

6. *The INFERIOR OOLITE and CONTIGUOUS DEPOSITS of the CREWKERNE DISTRICT (SOMERSET).* By LINSALL RICHARDSON, F.R.S.E., F.G.S. (Read June 20th, 1917.)

[PLATES XIV-XVI.]

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I. INTRODUCTION.

IN this paper I propose to give a detailed description of the Inferior Oolite and contiguous deposits of the Crewkerne district. The extent of this district, for the purpose of the present communication, will be observed from the map (fig. 1, p. 146).

(i) Geographical extent of the Inferior Oolite.—Reference to the Geological Survey Map, Sheet XVIII (Old Series) will show (1) that the most extensive tract where the Inferior-Oolite limestones occur, free from overlying rocks, is in the immediate neighbourhood of Crewkerne; (2) that there are numerous masses well separated from the principal tract; and (3) that the beds are affected by numerous faults.

(ii) Previous literature.—Comparatively little information has been published concerning the Inferior Oolite and immediate sub- and superjacent deposits of this district, with the exception of Ham Hill. This locality, famous for its warm-coloured building-stone, attracted considerable attention on the part of Charles Moore,¹ James Buckman,² and H. B. Woodward.³

The second author was correct in his local correlations of the Ham-Hill Stone—a conclusion also arrived at by H. B. Woodward—but was incorrect in his correlation with the Cotteswolds; although his recognition of the Cephalopoda-Bed below the Sands at Midford (near Bath) and around Yeovil, but above the Sands of the Cotteswolds, came nearer to the truth than was imagined. The actual solution arrived at by Mr. S. S. Buckman—published with a descriptive section in 1889⁴—that the Ham-Hill Building-

¹ Proc. Somerset Arch. & Nat. Hist. Soc. vol. xiii (1867) p. 126.

² *Ibid.* vol. xx (1875—pt. for 1874) p. 151; Q. J. G. S. vol. xxxiii (1877) pp. 4-6; Proc. Dorset Nat. Hist. & Ant. F. C. vol. i (1877) p. 68.

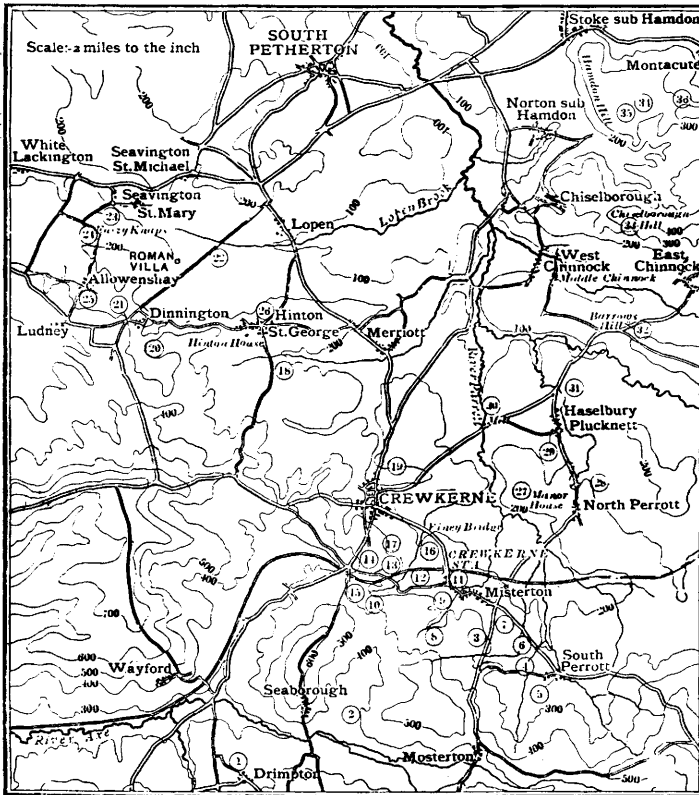
³ Proc. Bath Nat. Hist. & Ant. F. C. vol. vi (1887) p. 184.

⁴ Q. J. G. S. vol. xlv (1889) pp. 448-49.

Stone and its subjacent sands were a thick development of only a small middle portion of the Gloucestershire Cephalopoda-Bed was something quite unexpected. His dates—the Building-Stone as of *moorei* hemera and the subjacent sands as of *demortieræ* hemera—have been fully accepted.

As regards the rest of the district, in the seventies a considerable collection of fossils from the Crewkerne district was made by

Fig. 1.—Map of the Crewkerne district, showing the localities where exposures of Inferior Oolite are observed.



James Buckman and especially by his then pupil, Mr. Darell Stephens (now Mr. D. S. Darell), F.G.S.—the railway-sidings at Crewkerne Station, which were then under construction, yielding as quarrying proceeded a large number of specimens. Brachiopods so obtained, together with those procured by J. F. Walker, who had also collected in this district,¹ were sent to Davidson, and several

¹ Geol. Mag. dec. 2, vol. v (1878) p. 555.

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local species were described in his communications first to the Dorset Field Club¹ and then to the Palæontographical Society.²

In the early eighties Mr. S. S. Buckman explored the rocks of the district, particularly around Crewkerne and Haselbury Plucknett. The brachiopods were dealt with by Mr. Buckman in 1882, and as the species were allocated to their zones and localities, the first indication of the zones of the district is thus obtained.³ Other brachiopods were dealt with by him in 1910⁴ and certain ammonites in his Monograph.⁵

W. H. Hudleston, in his well-known monograph, gives some particulars concerning the section at 'Drympton' (Drimpton), and a fairly-detailed account—accompanied by a 'profile'—of one at Haselbury (see p. 165 of the present paper).⁶

In 1891 a party of the Somerset Archæological & Natural History Society visited Crewkerne, and the late H. B. Woodward contributed some 'Notes on the Geology of Crewkerne.'⁷ The information that he gave concerning the rocks under consideration appeared again in 1894—amplified and accompanied by a 'List of Fossils from the Inferior Oolite Series near Crewkerne.'⁸

In 1914 some members of the Geologists' Association of London visited the district, and saw the quarries at the Misterton Lime-works and Manor House (North Perrott), and Slade's Quarry—also at North Perrott.⁹

(iii) The lower and upper limits of the Inferior Oolite Series.—The division-line between the Lias and Oolite is now generally drawn between the deposits of *moorei* (Lias) and *aalensis* (Oolite) hemeræ. As the deposits of both these hemeræ are sand in this district, and as sandy matter continued to be deposited until the close of the *Aucolioceras* hemera, the line of demarcation between Lias and Oolite—as in the case of the Burton-Bradstock-Broadwindsor District—is not well marked.

