Brook–Atherfield, Isle of Wight

([SZ 375 842]–[SZ 452 788])

Highlights

Brook–Atherfield, Isle of Wight is one of the most important dinosaur sections in Europe. Over the past 200 years, dozens of nearly complete skeletons of dinosaurs have been excavated, representing about 20 species, some of them unique to the site. In addition, many species of turtles, crocodilians and pterosaurs have also been found. The dinosaur fauna is of importance because most of the specimens are well localized, and the fauna is the richest in the world for the Early Cretaceous.

Introduction

The Wealden Group of the south-west coast of the Isle of Wight (Figure 8.11) is world-famous for their rich reptile faunas (Figure 8.14) and (Figure 8.15). They have yielded abundant material in the past and good finds are made frequently because of continuing erosion. This section is currently the best source of dinosaur material in Britain and it is just as rich as the well-known deposits in North America and Mongolia.

The section between Compton Bay and Atherfield Point has been described by White (1921, pp. 5–15), Daley and Stewart (1979), Stewart (1981b), Simpson (1985), Stewart *et al.* (1991) and Wach and Ruffell (1991). The exposed portions are dated as mostly Barremian, but may range up to Early Aptian (Keith and Hailwood, 1988; Hughes and McDougall, 1990; Allen and Wimbledon, 1991). The section is best known for its dinosaurs, having yielded remains of about 100 individuals belonging to 15 or so species, although Swinton (1936a) recognized 22 valid species. The reptiles from the Isle of Wight section have been described by numerous authors, including Buckland (1835), Owen (1842b, 1855b, 1858, 1859b, 1864, 1874c, 1876), Mantel (1849), Wright (1852), Beckles (1862), Fox (1866, 1869), Hulke (1870d, 1871c, 1873, 1874b, 1874c, 1874d, 1874e, 1876, 1878, 1879a, 1879b, 1880b, 1882a, 1882c, 1882d), Huxley (1870b), Seeley (1870a, 1875c, 1882a, 1883, 1887b, 1887c, 1887d, 1888d, 1892, 1901), Lydekker (1887a, 1888a, 1888b, 1889a, 1889b, 1889d, 1890a, 1890c, 1890d, 1891), Andrews (1897), Hooley (1900, 1907, 1912, 1913, 1925), Nopcsa (1905a, 1905b, 1928), Huene (1923, 1926, 1929b), Swinton (1936a, 1936b), Galton (1969, 1971a, 1971b, 1973, 1974, 1975, 1976a, 1977, 1981a), Ostrom (1970), Blows (1978, 1982, 1987), Buffetaut and Ford (1979), Buffetaut and Hutt (1980), Charig (1980), Norman (1980, 1986, 1990b), Delair (1982c), Hutt *et al.* (1989), Howse and Milner (1993), Pereda-Suberiola (1993), Radley and Hutt (1993) and Radley (1993), and Insole and Hutt (1994).

Description

The Wealden Group along the Brook–Atherfield section (Figure 8.11) and (Figure 8.12) is exposed in the core of the Brighstone Anticline, the hinge of which is difficult to locate, but lies within Brook Bay. The Wealden Group and Atherfield Clay Formation (part) are to be seen at both ends of the section, and the oldest in the Brook Chine area. The section, on the southern limb of the anticline, is summarized from White (1921), with refinements from Simpson (1985), and formation and member names from Stewart (1978), Daley and Stewart (1979), Simpson (1985) and Wach and Ruffell (1991).

LOWER GREENSAND	Thickness (m)
Atherfield Clay Formation (=Atherfield Group)	
Chale Clay Member (=Atherfield Clay) (beds 3–6 of Simpson (1985, p. 27, fig. 4): pale bluish-grey silty clay with numerous small round or irregular clay-ironstone nodules, some forming discrete bands: highly fossiliferous, containing small teeth (presumably derived) of *Hybodus* and *Lonchidon,* pyritized wood and bivalves.	19

Perna Beds Member: Upper Sandstone (bed 2 of Simpson, 1985, p. 27, fig. 4): Hard, coarse-grained, greenish calcareous sandstone in which marine fossils (bivalves, brachiopods, corals, rare ammonites and burrows) occur	0.54
Lower Clay and Atherfield Bone Bed (bed 1 of Simpson, 1985, p. 27, fig. 4): grey-brown, passing into dark blue, sandy clay with many bivalves (including *Panopea, Aetostreon* and *Mulletia*), echinoids, brachiopods, but no indigenous ammonites; at the base is a thin layer (10–100 mm) of coarse quartz grit, bone fragments, fish teeth, phosphate nodules, rolled Jurassic ammonites and reptile remains (Atherfield Bone Bed)	0.85
Disconformity	
WEALDEN BEDS	
Vectis Formation (=Wealden Shales) Shepherd's Chine Member: grey or grey-green muds and fine sandstones, deposited as a number of thin cyclic units; impersistent ironstone lenses; several thin coquina limestones, and other beds with ostracods, plants and fishes	45
Barnes High Sandstone Member (=Sandstone of Cowleaze Chine and Barnes High of White (1921): massive, cross-bedded, yellow sandstone, with bands of *Filosina,* overlying thin-bedded sandstone with shale	7
Cowleaze Chine Member: blue shales containing bivalves, overlying white sand and clay	8
Wessex Formation (= Wealden Marls) Beds with *Opbiomorpha:* at the very top, red sand with bones (*Hypsilophodon* Bed, 1 m)*;* then reddish-brown mudstones, laminated in places, with mudcracks, calcareous nodules, burrows and rootlets, interbedded with medium-grained, cross-laminated sandstones; includes, about the middle, a new fossiliferous bed (Radley and Hutt, 1993)	14
Chine Farm Sandstone: white and yellow sand, with fragments and large trunks of carbonized wood (lignite')	3
Clays/marls: pale-blue and purple clays, with two plant debris beds near the top (9 m), overlying 'hard green bed, containing lignite and bones' (0.7 m), followed by deep-red marls (2 m) and purple and mottled marls (10 m)	22
Barnes Chine Sandstone: sandstone with clayey beds	4
Deep-red marls, purple below	9
Pebbly sandstone: channel fill	1
Clays/marls/sands: green and white clays with purple and red marl and white, sandy interbeds	20
Ship Ledge Sandstone: fine, white sandstone.	1
Mottled marls	8+
Grange Chine Black Band (Black Band of Brixton Chine; White, 1921, p. 14): plant debris bed with bivalves and bones.	0.8
White, sandy marl (1 m) overlying 'mottled red marls of Brixton (=Grange) Chine, with a plant debris bed near the middle' (29 m); the Grange Chine Sandstone occurs to the west of Grange Chine near the top	30

Marls/sandstones: green sandy bed with bones (0.7 m), overlying red and white sandstones interbedded with marl and a (0.1 m) bed of fragmented bone and pebble bed at the base (5 m), overlying mottled marls (15 m)	30
(?) Brighstone Sandstone: pebbly band with carbonized wood and pebbles of sandstone (top of east bank of Chilton Chine)	0.7
Chilton Chine Sandstone: cross-bedded sandstone (near the bottom of Chilton Chine);	4
Marls/sandstones: mottled marls, purple marls with white calcareous concretions, and red marls passing down into cross-bedded, white sandstone and marl; plant debris beds near base.	13
Sudmoor Point Sandstone: massive sandstone with irregular bands of bone; 0.2–0.6 m of gravel at base, with bones; *'Iguanodon'* footprints near the top	6
Deep red and purple marls	seen to 6

Unlike most other British fossil reptile localities, there is a large amount of information about provenances of finds made in the Compton Bay–Atherfield section. The information given below is extracted particularly from White (1921), other sources (cited below) and from museum labels. Unusually, there has always been a tradition among collectors of recording the locations of fossil reptile finds with a degree of precision encountered nowhere else in Britain. Nearly all the specimens have a label designation such as 'Brook Bay' or 'Cowleaze Chine', which restricts the provenance to a particular part of the stratigraphic column, and further collector information such as 'at beach level' or 'in a 6ft thick sandstone' is sometimes sufficient to identify the exact horizon. The records given below are arranged geographically from north-west to south-east along the section (Figure 8.11), thus descending stratigraphically from Compton Bay to Sudmoor Point, and then ascending to Atherfield Point.

Compton Bay

(There is a fault at about [SZ 371 849]).

