Burton Cliff and Cliff Hill Road Section, Dorset

[SY 478 895]-[SY 492 887], [SY 487 892]

B. M. Cox

Introduction

The major part of the Burton Cliff and Cliff Hill Road Section GCR site comprises the coastal section at Burton Cliff, near Burton Bradstock in Dorset, which extends for *c.* 1.5 km from near Burton Freshwater (the mouth of the River Bride) in the west to the National Trust car park opposite the Bay View Hotel in the east (Figure 2.11). The Aalenian–basal Bathonian Inferior Oolite Formation, overlying Toarcian–Aalenian Bridport Sand Formation and underlying Bathonian Fuller's Earth Formation, crops out high up in the cliff face and is inaccessible, but its constituent beds, many of which are highly fossiliferous, can be examined in fallen blocks on the beach (particularly at the western end) and these provide an excellent substitute for study. In addition, the GCR site includes a separate section in the deep cutting on Cliff Road [SY 487 892], sometimes referred to as the 'Cliff Hill Section' (Richardson, 1928; Wilson *et al.,* 1958), which lies *c.* 150 m north of Burton Cliff The cutting, from which collecting is not possible, extends towards Burton Bradstock for *c.* 130 m and, when clear of vegetation, exposes a similar, but more accessible, Inferior Oolite Formation succession to that of the cliffs together with the underlying Bridport Sand Formation (Figure 2.12). The semi-permanent exposure at the nearby Freshwater Caravan Park [SY 479 897] which in recent years has enabled additional fossil collecting and provided further sedimentological detail (Callomon and Chandler, 1994; Callomon and Cope, 1995) is not included within the GCR site.

Description

The following record of the Burton Cliff section (also (Figure 2.13)) is largely based on that of Callomon (in Callomon and Cope, 1995). His bed numbers originated with Torrens (1969b), who provided the first modern revision of the section based on Buckman (1910a) and Richardson (1928), and are essentially those of the latter author but in reverse order. Other earlier reports of the section include those of Wright (1856, 1860), Day (1863), Hudleston (1887), Woodward (1894), Arkell (1933) and Wilson *et al.* (1958). Following Callomon (in Callomon and Cope, 1995), the fauna recorded below, which is biased towards the ammonites, has been enhanced on the basis of material from the more readily collectable exposure at the nearby Freshwater Caravan Park.

	Thickness (m)
Great Oolite Group	
Fuller's Earth Formation	
19: Clay, grey, somewhat calcareous and silty; poorly fossiliferous; bivalves (*Bositra buchii* (Roemer))	seen to 5.0
Inferior Oolite Formation	
18: *The Scroff:* Marl, rusty, iron-stained, impersistent; belemnites; brachiopods (*Aulacothyris*)*;* poorly preserved ammonites, often encrusted with serpulids	0.05–0.15
17: *Zigzag Bed:* Limestone, nodular, hard, blue-hearted, locally limonitic or pyritic; ammonites including *Ebrayiceras, Morphoceras, Oecotraustes, Oxycerites, Parkinsonia, Procerites, Procerozigzag* and *Zigzagiceras* welded to underlying bed	*c.* 0.15
Burton Limestone	
16: Limestone, pale, more-or-less hard and massive, bioclastic, bioturbated, poorly fossiliferous; parting into three courses	0.65