The bulk of the Yeovil Sands is of *dumortieriæ-moorei* hemeræ.

The base of the Yeovil Sands has been observed by Mr. S. S. Buckman at White Lackington Park, near Ilminster, where it rests on an 'arenaceous marl-bed'¹⁰ of *dispansi* hemera.

Above the Inferior Oolite comes the Fuller's Earth.

In the district extending from Burton Bradstock, near Bridport,

¹ Proc. Dorset Nat. Hist. & Ant. F. C. vol. i (1877) pp. 73-88 & pls. i-iv.

² 'British Fossil Brachiopoda' Monogr. Palæont. Soc. Suppl. vol. iv, pt. 2, no. 2 (1878); & Suppl. vol. v, pt. 3 [Conclusion], 1884.

³ Proc. Dorset Nat. Hist. & Ant. F. C. vol. iv (1882) pp. 1-52.

⁴ Q. J. G. S. vol. lxxvi (1910) pp. 99 *et seqq.*

⁵ 'Ammonites of the Inferior Oolite Series' Monogr. Palæont. Soc. Suppl. (1905) pp. lxxvii, lxxix, lxxx.

⁶ 'The Inferior Oolite Gasteropoda' Monogr. Palæont. Soc. pt. i (1887) pp. 39-41.

⁷ Proc. Somerset Arch. & Nat. Hist. Soc. vol. xxxvii (1892) pp. 60-69.

⁸ 'The Jurassic Rocks of Britain, vol. iv—The Lower Oolitic Rocks of England (Yorkshire excepted)' Mem. Geol. Surv. 1894, pp. 69-71.

⁹ Proc. Geol. Assoc. vol. xxvi (1915) pp. 74-76.

¹⁰ Q. J. G. S. vol. xlv (1889) p. 450.

to Broadwindsor, the highest limestone of the Inferior Oolite is a thin bed with a bluish centre, often rubbly, and readily recognized. It is the 'Zigzag Bed,' and—as its name implies—is of zigzag hemera. The bed extends into the Crewkerne district, and has been observed in its typical condition as far north as Haselbury-Mill Quarry (30),¹ Haselbury Plucknett.²

The Zigzag Bed is succeeded by 'The Scroff,' which has been dated as *fuscæ* hemera. The Scroff contains the little brachiopod *Aulacothyris cucullata* S. Buckman,³ and—like the Zigzag Bed—extends into the Crewkerne district. J. F. Walker appears to have discovered the characteristic little brachiopod (*Aulacothyris cucullata*) in the quarry (9), near Misterton Church, for he has written—

'in a quarry near the Church at Misterton, near Crewkerne, I found a band of clay [The Scroff] lying on the top of the Inferior Oolite stone, containing numerous specimens of a variety of *Waldheimia meriana* associated with *T. decipiens*.' (Proc. Dorset Nat. Hist. & Ant. F. C. vol. iii, 1879, p. 46.)

Fuller's Earth is to be observed in an opening near Slade's Quarry at North Perrott (28), and at the Haselbury-Mill Quarry (30). Higher deposits have been dug for brick-making near the tunnel about a mile west of Crewkerne Station; at Lye's brickyard south-east of the brewery at Crewkerne (19)⁴; and at East-Cross Hill (32)⁵ between Haselbury and East Chinnock.

II. SUBDIVISIONS RECOGNIZABLE IN THE INFERIOR OOLITE OF THE CREWKERNE DISTRICT.

The subdivisions recognizable in the Inferior Oolite of this district will be seen on reference to the folding table (facing p. 170), from which also an idea will be obtained of their geographical distribution and thicknesses.

(xxvii) *Aalensis* Beds.—The *Aalensis* Beds are well developed (29 feet 8 inches) and very satisfactorily exposed at Chideock-Quarry Hill, near Bridport (Dorset).⁶

In the Crewkerne district there is an exposure of a portion of the *Aalensis* Beds in the bank by the roadside (23) at Furzy Knaps, near Seavington St. Mary—a village 4 miles north-west of Crewkerne. The deposits here are very fossiliferous, and have yielded to me ? *Canavarina venustula* S. Buckman, *Pleydellia*

¹ The numbers in parentheses refer to the corresponding numbers on the map (fig. 1, p. 146).

² On the old Ordnance Survey map the name is given as 'Haselbury' only

³ Q. J. G. S. vol. lxxvi (1910) p. 102 & pl. xii, figs. 1-2.

⁴ H. B. Woodward, 'The Jurassic Rocks of Britain, vol. iv—The Lower Oolitic Rocks of England (Yorkshire excepted)' Mem. Geol. Surv. 1894, p. 67.

⁵ *Ibid.* p. 235. Woodward gives the name of the hill as High Cross Hill, but it is called East Cross Hill on the current 6-inch map.

⁶ S. S. Buckman, Q. J. G. S. vol. lxxvi (1910) p. 64.

⁷ In this paper the note of interrogation is placed before the name of the genus, species, subdivision, or hemera that it queries.

leura (S. Buckman), and *Cotteswoldia subcandida* S. Buckman; while Mr. Charles Upton has obtained a specimen of ? *Terebratulina deslongchampsii* Davidson.¹

East of Crewkerne the *Aalensis* Beds 'attenuate,' and fail somewhere between North Perrott and Yeovil Junction, for they have not been detected in the Sherborne district.² A mile-and-a-half east of Crewkerne, at the Manor-House Quarry, North Perrott, the evidence for *Aalensis* Beds consists in the occurrence of the zonal ammonite in a deposit having a decidedly remanié aspect, which rests on the Perrott Stone.

(xxvi) *Opaliniforme* Beds.—At Chideock-Quarry Hill the *Opaliniforme* Beds consist of ³—

	Thickness in feet inches.	
(6a) Brown ironshot marly stone with Opalinoïd Ammonites, cf. <i>Canavarella</i>	1	0
(b) Sandstone with Opalinoïd Ammonites, cf. <i>Walkeria</i> [<i>Walkericeras</i> ⁴] <i>subglabra</i> , <i>Rhynchonella stephensi</i> (<i>cynocephala</i>).....	1	8
(c) Sands and sandburrs. <i>Rhynchonella</i> of <i>cynocephala</i> -pattern; Opalinoïd Ammonites	3	8'

and the equivalents of these, together with the bottom stratum (1 foot thick) of the *Scissum* Beds, constitute the Brachiopod Beds at Whaddon Hill.