1. 'White sandy clay, with bones' (2 m thick), above 4 m of 'deep red marls' immediately north-west of the fault (White, 1921, p. 9). This bone-bearing horizon, at about [SZ 370 850] (?) in the cliff, lies 82 m below the Perna Bed (28 m Wealden Shales, 54 m Wealden Marls). A recent find of *Polacanthus* (1979) by William Blows was probably from this bed (BMNH R9293; Blows, 1982, 1987). Blows (1987) records that the remains lay scattered within a confined pocket exposed near a shipwreck, and only visible at low tide on the beach at [SZ 347 854]. The site occurs in the lowest bed of the Vectis Formation and represents the first recorded find of *Polacanthus* from this stratigraphic unit (A. Insole, pers. comm. to W. Blows, 1987). The sediment containing the remains was a pale grey, non-fissile, massive clay otherwise generally devoid of fossils. A femur of *?Dryosaurus* (BMNH R8670) from Compton Bay (? this bed) is mentioned by Galton (1975, p. 750).

2. Sandstone containing *'Iguanodon'* footprints (Beckles, 1862) at about [SZ 376 842] on the beach ('600 yards west of Hanover Point': White, 1921, p. 14). This sandstone is in the Wessex Formation (repeated by the fault) just above the lignite band north-west of Shippard's (Compton Grange) Chine (?Compton Grange Sandstone of Stewart's unpublished section).

3. Plant debris bed at [SZ 377 840], about 200 m west of Hannover Point (=locality W.2 of Daley and Insole, 1984, p. 6; bed CH12 of Stewart, 1978). Buffetaut and Ford (1979) reported the discovery of crocodilian teeth (*Bernissartia,* (Figure 8.14)C and other vertebrate remains beneath a fossil tree trunk in the cliff face. They stated that the tree trunk occurred 'at beach level in the second of the three lignitic bands' depicted by Osborne White (1921, fig. 1, p. 12).' White (1921) illustrates three lignitic bands, none of which is anywhere near the site mentioned by Buffetaut and Ford (1979). The map reference is probably correct since these latter authors state that the site was 'midway between Compton Grange Chine

and Hanover Point', and thus in the Wessex Formation, and probably in the region of White's (1921, p. 9) 16 ft (5 m) 'White Sandstone (east of Compton Grange Chine)' or the 'variegated marl' (30 ft, 9 m) below.

4. Hanover Point sandstones: *'Iguanodon'* footprints are to be seen on reddish and grey sandstones on the foreshore reef at Hanover Point and to the north-west in bed CH8 of Stewart (1978), and abundantly in the overlying red mudstones (Daley and Insole, 1984, p. 10). Beckles (1862, p. 443) described such prints from 'the shore at low water, between Brook Point [i.e. Hanover Point] and the Chine to the west of it.' A specimen of *Iguanodon* was excavated on the foreshore reef at Hanover Point in 1984 (S. Hutt, pers. comm. to M.J.B.). Various other dinosaur remains have been recorded from Hanover Point (in IWCMS), but most seem to have come from localities in Brook Bay just to the south-east (see below).

Brook Bay

5. Hanover Point to Brook Chine: A specimen of *Iguanodon* was collected in 1872 between the cliff and the 'pine raft' (Seeley, 1875c; Blows, 1978, pp. 26–34), and there are several further dinosaur remains in the IWCMS from 'Hanover Point'. Buckland (1835, p. 428) recorded *Iguanodon* vertebrae 'along a quarter mile of this shore [near Brook], but most abundantly at a spot called Bull-face Ledge near Brook Point, where the iron-stone is abundantly loaded with prostrate trunks of fossil trees.' Mantell (1846, p. 94) further noted that many hundreds of bones had been collected along this stretch of shore where they had been eroded from beds of sandy clay with *Unio* immediately above the 'pine raft'. These sandstones are probably equivalent to those seen at Hanover Point and immediately to the west of it, since the same beds are seen at both sides of Hanover Point because of the sharp angle in the coastline here. Hulke (1882a, p. 135) described some *Iguanodon* remains from 'a bed of hard nodules intercalated between the red and purple clays below and the iron-stained flint-gravel which caps the cliff west of Brook Chine… A few yards east of where this nodule-bed touches the cliff-foot, the cliff is cut through by a small gully worn by a little rill. In the east bank of this gully were the fossils.' Hulke describes the nodule bed as apparently dipping west and passing beneath the sand seawards towards the 'pine raft'. The source bed, then, is probably close to those described by Buckland (1835) and Mantel (1846) on the coastal strip between Hanover Point and Brook Chine [SZ 379 837]–[SZ 385 835]. Seeley (1882a, p. 367) further described a dinosaur coracoid 'from the cliff midway between the pine raft and Brook Chine, at about 10 feet above high-water mark'. Andrews (1897) reported an *Iguanodon* cranium found 'on the shore near Brook Point'. Most other specimens labelled as 'Brook' or 'Brook Bay' probably came from this section, and this includes material described by Seeley (1883, 1887b, 1888d) and Lydekker (1887a, 1890c, 1890d). Delair (1989) notes Victorian finds of *'Iguanodon* ichnites', in sandstones on the shore west of Brook Point.

6. Brook Chine to Sudmoor (Sedmore) Point: parts of the cliff have collapsed along this section, and exposure is poor, except at Sudmoor Point. Some of the specimens labelled as 'Brook' may have come from this section, but there are no specific records.

7. Sudmoor Point to Chilton Chine: Sudmoor Point Sandstone: tridactyl *'Iguanodon'* and '*Megalosaurus'* footprints have been recorded in the sandstone between Sudmoor Point and Chilton Chine by several authors (Beckles, 1862, p. 444 ('Southmore'); White, 1921, p. 7; Blows, 1978, pp. 44–58; Insole, *in* Daley and Stewart, 1979; Delair, 1989). The recent finds, from the Sudmoor Point Sandstone were made from a foreshore ledge at low tide level just west of Chilton Chine. These consisted of over 30 imprints of different shapes and sizes and constituting portions of 10 separate tracks (Blows, 1978). Insole (1982) regards all the tracks as being iguanodontid. Limb bones of *Valdosaurus* were found recently west of Chilton Chine (Radley, 1993).

8. Sudmoor Point to Chilton Chine: several bone-bearing horizons occur in the marls, sandstones and plant debris beds above the Sudmoor Point Sandstone (White, 1921, p. 14). Hulke (1870d) described a large vertebra whose locality was considered to be 'a bed which occurs near the top of the high cliff between Brooke and Chilton', and this could lie either to the west or east of Sudmoor Point. Buffetaut and Ford (1979) noted the occurrence of *Bernissartia* teeth 'from the *Unio* bed on the cliff at Sudmore Point' (?exact horizon). Galton (1975, p. 750) noted an ornithopod femur (BMNH R8670) from a 'bone bed between high and low water, Clinton Chine' (?Chilton Chine), and thus probably a bed just below the Chilton Chine Sandstone. Hulke (1879a) described a centrum from the cliff near Chilton, which could refer to a location to the east or west of the chine. There is further localized material from these beds in the IWCMS. The locality is a small

conglomeratic lens, rich in *Margaritifera ('Unio'*), between the Chilton Chine Sandstone and Sudmoor Point Sandstone (Bed SS3 of Stewart, 1978; A. Insole, pers. comm., 1993).

Brighstone (or Brixton) Bay

9. Brighstone Bay (Grange [Brighstone] Chine to Barnes Chine): the upper portion of the Wealden Marls sequence is exposed between Grange Chine and Barnes Chine and there are several plant debris beds with bones — in particular the Grange Chine (Brixton Chine) Black Band at the top of the east side of Grange Chine. The iguanodontid dinosaur *Vectisaurus valdensis* was collected in a clay at the cliff-foot, '300 yards east of the flagstaff near Brixton Chine' (Hulke, 1879b). The flagstaff was at the small headland east of Grange Chine [SZ 427 813] (S. Hutt, pers. comm.), so that the skeleton was found on Ship Ledge at about [SZ 429 812], probably in the marls below the Ship Ledge Sandstone. A theropod was collected in 1978 by William Blows from the mottled red and blue marls above the Grange Chine Black Band at [SZ 423 815] (W. Blows, pers. comm.), and several IWCMS specimens have also been found here. Several specimens bear the labels lolliffe's Road, Brixton' or Jolliffe's Road, Barnes Chine' (e.g. BMNH R5226–7, R5338, IWCMS 3306), but this name cannot be found on 6-inch OS maps. A trackway of trifid impressions was noted from a low intertidal locality between Brook and Brighstone by Beckles (1862). Other finds from Brighstone (Brixton) Bay are not localized further (Wright, 1852, p. 89; Hulke, 1874b, 1874c).

