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# Troll Quarry, Dorset

[ST 594 127]

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## Introduction

Troll (sometimes known as 'Trill') Quarry, Thornford, near Sherborne, Dorset, is a famous Middle Jurassic locality where the Fuller's Earth Rock Member was once worked (Woodward, 1894; Richardson *et al.*, 1911; Buckman, 1921). First described in some detail by Buckman (1927a), the quarry yielded a distinctive ammonite fauna, almost exclusively of the cadicone genus *Tulites*. Such ammonites are a characteristic element of the Fuller's Earth Rock Member fauna in southern England, and Woodward (1894) termed this interval the 'zone of *Amm. subcontractus*' after one of the most common species (Figure 2.24). The Fuller's Earth Rock Member in the Sherborne area is one of the most ammonitiferous developments of rocks of this age known in Europe (Torrens, 1974), and Troll Quarry is now well established as the type locality of the Middle Bathonian Subcontractus Zone as used throughout Europe today (Torrens, 1980b). The quarry was visited by L. Richardson and W.J. Arkell in 1931. The manuscript containing their measured section is held in the Arkell archives at the University Museum Oxford and was reproduced by Torrens (1966). When the quarry ceased working, it became overgrown and degraded but, in 1964, a magnificent new section (Figure 2.25) became available when the old quarry was re-excavated during construction of a new sewage works immediately to its east, and many more ammonites were collected (Torrens in House, 1965). This section revealed a greater thickness of strata than had ever been recorded in the old quarry workings (Torrens in House, 1965; Torrens, 1969a, 1974).

## Description

The following section is based on Torrens (1966, 1974) and relates to the most westerly face of the extended exposure seen during construction of the sewage works in 1964. The section became degraded and overgrown; in 1992, English Nature (unpublished records) reported no exposure within the site.

	Thickness (m)
22: Soil	0.23
<b>Fuller's Earth Formation</b>	
<b>Fuller's Earth Rock Member</b>	
<i>Thornford Beds</i>	
21: Marl; <i>Pholadomya lirata</i> (J. Sowerby)	0.15
20: Limestone, impersistent; <i>Tulites</i> ; <i>Pholadomya lirata</i>	0.075
19: Marl; <i>Tulites</i>	0.15–0.23
18: Limestone, variable; <i>Tulites</i> (macroconch and microconch); nautiloid; <i>Pholadomya lirata</i>	0.075–0.15
17: Clay, marly with thin limestone towards base; <i>Tulites</i> ; <i>Pholadomya lirata</i>	0.38–0.46
16: Limestone, variable; clusters of <i>Rhynchonelloidella</i> ; <i>Pholadomya lirata</i>	up to 0.15
15: Marl; <i>Tulites</i> ; <i>Pholadomya lirata</i>	0.15
14: Limestone; <i>Tulites</i> ; marl parting at base	0.075–0.13
13: Limestone; <i>Tulites</i> ; clusters of <i>Rhynchonelloidella</i> ; belemnite fragments; very irregular base	up to 0.10

12: Marl; divided about the middle by impersistent, rubbly limestone; <i>Catinula</i> , <i>Pholadomya lirata</i> , <i>Pleuromya</i> cf. <i>alduini</i> (Brongniart); belemnite fragments; <i>Pleurotomaria</i> cf. <i>cotswoldensis</i> Cox and Arkell (some bored); <i>Rhynchonelloidella</i>	0.38
11: Limestone	0.075
10: Limestone	0.23
9: Marl; <i>Pholadomya lirata</i>	0.23–0.25
8: Limestone; marl parting at base	0.10
7: Limestone, prominent	0.36
6: Limestone	0.15
5: Limestone, soft and marly	0.075
4: Limestone	0.30
3: Limestone, soft and marly	0.075
2: Limestone, blue-hearted, hard	0.30
<b>Lower Fuller's Earth Member</b>	
1: Clay, compact, dark-blue where unweathered; belemnite fragment	0.30