These *Opaliniforme* Beds extend into the Crewkerne district, and are well exposed in a roadside section in Cat-Hole Lane south of Crewkerne (p. 160), where the deposits (*a*¹) and (*a*²) represent bed (6a) of Chideock-Quarry Hill. Deposits (*a*¹) and (*a*²) of Cat-Hole Lane are represented at the Manor-House Quarry, North Perrott, by the greater portion of the sandy clay (Bed 3) above the Perrott Stone (p. 163), and at Barrows'-Hill Quarry (32) by a very similar deposit (p. 169).

(xxv) *Scissum* Beds.—These are well exposed at the Conegar-Hill Section, Broadwindsor, where they consist of irregular sandstone and sand-rock with intervening deposits of sand. The harder portions are replete with fossils, among which the most noticeable are—*Gryphæa cygnoides* Whidborne, *Pholadomya fidicula* J. de C. Sowerby, *Lima inoceramoides* Whidborne, and *Volsella sowerbyana* (A. d'Orbigny).

Similar beds extend into the Crewkerne district, and are to be seen in the sections—opposite Hill Farm, South Perrott (5); near Lecker Bridge (4); and near Well-Spring Farm, near Misterton (7).

Farther north, however, at the Manor-House Quarry, North Perrott (27), and Barrows'-Hill Quarry (32), softer beds, consisting mainly of sand, are seen. They are rich in specimens of *Aulacothyris blakei* (Walker), *Rhynchonella cynocephala* auctt., and

¹ See p. 162.

² S. S. Buckman, Q. J. G. S. vol. lxxvi (1910) table iii, facing p. 78.

³ *Ibid.* p. 63.

⁴ S. S. Buckman, 'Yorkshire Type Ammonites' vol. ii, pt. ix (1913) p. iii.

Terebratulæ, and I am inclined to regard them as a thicker and softer development of the bottom-stratum of the *Scissum* Beds as developed at Whaddon Hill,¹ or—expressed in another way—as on the horizon of the top-stratum (early *scissi*) of the Brachiopod Beds of that locality and of the Conegar-Hill Section, Broadwindsor.

The *Scissum* Beds are absent from the neighbourhood of Bradford Abbas in the Sherborne district, and therefore—like the *Aalensis*- and *Opaliniforme*-Beds—fail somewhere between Haselbury and Yeovil Junction.

(xxiv) *Ancolioceras* Beds.—These beds² are not always easy to separate, on the one hand from the *Scissum* Beds below, and on the other hand from the *Murchisonæ* Beds above. They are very fossiliferous, containing many species common to the *Scissum*-Beds, and are characterized by ammonites of the genus *Geyerina*³ and Lytoceratids of the style of *Pachylitoceras aalenianum* S. Buckman.

At the Conegar-Hill Section, Broadwindsor, the *Ancolioceras*-Beds comprise two strata, each 1 foot thick. Similar strata extend into the Crewkerne district, and are to be seen at the Misterton Limeworks (3) and Slade's Quarry, North Perrott (28). It may be that the upper portion of the lowest rock-mass visible (in 1916) at Haselbury-Mill Quarry (30) is of this date, but I have not obtained any evidence from ammonites here.

(xxiii-xxii) *Murchisonæ* Beds.—The true *Murchisonæ* Beds in the neighbourhood of Beaminster are very rich in specimens of *Zeilleria anglica* (Oppel). Beds replete with specimens of the same species have been observed by Hudleston at Drimpton (1)—a village 3 miles south-south-west of Crewkerne, and at Haselbury Plucknett (29)—2 miles east-north-east of Crewkerne. In the intervening tract—in which are situated Misterton and North and South Perrott—specimens of *Zeilleria anglica* (Oppel) are rarely met with, and the beds are not always easy to separate from the *Ancolioceras* Beds below.

(xxi-vii) *Bradfordensis*-*Niortense* Beds.—The only rock that I have seen *in situ* in the Crewkerne district that is referable to some hemera between *murchisonæ* and *garantiana* hemere is ironshot rock (0 to 4 inches thick) in places attached to, or filling fissures in, that of *murchisonæ* hemera.

Such rock is seen at the Misterton Limeworks (3), the quarry near Misterton Church (9), and at the Ten-Acres-Field Quarry (6). Where the surface of the underlying *Murchisonæ* Beds could be examined it was found to be waterworn and iron-stained. In 1914 I remarked that this ironshot rock was either of *bradfordensis* or of

¹ L. Richardson, Proc. Geol. Assoc. vol. xxvi (1915) p. 73.

² S. S. Buckman, Q. J. G. S. vol. lxxvi (1910) p. 79. See also L. Richardson, *ibid.* vol. lxxi (1915-16) pp. 479-80.

³ Emended from *Geyeria*—S. S. Buckman, 'Yorkshire Type Ammonites' vol. ii, pt. ix (1913) p. iv.

discitæ hemera.¹ Since 1914 I have collected two Rhynchonellids, probably of unnamed species, which render it fairly evident that it is of *bradfordensis* hemera.²

Evidence of the occurrence in this district of rock belonging to one or more hemera between *murchisonæ* and *garantianæ* is to be had from two sources. Huddleston makes mention of a massive shell-bed with large conchifera and keeled ammonites, 2 feet 4 inches thick, at Haselbury (29) above the *Zeilleria-anglica* Horizon (*murchisonæ*).³ Mr. S. S. Buckman informs me (*in litt.*) that 'one would expect *bradfordensis*, but I cannot confirm this.'