10. Barnes Chine–Cowleaze Chine (upper portion of Wealden Marls): White (1921, p. 13) mentions a 'lignite bed' with bones 12 m above the Barnes Chine Sandstone which is 'seen in the top of Barnes Chine' and reaches beach level to the east of Barnes High. A second plant debris bed, a few metres higher has also yielded bones. Several specimens have been recorded from these beds. Hulke (1882b) noted a good skeleton of *Polacanthus* found 'in a bed of blue shaley clay, a short distance east of Barnes Chine. The bed is easily recognized by the large quantities of lignite which it contains.' A theropod femur (BMNH R5194) is labelled 'Wealden from bone bed under Barnes High, Brighstone Bay, found on beach.' Galton (1973) suggested that this was the *Hypsilophodon* Bed (base of Wealden Shales; top of cliff at Barnes High), but it is more likely to have been one of the plant debris beds which outcrop at beach level. Blows (1978, pp. 34–42) described the excavation of an *Iguanodon* pelvis from one of these beach-level lignite beds between Barnes High and Cowleaze Chine. Delair (1982c) reported a spine of *?Polacanthus* 'from the uppermost of the two lignite bone beds in the Wessex Formation (Wealden Marls), exposed in the low foreshore cliff below the south-east face of Barnes High, Isle of Wight [SZ 439 805]'. Further bones have been found in these plant debris beds (IWCMS 5122, 5129, 5136–9). Two recent finds have been made in the top bed of the Wealden Marls, a 14 m thick bed of red and mottled mudstones underlain by massive white and yellow sandstones. Buffetaut and Hutt (1980) reported a crocodilian, *Vectisuchus,* from the base of the bed at Barnes High, and a partly articulated *Iguanodon* (IWCMS 5126) was found about

10 m below the top and 400 m west of Cowleaze Chine [SZ 441 804] (Insole, 1980). Several further specimens have been collected from these beds recently, including the new sauropod, from [SZ 437 807] (Radley, 1993; Radley and Hutt, 1993).

11. Barnes Chine–Cowleaze Chine (*Hypsilophodon* Bed): the *Hypsilophodon* Bed is one of the best known units of the sequence (Figure 8.13). It can be traced from the top of the cliff just west of Barnes Chine [SZ 434 808] to beach level just west of Cowleaze Chine [SZ 443 801]. Owen (1855b, p. 2) noted a skeleton from 'about a hundred yards west of Cowleaze Chine.' Huxley (1870b) described specimens from the bed 'which forms the floor of Cowleaze Chine and rises to the top of the sea cliff at Barne's High'. Hulke (1873) reported *Hypsilophodon* remains 'from the same Cowleaze bed' and further specimens (Hulke, 1874d) from the same unit 'in a block of sandy clay-stone.' Owen (1874b, p. 13) quoted from a letter by Fox: 'this slab was found in the fallen cliff, about 150 yards east of 'Barnes High', directly fronting the den of my *Polacanthus…* The skull and broken jaw were found about 60 yards further eastward' ([SZ 437 806], [SZ 438 806]). Hulke (1882c, p. 1036) described the bed in some detail: 'The rock varies much often within the space of a few yards. Generally the upper 3ft of it consist of a cap of grey sandstone resting on sandy clay; this is succeeded by about the same depth of mottled-red and blue clay lying on the bands of sandstone. The *Hypsilophodon* remains are almost restricted to the lower half of the bed.' He mentioned the only other bones from the bed: rare remains of *Goniopholis (?*) and turtles. White (1921, p. 13) gave the relevant section as:

	Thickness	
	ft	in
White sand and clay	2	6
White rock	2	6
Red sand, with bones (*Hypsilophodon* Bed)	3	0

He noted that near Cowleaze Chine the 'white rock' was a pale, calcareous, silty stone containing *Unio* and bones, and that remains of *Hypsilophodon* had also been found in the marls a little below the *Hypsilophodon* Bed in Brixton Bay (White, 1921, p. 15). Galton (1974, pp. 15–18) gave more details of the *Hypsilophodon* Bed and of its lateral variation. He noted finds of bones both in the bed itself and in the white rock above, and emphasized that the locality designation usually given, 'Cowleaze Chine', is rather inappropriate since specimens came from sites 100–900 m west of the chine. Several recent finds have been made in the *Hypsilophodon* Bed (IWCMS 5123–4) and the 'White Rock' (IWCMS 5143, 5165, 5180). Insole (1980) noted remains of *Hypsilophodon in* red-mottled grey marls 'immediately beneath the *Hypsilophodon* Bed about 200 metres west of the Chine' (i.e. Cowleaze Chine, thus about [SZ 442 802]).

12. Barnes Chine–Atherfield Point (Vectis Formation): Hooley (1912) reported a partial *Iguanodon* skeleton from 8 ft (2.5 m) above the *Hypsilophodon* Bed at the base of the blue shales 150 yards west of Cowleaze Chine. White (1921, p. 15) noted bones of *Iguanodon, Goniopholis* and *Ornithodesmus* from the shales above the *Hypsilophodon* Bed and in the Barnes High Sandstone. Buffetaut and Ford (1979) recorded teeth of *Bernissartia* 'in the Wealden Shales overlying the *Hypsilophodon* Bed at Cowleaze Chine.' A partial *Iguanodon* skeleton (BMNH R5331) is labelled 'from the shales between the grey sandstone and purple-coloured marls overlying the *Hypsilophodon* Bed, 300 yards west of Cowleaze Chine'. The exact horizon of another partial *Iguanodon* skeleton (lignite band, 100 yards west of Cowleaze Chine'; probably from a plant debris bed within the White Rock; A. Insole, pers. comm., 1993) is uncertain. Hooley (1900) reported a fossil tortoise from 'about 10 feet above low water-mark opposite Shepherd's Chine' [SZ 446 798]. Further bones are labelled 'Wealden Shales, Sheperd's Chine' (IWCMS 4128, 4199–200). Hooley (1913) noted two specimens of *Ornithodesmus* from a rock fall at Atherfield, and the label (BMNH R3877–80) indicates a locality 20 yards west of Shepherd's Chine [SZ 447 789]. Many of the other fossil reptiles collected by Hooley are labelled 'Tie Pits, Atherfield' (BMNH specimens), which probably refers to the broad area of collapsed and pitted cliffs between the coastguard station and Atherfield Point. These include a partial skeleton of *Goniopholis* found about 80–90 ft (25–28 m) below the top of the Vectis Formation (Hooley, 1907), thus just below the middle of the Shepherd's Chine Member. There was a small brickpit immediately west of Atherfield Point, and in the upper part of the Vectis Formation, which probably yielded these older specimens, as well as some new finds of *Iguanodon* (A. Insole, pers. comm., 1993). The *Iguanodon (IWCMS* 5196) came from the *Diplocraterion* Band' of the Shepherd's Chine Member and is encrusted in oysters, pyritized and marked with some predatory scratches (J. Radley, pers. comm., 1993). Stewart *et al.* (1991, p. 125) note plesiosaur remains from black mudstones near the top of the Shepherd's Chine Member. Tridactyl footprints have been found recently loose on the shore between Cowleaze Chine and Atherfield Point ([SZ 444 801]–[SZ 453 792]; Radley, 1993).

The preservation of the reptile remains from the Compton Bay–Atherfield section is variable. Bones found *in situ* are in various degrees of articulation or are isolated elements, and they may be crushed or virtually unaffected by compaction. The well-recorded (Blows, 1987) new specimen of *Polacanthus* ((Figure 8.15)G is atypical of the preservation at this locality, being semi-articulated and in good condition, with the delicate processes of most elements intact. There appear to be two modes of preservation: well mineralized (pyrites, baryte, etc.) black bones in organic facies, such as the plant debris beds and Vectis Formation shales; and, poorly mineralized pale-coloured bones, found in overbank muds and channels (J. Radley, pers. comm., 1993).

Fauna

Large numbers of reptiles from various sites in the Compton–Atherfield section are preserved in British museums, especially BMNH and IWCMS. Type specimens are noted, and an estimate is given of the numbers of specimens of each species in major collections. Clearly there is much more material in other collections, but the figures will give an impression of relative abundance. Reptiles from all horizons are treated together since most occur throughout the succession (except *Hypsilophodon*).