According to Torrens (1966), individual beds of the Fuller's Earth Rock Member here, which totalled about 3.8 m, could only be clearly differentiated where weathered. In particular, beds 9–12 were barely separable where fresh. In addition to the fauna given above, Torrens (1966) also reported ex-situ occurrences of the oppeliid ammonite *Oecotraustes* and the bivalves *Camptonectes* cf. *laminatus* (J. Sowerby), *Entolium corneolum* (Young and Bird) and *Trigonia elongata* (J. de C. Sowerby); the ammonites were occasionally seen encrusted with serpulids and oysters. Other references to this site (Arkell, 1939a; Kellaway and Wilson, 1941; Wilson *et al.*, 1958; Torrens in House, 1965; Torrens, 1969a) add no further lithological or faunal detail except to record the bivalve *Meleagrinnella*. According to Muir-Wood (1936), brachiopods are rare at Troll Quarry and differ from those of any other Fuller's Earth Rock Member locality in being dwarf or immature forms (but see also Goathill GCR site report, this volume). Most of the specimens, amongst which she identified *Rugitela cadomensis* (Eudes-Deslongchamps) and the new species *Ornithella haydonensis*, *Rhynchonelloidella wattonensis* and *Kallirhynchia platiloba*, are poorly preserved. Her record of *Rugitela* was challenged by Torrens (1966).

## Interpretation

In Dorset and Somerset, Buckman (1918, 1921) recognized an upper division of the Fuller's Earth Rock Member, which he termed the 'Milborne Beds', and a lower division that he termed the 'Thornford Beds'. The latter was based on the beds exposed in Troll Quarry. The Milborne Beds were described as brown (iron-shot) limestones, and the Thornford Beds as whitish, chalky limestones. Although Arkell (in Donovan and Hemingway, 1963; Arkell, 1933) considered these subdivisions to be unnecessary and not well founded, accusing Buckman of not 'describing a single section in support of his conclusion', the terms are still used today. In fact, the Milborne Beds are the more widespread facies; the major part of the Fuller's Earth Rock Member throughout the main escarpment of Somerset is classified as such (Arkell, 1933) (see (Figure 2.4)). Torrens (1966) clarified their definition according to which they comprise the thick limestone beds that lie between the Acuminata Beds (Lower Fuller's Earth Member) below and the Ornithella Beds above, north of Milborne Port. Their upper and greater part typically consists of thick courses of brown, often very shelly, limestones, and the lower part consists of marls with occasional beds of soft limestone. Large bivalve casts are common, and simple corals are common towards the base of the upper part. The Thornford Beds are more restricted; indeed, the only locality where Buckman recognized them was Troll Quarry and, according to Arkell (1933), it was the only exposure of the Fuller's Earth Rock Member that Buckman ever described from first-hand experience (in 1921, with additions in 1927a). Arkell (1933) recognized that the Fuller's Earth Rock Member here was 'certainly peculiar' and concluded that Troll Quarry apparently afforded a glimpse of beds that are not developed in fossiliferous facies anywhere along the Somerset outcrop. He agreed with Buckman that the Thornford Beds, of which Troll Quarry is the type locality, appeared to be on a somewhat lower horizon than most of the ordinary Fuller's Earth Rock Member or Milborne Beds. In fact, they are largely contemporaneous but the upper part of the Milborne Beds is younger than any part of the Thornford Beds (Torrens,

1966).

The definition of the Thornford Beds was clarified by Torrens (1966). Typically, they comprise whitish, chalky limestones separated by beds of grey-white marl. The limestones may be massive and occur in thick, compact courses. Softer marly beds are developed in the lower part. Apart from the ammonite fauna discussed below, the most common fossil is the bivalve *Pholadomya lirata*; the brachiopod fauna is mainly dwarfed.