15: *Sponge Bed:* Limestone, marly, variable; well bedded in several courses, separated by thin, marly partings; thicker limonitic marl at top; coarsely bioclastic with clasts largely of sponge fragments; occasional poorly preserved ammonites (*Parkinsonia*); profuse calcareous sponges; bivalves; brachiopods; bryozoans; crinoids; echinoids (*Cidaris, Clypeus, Collyrites*); marl parting at base	0.35
14: Limestone, harder than above, coarsely biodetrital and somewhat rubbly packstone; clasts largely of echinoids; divided into two courses (a,b) by undulating parting; sparsely fossiliferous with fauna as above but better preserved; ammonites (*Parkinsonia* (*P.*) *bomfordi* Arkell); large nautiloids; bivalves; brachiopods including *Sphenorhynchia plicatella* (J. de C. Sowerby); echinoids; sponges; undulating parting at base	0.40
13: Limestone, in three main courses (a–c), variably hard; brachiopods (*Sphaeroidothyris sphaeroidalis* (J. de C. Sowerby)) abundant throughout	
13c: Packstone, fine grained, biomicritic, marly, somewhat ferruginous with weathered pockets of limonite; ammonites, as wholly decalcified internal casts including *Lobosphinctes intersertus* S.S. Buckman, *Oxycerites aspidoides* (Oppel), and macroconch and microconch *Parkinsonia pseudoferruginea* Nicolesco; nautiloids	0.30
13b: *Truellei Bed:* Biosparite, hard, somewhat peloidal with scattered large, cream-coloured ooids and characteristic small black grains or specks; many well-preserved but difficult to extract fossils including macroconch and microconch *Bigotites petri* Nicolesco, *Cadomites daubenyi* (Gemmellaro), *Dimorphinites defrancii* (d'Orbigny), *Lissoceras* spp., *Parkinsonia* (*Durotrigensia*) *dorsetensis* (*Wright*), *Parkinsonia* (*P.*) *parkinsoni* (J. Sowerby) (β, *Polyplectites, Strigoceras truellei* (d'Orbigny); large thick-shelled bivalves including *Ctenostreon, Neocrassina, Trigonia;* echinoids (*Holectypus, Stomechinus*); gastropods; nautiloids; parting at base	0.15–0.20
13a: Limestone, marly, biomicritic packstone or wackestone; sparsely (upper part) to fairly densely (lower part) ooidal with large, weathering cream-coloured, ooids; less fossiliferous than 13b with ammonites including *Bigotites* sp., *Parkinsonia* (*Durotrigensia*) aff. *dorsetensis* (Wright) and *P.* (*P.*) *parkinsoni* (J. Sowerby) *cc;* belemnites	0.10

12:Astarte Bed: Limestone, softer than bed above, marly, densely 'iron-shot' ooidal, variable; richly fossiliferous with diverse fauna ranging from bored, thick-shelled bivalves encrusted with epifauna and limonite to perfect 'fresh' ammonites with lappets preserved; *Di plesioceras* spp., *Garantiana* including *G. garantiana* (d'Orbigny), *G. longidens* (Quenstedt) and *G.* (*Pseudogarantiana*) *minima* Wetzel, *Leptosphinctes* (*Cleistosphinctes*) *subdivisus* (S.S. Buckman), abundant *L.* (*Vermisphinctes*) *meseres* (S.S. Buckman), *Lissoceras, Oppelia, Parkinsonia rarecostata* (S.S. Buckman), *Plagiamites costatus* (Morris), *Sphaeroceras, Spiroceras waltoni* (Morris), *Strigoceras septicarinatus* S.S. Buckman; bivalves including, most commonly, *Neocrassina modiolaris* (Lamarck); gastropods including *Pseudomelania procera* (Deslongchamps); small, solitary corals including *Discocyathus* and *Pochocyathus;* spectacular limonitic, algal crust at base	0.10
11: *Red Conglomerate:* Oolite, 'iron-shot' with berthierine, highly variable, preserved in patches and pockets let down into karstic undulating surface of bed below; often conglomeratic with limonite-encrusted worn pebbles including belemnites and ammonite nuclei; locally re-cemented in crimson limonite, sometimes with stromatolitic lamination; in places, thickening into lenticular 'iron-shot' oolite with 'fresh' fossils, particularly ammonites; undulating, sharp base	0–0.15
Divisible into three generations of sediment:	
11c. Limestone, white, preserved in blocks as fissure-infills; ammonites including *Cadomoceras* and *Garantiana;* large nautiloids; brachiopods; echinoids	
11b. Limestone, white, soft, in small pockets; ammonites including *Leptosphinctes, Spiroceras* and *Strenoceras*	
11a. Oolite, 'iron-shot', bioturbated but well bedded; well-preserved ammonites including *Dorsetensia* cf. *regrediens* (Haug), *Sonninia* cf. *hebridica* (Morton), rare *Sphaeroceras brongniarti* (J. Sowerby), *Stephanoceras kreter* (S.S. Buckman), *S. mutabile* (Quenstedt), *S. umbilicum* (Quenstedt), *S.* (*Normannites*) *braikenridgii* (J. Sowerby), *S.* (*N.*) *latum* Westermann and *S.* (*Phaulostephanus*) aff. *diniense Pavia*	
Red Bed	
10: Limestone, massive, hard, in two courses; somewhat ooidal, coarse bioclastic packstone rich in crinoid and echinoid plates; weathering white or pale-pink; totally bioturbated with overprint of large, irregular, vertical burrows often marked by red limonite; sparsely fossiliferous; belemnites; undulating surface largely covered in stromatolitic crusts up to 0.05 m thick at base	0.30–0.50

