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## Fort Quarry, Gloucestershire

[SO 850 040]

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### Introduction

Fort Quarry, c. 1 km south of Stroud in Gloucestershire, is situated adjacent to Rodborough Fort, at the northern end of the extensive Rodborough Common SSSI. As one of several quarries on Rodborough Hill, it features frequently in the early literature on the Inferior Oolite Group of the Cotswolds and has yielded the type specimens of various fossil taxa described by Lycett (1853; Lycett in Wright, 1860) and Witchell (1880, 1882a). Wright (1860) recorded a section through the upper part of the succession, and additional details are given by Buckman (1895) and Richardson (1907b).

### Description

The following section is based mainly on that held on file by English Nature, with revised lithostratigraphical classification by the present author.

	Thickness (m)
<b>Salperton Limestone Formation</b>	
<b><i>Clypeus Grit Member</i></b>	
4: Limestone, brown, very hard, compact, bioclastic; very rare shells and shell fragments	0.75
<b><i>Upper Trigonía Grit Member</i></b>	
3b: Limestone (biomicrite), grey-brown, ferruginous, thinly bedded; very shelly with numerous oyster fragments	0.30–0.35
3a: Limestone (biomicrite), ferruginous, massive; very shelly, with <i>Trichites</i> and numerous brachiopods including <i>Acanthothiris spinosa</i> (Linnaeus) and <i>Rhactorhynchia hampenensis</i> (S.S. Buckman); marl parting at base	0.60
2d: Limestone (biomicrite), grey-brown, ferruginous, soft; highly fossiliferous with <i>Trigonía costata</i> Parkinson and numerous brachiopods in clusters; <i>Acanthothiris spinosa</i> , <i>Rhactorhynchia hampenensis</i> ; base penetrates crevices and irregularities in top of Bed 2c below	0.15–0.20
<b>Aston Limestone Formation</b>	
<b><i>Gryphite Grit Member</i></b>	
2c: Limestone, hard, yellow-brown, slightly limonitic, sandy, uneven top, with some vertical borings; relatively unfossiliferous but including ' <i>Astarte</i> ', <i>Ctenostreon</i> and <i>Gryphaea</i> (see also Lycett in Wright, 1860) and the brachiopod <i>Lobothyris buckmani</i> (Davidson)	0.12–0.16
<b><i>Lower Trigonía Grit Member</i></b>	
2b: Limestone (biomicrite), grey-brown, soft, more massive than rest of Bed 2; numerous well-preserved bivalves such as <i>Gryphaea</i> , <i>Quenstedtia</i> and <i>Tancredia</i> (see Richardson, 1907b; Lycett, 1857; Lycett in Wright, 1860); also corals and ammonites ( <i>Darellia</i> and <i>Docidoceras</i> , and ' <i>Ammonites sowerbyi</i> Miller' recorded by Lycett (in Wright, 1860))	0.16–0.25
2a: Limestone, brown, soft, marly	0.05

## Birdlip Limestone Formation

### *Scottsquar Member*

1b: Limestone (oosparite), massive, hard, in several courses; sparsely bored hardground at top	1.0
1a: Limestone (oosparite), thinly bedded, softer than Bed 1b above; shelly	seen to 1.0

## Interpretation

The lowest beds seen in Fort Quarry belong to the Scottsquar Member of the Birdlip Limestone Formation (Lower Inferior Oolite), of which 3.65 m were recorded by Richardson (1907b).

The member incorporates both the 'Oolite Marl' and 'Upper Freestone' of previous accounts (Barron *et al.*, 1997). The strata at Fort Quarry are entirely of high-energy 'Upper Freestone' facies, being composed of cream to white ooidal grainstones (Baker's (1981) oolite-dominated shoal facies). They contrast markedly with the lower-energy micritic 'Oolite Marl' facies (Baker's (1981) micritic marginal facies and marl-dominated trough facies) seen, for example, at Leigh's Quarry and Frith Quarry (see GCR site reports, this volume). As well as borings, Buckman (1895) and Richardson (1907b) recorded encrusting oysters in the hardground at the top of the Scottsquar Member.

