**Sedimentological descriptions and key ammonite records: Seavington St Michael exposure of Marlstone Rock Formation and Beacon Limestone Formation.**

*(50°56’17.45” N, 002°50’52.33” W, Great Britain Ordnance Survey Grid ST 40521 15757)*

Compiled by Kevin Page, edited & formatted by Ian Boomer.

*From Boomer et al., 2021. Faunal and stable-isotope characterization of the Toarcian Ocean Anoxic Event through a new carbonate-clastic sequence from Somerset, U.K. Geological Society Special Publication. Details TBC.*

[Silt, rusty coloured, possible Bridport Sand Formation remnant? (10-15 cm) with limestone rubble above (made ground)]

**BEACON LIMESTONE FORMATION, BARRINGTON MARL MEMBER**

**UPPER TOARCIAN**

**Bed SM35:** Marl, blocky, weathered a khaki colour (= decalcified continuation of SM34?).

**0.02-0.22 m**

(*Thouarsense Chronozone*, *including Fascigerum Subchronozone, Fascigerum Horizon*)

**Bed SM34:** Marl, brownish weathered with rounded and irregular nodules of silty limestone, pale buff coloured, with sandy textured weathered surface due to bioclastic content. Occasional belemnites, occasional ammonoids including *Esericeras* sp. in band at base. *Hammatoceras* sp. also present.

**0.2 m**

**Bed SM33:** Marl, grey where unweathered, occasional small (<2 cm) limestone nodules and occasional ammonites: *Esericeras* sp. (fragmentary) in top c. 2-3 cm.

(*Thouarsense Chronozone, Thouarsense Subchronozone, including Thouarsense Horizon*)

*Grammoceras* grp. *thouarsense* (D’Orbigny) and belemnites abundant, typically fragmentary, in lower c.3-4 cm.

**Total for SM33:** **0.05-0.1 m**

(*Thouarsense Chronozone, Bingmanni Subchronozone, Bingmanni Horizon*)

**Bed SM32:** Limestone, argillaceous, in thin lenticular nodules, and smaller nodules, locally with c.2cm grey marl at base (discontinuous); *Pseudogrammoceras* sp. cf. *bingmanni* (Denckmann) present.

**0-0.04 m**

(*Variabilis Chronozone, Illustris Subchronozone, including Phillipsi Horizon*)

**Bed SM31:** Marl/ argillaceous limestone, typically rusty weathered: ammonites include common *Haugia* sp. cf. *phillipsi* (Simpson), frequently with corroded surfaces and epifauna (serpulids, etc.) and rare *Phymatoceras* sp. *Osperlioceras* *bicarinatum* (Zieten) present, especially near base, and rare, ferruginous coated *Catacoeloceras* sp. cf. *dumortieri* (de Brun) and *Hildoceras semipolitum* Buckman at base (probably reworked):

 **up to 0.05 m**

(*Variabilis Chronozone, Variabilis Subchronozone, including Navis Horizon*)

**Bed SM30:** Limestone, crumbly and rubbly textured, chalky in places (e.g. due to weathering?): *Haugia* sp. cf. *phillipsi* with corroded surfaces and epifauna (serpulids, etc.) on surface and top 0.01 m Ammonoid fauna includes *Haugia* sp. cf. grp. *variabilis* (d’Orbigny), *Hildoceras* *semipolitum*, and rare *Osperleioceras bicarinatum*, *Catacoeloceras* sp. juv., *Phymatoceras* sp. and ?*Paroniceras* sp. juv. in uppermost c. 8-10 cm of SM30.

**LOWER TOARCIAN**

*(Bifrons Chronozone, Bifrons Subchronozone, Semipolitum Horizon*)

*Hildoceras* *semipolitum*, rare *Catacoeloceras* sp. juv., rare *Phymatoceras* sp. in lower c. 10cm of SM30. [*crassum-semipolitum* Biohorizon (To19), part]

**Total for SM30: 0.2 m**

**Bed SM29:** Limestone, argillaceous, harder than above and below, as double lenticular bands (continuous prior to weathering?): *Hildoceras* grp *semipolitum.* [*crassum-semipolitum* Biohorizon (To19)]

**0.08 m**

(*Bifrons Chronozone, Bifrons Subchronozone, Bifrons Horizon*)

**Bed SM28:** Limestone, crumbly and rubbly textured, chalky in places (e.g. due to weathering?) (as SM30): *Hildoceras angustisiphonatum* Prinz, ?*Harpoceras* sp. juv., *Catacoeloceras* sp. juv., ?*Mercaticeras* sp.. Belemnites present. [*crassum-bifrons* Biohorizon (To18)]

**0.2 m**

**Bed SM27b:** Limestone, argillaceous, harder than above, observed as discontinuous lenticles (due to weathering?): *Hildoceras angustisiphonatum* Prinz, *Harpoceras* *subplanatum* (Oppel), rare *Phymatoceras* sp. juv., *Phylloceras* sp*.*, *Porpoceras* sp. and ?*Mercaticeras* sp.. Belemnites, nautilid fragment and inoceramid bivalves also present. [*vortex* Biohorizon (To17), part?].