Where complete, the Thornford Beds are overlain by the easily distinguished rubbly, brown-weathering, brachiopod-rich Linguifera Bed (see Goathill GCR site report, this volume). Buckman (1927a) recognized a specific 'Rhynchonella Bed' and 'Pholadomya Bed' within the Thornford Beds at Troll Quarry. These stratal terms were sanctioned by Arkell (in Donovan and Hemingway, 1963) but Torrens (1966) recommended that they should be abandoned because the fossils, after which they were named, were not restricted to any particular bed. The large 'myid' bivalves of the genus *Pholadomya* ranged from the base of Bed 9 up to Bed 21, and rhynchonellid brachiopods occurred in clusters in both beds 13 and 16, as well as individually in other beds.

Although, as a whole, the beds at Troll Quarry are monotonous and poorly fossiliferous, they have yielded an interesting ammonite fauna that Buckman (1927a) described as 'almost, if not quite, unique in England'. According to Torrens (1974), many English museums hold ammonites obtained from here between 1885 and 1945. Buckman (1923a, pls 338A, 367–371) figured several, amongst which he recognized a number of tulitid genera: *Pleurophorites*, *Rugiferites*, *Sphaeromorphites* and *Tulophorites*. By comparing the matrix of the specimens with his measured section, he ordered these, together with the genus *Madarites*, into a possible sequence. Buckman (1927a) conceded that this might well be an unreliable method of establishing the ammonite succession; Arkell (1933) confirmed this by reporting *Sphaeromorphites in situ* within the top metre of the section whereas Buckman had deduced this genus to belong to the lowest beds. Arkell (1933) concluded that the peculiar ammonites here probably lived contemporaneously and together formed a single 'launizone'. Later, Arkell (1951–1958) figured other ammonite specimens from Troll Quarry that led Torrens (1974) to comment, when he proposed the site as type locality of the Subcontractus Zone, that it made an ideal type section because its fauna was so well documented. Almost all of the tulitid ammonites recorded from Troll Quarry are now assigned to the genus *Tulites*. Over a hundred specimens were collected when the section was re-excavated for the sewage works in the 1960s. The great majority of these are macroconchs, which outnumber microconchs by over 100 to 2; for the latter, Torrens (1970) proposed the name *Trolliceras*, after this locality. The lowest in-situ occurrence of *Tulites* is Bed 13 but Torrens (1974) considered that there was no doubt, from the matrix of loose specimens, that the genus ranged lower. He recommended that the base of the Subcontractus Zone should be drawn at the base of Bed 2; the top of the zone was not seen. According to Page (1996a), most of the nominal species described from Troll Quarry can probably be placed in synonymy. They include *Tulites calvus* (S.S. Buckman), *T. glabretus* (S.S. Buckman), *T. modiolaris* (Wm Smith), *T. praeclarus* (S.S. Buckman), *T. pravus* (S.S. Buckman), *T. pumilus* (Arkell), *T. reuteri* (Arkell), *T. sphaeroidalis* (S.S. Buckman), *T. subcontractus* (Morris and Lycett) and *T. tulotus* (S.S. Buckman). *Bullatimorphites rugifer* (S.S. Buckman), *B. polypleurus* (S.S. Buckman) and ?*B. pleurophorus* (S.S. Buckman) are also present. Torrens' (1966) preferred name for the macroconchs was *T. modiolaris*. Page (1996a) considered it likely that more than one ammonite faunal horizon was present but this could not be demonstrated because none of the many type ammonites described from the quarry by Buckman (1909–1930) and Arkell (1951–1958) had any associated stratigraphical information.

The Fuller's Earth Rock Member can be traced continuously from north of Bath to just southwest of Yeovil where it dies out and is probably replaced laterally by clay. Troll Quarry is sited near this southern limit. The cadicone–sphaerocone tulitids also die out where the limestone facies passes into clay that led Torrens (1967, 1969b, 1974) to suggest that they may have been somewhat facies-dependent. However, later (Torrens, 1980b), he suggested that this problem had probably been overstated.

