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# Swift's Hill, Gloucestershire

[SO 878 067]

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## Introduction

The quarry at Swift's Hill is sited about 3 km north-east of Stroud, Gloucestershire, at the northern side of Swift's Hill SSSI. It exposes much of the middle part of the Inferior Oolite Group, and has a special place in the history of Cotswold geology because Edwin Witchell (Figure 3.32) suffered a fatal heart attack there on 20th August 1887, whilst collecting fossils. Witchell, a solicitor in Stroud, was an amateur geologist who contributed much to the study of Cotswold stratigraphy and palaeontology, mainly through the activities and publications of the Cotteswold Naturalists' Field Club (Anonymous, 1887; Judd, 1888; Lucy, 1890a; Vaughan, 1998). The quarry at Swift's Hill is alluded to by Woodward (1894), and described in some detail by Buckman (1895). The latter's record was summarized by Richardson (1904) but, surprisingly, the quarry does not seem to feature in subsequent literature despite the excellent exposure (Figure 3.33).

## Description

The following section is based on that recorded by Buckman (1895) with revised lithostratigraphy by the present author.

|   | Thickness (m) |
|---|---------------|
| <b>Salperton Limestone Formation</b>  |               |
| <b>Upper Trigonía Grit Member</b>   |               |
| 1: Limestone, 'ragstone'; ' <i>Terebratula globata</i> of authors (non J. de C. Sowerby), <i>Rhactorhynchia subtetrahedra</i> (Davidson), <i>Trigonía</i> | c. 1.52       |
| <b>Aston Limestone Formation</b>  |               |
| <b>Gryphite Grit Member</b>   |               |
| 2: Limestone, 'ragstone', bluish-grey, much stained with iron, vertical borings   | 0.05–0.18     |
| 3: Limestone, 'ragstone', grey, sparsely shelly   | 0.28          |
| 4: Limestone, 'ragstone', grey, hard, sandy, some shelly beds; <i>Gryphaea</i> in partings, more common in lower part                                     | 2.13          |
| 5: Sandy 'ragstone', mostly very shelly; with numerous small bivalves in some parts; base very uneven   | 1.52          |
| 6: Fine-grained yellow sand   | 0.10–0.15     |
| 7: Mudstone, purplish-grey, sandy, with numerous broken shells; scarce<br><i>Lobothyris buckmani</i> (Davidson)   | 0.08–0.15     |
| 8: Limestone, 'ragstone', grey, shelly, bored in places; <i>Acanthothiris</i> at top  | 0.46          |
| <b>Lower Trigonía Grit Member</b>   |               |
| 9: Limestone, 'ragstone', yellowish, somewhat 'iron-shot', shelly with a few bivalves; highly bored in places; <i>Rhynchonella bajinensis</i> Szajnocha   | 1.52          |
| 10: Marl, yellowish   | 0.08          |
| <b>Birdlip Limestone Formation</b>  |               |
| <b>Scottsuar Member</b>   |               |
| 11: Ooidal debris   | 0.13          |
| 12: Limestone, white, ooidal  | 0.96          |

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| 13: Marl, brown  | 0.03 |
| 14: Marl, grey; <i>Globirhynchia tatei</i> (Davidson), scarce<br><i>Plectothyris fimbria</i> (J. Sowerby), <i>Trigonia</i> | 0.23 |
| 15: Marl, yellow   | 0.03 |
| 16: Limestone, white shelly, ooidal  |      |

At the time of writing (1997), only the upper part of the succession (beds 1 to 9) was exposed in continuous section. The strata are somewhat disrupted by minor faults, probably a result of cambering on the steep hillside, but there is little difficulty in recognizing the units described by Buckman (1895); the sand and marl of beds 6 and 7 form a particularly obvious marker. Lower strata are largely concealed by rubble, although at the southern end of the site there is a small exposure of cream-buff, peloidal wackestone with *Plectothyris*, belonging to the Scottsquar Member of the Birdlip Limestone Formation (Lower Inferior Oolite), as mentioned by Baker (1981).