	Numbers
Testudines: Cryptodira: Pleurosternidae	
Helochelydra Nopsca, 1928 (no species name) Type specimen: BMNH R171	1
Testudines: Cryptodira: Plesiochelyidae	
Plesiochelys brodiei Lydekker, 1889 Type specimen: BMNH R1444 (cast)	2
Plesiochelys valdensis Lydekker, 1889 Type specimen: BMNH 28967	1
Plesiochelys vectensis Hooley, 1900 Type specimen: BMNH R6683	1
Plesiochelys sp.	2
'chelonian'	1
Archosauria: Crocodylia: Neosuchia: Goniopholididae	
Goniopholis crassidens Owen, 1841	12
Goniopholis minor Koken, 1887	1
Goniopholis sp.	*c.* 60
Oweniasuchus sp.(?)	1
Vectisuchus leptognathus Buffetaut and Hutt, 1980 Type specimen: Staatl. Mus. Naturk. Stuttgart 50984	1
Archosauria: Crocodylia: Neosuchia: Pholidosauridae	
Pholidosaurus meyeri (Dunker, 1844)	3
Suchosaurus cultridens Owen, 1841	1
Suchosaurus sp.	1
Archosauria: Crocodylia: Neosuchia: Atoposauridae	
Theriosuchus sp.	1
Archosauria: Crocodylia: Neosuchia: Bernissartiidae	
Bernissartia sp.	(40 teeth)
Archosauria: Crocodylia: Neosuchia: Eusuchia	
Hylaeochampsa valdensis (Seeley, 1887)	1
Hylaeochampsa vectiana Owen, 1874 Type specimen: BMNH R177.1	1
Hylaeochampsa sp.	2
'crocodilian'	1
Archosauria: Pterosauria: Pterodactyloidea: Ornithodesmidae	
Ornithodesmus latidens Seeley, 1901 Type specimen: BMNH R176	3
Ornithodesmus sp.	2
'pterosaur'	1
Archosauria: Dinosauria: Saurischia: Theropoda	
Aristosuchus pusillus (Owen, 1876) Type specimen: BMNH R178	?5
Calamospondylus foxi Lydekker, 1889 Type specimen: BMNH R901	1

Ornithodesmus cluniculus Seeley, 1887 Type specimen: BMNH R187	1
Thecocoelurus daviesi (Seeley, 1888) Type specimen: BMNH R181	1
'coelurosaur'	2
Megalosaurus dunkeri Koken, 1887	1
Megalosaurus sp.	21
?Allosaurid	1
Archosauria: Dinosauria: Saurischia: Sauropoda	
Astrodon valdensis (Lydekker, 1889) Type specimen: BMNH R1730	3
Cetiosaurus sp.	4
'diplodocid'	1
Pelorosaurus hulkei (Seeley, 1870)	22
(*?)Titanosaurus valdensis* Huene, 1929 Type specimen: BMNH R151	2
'sauropod'	5
brachiosaurid	1
Archosauria: Dinosauria: Ornithischia: Ornithopoda: Hypsilophodontidae	
Hypsilophodon foxi Huxley, 1870 Type specimen: BMNH R197	26
'hypsilophodontid'	1
Valdosaurus canaliculatus Galton, 1975 Type specimen: BMNH R185, R186	4
Archosauria: Dinosauria: Ornithischia: Ornithopoda: Iguanodontidae	
Iguanodon atherfieldensis Hooley, 1925 Type specimen: BMNH R5764	1
Iguanodon bernissartensis Boulenger, 1881 23 *Iguanodon gracilis* (Lydekker, 1888) Type specimen: BMNH R142	7
Iguanodon sp.	105
Vectisaurus valdensis Hulke, 1879 Type specimen: BMNH R2494	4
Archosauria: Dinosauria: Ornithischia: Ankylosauria: Nodosauridae	
Polacanthus foxi Hulke, 1882 Type specimen: BMNH R175	5
Polacanthus sp.	*c.* 30
'nodosaur'	4
Sauropterygia: Plesiosamia	
'Plesiosaurus sp.'	10

Interpretation

Stewart *et al.* (1991) interpret the Wealden Group on the west coast of the Isle of Wight (Figure 8.11) and (Figure 8.12) as a sequence that records a shift from terrestrial deposition to fully marine. The lower unit, the Wessex Formation, is a fluviatile/coastal plain unit; the Vectis Formation above was deposited in a lagoon that was shallow and temporarily emergent, and the overlying Atherfield Clay Formation consists of marine units. Climatic conditions were seasonal, with wet and dry seasons in warm temperate to subtropical latitudes (Stewart, 1981b). The Wessex Formation contains numerous coarse sandstones deposited in channels, as well as overbank mudstones (marls), and a number of thin plant debris beds (carbonized wood with dinosaur and crocodilian bones, fish remains, plant cones and, occasionally, bivalve

shells) represent reworked terrestrial fossils from flood events (Daley and Stewart, 1979).

The Vectis Formation is divided by Stewart *et al.* (1991) into four facies: fine sandstones, heterolithic sand/silt and mudstones, parallel-laminated mudstones and black mudstones, which occur cyclically through the sequence. The cyclicity may relate to advance and retreat of deltaic sand bodies into the lagoon, of which the Barnes High Sandstone Member may be a major example. Mollusc and ostracod associations give measures of salinity. These authors note that salinity and the frequency of storms increase towards the top of the Vectis Formation, and the sequence is terminated by the Atherfield Clay Formation, representing the major Aptian marine transgression.

Turtles are relatively uncommon in the Wealden of the Isle of Wight. Fewer than ten specimens are known, compared with many hundreds of crocodilians and dinosaurs. The genus *Helochelydra* Nopsca, 1928 belongs to *Tretosternon* Owen, 1842 (M■ynarski, 1976, pp. 60–1). All other forms have been referred to the genus *Plesiochelys, a* well-known Late Jurassic and Cretaceous form of disputed affinities (Gaffney, 1976; M■ynarski, 1976). The species *P. brodiei* and *P. valdensis* were erected by Lydekker (1889d, pp. 236–9) on the basis of well-preserved carapaces (also Lydekker, 1889b, pp. 199–201). Hooley (1900) erected the third species, *P. vectensis,* again on the basis of a carapace. The species are distinguished by minor differences in the shapes of various plates in the carapace. An examination of the illustrations suggests, for example, that *P. valdensis* and *P. vectensis* may be identical.

A variety of small and large crocodilians is known from the Isle of Wight, and with a variety of terrestrial and aquatic adaptations. *Goniopholis,* which is well known in the Late Jurassic and Early Cretaceous of Europe and North America, is represented on the Isle of Wight by many specimens. Lydekker (1890a, pp. 229–30) mentioned some material of *G. crassidens* from the Isle of Wight ((Figure 8.14)A, and Hooley (1907) described a relatively complete skeleton from Atherfield. The skull was 540 mm long and it was capable of a gape of over 1 m. *Oweniasuchus* and *Vectisuchus* are also goniopholids. *V. leptognathus* has been described on the basis of a partial skeleton and skull (Figure 8.14)B, which is characterized by a long slender snout (Buffetaut and Hutt, 1980). *Pholidosaurus* and *Suchosaurus* are pholidosaurids, a largely aquatic group. The goniopholids were ecological counterparts of today's crocodilians and alligators, and the pholidosaurids of gavials (Buffetaut, 1982, pp. 29–38). Buffetaut (1983) has also noted the occurrence of *Theriosuchus,* based on odd teeth and a skull fragment. *Theriosuchus* is an atoposaurid (Benton and Clark, 1988, p. 321), previously known only from the Purbeck (q.v.).

More advanced crocodilians from the Compton–Atherfield section include *Bernissartia* and *Hylaeochampsa. Bernissartia,* a small crocodilian with button-like teeth ((Figure 8.14)C for crushing molluscs, has recently been identified from several locations (Buffetaut and Ford, 1979). *Hylaeochampsa* was a 2 m long crocodilian known from the Purbeck and Wealden of England; Owen (1874c) described *H. vectiana* on the basis of a partial skull with large orbits ((Figure 8.14)D, and Lydekker (1888a, p. 75) referred some Isle of Wight material to *H. valdensis* (Seeley, 1887). Both *Bernissartia* and *Hylaeochampsa* are of some importance, the latter being the oldest known eusuchian (Benton and Clark, 1988, p. 323; Clark and Norell, 1992), the former being close to the origin of the Eusuchia (Norell and Clark, 1990), and each is placed in its own family.

Remains of pterosaurs are rare, but significant. Seeley (1887b) described a sacrum from Brook as *Ornithodesmus cluniculus* (BMNH R187) and interpreted it as that of a bird. Lydekker (1888a, p. 42) suggested that it was, in fact, a pterosaur, but Howse and Milner (1993) have reinterpreted it as a theropod dinosaur (see below). Seeley (1901, p. 173) later named a partial pterosaur skeleton and skull from Atherfield (BMNH R176) as *O. latidens* ((Figure 8.14)E and Hooley (1913) described it in detail. Wellnhofer (1978, pp. 54–5) suggested that both species may be the same. *Ornithodesmus* was a large animal (skull 560 mm long (?), estimated wingspan 5 m) and it is placed in its own family.