9: Limestone, biodetrital packstone as bed above but somewhat finer; moderately to densely ooidal; weathering olive-grey; ammonites including *Emileia, Labyrinthoceras, Otoites, Nannina evoluta* S.S. Buckman, *Sonninia celans* S.S. Buckman, *S. felix* S.S. Buckman, *S. propinquans* (Bayle) and *Stephanoceras rhytum* (S.S. Buckman); large bivalves; and gastropods (*Bathrotomaria*)*;* sharp base	0.20–0.25
8: *Snuffbox Bed:* Limestone, marly, blue-grey; sparsely to densely ooidal; ooids large and limonitic, concentrated in pockets; scattered large echinoid spines and plates; numerous ellipsoidal, limonitic, strongly laminated oncoids ('snuff-boxes') concentrated locally and embedded at all angles; sharp base	0–0.10
7: *Yellow Conglomerate:* Limestone, marly, weathering yellow with masses of pebbles including rolled, worn ammonites and many belemnites; 'fresh' ammonites including *Graphoceras limitatum* S.S. Buckman; sharp but undulating erosive base	0.05
6: *Scissum Bed:* Limestone, sandy, hard, massive when unweathered; ammonites including, most commonly, *Leioceras* (*L.*) *undulatum* S.S. Buckman (microconch)/L. (*Cypholioceras*) *lineatum* S.S. Buckman (macroconch) and rarer *Cylicoceras* (*C.*) *uncinatum* S.S Buckman (macroconch)/C. *subcostatum* S.S. Buckman *C. paucicostatum* Rieber (microconchs) as well as *Bredyia subinsignis* (Oppel), *Csernyeiceras verpillierense* (Roman and Boyer), *Erycites aff. barodiscus* Gemmellaro, *E.* cf. *fallifax* Arkell, *Hammatoceras lorteti* Dumortier, *Planammatoceras planinsigne* (Vacek), *Tmetoceras scissum* (Benecke); *Leioceras* cf. *opalinum* (Reinecke) in lower part; large bivalves including *Ctenostreon* and *Plagiostoma inoceramoides* (Windborne); fossil wood	0.45–0.50
Lias Group	
Bridport Sand Formation	
5: *Rusty* or *Foxy Bed:* Marl, sandy, brown, somewhat laminated, moderately fossiliferous with ammonites, including *Alocolytoceras taeniatum* (Pompeckj), *Bredyia subinsignis* (Oppel) and *Leioceras opalinum* (Reinecke) (microconch)/*L. opaliniforme S.S.* Buckman (macroconch); brachiopods; passing down into	*c.* 0.05
4b: Sandstone, fine grained, highly calcareous, hard, burrowed and piped; few fossils except local accumulations of *Leioceras opalinum* (Reinecke) near top, *Pachylytoceras torulosum* (Zieten) and rare *Tmetoceras scissum* (Benecke); indistinct parting at base	0.25
4a: Sandstone, fine grained, weakly calcareous, somewhat concretionary; undulating base	*c.* 0.20
1–3: Sand, slightly micaceous, yellow, with layers of calcareous, burrowed concretionary sandstone; ammonites including *Pleydellia aalensis* (Zieten)	1.50
Sand with occasional concretionary sandstones	seen to 30–40

Interpretation

The ammonite fauna enables recognition of the Aalenian Opalinum, Scissum, Concavum and Discites zones, the Lower Bajocian Sauzei and Humphriesianum zones, and the Upper Bajocian Subfurcatum, Garantiana and Parkinsoni zones (Figure 2.13). In the Aalenian Stage, a non-sequence at the base of Bed 7 cuts out the Murchisonae and Bradfordensis zones, although ammonites indicative of those zones occur as a reworked element in the fauna of Bed 7 (the Yellow Conglomerate of Buckman, 1910a). In the Lower Bajocian Substage, a non-sequence at the base of Bed 9 cuts out the Ovalis and Laeviuscula zones.