In the Moore Collection at Bath are a number of ammonites and other fossils, attached to tablets labelled by Moore, recorded as having come from Dinnington, a village 3 miles from Crewkerne in a north-westerly direction. Through the kindness of the Rev. H. H. Winwood, F.G.S., I was enabled to send a selection of the ammonites to Mr. Buckman. When returning the specimens he wrote:

'Two of them are obviously from Dundry [Hill, near Bristol] and invalidate Moore's evidence. The others

[*Brasilina crinalis* S. Buckman, *bradfordensis* hemera; *Brausina* cf. *contorta* (S. Buckman), *discitæ* hemera; *Erycites* aff. *tulcus* (Gregorio), *bradfordensis* hemera; *Graphoceras decorum* S. Buckman, *discitæ* hemera; *Hammatoceras* cf. *lorteti* Vacek (*non* Dumortier sp.), *murchisonæ* or *bradfordensis* hemera; *H.* cf. *sieboldi* Vacek (*non* Oppel sp.), about *bradfordensis-concavi* hemera]

are from a matrix unfamiliar to me, but the matrix—and, in some cases, the test—shows much likeness to the Stoke-Knap conditions: by this I mean that they indicate an area more linked up with Stoke Knap than with Bradford Abbas.

'Dinnington may be the locality for J. Sowerby's type of *Ammonites concavus* [which Sowerby states came from] "the neighbourhood of Ilminster,"⁴ and Davidson figures "*Terebratula perovalis*"—a *Concava*-Bed fossil from "Dunnington"⁵ (Dinnington).'

I have not discovered any section in the neighbourhood of Dinnington that displays the sequence from the *Murchisonæ* to the Top Beds.⁶ There is no reason, however, why *Bradfordensis*-, *Concava*-, and *Discites*-Beds should not occur in the district: indeed the matrix of the specimens of *Brasilina crinalis* and *Graphoceras decorum* mentioned above reminds one of the ironshot rock attached to the top of the *Murchisonæ* Beds at the Misterton Lineworks and neighbouring sections.

The surface of the ironshot rock seen at the Misterton Lime-

¹ Proc. Geol. Assoc. vol. xxvi (1915) p. 75.

² See records of sections at Ten-Acres Field Quarry (p. 158) and the Lineworks, Misterton (p. 154).

³ 'The Inferior Oolite Gasteropoda' Monogr. Palæont. Soc. pt. i (1887) p. 41.

⁴ 'Mineral Conchology' vol. i (1815) p. 214 & pl. xciv.

⁵ 'British Fossil Brachiopoda' Monogr. Palæont. Soc. vol. i, pt. iii (1852) p. 51 & pl. x, fig. 4.

⁶ By the term 'Top Beds' is meant the rock of *garantianæ-zigzag* hemera (inclusive).

works, the quarry near the Church (9), and Ten-Acres-Field Quarry is waterworn and ferruginous.¹

(vi, v) *Garantiana* Beds.—No rock of *garantiana* hemera occurs in the neighbourhood of Broadwindsor, as is shown by the section at Conegar Hill (p. 153), where limestone of probably *schlœnbachi* date rests directly on the *Murchisonæ* Beds. At Misterton Lineworks, the Lecker-Bridge section (South Perrott), and Ten-Acres-Field Quarry, however, occurs rock very barren of fossils, but similar to that of *garantiana* hemera at Green-Hill Quarry, near Innsacre Farm, Shipton Gorge (Dorset)—that is, somewhat soft limestone with numerous brownish oolite-granules. At the Lecker-Bridge section there is below the main layer rubbly limestone (0 to 4 inches thick); but at the Hill-Farm section, South Perrott (5) there is no rock at all of *garantiana* hemera.

At Slade's Quarry, North Perrott, the *Garantiana* Beds have 'expanded,' are very fossiliferous, and in addition to the quantity of rich yellowish-brown ochreous matter associated with the lowest layer (*c*) (see p. 164), their top marly layer is rich reddish-brown, owing to the presence of oxidized iron-pyrites such as one is accustomed to meet with at this horizon in the Burton-Bradstock-Beaminster district. At the Haselbury-Mill Quarry a similar ferruginous marly layer overlies a 6-inch bed of limestone, the lithic structure of which calls to mind the Marl-Bed and subjacent limestone of the neighbourhood of Bradford Abbas.

North-west of Crewkerne, at the quarry in Hinton Park (20) the rock of *garantiana* hemera consists of some $\frac{3}{4}$ feet 6 inches of massive rich brown, ferruginous limestone, overlying a hard somewhat conglomeratic limestone ($\frac{1}{2}$ 18 inches thick) full of fossils, including *Patoceeras annulatum* (A. d'Orbigny)—the whole recalling the Hadspen Stone of the Castle-Cary district.²

Top Limestones.³—Top Limestones, similar to those of the neighbourhood of Beaminster and Broadwindsor, extend into the Crewkerne district, and maintain their similarity throughout it with the exception of the neighbourhood of Haselbury Mill. In this direction the Top Limestones have 'attenuated,' their constituent beds are better separated one from the other, and, at the Haselbury-Mill Quarry, include a very interesting Sponge-Bed, very similar in appearance to the well-known one at Shipton Gorge (Dorset).⁴

Indications of the *Zigzag* Bed, similar to its equivalent at Broadwindsor and elsewhere in the Burton-Bradstock-Broadwindsor district, have been found in an opening near Slade's Quarry,

¹ I have seen a specimen of *Pleurotomaria*, stated to have come from Dinnington, in a matrix which at once called to mind that of the Irony Bed of Louse Hill, near Sherborne (Dorset). It may be that rock of *blagdeni* date occurs sporadically in 'pockets' in this neighbourhood, as is also probably the case at Dundry Hill, near Bristol.

² L. Richardson, Q. J. G. S. vol. lxxi (1915-16) pp. 486, 504, 505.

³ This term embraces the beds dating from *truellei* to *zigzag* inclusive.

⁴ Proc. Geol. Assoc. vol. xxvi (1915) pp. 60-61.