Four species of carnivorous theropod, three 'coelurosaurs', and one carnosaur have been described. *Calamospondylus oweni* was described by Fox (1866) on the basis of some pelvic remains ((Figure 8.15)A, and is probably the same as *Aristosuchus pusillus,* which was described by Owen (1876) on the basis of some sacral and lumbar vertebrae and a claw. Owen (1876) regarded the remains as those of a crocodilian and ascribed his new species to *Poikilopleuron, a* genus known from the Mid Jurassic of France. Seeley (1887c) noted that *Poikilopleuron* was very like *Megalosaurus,* and that the Isle of Wight animal was a 'coelurosaue for which he erected the new genus *Aristosuchus.* Lydekker (1888a, pp. 157–9) agreed with this, and Huene (1926) amplified the original description. Galton (1973) ascribed a partial femur from

Barnes High to *A. pusillus. Calamospondylus foxi* Lydekker (1889a) was probably rather similar, but it was based on only two cervical vertebrae. Lydekker (1891) figured more material which he ascribed to *C. foxi.* The third Isle of Wight 'coelurosaue, *Thecocoelurus daviesi* Seeley, 1888 was described on the basis of the anterior third of a cervical vertebra. Seeley (1888d) referred this to *Thecospondylus,* a genus erected on the internal mould of a sacrum from Kent ((Figure 8.15)B. Lydekker (1888a) referred the specimen to the genus *Coelurus,* and Huene (1923, p. 455; 1926) erected the new genus *Thecocoelurus* for it. In conclusion, three genera of 'coelurosaur' have been named from the Isle of Wight section, but each is based on miserable material, and there may only be one or two forms present (Ostrom, 1970, pp. 130–1, 140). Norman (1990a, p. 282) wisely termed all of these as *nomina dubia. Ornithodesmus cluniculus* has been reinterpreted (Howse and Milner, 1993) as a fourth small theropod, specifically a maniraptoran and possibly a troodontid, the earliest record of that family, if confirmed.

The carnosaur '*Megalosaurus'* is represented by some teeth, claws and vertebrae (Lydekker, 1889a, pp. 44–5, 166; 1891, pp. 244–5), a fragmented skeleton and two partial skeletons (Hutt *et al.,* 1989). The first skeleton discussed by Hutt *et al.* (1989) (BMNH R10001/IWCMS 6348) appears to share certain characters with *Megalosaurus nethercombensis* (Waldman, 1974) from the Inferior Oolite of Dorset. The second skeleton (IWCMS 6352) consists of cervical and dorsal vertebrae, ilia, sacral vertebrae, complete paired pubes and other elements. The pubic symphysis in this form is extraordinarily enlarged and the animal may belong to a new carnosaur species (Hutt *et al.,* 1989, p. 140). A comparison with North American carnosaurs has more recently suggested allosaur affinities for the new specimen, and it is being described by Stephen Hutt.

Sauropods are also rare on the Isle of Wight, being represented by incomplete material, but this did not deter early workers from erecting numerous genera and species, which gives the false impression of a diverse fauna. Lydekker (1890c) described *Pleurocoelus valdensis* on the basis of some teeth and a vertebra from Sussex and a vertebra from Brook Bay. The species has been referred to the genus *Astrodon* (Steel, 1970, p. 67; Galton, 1981a, p. 252), but McIntosh (1990, p. 348) is uncertain of the validity of the latter genus. The meagre remains indicate a relatively small sauropod (vertebrae 100–130 mm long compared with 500 mm in *Diplodocus*). Several vertebrae from the Isle of Wight were referred by Lydekker (1888a, pp. 139–41) to *Cetiosaurus brevis* Owen, 1842, but this species is invalid since the type specimen belongs to *Iguanodon* (Steel, 1970, p. 64; Ostrom, 1970, p. 129). Lydekker (1887a, 1888a, pp. 135–6) described two partial caudal vertebrae from the Isle of Wight as *Titanosaurus* sp., and Huene (1929b) erected the new species T *valdensis* for these. Ostrom (1970, p. 130) confirmed the titanosaurid nature of these, and McIntosh (1990, p. 351) ascribed them to *Macrurosaurus semnus* Seeley, 1869, known also from the Cambridge Greensand. An unusual caudal chevron has been identified as 'diplodocid' (Charig, 1980). The '1992 sauropod' (Radley, 1993; Radley and Hutt, 1993), consisting of vertebrae and limb bones, appears to be a brachiosaurid that would have been about 15 m long.

The commonest sauropod in the Wealden of the Isle of Wight, and of the Weald, is *Pelorosaurus,* and numerous isolated vertebrae, teeth and limb bones have been described from the Compton–Atherfield section ((Figure 8.15)C, and ascribed to the genera *Chondrosteosaurus, Eucamerotus, Ornithopsis* and *Pelorosaurus* (Wright, 1852; Seeley, 1870a; Hulke, 1870d, 1879a, 1880b, 1882d; Owen, 1876; Lydekker, 1888a, pp. 146–51). Steel (1970, pp. 68, 70) synonymized these and numerous other Late Jurassic and Early Cretaceous genera with *Pelorosaurus,* and he ascribed all the Isle of Wight material to *P. hulkei* (Seeley, 1870). This animal had 85 mm long peg-like teeth and 350 mm long vertebrae. McIntosh (1990, pp. 348–9) accepted the validity of *Pelorosaurus conybeari* (Melville, 1849) and *Chondrosteosaurus gigas* Owen, 1876 from the Isle of Wight. Ostrom (1970, pp. 129–30, 140) considered that there may be a minimum of two Wealden sauropods.

The commonest dinosaurs on the Isle of Wight are the ornithopods *Iguanodon* and *Hypsilophodon. Iguanodon* was recorded from Brook Bay and Yaverland by Buckland (1835) and Mantell (1846). Further material from the Isle of Wight was described by Owen (1842b, 1855b, 1858, 1859b, 1864), Hulke (1871c, 1874b, 1874e, 1876, 1878, 1882a), Seeley (1875c, 1882a, 1883, 1887d), Lydekker (1888a, pp. 201–40, 1888b), Andrews (1897) and Hooley (1912, 1925). The species currently recognized from the Isle of Wight ((Figure 8.15)D and E) are *I. bernissartensis* (including *I. gracilis*) and *I. atherfieldensis* (Norman and Weishampel, 1990, p. 530), although Steel (1970, pp. 17–19) and Ostrom (1970, pp. 131–4) had accepted others as valid. The various species attained lengths of 5–8 m, and they may have fed on vegetation from trees.

Hypsilophodon, a small bipedal herbivore 1.5–2.5 m long ((Figure 8.15)F, was originally considered to be a juvenile *Iguanodon* (Mantell, 1849; Owen, 1855b; Fox, 1869). A good skull was described as *H. foxi* by Huxley (1870b). Numerous further finds were made (Hulke, 1873, 1874d, 1882c; Lydekker, 1888a, pp. 193–5; Nopcsa, 1905a). Since then, several studies on the anatomy, lifestyle and relationships of *Hypsilophodon* have been published (e.g. Swinton, 1936b; Galion, 1969, 1971a, 1971b, 1974, 1975). It has been variously interpreted as a tree-percher and as an active cursorial biped, the latter being the current view.

The other ornithopods from the Wealden of the Isle of Wight are less well known. *Vectisaurus valdensis* was described (Hulke, 1879b) on the basis of six vertebrae and an ilium. Galton (1976a) referred a further three specimens (vertebrae, pelvis and dentary) to the species and concluded that it was an iguanodontid. However, Norman (1990b) argued that *Vectisaurus* is a juvenile *Iguanodon atherfieldensis.* Finally, Galton (1975) erected the species *Dryosaurus? canaliculatus* for two small femora (previously referred to *Hypsilophodon foxi* by Lydekker, 1888a) and later made this the holotype of the genus *Valdosaurus* (Galion, 1977; Galton and Taquet, 1982).

Most of the Isle of Wight ankylosaurs have been referred to *Polacanthus foxi* ((Figure 8.15)G, but a few were classified as *Hylaeosaurus armatus,* a form originally described from the Wealden of Cuckfield. Fox (1866) reported a skeleton of an armoured reptile, lacking the skull, from Brighstone Bay and mentioned Owen's new name *Polacanthus.* However, Owen never described the specimen, and Hulke (1882b) supplied a detailed account, with the name *P. foxi.* Further descriptions of *'Hylaeosaurus'* and of *Polacanthus* from the Isle of Wight are those of Hulke (1874c), Lydekker (1888a, 1890d), Seeley (1892), Nopcsa (1905b), Blows (1982, 1987), Delair (1982c) and Pereda-Suberbiola (1991). Nopcsa (1928) erected the genus and species *Polacanthoides ponderosus* for a partial skeleton from Atherfield. Most authors noted the close similarity of *Polacanthus* and *Hylaeosaurus* (Hulke, 1882b; Lydekker, 1888a; Seeley, 1892; Ostrom, 1970, pp. 134–5; Coombs, 1978; Coombs and Maryanska, 1990), although Steel (1970), Blows (1987), and Pereda-Suberbiola (1993) argued for the validity both genera. Ostrom (1970, pp. 135, 141) suggested that *Polacanthoides* may be distinct from the other two genera, but others (Coombs, 1978; Coombs and Maryanska, 1990) have synonymized *Polacanthus* and *Polacanthoides with Hylaeosaurus.*

The plesiosaur remains (teeth, vertebrae and limb bones) from Tie Pits, Atherfield (BMNH R5180–5, 7–8), Brook (IWCMS 1586) and Compton Bay (BMNH R5186) do not appear to have been described, although they are mentioned by Stewart *et al.* (1991, p. 125), and it is consequently hard to assess their significance in the fauna.