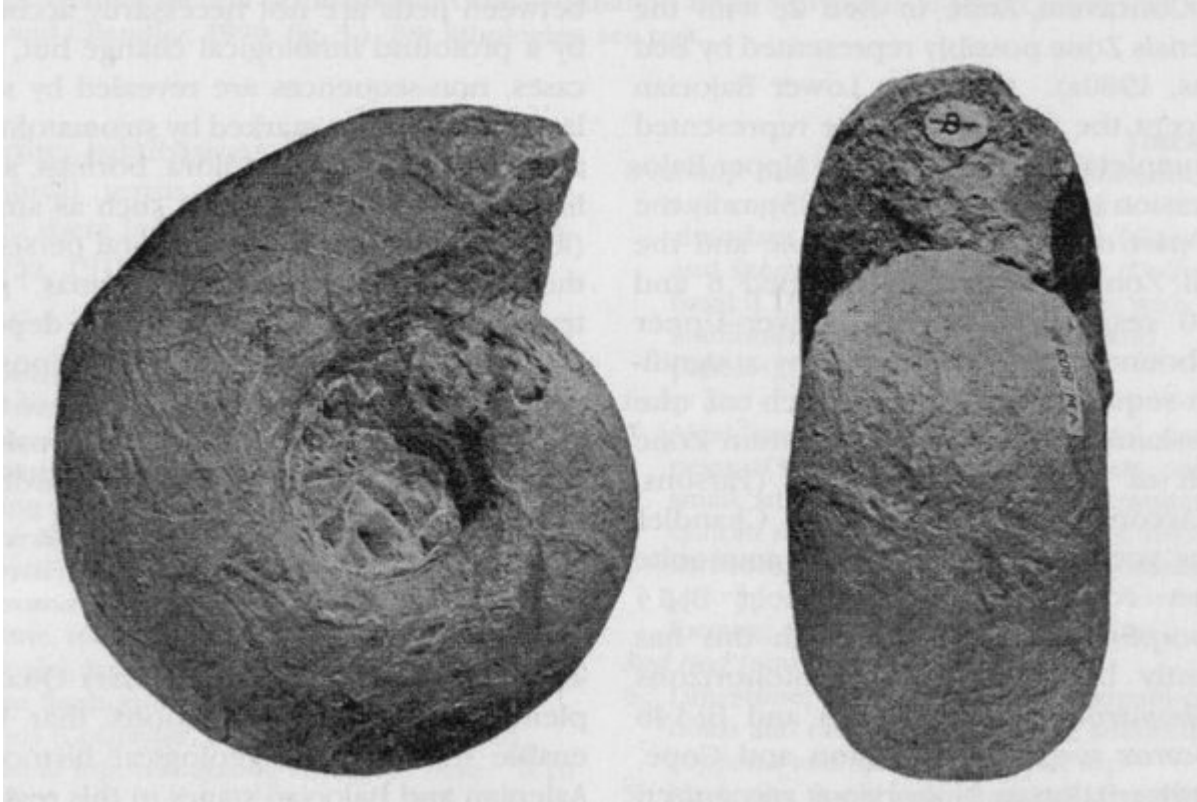
## Conclusions

The Fuller's Earth Rock Member in Dorset and Somerset shows one of the best developments of Middle Bathonian rocks in Europe. The section at Troll Quarry provides the type locality for the Subcontractus Zone, which can be recognized

throughout Europe, as well as the Thornford Beds, a local facies of the Fuller's Earth Rock Member.

The zonally diagnostic tulitid ammonite fauna recovered from Troll Quarry in the past has been well described and illustrated in the published literature. The site is thus a most important one for regional, national and international correlation.

