutherornithid *Proceriavis martini*; cervical vertebra in dorsal view (a), and basal phalanx of right digit 4 in ventral (b) and external (c) views. (d) Proximal end of the right scapula of the presbyornithid *Headonornis hantoniensis* in ventral view. (e,f) left coracoid of the right scapula of the duck *Palaeopapia eous* in ventral (e) and dorsal (f) views. (g,h) Proximal end of the left tarsometatarsus of the gamebird *Argillipes magnus* in posterior (g) and external (h) views. (i,j) Distal end of the left tarsometatarsus of the falconiform *Oligocathartes olsoni* in dorsal (i) and ventral (j) views. (After Harrison and Walker, 1979b.)