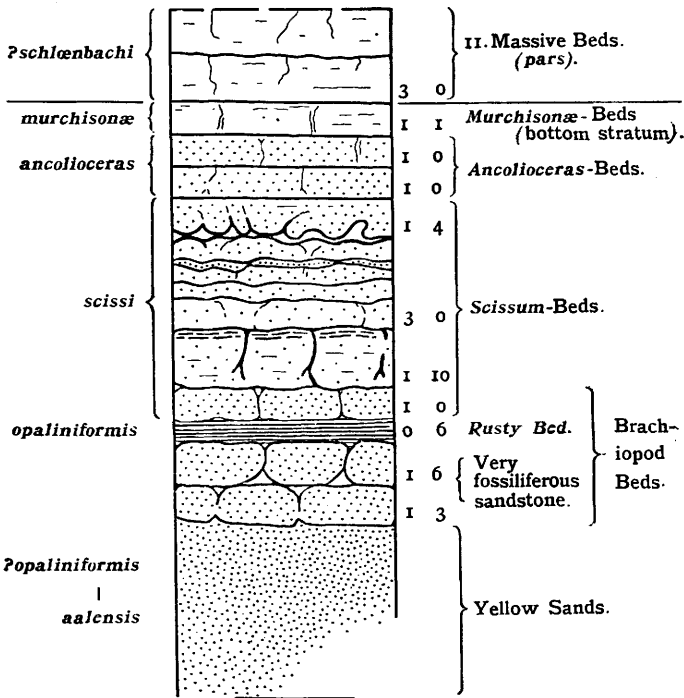
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North Perrott, and a more fossiliferous development of it—rich in specimens of species of *Parkinsonia* and *Murchisonæ*—at Haselbury-Mill Quarry.

III. LOCAL DETAILS.

Conegar-Hill section, Broadwindsor (Dorset).—The last and northernmost section in the Burton-Bradstock-Broadwindsor district is that in the road-cutting at Conegar Hill. Here the sequence is as follows :

Fig. 2.—Sequence of Inferior-Oolite deposits at Conegar Hill, Broadwindsor (Dorset).¹



Drimpton (Dorset).—Some 2 miles north-west of the above section, at Drimpton, is a small but now disused quarry (1) in which—as Hudleston has remarked²—*Murchisonæ* Beds, rich in specimens of *Zeilleria anglica* (Oppel), are exposed.

Hudleston has also remarked that the place is noteworthy for ‘very pretty species of *Trochus* or *Delphinula*.’³ I have

¹ The upper 3 or 4 feet of the Yellow Sands may be of *opaliniformis* hemera.

² ‘The Inferior Oolite Gasteropoda’ Monogr. Palæont. Soc. pt. i (1887) pp. 39–40.

³ *Ibid.* p. 40.

collected here¹ *Trochus sybilla* Hudleston, *Cucullæ oblonga* J. Sowerby,² *Terebratula etheridgei* Davidson (rare), and *Montlivaltia lens* Edwards & Haime. R. F. Tomes has recorded from here *Montlivaltia delabechei* Edwards & Haime,³ and Mr. S. S. Buckman *Rhynchonella* aff. *weigandi* Haas & Petri—also

‘from Netherton [near Beaminster] in Dorset, from the base of what is known as “Inferior Oolite limestone,” that is, beds deposited before the *Murchisonæ* hemera strictly so-called.’⁴

Little Windsor.—The quarry here is now (1916) overgrown.

Seaborough.—Portions of the Top Limestones—from which I obtained *Rhynchonella* cf. *parvula* Deslongchamps and *Holactypus hemisphericus* (Agassiz)—are to be seen in an old quarry (2) near this village.

Limeworks, Misterton (Somerset).—In the quarry at this locality, the following beds are exposed:

3. LIMWORKS, MISTERTON.

		<i>Thickness in feet inches.</i>	
<i>Schlaenbachi</i> ...	Microzoa-Beds. 4. Limestones and some marl; <i>Terebratula sphaeroidalis</i> auctt.: seen..	2	0
	5. Marl with yellow ‘ochreous bodies’ ⁵	0	2
	Massive Beds. 6. Limestone: <i>Belemnopsis bessina</i> (A. d’Orbigny), <i>Ostrea</i> sp., <i>Acanthothyris panacanthina</i> Buckman & Walker, <i>Rhynchonella subtetrahedra</i> auctt., ⁶ etc.	1	6
	7. Marl: 0 to 1 inch	0	1
	8. Limestone, similar to 6	2	0
? <i>truellii</i>	? 9. ? <i>Truelli</i> Bed. Limestone: <i>Rhynchonella subtetrahedra</i> auctt., isocrinoid-ossicles, echinoid-radioles, etc.	1	4
	to the base of which is attached		
<i>Garantianæ</i> ...	Equivalent of the <i>Astarte-obliqua</i> Bed. Limestone, 2 to 4 inches: usually.....	0	4
	Non-sequence. Deposits of <i>nitortensis-concavi</i> hemeræ (inclusive) wanting.		
<i>Bradfordensis</i> .	Limestone, hard, bluish-grey, ironshot; belemnites, <i>Rhynchonella</i> of the <i>Rh.-ringens</i> series: 0 to 4 inches: average	0	2
	attached to the		
<i>Murchisonæ</i> ...	Blue Bed. (a) Limestone, hard, bluish-grey; bone (piece of), <i>Variamussium pumilum</i>		

¹ Mr. Charles Upton informs me that a schoolmaster at Drimpton collected and distributed many fossils from this quarry.

² The type-specimen of *Cucullæ oblonga* J. Sowerby was found ‘at Dundry in the Inferior Oolite, holding grains of iron-ore’ (Min. Conch. vol. iii, pl. cevi, fig. 1, 1818, p. 7)—that is, it came from the *Sauzei* Bed of that locality. The specimens recorded as ‘*Cucullæ oblonga* J. Sowerby’ in the present paper are similar to those from the *Sauzei* Bed of Dundry Hill, although they come from much lower down.

³ Geol. Mag. dec. 3, vol. iii (1886) p. 388.

⁴ Q. J. G. S. vol. li (1895) pp. 453, 462.

⁵ Throughout this paper the ‘ochreous’ matter referred to is due to the oxidization and hydration of iron-pyrites.

⁶ Mr. Buckman informs me that it is very doubtful whether this is the true Dundry-Hill form.