**(up to 5 cm)**

**Bed SM27a:** Limestone, argillaceous, continuous band with irregular top and base, observed as discontinuous lenticles where more weathered, separated from SM27b locally by marl seam (<2 cm) with *Harpoceras* (*H*.) *subplanatum* (Oppel) and *Hildoceras bifrons* (Bruguière) transitional to *H.* *angustisiphonatum* Prinz. SM27a characterised by many of ammonite shell fragments and ammonites embedded obliquely to bedding and with: *Hildoceras bifrons* (Bruguière) transactional to *H.* *angustisiphonatum* Prinz, *Harpoceras* (*H*.) *subplanatum* (Oppel), ?*Dactylioceras* sp., ?*Phymatoceras* sp.

 **(up to 6 cm)**

 **Total for SM27: 0.12 m**

**Bed SM26:** Marl, grey. Common *Hildoceras bifrons* (Bruguière), occasional *Harpoceras* (*H*.) *subplanatum* (Oppel) and rare *Phymatoceras* sp. and ?phylloceratid. Inoceramid bivalve present.

**0.02-0.05 m**

**Bed SM25:** Limestone, argillaceous, relatively hard, as continuous, tabular band with undulating top and base: *Hildoceras* grp. *bifrons* (Bruguière), *Harpoceras* sp., *Peronoceras* sp. juv.. Belemnites present.

 **0.02-0.06 m**

**Bed SM24:** Marl, grey: *Hildoceras* *bifrons.*

 **0.02-0.04 m**

**Bed SM23c:** Limestone, argillaceous, as irregular sub-continous band capping Bed SM23: *Hildoceras* grp. *bifrons.*

**(2-4 cm)**

(*Bifrons Chronozone, Bifrons Subchronozone, Apertum Horizon*)

**Bed SM23b:** Limestone, argillaceous, with elliptical intraclasts (up to c. 12 cm across), often enclosing ammonites (mainly *Hildoceras* cf. *apertum* (Gabilly)); typically reddish-brown coloured.

**(4-5 cm)**

**Bed SM23a:** Limestone, argillaceous, with some irregular partings along which the bed splits: *Hildoceras* *apertum*, *Harpoceras* (*H*.) *falciferoides* Buckman *sensu* Gabilly and *Dactylioceras* cf. *athleticum* (Simpson)sp. on base (junction with SM22), and within. *Peronoceras* sp. cf. *fibulatum* (J. de C. Sowerby) within. [*turriculatum* Biohorizon (To15), part?]

**(c.8 cm)**

**Total for SM23: 0.14-0.15 m**

**Bed SM22:** Marl, grey, with small argillaceous limestone lenticles and nodules (<6cm): *Hildoceras* *apertum* (common) with *Dactylioceras* sp. cf. *athleticum* (Simpson), *Harpoceras* (*H*.) *falciferoides* Buckman *sensu* Gabilly and rare *Frechiella subcarinata* (Young and Bird), *Pseudolioceras lythense* (Young and Bird) and *Phylloceras* sp.. [*athleticum* Biohorizon (To14), part]

**0.04-0.06 m**

**Bed SM21:** Limestone, argillaceous, as strong ?continuous band: *Hildoceras* cf. *apertum* on upper surface.

(*Bifrons Chronozone, Sublevisoni Subchronozone,* Lusitanicum Horizon)

*Hildoceras lusitanicum* Meister on lower surface. *Dactylioceras* (*D*.) grp. *athleticum* (Simpson) within. [*athleticum* Biohorizon (To14), part

**Total for SM21:** **0.06-0.08 m**

**Bed SM20c:** Marl, grey, with small argillaceous limestone nodules (<2cm): *Hildoceras* (*Hi*.) *lusitanicum* (abundant), *Dactylioceras* (*D*.) grp. *athleticum* (Simpson) (common) also *Nodicoeloceras* sp., *Harpoceras* (*H*.) grp. *falciferoides* Buckman *sensu* Gabilly and rare *Phylloceras* sp. and *Lytoceras* sp.. [*athleticum* Biohorizon (To14), part]