The Toarcian–Aalenian stage boundary is taken at the base of Bed 4 in which the ammonite fauna is indicative of the Opalinum Zone and the oldest known Aalenian ammonite biohorizon (Aa-1 *Leioceras opalinum*) (Callomon and Chandler, 1990; Callomon and Cope, 1995). The ammonite *Pleydellia aalensis* (Zieten) in the underlying Bed 3 gives its name to the Aalensis Subzone, the youngest subzone of the Levesquei Zone and Toarcian Stage. At Burton Bradstock and elsewhere in this area, many authors (e.g. Wilson *et al.,* 1958; Torrens, 1969b; Parsons, 1980a; Callomon and Cope, 1995 (text only); Hesselbo and Jenkyns, 1995) have taken the top of the Opalinum Zone at the top of the Rusty or Foxy Bed — alternative stratal names, used since Buckman (1910a) — for a thin, brown, sandy marl (Bed 5 above) or iron-stained clay seam. At some localities including the Cliff Hill Road Section, this bed overlies an irregular hardground (Hesselbo and Jenkyns, 1995). The top of the Rusty or Foxy Bed has also been taken by some authors (e.g. Torrens, 1969b; Parsons, 1980a; Hesselbo and Jenkyns, 1995; Cox *et al.,* 1999; and herein) as the Bridport Sand–Inferior Oolite formational boundary (see Conegar Hill GCR site report, this volume). Although Callomon (in Callomon and Cope, 1995) took this boundary somewhat lower (at the base of Bed 4), he acknowledged that Bed 4a was probably already the topmost cemented member of the Bridport Sand Formation. Buckman (1910a), Arkell (1933) and Wilson *et al.* (1958) had earlier taken the boundary somewhat higher, at the top of Bed 6 (the Scissum Bed). The latter term, which takes its name from the hildoceratid ammonite *Tmetoceras scissum* (Benecke), was first introduced from the Cotswolds (see Chapter 3) to the Dorset succession by Richardson (1928–1930). According to Hesselbo and Jenkyns (1995), the Scissum Bed, which they described as a highly calcareous sandstone rather than a sandy limestone, is similar in aspect to the cemented bands in the Bridport Sand Formation but with much better sorting.

The limonitic oncoids known locally by the quarryman's term 'snuff-boxes', which give their name to Bed 8, are a well-known sedimentological feature in the European Bajocian Stage and they have been investigated in some detail (e.g. Sellwood *et al.,* 1970; Gatrall *et al.,* 1972; Palmer and Wilson, 1990; Hesselbo and Jenkyns, 1995; (Figure 2.14)). The bed is assigned to the Discites Zone on the basis of ammonites, including *Hyperlioceras,* recorded by Parsons (1972) from an inland trench section *c.* 2 km to the north-east. The internal structure of the snuff-boxes, which are roughly discoidal with diameters between 30 mm and 0.3 m and thicknesses up to 80 mm, comprises discontinuous limonite lamellae with encrusting calcareous organisms (principally serpulids and bryozoans, but also foraminifera, sponges, bivalves and brachiopods) and diagenetic fibrous calcite at interlamellar boundaries. Accretion took place around a large shell-fragment or lithoclast but, apparently, on only one side at a time; individual snuff-boxes were probably overturned several times during their development (Palmer and Wilson, 1990; Hesselbo and Jenkyns, 1995). According to Palmer and Wilson (1990), the form of the outermost lamellae and nature of the intergrown encrusting fauna (gloomy-cavity and gloomy-crevice dwellers) suggests that the lamellae accreted only on the underside of each snuff-box, and that the micro-organisms involved in their genesis were non-photosynthetic, iron-oxidizing bacteria. Subsequently, Hesselbo and Jenkyns (1995) queried whether the lack of light indicated by the encrusting fauna might be related to water depth rather than to shadow. The present orientation of the snuff-boxes, which are in contact with one another in three dimensions, usually with their long-axes parallel to bedding but sometimes tilted, and with some sets of steeply dipping imbricated individuals, suggested to Palmer and Wilson (1990) that they grew and accumulated as cobble-sized concretions lying free on an agitated sea-bottom with episodes of movement and stacking by strong currents. Hesselbo and Jenkyns (1995) raised the possibility that disturbance by large scavengers might also be an influence on the present orientation. Gatrall *et al.* (1972) had earlier suggested a depositional environment of turbulent water some tens of metres deep on a submarine swell or slightly undulating shelf, and Jenkyns and Senior (1991) postulated highly turbulent water on a particularly shallow, fault-controlled sector of the sea floor.