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		Thickness in feet inches.	
	(Lamarck), ¹ <i>Pseudoglossothyris simplex</i> (J. Buckman): 3 to 7 inches	0	5
	(b) Limestone, similar to (a); <i>Variamusium pumilum</i> (Lamarck), and <i>Lima inoceramoides</i> Whidborne	0	7
<i>Ancolioceras</i> ...	Red Bed. Limestone, hard, grey, with a pinkish tinge; <i>Geyerina</i> cf. <i>everteus</i> S. Buckman, <i>Eopecten velatus</i> (Goldfuss), <i>Terebratula conglobata</i> Deslongchamps, <i>Galeropygus agariciformis</i> (Wright): 6 to 8 inches	0	8
	Grey or Cackle Bed. Limestone, hard, grey, sandy to the touch; ammonite of the <i>Hyattina-brasili</i> S. Buckman aspect, <i>Celastarte</i> spp., <i>Camptonectes</i> sp., <i>Ctenostreon</i> sp., <i>Ceromya concentrica</i> (J. de C. Sowerby), <i>Cucullæa oblonga</i> J. Sowerby, <i>Gresslya abducta</i> (Phillips), <i>Gryphæa cygnoides</i> Whidborne, <i>Lima inoceramoides</i> Whidborne, <i>Pholadomya oblita</i> Lycett, <i>Protocardia</i> sp., <i>Trigonia</i> ? <i>sculpta</i> Lycett, <i>Eopecten velatus</i> (Goldfuss), <i>Pseudoglossothyris leesi</i> S. Buckman, <i>Terebratula</i> spp., <i>Berenicea</i> sp. (usually on the specimens of <i>Lima</i>), etc.....	1	1
<i>Scissi</i>	Sand-rock. Surface exposed.		

Mr. Charles Upton has examined for me a sample of the marl from Bed 5, and reports having found the following fossils :

Two small fish-teeth—one smooth, the other fluted.	<i>Flabellina pulchra</i> A. d'Orbigny. <i>Nodosaria affinis</i> Terquem. — <i>communis</i> (A. d'Orbigny). One specimen. — <i>raphanus</i> (Linné). <i>Plaudularia crepidula</i> Fichtel & Moll. — <i>harpula</i> (A. d'Orbigny). — <i>pauperata</i> Jones & Walker. <i>Polymorphina lactea</i> Walker & Jacob. <i>Textularia trochus</i> A. d'Orbigny. <i>Vaginulina</i> sp.
OSTRACODA. <i>Bairdia hilda</i> Jones. <i>Cytheropteron</i> sp. <i>Polycope</i> sp.	
FORAMINIFERA. <i>Cristellaria acntauricularis</i> Fichtel & Moll. — <i>rotulata</i> (Lamarck). — <i>tricarinata</i> Reuss. <i>Cornuspira cretacea</i> Reuss.	

The representative of the *Astarte-obliqua* Bed rests on a level, waterworn, and iron-stained surface of the underlying bed. This bed is of *murchisonæ-Ancolioceras* hemeræ—the greater portion of the bed being of the earlier date. Writing of the *Ancolioceras* Beds here Mr. Buckman observes :

'At Misterton, which is near Crewkerne, the strata hitherto regarded as early *murchisonæ* yield *Lytocerotoids* of the style of *Pachylitoceras aalenianum*.'²

The Blue Bed is probably of early *murchisonæ* hemera and correlative with what remains of the *Murchisonæ* Beds at the Conegar-Hill Section, Broadwindsor. The upper portion—that

¹ E. T. Paris & L. Richardson, Q. J. G. S. vol. lxxi (1915-16) p. 529.

² Q. J. G. S. vol. lxxvi (1910) p. 79.

characterized by an abundance of specimens of *Zeilleria anglica* (Oppel), as seen at Drimpton—is not represented.

Prof. S. H. Reynolds has very kindly examined microscopically for me pieces of the Blue, Red, and Grey Beds. Concerning the Blue Bed he states—

‘It is composed of a mass of finely-divided calcareous organisms with frequent subangular quartz-grains. Crinoid ossicles are by far the most plentiful; but foraminifera are not infrequent. A good deal of the staining is due to ferric oxide.’

The Red and Grey Beds are dated as *Ancolioceras* on the evidence of the ammonites.

‘The Red Bed is a non-oolitic rock of fine and uniform grain. It is composed of crinoidal fragments, foraminifera, and many pieces of small molluscs—gastropods and lamellibranchs—embedded in a calcite matrix, which is sometimes structureless and sometimes finely crystalline. Some of the fragments, particularly of crinoids, are partly replaced or stained with ferric oxide. Many small quartz-grains occur.’ [S. H. R.]

The Grey Bed is also known to the quarrymen as the ‘Cockle Bed,’ on account of the large number of fossils that it contains. It is

‘a fine-grained gritty limestone. Crinoidal fragments form the bulk of the rock. Small angular quartz-grains are very plentiful, but are irregularly distributed.’ [S. H. R.]

As in the case of the equivalent bed in the Conegar-Hill section, the nether surface of the Grey Bed here is very irregular, and fits into an equally irregular surface of the immediately subjacent sand-rock of the *Scissum* Beds.

Concerning this section H. B. Woodward wrote¹ that it shows

‘a few beds of the pale [Top] limestones belonging to the zone of *A. Parkinsoni*; lower down there were brown oolitic and ironshot limestones (2 ft. 2 in.); and, at the base, hard, grey, shelly and oolitic limestones, yielding fine specimens of *Ceromya concentrica* and also *Gryphæa sublobata*—the latter recalling the Gryphite Grit of the Cotteswold Hills.

‘The same *Gryphæa* occurs also abundantly at Haselbury: and in both of these Dorset* localities it is associated with *Ammonites Murchisonæ*. It occurs in higher beds near Bruton.†

* The Misterton Limeworks and Haselbury are in Somerset.

† I have recorded *Gryphæa sublobata* (Deslongchamps) from the rock of *shirbuirniæ* hemera at Sunny Hill, Cole, near Bruton. See Q. J. G. S. vol. lxxi (1915–16) p. 498.

The *Gryphæa* mentioned by H. B. Woodward as occurring at Misterton and Haselbury is doubtless the form called ‘*Gryphæa cygnoides*’ by Whidborne.²

Lecker-Bridge section.—Near Lecker Bridge (†), South Perrott (Dorset), rock of *garantianæ* hemera—similar to its equivalent at the Misterton Limeworks—is seen resting on sandstones, the date of the highest portion of which I have been unable to ascertain; but it is either *Ancolioceras* or *scissi*.

¹ ‘The Jurassic Rocks of Britain, vol. iv—The Lower Oolitic Rocks of England (Yorkshire excepted)’ Mem. Geol. Surv. 1894, pp. 68–69.

² Q. J. G. S. vol. xxxix (1883) p. 494 & pl. xv, figs. 8–8 a.