 **(3-4 cm)**

(*Bifrons Chronozone, Sublevisoni Subchronozone, Tethysi Horizon*)

**Bed SM20b:** Limestone, argillaceous, as discontinuous band of irregular surfaced lenticles in grey marl: *Hildoceras* sp. cf. *tethysi* (Geczy), *Harpoceras* (*H.*) sp., *Nodicoeloceras* sp.. [*athleticum* Biohorizon (To14), part]

**(0-5 cm)**

**Bed SM20a:** Marl, grey, with small argillaceous limestone nodules (<2cm): *Hildoceras* sp. cf. *tethysi* (Geczy), *Dactylioceras* (*D*.) grp. *athleticum* (Simpson), *Nodicoeloceras* sp.. [*athleticum* Biohorizon (To14), part]

**(2-8 cm)**

 **Total for SM20: c.0.12-0.15 m**

**Bed SM19c:** Limestone, argillaceous, in solid bed with discontinuous marl partings near middle: *Hildoceras* *tethysi* on surface, within and on base, also *Harpoceras* (*H*.) grp. *falciferoides sensu* Gabillyand *Dactylioceras* sp..

**(1-5 cm)**

**Bed SM19b:** Marl, grey, as thin seam: *Hildoceras* *tethysi* (Geczy).

**(c.1 cm)**

(*Bifrons Chronozone, Sublevisoni Subchronozone, Sublevisoni Horizon*)

**Bed SM19a:** Limestone, argillaceous, in solid bed with discontinuous marl partings near middle, rubbly in part with some rusty staining, common intraclasts in lower part of bed: *Hildoceras sublevisoni*, *Dactylioceras* (*D*.) cf. grp. *commune* (J. Sowerby), *Nodicoeloceras* sp. and *Harpoceras* (*H*.) grp. *falciferoides sensu* Gabilly. [*commune* Biohorizon (To13), part]

**(c.16 cm)**

 **Total for SM19: c.0.3-0.31 m**

**Bed SM18:** Marl, grey, with small argillaceous limestone nodules (<2cm), apparently passing laterally (to south) to rubbly limestone.*Hildoceras* grp. *sublevisoni* Fucini abundant, frequent *Harpoceras* (*H*.) grp. *falciferoides* Buckman *sensu* Gabilly, also *Nodicoeloceras* sp., *Dactylioceras* (*D*.) sp. frequent; rare *Ovaticeras ovatum* (Young and Bird). [*ovatum* (To12) Biohorizon]

**0.04-0.07 m**

(*Serpentinum Chronozone, Falciferum Subchronozone, Douvillei Horizon*)

**Bed SM17b:** Limestone, argillaceous, grey, weathering paler, with associated grey marl, disappears laterally; rusty blebs suggests former presence of small pyrite ?nodules. Large *Harpoceras* (*H*.) *falciferoides* Buckman *sensu* Gabilly frequent, including broken fragments, also *Hildoceras* (*Orthodactylites*) grp *douvillei* (Haug), *Dactylioceras* sp. and *Nodicoeloceras* sp.. Crinoid fragments frequent on surface of bed.

**(0-5 cm)**

**Bed SM17a:** Limestone, argillaceous, pale grey, weathering to pale buff colour, easily recognisable as a continuous and relative thick and hard band in exposures. Base ‘lumpy’ due to limestone intraclasts, (generally <1.5 cm), some pale brownish (?phosphatic). A few similar intraclasts scattered higher in bed. Top only slightly irregular. *Dactylioceras* etc present including as intraclasts; large *Harpoceras* (*Ha*.) *falciferoides* Buckman *sensu* Gabilly common especially neat top.

**(c.15 cm)**

 **Total for SM17: 0.15-0.2 m**

**Bed SM16:** Nodular grey marl, with some layers dominated by argillaceous limestone nodules (whitish weathering) up to around 10cm in diameter (some levels intraclastic), but often much smaller; other layers marl dominated: such bands do not appear to be laterally continuous: *Harpoceras* (*H*.) grp *falciferum* (J. Sowerby) [M] and [m] common in lower c. 20 cm of SM16 [*falciferum* Biohorizon (To11), part] , with *Harpoceras* (*H*.) *falciferoides* *sensu* Gabilly in topmost c. 10cm. *Dactylioceras* common throughout with rare *Polyplectus* (*Praepolyplectus*) sp. at c.15 cm above base.