As originally used by Buckman (1910a), the term Red Bed referred to all of the strata between the Yellow Conglomerate and the Astarte Bed, and thus included the Snuff-box Bed (Bed 8) and the Red Conglomerate (Bed 11). Subsequently, most authors grouped beds 8, 9 and 10 together as the 'Red Bed' (e.g. Richardson, 1928–1930; Wilson *et al.,* 1958) or 'Red Beds' (e.g. Parsons, 1980a) but latterly, the term Red Bed has been applied to beds 9 and 10 only (e.g. House, 1989; Callomon and Cope, 1995). At Burton Cliff, Bed 9 forms hard massive blocks on the beach that are difficult to break up. However, at the nearby Freshwater Caravan Park, where Bed 9 divides into three courses, weathered exposures led Callomon and Cope (1995) to describe it as one of the most interesting beds in the Inferior Oolite Formation, displaying extensive marly partings, marking stromatolitic crusts, and numerous flat oncoids; the latter are less prominent but often much larger than the snuff-boxes of Bed 8, and their nuclei are 'fresh' or corroded ammonites. According to Callomon and Cope (1995), ammonites occur throughout Bed 9 and include almost the entire fauna of the Lower Bajocian Sauzei Zone. At Burton Cliff, the sparsely fossiliferous Bed 10 comprises two courses, and its characteristic overprint of large, irregular vertical burrows often marked by red limonite gives it a distinctive appearance that enables it to be traced over much of southern Dorset (Callomon and Cope, 1995). The top of the Red Bed is an important erosion surface and is a good example of a hardground (Sellwood *et al.,* 1970).

The oldest element (11a above) of the overlying and discontinuous Red Conglomerate belongs to the basal Humphriesianum Zone, probably near to the Sauzei–Humphriesianum zonal boundary Ammonites in the next youngest element (11b above) indicate the Polygyralis Subzone of the Upper Bajocian Subfurcatum Zone, and the youngest element (11c above), which Buckman (1910a, 1922a) called the 'White Bed' or '*Nautilus* Bed', belongs to the Upper Bajocian Garantiana Zone (Callomon and Cope, 1995). Further lithological details of the last-named sediment were given by Jenkyns and Senior (1991). The fissures that it infills were created by movements of the synsedimentary Bride Fault that truncates Burton Cliff at its eastern end and brings the Bridport Sand Formation of Toarcian–Aalenian age and Fuller's Earth Formation of Bathonian age into juxtaposition (Hesselbo and Jenkyns, 1995). The interpretation of these fissure-infills has not always been understood and they perplexed the early workers such as Buckman (1910a, 1922a), Richardson and Butt (1912) and Richardson (1915, 1928–1930). According to Hesselbo and Jenkyns (1995), a trace of a fault, identified as the 'Bride Fault' by Jenkyns and Senior (1991), is sometimes visible on the upper beach where a sliver of Inferior Oolite Formation is caught up in the fault zone. With bored limestone boulders and laminated ferruginous concretions set in a highly fossiliferous ferruginous limestone matrix, the latter authors described it as an 'anomalous facies' containing ammonites indicative of the Subfurcatum Zone (Baculata Subzone) (i.e. an age intermediate between that of 11b and 11c). Hesselbo and Jenkyns (1995) thought that the beach fault was more likely to be the onshore extension of a substantial fault, albeit joined to the Bride Fault, mapped offshore by Darton *et al.* (1981).

The algal crust that separates the Red Conglomerate (Bed 11), or in its absence the Red Bed (Bed 10), from the overlying Astarte Bed (Bed 12) has been investigated by Radley (1986). It lies below an erosion surface marking the base of the latter bed and is composed of stromatolites, ranging up to *c.* 0.5 m in diameter, which are often limonitic on their upper surfaces. The stromatolites are colonized by serpulids that, together with the absence of features such as desiccation cracks and evaporite traces, led Radley (1986) to conclude that they were almost certainly of normal marine subtidal origin and that the substrate on which they accumulated was probably a rocky platform (top of Red Bed) with topographical lows in which the Red Conglomerate accumulated. The erosional 'event' at this level is the Bajocian Denudation of Buckman (1895), the Bajocian Oscillation of Sollas (1926) and the Vesulian Oscillation or Transgression of Arkell (1933). Callomon and Cope (1995) and Hesselbo and Jenkyns (1995) referred to this level as the 'Vesulian Unconformity'. 'Vesulian' is an otherwise obsolete term, dating from Marcou (1848), which was once used as a stage name for the Upper Bajocian. The Astarte Bed itself is widespread in Dorset and is present at several other GCR sites (see Horn Park Quarry, Seavington St Mary Quarry, Louse Hill Quarry and Halfway House Cutting and Quarry GCR site reports, this volume). The term was used by Hudleston (1887) and Buckman (1910a) but Richardson (1915, 1932) and some subsequent authors later called it the '*Astarte obliqua* Bed'. The common astartid bivalve that characterizes the bed is now identified as *Neocrassina modiolaris* (Lamarck) (e.g. Callomon and Cope, 1995).