Although only some 0.4 m of the succeeding Aston Limestone Formation (Middle Inferior Oolite) is now exposed, comprising the oldest part of the formation (Lower Trigonina Grit and Gryphite Grit members), slightly thicker successions (up to 1.1 m; Wright, 1860) have been recorded in the past. In other quarries farther south on Rodborough Common, the formation is entirely absent, and the Salperton Limestone Formation rests directly on the Birdlip Limestone Formation (Buckman, 1895; Richardson, 1907b). The regional pattern of the overstep of the Middle Inferior Oolite led Buckman (1901) to his concept of the 'Bajocian denudation', and its disappearance on Rodborough Common defines the southern limb of the so-called 'Painswick Syncline' (see Frith Quarry GCR site report, this volume).

The Lower Trigonina Grit Member at the base of the Aston Limestone Formation is very thin, and probably for this reason was not recognized in the Stroud area by either Lycett (1857) or Witchell (1880, 1882a) who included it in the Gryphite Grit Member. However, it was correctly identified by Wright (1860) who gave its thickness as 0.3 m. Richardson (1907b) described it as 'iron-shot', which is very typical of this unit. The ammonite fauna of this member is indicative of the Lower Bajocian Discites Zone. The succeeding Gryphite Grit Member incorporates the Gryphite Grit and Buckmani Grit of earlier accounts. The latter, comprising the lower part of the unit, was not definitely recognized here until Richardson (1907b) discovered the eponymous brachiopod *Lobothyris buckmani* (Davidson) within Bed 2c. The highly irregular, fissured hardground at the top of the Gryphite Grit Member marks a major non-sequence, with several zones 'missing' beneath the Salperton Limestone Formation (Upper Inferior Oolite) (Figure 3.28).

The Upper Trigonina Grit Member, at the base of the Salperton Limestone Formation, is highly fossiliferous; over 40 taxa (including '*Ammonites parkinsoni* Sow' and *A. martinsii* d'Orb.')

 are listed by Lycett (in Wright, 1860), although these may include specimens from beds that would now be assigned to the Clypeus Grit Member, of which Richardson (1907b) recorded a total of 2.13 m. The ammonite fauna of the Upper Trigonina Grit Member is everywhere taken to be indicative of the Upper Bajocian Garantiana Zone. In contrast with the unfossiliferous beds of the Clypeus Grit Member presently exposed, the higher beds of the member were apparently highly fossiliferous with myacean bivalves, '*Terebratula globata* of authors, and *Clypeus ploti* Salter. Witchell (1880) described and figured many fossils from the Clypeus Grit of 'Rodborough Hill', undoubtedly including specimens from Fort Quarry.

## Conclusions

Fort Quarry exposes a section through the upper part of the Birdlip Limestone Formation (Lower Inferior Oolite), the Aston Limestone Formation (Middle Inferior Oolite) and basal Salperton Limestone Formation (Upper Inferior Oolite). The Birdlip Limestone Formation is represented by the Scottsquar Member of 'Upper Freestone' facies. The Aston Limestone Formation succession is thin and attenuated owing to the location of the site on the southern limb of the Tainswick

Syncline'; the formation is overstepped by the succeeding Salperton Limestone Formation a short distance to the south. Parts of the Aston Limestone Formation and Salperton Limestone Formation are highly fossiliferous and have yielded many type and figured specimens, particularly of bivalves.

### References



*(Figure 3.28) Upper Trigonía Grit Member (Salperton Limestone Formation) overlying thin Aston Limestone Formation at Fort Quarry. The formational boundary is marked by a black arrow. (Photo: British Geological Survey, No. A10482; reproduced with the permission of the Director, British Geological Survey, © NERC, 1966.)*