**0.3 m**

**Bed SM15c:** Limestone, argillaceous, whitish in appearance. Irregular bedding reflects nodular texture. Conspicuous in exposures as solid, bank of pale limestone.Top surface marked by rusty seam (formerly pyritic?), at least locally. *Harpoceras* (*H*.) grp *falciferum* and *Dactylioceras* (*D*.) common. *Hildaites* sp. (= “*Hildoceras lusitanicum*” Meister” *sensu* Howarth, part) in lowest c. 7 cm. [*falciferum* Biohorizon (To11), part]

**(c. 44 cm)**

**Bed SM15b:** Grey marl with small argillaceous limestone nodules, sub-continuous band: *Harpoceras* (*H*.) grp *falciferum*. [*falciferum* Biohorizon (To11), part]

**(up to 4 cm)**

**Bed SM15a:** Limestone, argillaceous, pale grey, weathering to pale buff colour/ whitish; some fine shell debris (e.g. <2mm); apparently as continuous band with uneven top and base. Large *Harpoceras* (*H*.) grp *falciferum* [M] common, *Hildaites* sp. (= “*Hildoceras lusitanicum*” *sensu* Howarth, part), rare *Polyplectus* (*Praepolyplectus*) sp. aff. *pleuricosta* (Haas). Belemnites present. [*falciferum* Biohorizon (To11), part]

 **(4-5 cm)**

 **Total for SM15: c.0.5-0.52 m**

**Bed SM14**: Marl, grey with irregular limestone lenticles (weathering pale buff colour) passing laterally into marl with small (e.g. <2 cm) nodules. Small ammonites (*Dactylioceras*, *Nodicoeloceras*, *H.* (*Harpoceras*) grp. *falciferum* (including [m]) abundant with common larger *Harpoceras* (*H*.) grp *falciferum* [M], occasional Hildaites sp. aff. *serpentiniformis* Buckman [*falciferum* Biohorizon (To11), part] (upper c. 12 cm of SM14).

(*Serpentinum Chronozone, Falciferum Subchronozone, Pseudoserpentinum Horizon*)

Grey marl, with small limestone nodules, passing from top of Bed SM13, below: occasional *Harpoceras* (*H*.) *pseudoserpentinum* Gabilly, abundant *Nodicoeloceras* sp. and *Dactylioceras* sp.; rare *Hildaites* cf. *serpentiniformis*, rare *Polyplectites* (Praepolyplectus) sp. aff. *pleuricosta*. [*pseudoserpentinum* Biohorizon (To10), part] (basal c. 3 cm of SM14).

**Total for SM14: c.0.14 m**

**Bed SM13:** Limestone, argillaceous, weathering to pale buff colour. Lower surface uneven, top surface relatively level. Common *Nodicoeloceras crassoides* (Simpson) *sensu* Howarth, including on base and obliquely embedded, and *Dactylioceras* (*D*.) sp., occasional *Harpoceras* (*H*.) *pseudoserpentinum* Gabilly. [*pseudoserpentinum* Biohorizon (To10), part]

**0.06-0.08 m**

(*Serpentinum Chronozone, Exaratum/Elegantulum Subchronozone, Strangewaysi Horizon*)

**Bed SM12b:** Marl, grey with scattered small argillaceous limestone nodules (<1cm) and occasional larger lenticles, (up to 3x6 cm thickness by width): *Dactylioceras* common in top 2-3 cm, with *Nodicoeloceras* cf. *crassoides* *sensu* Howarth and *Harpoceras* (*Harpoceratoides*) sp. (transistional to *H*. (*Harpoceras*) *pseudoserpentinum*).

**(c.12 m)**

**Bed SM12a:** Discontinuous band of irregular, elongated argillaceous limestone lenticles, weathering to pale buff colour, passing laterally to marl: *Harpoceras* (*Harpoceratoides*) sp. (transistional to *H*. (*Harpoceras*) *pseudoserpentinum*).

**(0-6 cm)**

 **Total for Bed SM 12: 0.12-0.2 m**

**Bed SM11b:** Band of irregular, elongated argillaceous limestone lenticles: rare *Phylloceras* sp..

**(0-4 cm)**

**Bed SM11a:** Band of irregular, elongated argillaceous limestone lenticles - laterally passing into smaller nodules; separated from SM 11b, where developed, by c.2 cm marl: *Dactylioceras* sp. (similar to SM10b).