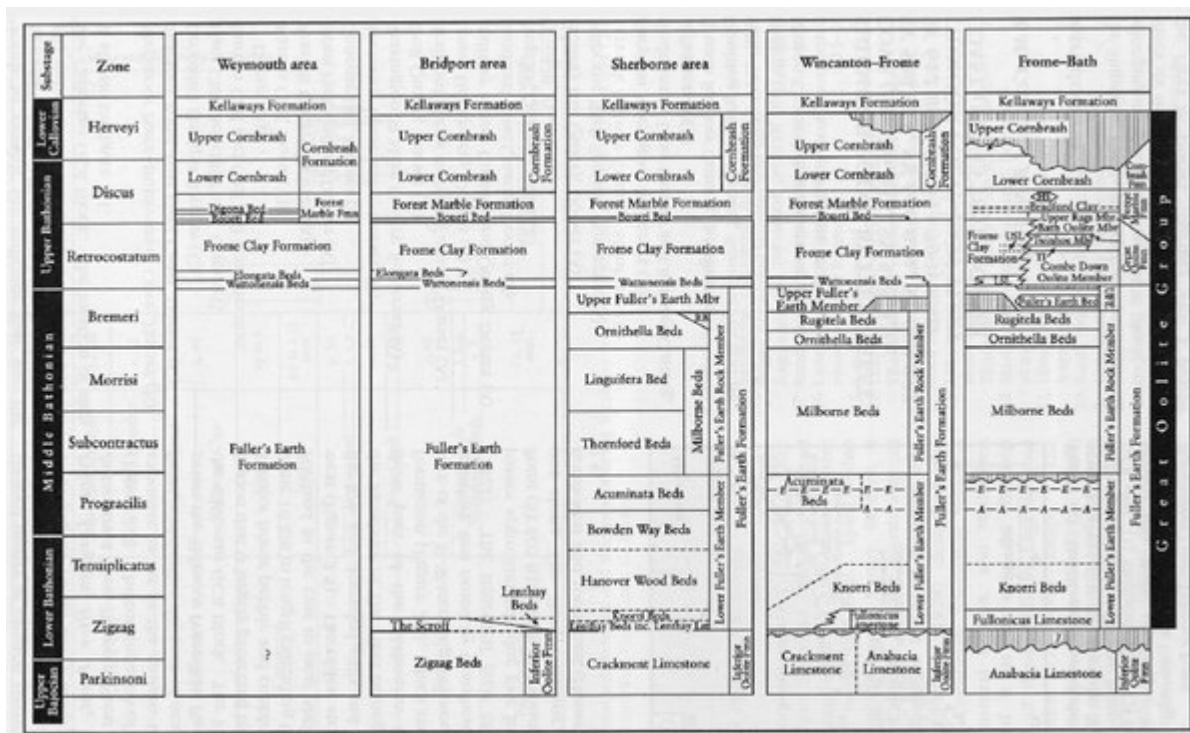
### References



(Figure 2.24) *Tulites subcontractus* (Morris and Lycett) from the Fuller's Earth Rock Member of Troll Quarry as figured by Arkell (1952, text-fig. 30). The specimen is shown at c. 75% natural size.)



(Figure 2.25) The main face at Troll Quarry, as exposed in 1964. (Photo: H.S. Torrens.)



(Figure 2.4) Lithostratigraphical classification of the Great Oolite Group in the Wessex region. Vertical ruled lines indicate non-sequence. (Based on data in Penn and Wyatt, 1979; Torrens, 1980b; Page, 1989, 1996a; Bristow et al., 1995, 1999; and Wyatt, 1998.) (-E-E-E-E- = Echinata Bed; -A-A-A-A- = Acuminata Bed of Penn and Wyatt (1979); HS = Hinton Sand Member; LSL = Lower Smithi Limestone; RB = Rugitela Beds; TI = Twinhoe Ironshot; UFE = Upper Fuller's Earth Member; USL = Upper Smithi Limestone.))