4. LECKER-BRIDGE SECTION.

		<i>Thickness in feet inches.</i>	
? <i>Schlaenbachi</i> .	Massive Beds. Limestone, greyish-white and sparry: seen.....	2	0
<i>Garantianæ</i> ...	(a) Limestone similar to its equivalent at the Misterton Limeworks	0	3
	(b) Limestone, similar to (a) but more rubbly; 0 to 4 inches	0	2
	Non-sequence. Deposits of <i>niortensis-Murchisonæ</i> and ? <i>Ancolioceras hemeræ</i> wanting.		
<i>Ancolioceras</i>	Sandstone, grey, fine-grained	0	10
or	Sandstone, in irregular layers, with which is associated sandy marl.....	0	10
<i>Scissi</i> .	Sandstone	0	10
<i>Scissi</i>	Sandburrs and sand; <i>Ceromya concentrica</i> (J. de C. Sowerby), <i>Gervillia whidbornei</i> Paris, <i>Gryphaea cygnoides</i> Whidborne. <i>Goniomya</i> sp., <i>Pholadomya fidicula</i> J. de C. Sowerby, <i>Folsella sowerbyana</i> (A. d'Orbigny): seen.....	3	0

At a slightly-lower level in the bank north of the preceding section are seen

irregular layers of sandy rock with partings of a noticeable pale-yellow sandy 'marl' containing *Variamussium læviradiatum* (Waagen), *Terebratula whaddonensis* S. Buckman, and *Serpula tricarinata* auctt.—beds calling to mind the Brachiopod Beds (*scissi-opaliniformis*) of Whaddon Hill.

Hill-Farm section, South Perrott (Dorset).—By the roadside opposite this farm (5) is a face of rock.

5. HILL-FARM SECTION, SOUTH PERROTT.¹

		<i>Thickness in feet inches.</i>	
? <i>Schlaenbachi</i> .	Massive Beds. Limestones: seen	4	0
	Non-sequence. Deposits of ? <i>truellæi-Murchisonæ</i> and ? <i>Ancolioceras hemeræ</i> wanting.		
<i>Ancolioceras</i>	Sandstones, grey, calcareous, fairly massive; <i>Nautilus</i> sp., <i>Gervillia whidbornei</i> Paris, <i>Trigonia ?sculpta</i> Lycett, <i>Pholadomya fidicula</i> J. de C. Sowerby: about	1	8
or			
<i>Scissi</i> .			
<i>Scissi</i>	Sandstones, in thinner layers with sandy partings; <i>Cucullæa oblonga</i> J. Sowerby, <i>Entolium demissum</i> (Phillips), <i>Folsella sowerbyana</i> (A. d'Orbigny)	4	0
	Sandstone, softer: seen	2	0

The upper portion of this section is difficult to reach, but no rock of *garantianæ* hemera was detected.

Ten-Acres-Field Quarry, near South Perrott.—At (6) is a quarry 'in work,' in which the sequence of beds is similar to that at the Misterton Limeworks.

¹ The holotype of *Lima inoceramoides* Whidborne (Q. J. G. S. vol. xxxix, 1883, p. 507 & pl. xvii, fig. 5) came from the Inferior Oolite 'south of Perrott.' This species is very characteristic of the *Ancolioceras*- and *Scissum*-Beds of this neighbourhood, and possibly by 'south of Perrott' South Perrott is meant.

6. TEN-ACRES-FIELD QUARRY, NEAR SOUTH PERROTT.

		<i>Thickness in feet inches.</i>	
<i>Schlenbachi</i> ...	Microzoa-Beds. 6. Limestone: seen.....	2	0
	7. Marl and rubble	0	2
	Massive Beds. 8. Limestone, rather sparry; <i>Ctenostreon</i> sp.....	2	0
? <i>Truellei</i>	? <i>Truellei</i> Bed. 9. Limestone; <i>Belemnopsis</i> <i>bessina</i> (A. d'Orbigny), <i>Rhynchonella</i> aff. <i>parvula</i> Deslongchamps, <i>Rh. subtetrahedra</i> auctt., isocrinoid-ossicles, etc.	1	2
	to the base of which is attached		
<i>Garantianæ</i> ...	Limestone, similar to its equivalent—(a) at the Misterton Lime-Works	0	4
	Non-sequence. Deposits of <i>niortensis-con-</i> <i>cavi hemeræ</i> (inclusive) wanting.		
<i>Bradfordensis</i> .	Limestone, hard, bluish-grey and yellowish- brown, well iron-shot, with an iron-stained surface (to which oysters are attached); <i>Rhynchonella</i> sp. ¹ ; usually.....	0	4
	joined on to the surface of the bed below		
<i>Murchisonæ</i>	Limestone; <i>Nautilus</i> sp., <i>Pseudomelania hetero-</i> <i>cycla</i> (Deslongchamps), <i>Colastarte</i> sp., <i>Ento-</i> <i>lium demissum</i> (Phillips), <i>Gryphæa cygnoides</i> <i>Ancolioceras</i> .		
	Whidborne, <i>Lima inoceramoides</i> Whidborne, <i>Pholadomya julicula</i> J. de C. Sowerby. <i>Vari-</i> <i>musium pumilum</i> (Lamarek). <i>Rhynchonella</i> aff. <i>weigandi</i> Haas & Petri. <i>Pseudogloss-</i> <i>thyris simplex</i> (J. Buckman). <i>Terebratulina</i> sp., <i>Zeilleria anglica</i> (Oppel) (rare near the top), <i>Galeropygus agoriciformis</i> (Wright). <i>Berenicea</i> sp. (usually on the <i>Limæ</i>) etc.	2	8
<i>Scissi</i>	Sand-rock, with a very irregular surface.		

Well-Spring-Farm Quarry, Misterton (Somerset).—
In the field at (7) is an old quarry on the line of fault shown on the
Geological Survey map (Old Series, Sheet XVIII). In the quarry
are seen Top Limestones of the usual type, let down against grey
sandy *Scissum* Beds on the south side of the fault.

The Top Limestones are seen in an old quarry at (8).

Quarry near Misterton Church.—In the old quarry (9)
south of Misterton Church the Top Limestones are seen resting
on rock of *garantianæ* hemera (similar to its equivalent at the
Misterton Limeworks), and this in turn on the ironstained sur-
face of the *Murchisonæ*–*Ancolioceras* Beds, to which is attached,
here and there, ironshot rock also similar to the corresponding
deposit at the Limeworks. No doubt this is the quarry where
J. F. Walker found evidence in the form of ‘a variety of *Wald-*
heimia meriana [probably *Aulacothyris cucullata* S. Buckman],
associated with *T. decipiens*,² of the Scroff (*fusca* hemera).