Footprints variously ascribed to *Iguanodon* and '*Megalosaurus'* have been reported from several locations along the section (e.g. Beckles, 1862; Blows, 1978; Delair, 1989; S.H. Hutt, pers. comm.). They are found as trackways, or isolated prints weathered out in sandstone units on the foreshore. They are generally large three-toed prints, and resemble specimens from the Purbeck beds of Swanage and the Wealden of the Sussex coast (see above). Newer finds include four-toed casts from Brook, which may have been produced by a sauropod or an ankylosaur Q. Radley, pers. comm., 1993).

Comparison with other localities

The nearest comparable Wealden locality to the Compton–Atherfield section is the stretch of coast at Yaverland (see below) which exposes similar rocks and has yielded *Suchosaurus, Pelorosaurus, Iguanodon, Yaverlandia* and *Polacanthus.* The exposed Isle of Wight Wealden is largely, or wholly, Barremian in age (mid-Early Cretaceous), whereas reptile localities in the Wealden of the Weald are generally Valanginian (earliest Early Cretaceous). The exception in the Weald is Smokejacks Pit, Ockley [TQ 113 372] which is in the Weald Clay (Hauterivian/Barremian in age) (*Iguanodon, Baryonyx,* ?crocodilians).

The turtles *Tretosternon* and *Plesiochelys* are well known from the latest Jurassic (Purbeck) and the Cretaceous of Europe (M■ynarski, 1976, pp. 55, 60).

The crocodilian *Bernissartia* is known from the Wealden of Belgium, Sussex and eastern Spain, as well as possibly the Early Cretaceous of Texas (Buffetaut and Ford, 1979; Norell and Clark, 1990) and the ?latest Jurassic of Wimille, northern France (Curry *et al.,* 1991). *Hylaeochampsa* may also be known from the Wealden of Sussex, but the synonymy

is uncertain (Clark and Norell, 1992). *Goniopholis* occurs widely in the Late Jurassic and Cretaceous of Europe, North and South America, while *Oweniasuchus* is known from the Purbeck of Swanage, and ?Early Cretaceous of Portugal (Steel, 1973). *Vectisuchus* is restricted to the Isle of Wight. *Pholidosaurus* occurs in the Purbeck of Swanage and the Wealden of Germany, as well as the ?Late Cretaceous of Brazil; *Suchosaurus* has been reported from the Early Cretaceous of the Weald and of Portugal (Steel, 1973). *Theriosuchus* is known best from the Purbeck of Swanage.

The Isle of Wight 'coelurosaurs' are hard to compare with relatives elsewhere because of the inadequate material. The theropod *Megalosaurus* has been reported from all parts of the world and from earliest Jurassic to latest Cretaceous. *M. dunkeri* is reputed to come from the Purbeck, Wealden and Lower Greensand of southern England (Steel, 1970, pp. 43–5). The sauropod *Pleurocoelus* is known from the Wealden of Sussex, and the Early Cretaceous of Maryland and Texas, USA (McIntosh, 1990). Diplodocids are known from the Late Jurassic of North America, Tanzania and China (Charig, 1980), *Pelorosaurus* is known from the Early Cretaceous of England, as is *Macrurosaurus* (McIntosh, 1990).

Of the ornithischians, *Vectisaurus,* is restricted to the Isle of Wight. The genus *Hypsilophodon,* however, is known from the Early Cretaceous of Spain (Las Zabacheras Beds, Teruel) and reputedly also from the Early Cretaceous Lakota Formation of North America (*H. wielandi:* Galton and Jensen, 1979), but Sues and Norman (1990, p. 500) note this last taxon as *nomen dubium.* Other hypsilophodontids are known from the Kimmeridge Clay of Weymouth (?), the Late Jurassic Morrison Formation of North America and Tendaguru Beds of Tanzania, the early to mid-Cretaceous of Montana, USA (Cloverly Formation), Antarctica, Victoria (Otway Group) and New South Wales (Griman Creek Formation), Australia, and the Late Cretaceous of Montana, Wyoming, South Dakota and Colorado, USA and Alberta and Saskatchewan, Canada (Sues and Norman, 1990). *Iguanodon* is best known from the Wealden of southern England and Belgium, but it has also been reported from the Purbeck beds of Swanage, the Wealden of Germany, the Lower Greensand of southern England, and the Early Cretaceous of Spain, Mongolia and North America (Norman and Weishampel, 1990, p. 530). *Valdosaurus canaliculatus* is known from the Wealden of Tilgate Forest, Sussex, and from Cornet, Bihor, Romania and the species V. *nigeriensis* from the El Rhaz Formation (Aptian), Gadoufaoa, Niger, West Africa (Sues and Norman, 1990, p. 500). *Valdosaurus* is closely similar to the hypsilophodontid *Dryosaurus* (e.g. Galton, 1977), a form known from the Late Jurassic of western North America and Tanzania.

The ankylosaur *Polacanthus* ranges from the Wessex Formation to the Lower Greensand (Ferruginous Sands) (Barremian to Lower Aptian) mostly from the Isle of Wight, with one specimen known from the mainland. This block came from the Upper Greensand (Albian) at Charmouth, Dorset, and contained parts of four disarticulated, but associated, dorsal vertebrae, a rib section and portions of flat dermal armour (sacral shield). If *Hylaeosaurus is* a synonym then the range extends to the Wealden of the Weald area. Further, if *Hoplitosaurus* is synonymous with *Polacanthus,* as Pereda-Suberbiola (1991) suggests, the range expands to include the Early Cretaceous Lakota Formation of South Dakota (source also of the North American *Iguanodon* and *Hypsilophodon*).

Plesiosaurs are rare in the Wealden. Isolated bones have also been registered from Ridgeway Hill, Dorset [SY 67 85], Cuckfield and Hastings, Sussex (Lydekker, 1889a, pp. 188–90, 224–7), Berwick, Sussex ([TQ 52 05]: Andrews, 1922), Telham, Sussex [TQ 769 142] and Brenchley, Kent [TQ 67 41].

Wealden dinosaur footprints are also known on the Isle of Wight from Yaverland, and from several sites along the Sussex coast from Bexhill to Cliff End (Beckles, 1854; Tylor, 1862; White, 1928; Delair and Sarjeant, 1985; Delair, 1989; Radley, 1993), as well as from the former West Germany (Bfickeburg and Bad Rehburg, Niedersachsen) and Belgium (Bernissart) (Haubold, 1971, pp. 79, 86–9).