**(0-4 cm)**

 **Total for Bed SM11: 0.01 m**

**Bed SM 10c:** Marl, grey: *Hildaites* sp**.**

**(8 cm)**

**Bed SM 10b:** Band of welded-together small limestone nodules, pale buff colour (c.1-2cm+), sometimes separable into an upper and lower band. Abundant *Dactylioceras* sp. (including ‘*Rakusites’*), occasional *Harpoceras* (*Harpoceratoides*) grp. *serpentinum* (Schlotheim), *Hildaites* sp. and *Cleviceras elegans* (J. Sowerby). [*elegans* Biohorizon (To9), part]

**(1-3 cm)**

**Bed SM 10a:** Marl: *Harpoceras* (*Harpoceratoides*) grp. *serpentinum*. [*elegans* Biohorizon (To9), part]

 **(c. 13 cm)**

 **Total for Bed SM10: c.0.22 m**

**Bed SM9:** Limestone, argillaceous, weathering to pale buff colour – some shell fragments up to a few mm across. Top surface ‘lumpy’, including pale brownish grey intraclasts up to 1 cm. Base uneven, including external mould of*Harpoceras* (*Harpoceratoides*) grp. *serpentinum* [M]. [*elegans* Biohorizon (To9), part]:

**c.0.09 m**

**Bed SM8d:** Sub-continuous band of welded-together small limestone nodules, pale buff colour. [*elegans* Biohorizon (To9), part]

**(1 cm)**

**Bed SM8c:** Marl, grey: *Harpoceras* (*Harpoceratoides*) grp. *serpentinum.* [*elegans* Biohorizon (To9), part]

 **(8-10 cm)**

**Bed SM8a:** Discontinuous band of welded-together small limestone nodules, pale buff colour (similar to SM10b). [*elegans* Biohorizon (To9), part]

**(0-10 cm)**

**Bed SM8a:** Marl, grey with common *Harpoceras* (*Harpoceratoides*) grp. *serpentinum* [M] body chambers and more rarely inner whorls. [*elegans* Biohorizon (To9), part]

**(7-8 cm)**

 **Total for Bed SM8: c.0.2 m**

**Bed SM7:** Limestone, argillaceous, weathering to pale buff colour. Lower surface gently undulates with some surface irregularities and occasional external moulds of *Harpoceras* (*Harpoceratoides*) grp. *serpentinum* (Reinecke) [M]; top with ‘knobbly’ texture. 2 cm band of pale slightly brownish-grey limestone (?phosphatic) intraclasts up to 1.5 cm in diameter present 5cm above base, at least locally. *Harpoceras* (*Harpoceratoides*) grp. *serpentinum* [M] common and characteristic on top surface, also within bed and occasionally on lower surface. Occasional *Cleviceras* *elegans* (J. Sowerby), *Dactylioceras* (*Orthodactylites*) *semmiannulatum* Howarth , *Nodicoeloceras* sp. and *Hildaites* sp. present. [*elegans* Biohorizon (To9), part]

**0.05-0.08 m**

**Bed SM6b:** Marl, pale grey with abundant limestone ‘pellets’ (typically <2 cm) marking base: *Harpoceras* (*Harpoceratoides*) grp. *serpentinum*, *Nodicoeloceras* sp. and rare *Cleviceras* *elegans*, also occasional small brachiopods

**(6-8 cm)**

**Bed SM6a:** Marl, in part grey including brown seam: latter includes common fish debris (<2 mm): abundant crushed *Harpoceras* (*Harpoceratoides*) sp. cf. *kisslingi* Hug and occasional *Cleviceras* cf. *exaratum* (Young and Bird), *Hildaites* sp. and *Dactylioceras* sp.. Small bivalves, rare brachiopods and echinoid spine present. [*exaratum* Biohorizon (To8), part]

**(2-3 cm)**

 **Total for Bed SM6: c. 0.1-0.11 m**

**Bed SM5:**Band of frequently ovoid limestone nodules: fine grained, micritic with some <0.5mm shell fragments and other scattered shell fragments (bivalve?). Externally pale buff colour with pale grey unweathered cores. Marl between indistinguishable from Beds SM4d-6a: *Harpoceras* (*Harpoceratoides*) sp. cf. *kissingli* , rare *Cleviceras* cf. exaratum and *Hildaites murleyi* (Moxon) *sensu* Howarth, dactylioceratid. Carbonised wood fragment also present. [*exaratum* Biohorizon (To8), part]