## Interpretation

Swift's Hill is sited in the axial region of the so-called Painswick Syncline (Buckman, 1901) in which a largely complete succession of the Bird-lip Limestone Formation (Lower Inferior Oolite) and the Aston Limestone Formation (Middle Inferior Oolite) is preserved. The Birdlip Limestone Formation is presently not well exposed at Swift's Hill; it is, however, better exposed at Frith Quarry (see GCR site report, this volume), only 2 km to the north-west. Together with Haresfield Hill (see GCR report, this volume), these quarries form the basis of the generalized section for the Painswick area given by Parsons (1980a).

The Aston Limestone Formation (Middle Inferior Oolite) is 6.35 m thick at Swift's Hill, whereas on the axis of the 'Birdlip Anticline' to the north-east (e.g. Knap House Quarry, see GCR site report, this volume) and south-west (e.g. Leigh's Quarry, see GCR site report, this volume), it is entirely absent. It is, however, much thinner than in the Cleeve Hill area, its area of maximum development, where it reaches some 22 m in thickness (Barron *et al.*, 1997). This relative thinness is due principally to the absence of the uppermost part of the Cleeve Hill succession (see Rolling Bank Quarry GCR site report, this volume), beneath the unconformable base of the Salperton Limestone Formation (Upper Inferior Oolite). Only the Lower Trigonia Grit and Gryphite Grit members are present at Swift's Hill.

The Lower Trigonia Grit Member comprises 'iron-shot' limestones and marls as at Frith Quarry (see GCR site report, this volume) where it has yielded an extensive fauna of (Lower Bajocian) Discites Zone ammonites. The basal marl, not now exposed, includes pebbles of a whitish limestone (Buckman, 1895; Richardson, 1904) presumably derived from the underlying Scottsquar Member. The top of the succeeding Gryphite Grit Member (total thickness c. 4.75 m) is marked by a well-developed hard-ground with borings and abundant encrusting oysters. Buckman (1895) classified the topmost bored beds (2 and 3) as Notgrove Freestone (= Notgrove Member) because of the presence of borings, but the 'ragstone' lithology is typical of the Gryphite Grit Member. The Notgrove Member, in its typical oolite facies is, however, present farther to the north-west in the 'Painswick Syncline', for example at Kimsbury Castle [SO 868 118], where the Gryphite Grit Member totals 7 m in thickness (Buckman, 1895). The Gryphite Grit Member (Barron *et al.*, 1997) incorporates the Buckmani Grit of Buckman (1895, beds 5–8) in which the eponymous brachiopod *Lobothyris buckmani* occurs rather sparsely. Parsons (19806) recorded the ammonites *Docidoceras (Emileites) liebi* (Maubeuge) and *Witchellia (W.) romanoides* (Douvillé) from the Gryphite Grit Member of Swift's Hill, indicating the Lower Bajocian Ovalis Zone.

Only the lower part of the succeeding Salperton Limestone Formation is exposed at Swift's Hill. The strata comprise ooidal packstones, with lenses of richly fossiliferous rubbly limestone, belonging to the Upper Trigonia Grit Member.

## Conclusions

Swift's Hill exposes the whole of the Aston Limestone Formation (Middle Inferior Oolite) together with the basal part of the succeeding Salperton Limestone Formation (Upper Inferior Oolite). In combination with other GCR sites, it provides a representative section of the Inferior Oolite Group within the so-called 'Painswick Syncline'.

## [References](#)



*(Figure 3.32) Edwin Witchell (1823–1887). (Reproduced courtesy of the Cotteswold Naturalists' Field Club.)*



*(Figure 3.33) General view of the exposure of Aston Limestone Formation at Swift's Hill with a small outcrop of the overlying Upper Trigonía Grit Member at centre top. (Photo: M.G. Sumbler.)*