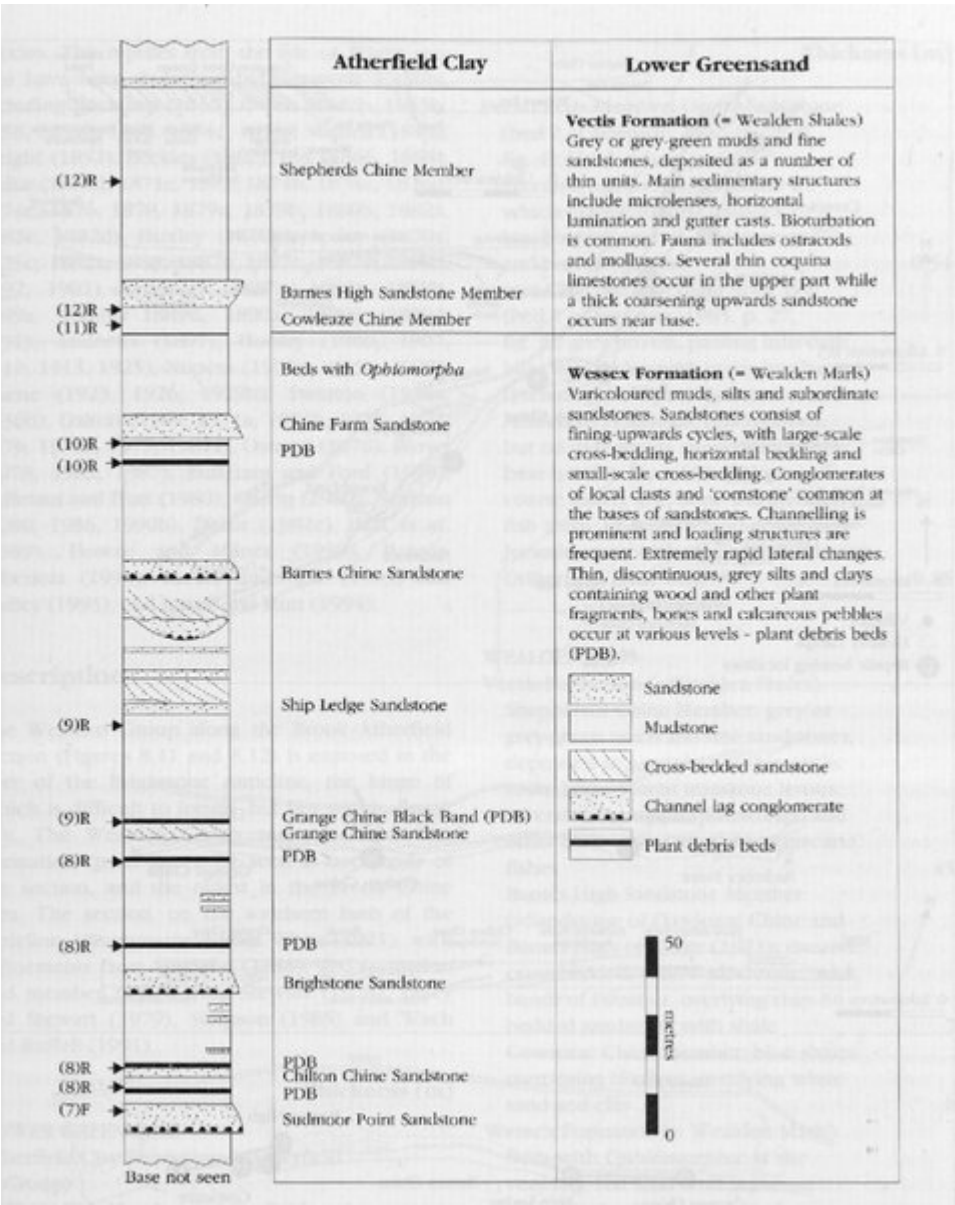
Conclusions

The Wealden section between Compton Bay and Atherfield Point is one of the most famous sources of dinosaurs in the world, and Britain's best. A large reptile fauna is known, including turtles and plesiosaurs, but the archosaurs are best represented. The seven genera of crocodilians include a good selection of aquatic goniopholids and pholidosaurids, as well as some forms close to the origin of the modern crocodilians, the eusuchians (*Hylaeochampsa, Bernissartia*). Remains of pterosaurs (*Ornithodesmus*) may represent a unique group. Of the dinosaurs, fragmentary 'coelurosaue and sauropod remains are known, but the best represented dinosaurs are the ornithopods *Hypsilophodon, Iguanodon* (two

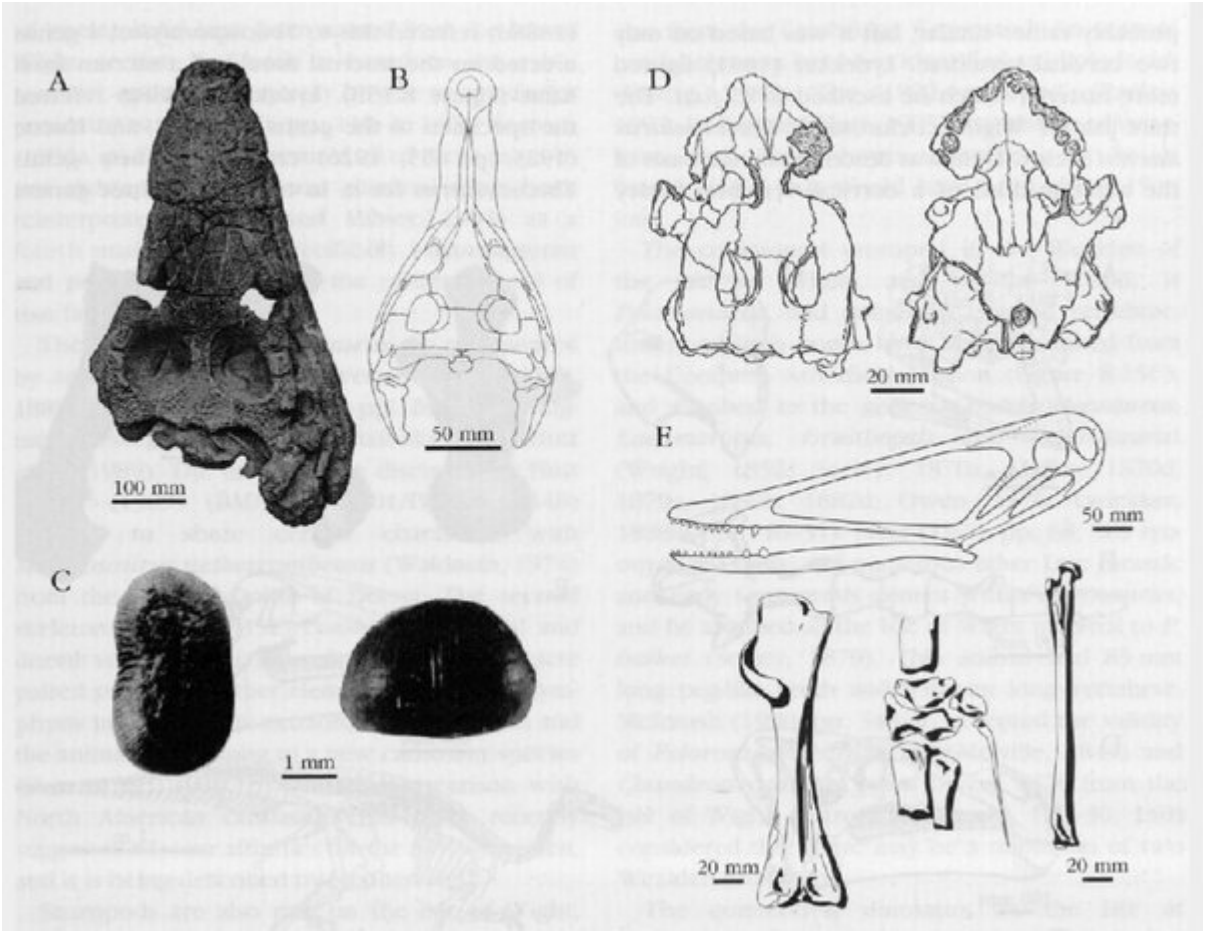
species), *Valdosaurus,* and the armoured ankylosaur *Hylaeosaurus. Valdosaurus* and *Iguanodon* are of biostratigraphic importance, providing evidence of a land connection between northern Europe and Africa across Tethys during the Early Cretaceous, and *Hypsilophodon* and *Hylaeosaurus* relate the Isle of Wight dinosaur fauna with the Early Cretaceous faunas of Dakota in North America.

The international importance of finds from this site and the continuing potential for significant future discoveries give it a very high conservation value.