The term 'Burton Limestone' (beds 13–16) was introduced by Parsons (1975b) for the beds previously and variously known as the 'Microzoa Beds', 'Massive Beds', 'Sponge Beds' and 'Top Limestones' (Richardson, 1928–1930). Parsons (1975b) considered that these earlier terms either referred to facies of limited geographical and stratigraphical range or had been used in a wider sense thereby including several distinct lithostratigraphical units. He therefore proposed the

Burton Limestone, with Burton Cliff as its type locality, as a single lithostratigraphical unit covering all of the bioclastic limestones and subsidiary marl partings between the Astarte Bed (Bed 12) and the Zigzag Bed (Bed 17). Bed 13, beds 14–15 and Bed 16 are respectively the Third, Second and First beds of Buckman (1910a), and beds 14–15 are the Sponge Beds of Richardson (1928–1930). Bed 15 is particularly rich in calcareous sponges and Callomon and Cope (1995) referred to it as the Sponge Bed. Bed 14 is the type horizon of the ammonite *Parkinsonia* (*P.*) *bomfordi* Arkell, which gives its name to the youngest Bajocian subzone and is the index taxon of the youngest Bajocian ammonite biohorizon (Bj-28) (Callomon and Cope, 1995). The lower part of Bed 13 includes the Truellei Bed (Richardson, 1915) (13b above), which takes its name from the strigoceratid ammonite *Strigoceras truellei* (d'Orbigny). Its well-preserved fauna is the same as that of the Halfway House Fossil Bed (see Halfway House Cutting and Quarry GCR site report, this volume), which is the type horizon of the Truellei Subzone of the Upper Bajocian Parkinsoni Zone (Buckman, 1891; Arkell, 1951a). Some authors (e.g. Rioult *et al.,* 1991) have followed Richardson (1928–1930) by calling the whole of Bed 13 the Truellei Bed.

The Zigzag Bed (Bed 17) and The Scroff (Bed 18), the youngest beds of the Inferior Oolite Formation at this site, belong to the Lower Bathonian Zigzag Zone. The Scroff — the name given to a thin irony layer by the quarrymen who worked the Inferior Oolite Formation in quarries around the village of Burton Bradstock (Buckman, 1910a) — forms the reworked top of the Zigzag Bed, which, like the zone, takes its name from the perisphinctid ammonite *Zigzagiceras zigzag* (d'Orbigny). This taxon is itself named after its distinctive style of ribbing. As at Horn Park Quarry (see GCR site report, this volume), the Zigzag Bed includes all of the characteristic ammonites of the Zigzag Zone (Arkell, 1951a, 1958a; Torrens, 1974). All three of the latter's subzones (Convergens, Macre-scens and Yeovilensis) are condensed into the two beds, although the youngest (Yeovilensis) is also represented in the overlying Fuller's Earth Formation (Torrens, 1980b; Callomon and Cope, 1995).