**0-0.05 m**

**Beds SM4d:** Marl, grey where least weathered. [*exaratum* Biohorizon (To8), part]

**(5-6 cm)**

**Bed SM4c**: Greenish-grey marl (pale grey when dry), with abundant crushed ammonites from around 0.1 to 0.19 m above base of Bed SM4 (some have ochreous coatings and where least weathered powdery black coatings, suggesting former presence of pyrite): *Harpoceras* (*Harpoceratoides*) sp. cf. *kisslingi* (abundant), *Cleviceras exaratum* (Young and Bird (occasional) and *Hildaites* grp. *levisoni* (Simpson) (rare). Also bivalve fragments including inoceramid [To8: *exaratum* Biohorizon, part]

**(c.13 cm)**

(*Serpentinum Chronozone, Exaratum/Elegantulum Subchronozone, including Elegantulum Horizon?*)

**Bed SM4b**: Marl, greenish-grey, typically heavily stained/replaced by yellow iron oxides (i.e. formerly pyrite rich?). Occasional belemnites and very rare ammonites including crushed ?*Elegantuliceras* sp., (at c. 0.05 m above base of SM4) and *Harpoceras* (*Harpoceratoides*) sp. (fragment) [*elegantulum*) Biohorizon? (To9)]

**(7-8 cm)**

(*Tenuicostatum Chronozone, Semicelatum Subchronozone, Semicelatum Horizon*)

**Bed SM4a:** Marl, greenish grey, ‘speckled’, passing from Bed S3 below. Patches of broken ammonites locally present: *D.* (*Orthodactylites*) cf. *semicelatum* (Simpson).

**(3-4 cm)**

 **Total for Bed SM4: c. 0.3 m**

**MARLSTONE ROCK BED FORMATION** (part)

(*Tenuicostatum Chronozone, including Paltum Subchronozone, Paltum Horizon*)

**Bed SM3**: Limestone, marly and sandy limestone with distinctive ‘flecked’ appearance; occasional belemnites, mainly on lower surface and shell fragments (bivalve?). Rare *Dactylioceras* (*Eodactylites*) sp.cf. *pseudocommune* Fucini on top surface with *D*. (*E*.) sp. juv. within Bed; small fragment of *Pleuroceras* sp cf. grp *hawskerense* (Young and Bird) present in lower part of Bed (i.e. derived):

 **0.05-0.08 m**

**UPPER PLIENSBACHIAN-LOWER TOARCIAN**

*(Spinatum Chronozone, Hawskerense Subchronozone*)

**Bed SM2**: Sand, friable and marly where unweathered, but typically developing a deep reddish-brown colour. Belemnites (*Passaloteuthis*) abundant (including in pockets in irregularities in the top of Bed S1), some broken and corroded. Calcitic bivalves and brachiopods present as SM1: *Pleuroceras* ex grp *hawskerense* (Young and Bird) also present.

**c. 0.02-0.15 m**

**UPPER PLIENSBACHIAN**

(*Spinatum Chronozone,* including *Hawskerense* and *Apyrenum subchronozones?*)

**Bed SM1**: Limestone, hard sandy, and massive: bioclastic calcarenite. Extracted on site as large, coherent blocks, occasionally with discontinuous sandy/ marly partings within. Typically, a pale sandy to pale grey colour when freshly broken, but surfaces weathered to a dark, reddish brown. Top surface of Bed SM12 is irregular and conspicuous on loose blocks, especially as patches of bivalves, belemnites and brachiopods are abundant. The irregularities appear to represent intraclastic cobbles up to around 20 cm across and 10 cm thick of identical lithology to the rest of the Bed (although the edges of the cobbles are often cryptic when seen in contact with the rest of SM1 below). In contrast, the lower surface of the Bed shows only minor irregularities, but does show frequent belemnites and other shells, and suggests the presence of a soft marl/ sandy band immediate below (but not seen in any exposures). The abundant fauna includes large *Pseudopecten* *aequivalvis* (J. Sowerby) and other bivalves including *Pleuromya*, Entolium, Oxytoma and ‘Chlamys, with brachiopods (including *Tetrarhychia tetrahedra* (J. Sowerby) and *Lobothyris puctata* (J. Sowerby)), belemnites (*Passaloteuthis*) and rare gastropods. Infrequent ammonites include *Pleuroceras* sp. from within the unit and ‘*Pl. spinatum* (Bruguière)’ *sensu* Howarth (1958) associated with the intraclastic cobbles at the top.

 **Up to 0.8 m** **seen**

(N.B. the Formation may reach 2-2.5 m in the immediate area; Boomer et al. 2009)