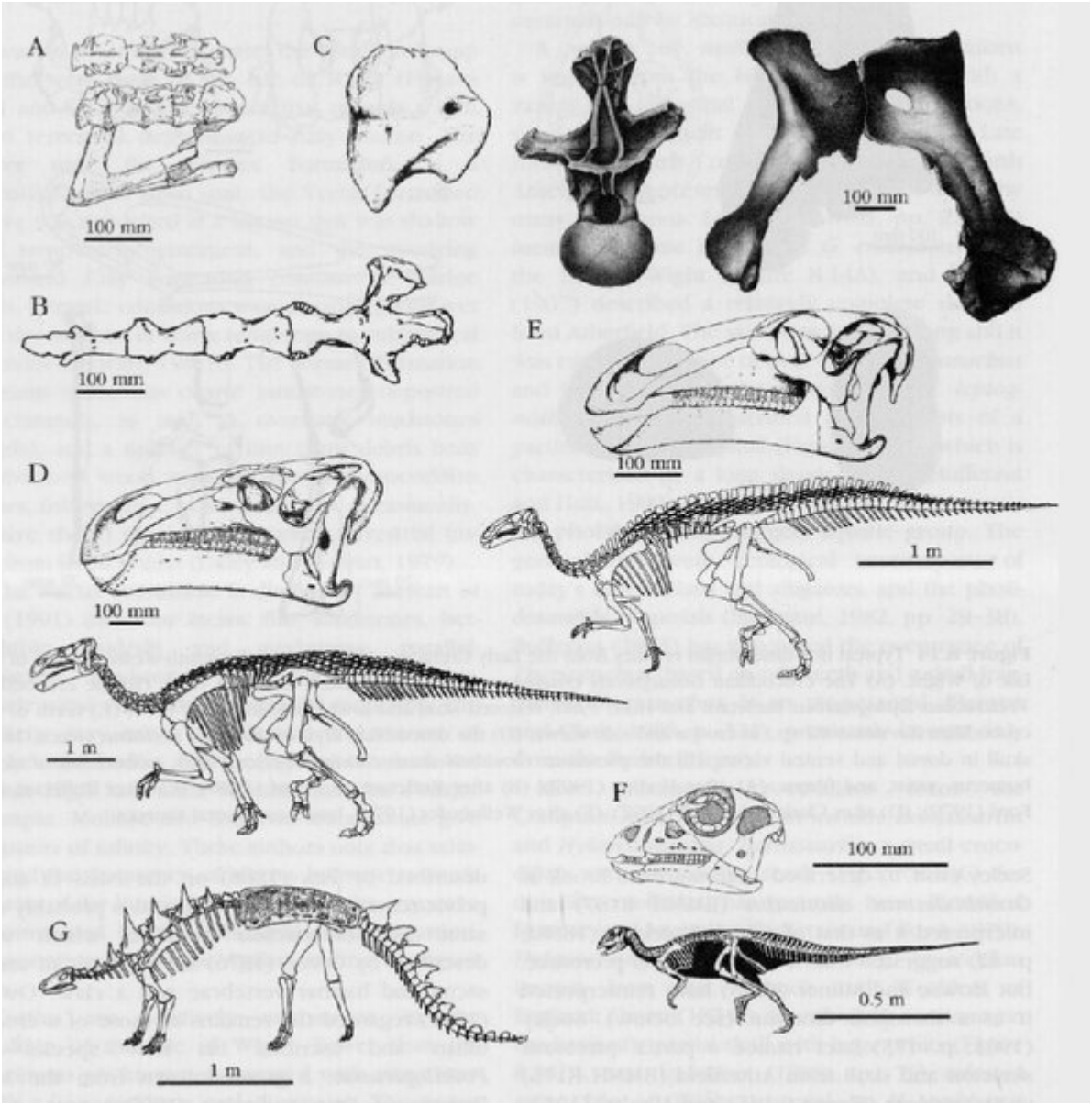
References



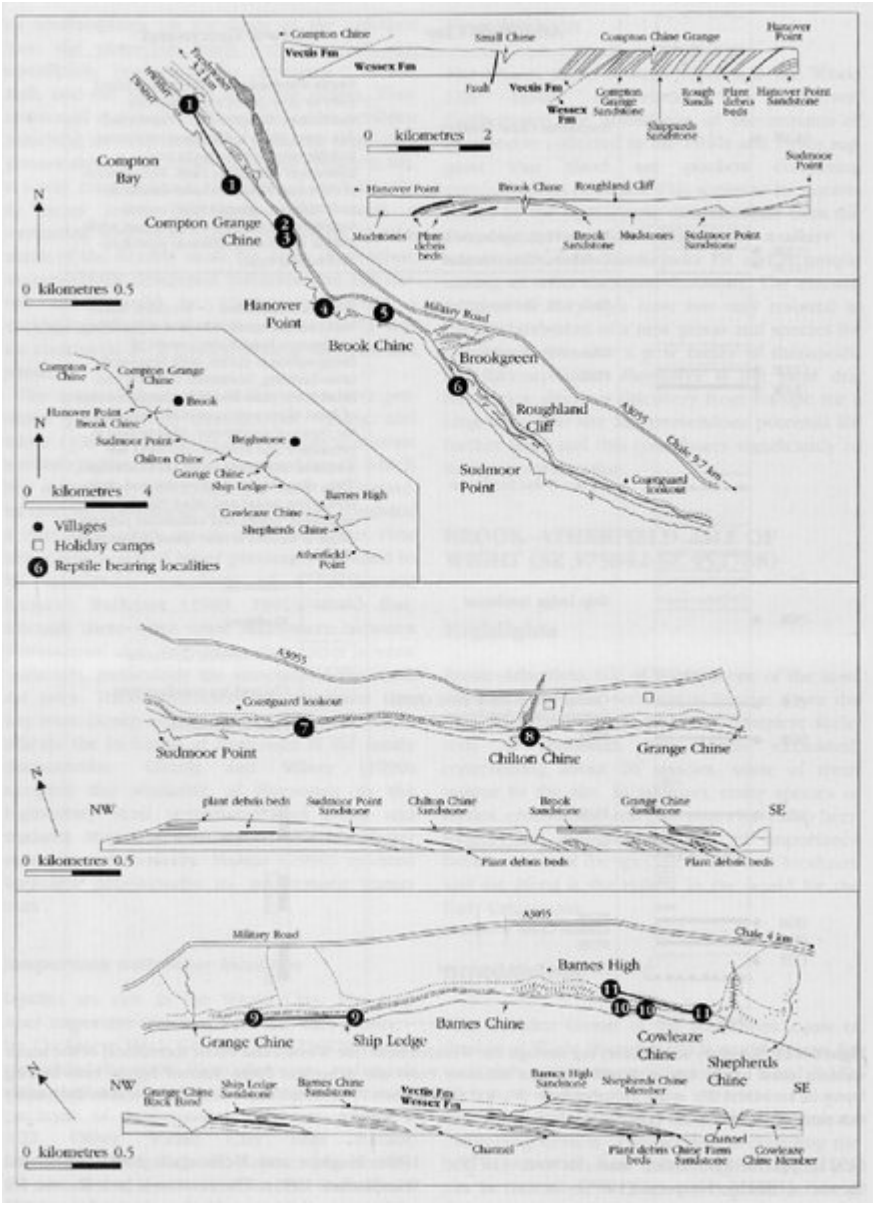
(Figure 8.11) Summary sedimentary log through the Wealden beds (the Wessex and Vectis formations) of the southwestern coast of the Isle of Wight between Sudmoor Point and Atherfield Point. Known reptile bone-bearing horizons are noted (R), as are footprint beds (F), and the numbers 7–12 match those used in the text in the locality descriptions. After Stewart (1981b).



(Figure 8.14) Typical non-dinosaurian reptiles from the Early Cretaceous Wealden of the south-western coast of the Isle of Wight. (A) The crocodilian Goniopholis crassidens Owen, 1841, skull in dorsal view; (B) the crocodilian Vectisuchus leptognathus Buffetaut and Hutt, 1980, restored skull and lower jaws in dorsal view; (C) teeth of the crocodilian Bernissartia sp., in crown and side views; (D) the crocodilian Hylaeochampsa vectiana Owen, 1874, skull in dorsal and ventral views; (E) the pterosaur Ornithodesmus latidens Seeley, 1901, restoration of skull, humerus, wrist, and femur. (A) After Hooley (1907); (B) after Buffetaut and Hutt (1980); (C) after Buffetaut and Ford (1979); (D) after Clark and Norell (1992); (E) after Wellnhofer (1978), based on several sources.



(Figure 8.15) Typical dinosaurs from the Early Cretaceous Wealden of the south-western coast of the Isle of Wight. (A) The theropod dinosaur Calamospondylus oweni Fox, 1866, sacrum and pubis in dorsal and lateral views; (B) the theropod dinosaur Thecospondylus horneri Seeley, 1882, natural cast of the sacral cavity; (C) the sauropod dinosaur Pelorosaurus hulkei (Seeley, 1870), a dorsal vertebra in anterior view, a coracoid, and the pubis and ischium; (D) the large ornithopod Iguanodon atherfieldensis Hooley, 1925, skull and skeleton; (E) the large ornithopod Iguanodon bernissartensis Boulenger, 1881, skull and skeleton; (F) the small ornithopod Hypsilophodon foxii Huxley, 1869, skull and restored skeleton; (G) the ankylosaur Polacanthus foxi Hulke, 1881, skeleton. (A) After Seeley (1887c); (B) after Seeley (1882a); (C) after Hulke (1880b, 1882d), Seeley (1882); (D) and (E) after Norman (1980, 1986); (F) after Galton (1974); (G) after Blows (1987).



(Figure 8.12) Maps and diagrammatic cliff views of the coastal section from Compton Chine to Atherfield Point, on the south-western coast of the Isle of Wight. Fossil reptile localities are indicated as 1–11, corresponding to the sites described in the text. After Stewart (1981b).

(Figure 8.13) The Hypsilophodon Bed at Cowleaze Chine, high in the Wealden sequence. Stephen Hutt points to the horizon from which several complete skeletons of Hypsilophodon have been excavated. (Photo: M.J. Benton.)