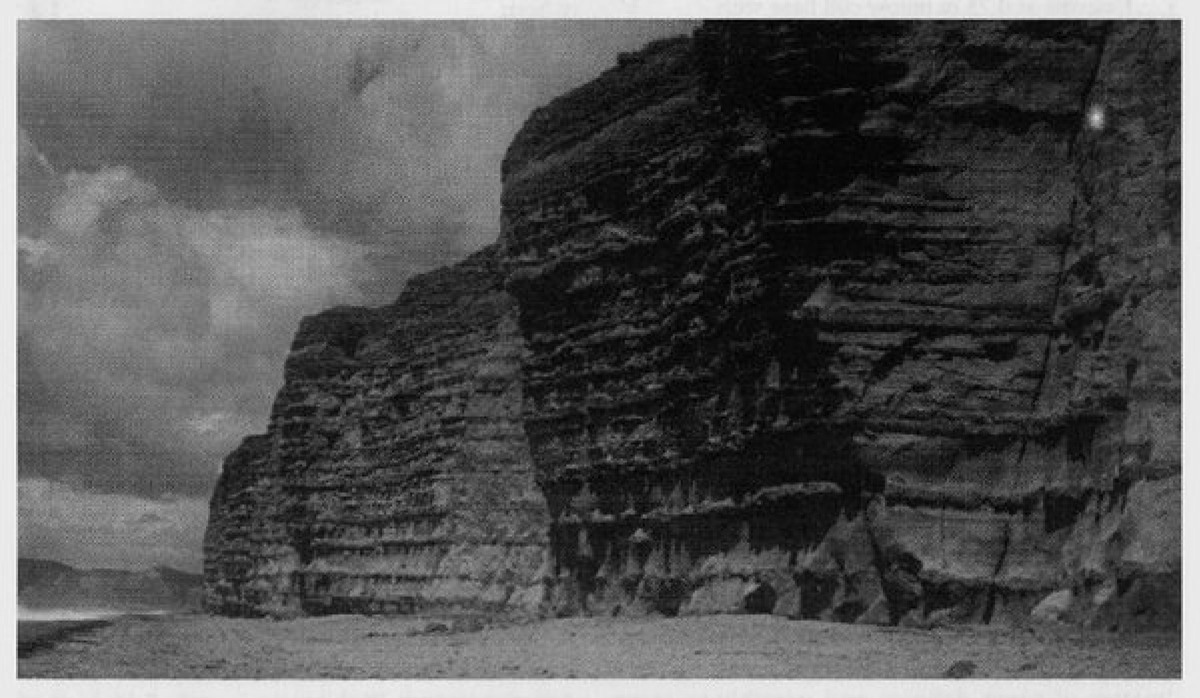
The succession at Burton Cliff featured in the sequence stratigraphical analysis of Rioult *et al.* (1991), which was based primarily on detailed bed-by-bed outcrop observation and sedimentological and biostratigraphical analysis, as well as comparison with similar data from the Normandy coast of France. They recognized sequence boundaries at the top of the Scissum Bed (base of Bed 7), at the top of the Red Bed (base of Bed 11) and at the base of the Bomfordi Subzone (base of Bed 14b); maximum flooding surfaces between the Snuff-box Bed and the Red Bed (base of Bed 9), possibly between the Astarte Bed and the Truellei Bed (*sensu* Richardson, 1928–1930; base of Bed 13) and between The Scroff and the Zigzag Bed (base of Bed 18); the Red Bed (beds 9 and 10) and possibly the upper part of the Truellei Bed (*sensu* Richardson, 1928–1930; upper part of Bed 13) as highstand systems tracts; the conglomeratic accumulation of rolled, worn ammonites in the Yellow Conglomerate (Bed 7) as a transgressive lag; and a transgressive surface between the Red Conglomerate and the Astarte Bed (base of Bed 12).

The probable palaeogeographical setting for the Inferior Oolite Formation of the Wessex Basin is an intrabasinal structural high distal to carbonate ramp facies developed around the London Platform and the Worcester Basin to the north (Hesselbo and Jenkyns, 1995). Some of the characteristic sedimentological features of the formation in Dorset and Somerset and their significance are discussed in the Seavington St Mary Quarry GCR site report (this volume).

Conclusions

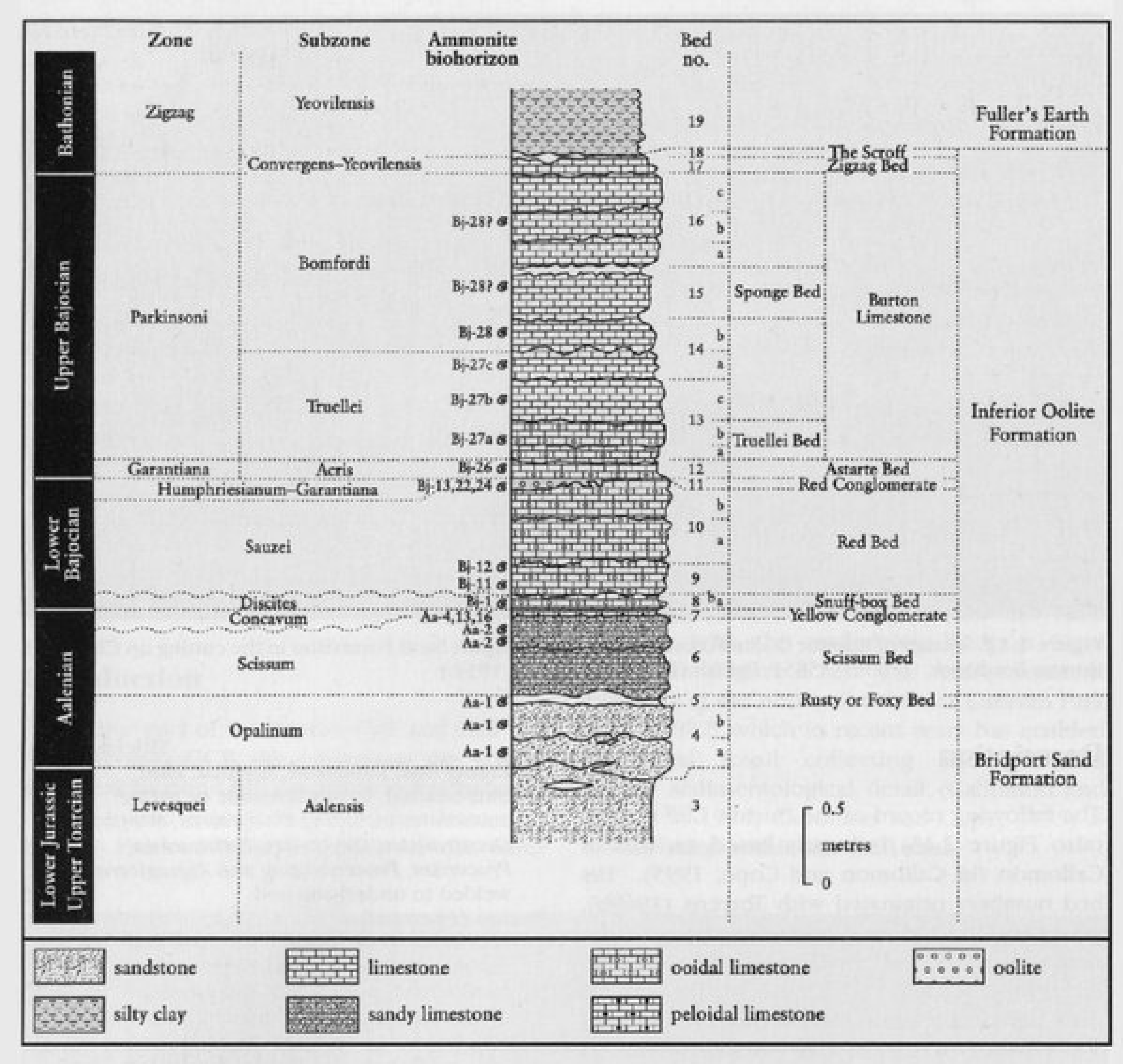
The coastal sections of Dorset are among the most famous Jurassic sections in the world. Burton Cliff is the best locality for studying the Inferior Oolite Formation, together with the underlying Bridport Sand Formation and is one of the most visited and studied Aalenian–Bajocian sites in Britain; it features extensively in the geological literature for over 100 years. Fallen blocks from high up in the cliff face enable the thin, highly fossiliferous and sedimentologically fascinating Aalenian–Bajocian succession to be examined on the beach. The rich ammonite faunas establish the zonal/ subzonal succession and, together with palaeontological and sedimentological data from other sites in the region, enable the complexities of the depositional history of the Aalenian–Bajocian stages in Wessex to be unravelled. The nearby Cliff Hill Road Cutting repeats the succession, which can be seen, when clear of vegetation, *in situ* at eye-level. This composite site is thus of regional, national and international importance in several fields of geological research.

References



(Figure 2.11) East end of Burton Cliff showing the Bridport Sand Formation capped by the Inferior Oolite Formation. (Photo: A5849, British Geological Survey, 1932.))

(Figure 2.12) Section of Inferior Oolite Formation capping Bridport Sand Formation in the cutting on Cliff Road, Burton Bradstock. (Photo: A5851, British Geological Survey, 1932.))



(Figure 2.13) Graphic section of the Inferior Oolite Formation at Burton Cliff, Burton Bradstock. (After Callomon and Cope, 1995, fig. 9.) For lithologies, see text.)

(Figure 2.14) Fallen block of the Snuff-box Bed showing cross-sections of the characteristic limonitic oncoids known as 'snuff-boxes'. (Photo: A5845, British Geological Survey, 1932.))