¹ Mr. S. S. Buckman. to whom I submitted this specimen for examination,
informs me that he has this peculiar broad triangular form, but larger and
with one plait, from the [*Rhynchonella*-] *ringens* Beds of Sherborne [Dorset].

² Proc. Dorset Nat. Hist. & Ant. F. C. vol. iii (1879) p. 46.

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The Top Limestones are at present (1916) being worked in a quarry near Henley Farm (10).

Crewkerne Station.—This is the locality¹ from which the numerous specimens labelled ‘Crewkerne Station’ were collected in the past—especially by Mr. Darell. As the quarrying operations proceeded the sidings were extended, but now such operations have ceased. The beds exposed were ‘the upper limestones’ of Mr. S. S. Buckman²—a portion of the Top Limestones. In 1891 he referred them to the *Zigzag Zone*,³ for he informs me that his ‘Broad Windsor district’⁴ included Crewkerne Station. Before the more detailed separation of the Top Limestones was effected the term ‘*Zigzag Zone*,’ he also informs me, sometimes included deposits of *schlænbachii* date, and at other places they would be reckoned *truellei*. Thus the holotype of *Terebratula stibara* S. Buckman is stated to have come from the “‘Top Beds” of Crewkerne Station (Somerset)... circa *schlænbachii* zone.’⁵ *Zelleria bicornis* S. Buckman is recorded from the same beds and locality.⁶

Railway-cutting, Crewkerne.—I have not had the opportunity of examining what remains unobscured of this section (12). According to H. B. Woodward⁷ the beds exposed here were :

	Thickness in feet inches.
‘[<i>Schlænbachii</i> — ? <i>truellei</i> .]	7. Pale rubbly oolitic limestones (zone of <i>Ammonites Parkinsoni</i>) 6 0
[<i>Bradfordensis</i> <i>Ancolloceras</i> .]	6. Brown shelly and ironshot oolite 2 0
[<i>Sciissi</i>]	5. Hard brown limestone passing into com- pact grey oolitic limestone 1 5
[<i>Opaliniformis</i> .]	4. Pale sandy and shelly limestones 3 0
[<i>Opaliniformis</i> .]	3. Brown sandy marl with <i>Terebratula infra-</i> <i>oolitica</i> 1 0
[<i>Opaliniformis</i> .]	2. Indurated marl and sandy limestone with <i>Ammonites</i> , <i>Belemnites</i> , <i>Pecten læviradi-</i> <i>atus</i> , and <i>Rhynchonella</i> 1 3
	1. Sands with irregular bands and nodules of calcareous sandstone: <i>Pecten</i> , <i>Rhynchonella</i> <i>cynocephala</i> , <i>Serpula</i> 6 0’

Before justifying the dates here suggested for the beds noted by Woodward, it will be best to describe a section in Cat-Hole Lane.

¹ Proc. Somerset Arch. & Nat. Hist. Soc. vol. xxxvii (1892) p. 65.

² Proc. Cotteswold Nat. F. C. vol. xiii, pt. 4 (1901) p. 268; and ‘Ammonites of the Inferior Oolite Series’ Monogr. Palæont. Soc. Suppl. (1905) p. ccvi.

³ Rep. Brit. Assoc. (Cardiff) 1891, p. 656; and Geol. Mag. dec. 3, vol. viii (1891) pp. 502–503.

⁴ *Ibid.*

⁵ Q. J. G. S. vol. lxvi (1910) pp. 100 & 108, pl. xii, figs. 5–6.

⁶ Proc. Cotteswold Nat. F. C. vol. xiii, pt. 4 (1901) p. 253.

⁷ ‘The Jurassic Rocks of Britain, vol. iv—The Lower Oolitic Rocks of England (Yorkshire excepted)’ Mem. Geol. Surv. 1894, p. 68.

13. CAT-HOLE-LANE SECTION, CREWKERNE.

Thickness in feet inches.

<i>Scissi</i>	Sandstone in loose pieces.		
<i>Opaliniformis</i> .	(a ¹) Brown and purplish-grey-streaked sandy marl; belemnites, <i>Gryphæa</i> sp. (some of the less gryphoid form of an <i>Ostræa-knorri</i> Voltz aspect), <i>Variamussium læviradiatum</i> (Waagen), <i>Aulacothyris blakei</i> (Walker), <i>Rhynchonella cynocephala</i> auctt., <i>Terebratula</i> of the <i>T. haresfeldensis</i> -Group, <i>T. whaddonensis</i> S. Buckman: seen	1	0
	(a ²) Brown marly sandstone with an occasional ill-preserved opalinoid ammonite; belemnites, <i>Pleuromya</i> sp., <i>Rhynchonella cynocephala</i> auctt.—all rare	0	8
<i>Opaliniformis</i> .	(b) Ammonite Bed. Sandstone, very fossiliferous; cf. <i>Canavarella toma</i> S. Buckman (periphery not acute enough and radial line hardly sufficiently curved), <i>Cyphioceras</i> sp. nov. (a morphic equivalent to species prior to <i>Lioceras uncinatum</i> S. Buckman), <i>Walkeriaceras subglabrum</i> S. Buckman (Monogr. Amm. Inf. Ool. Series, pt. ii, 1888, pl. xiii, fig. 9), belemnites, <i>Pleuromya</i> sp., <i>Variamussium læviradiatum</i> (Waagen) (common)	1	0
	(c) Sands and sandburrs; <i>Goniomya</i> sp., <i>Pleuromya</i> sp., <i>Pteria (Oxytoma)</i> sp., <i>Variamussium læviradiatum</i> (Waagen), <i>Serpula tricarinata</i> auctt. (common): seen	1	6

Beds (a¹) and (a²) would seem to be the equivalent of the Rusty Bed of the Conegar-Hill Section, Broadwindsor, and of Whaddon Hill, near Beaminster;¹ while the Ammonite Bed is comparable with the very fossiliferous sandstone bed, bed 6 b, at Chideock-Quarry Hill,² and the similar bed immediately below the Rusty Bed at Whaddon Hill.³

Referring now to Woodward's section in the railway-cutting, one can have little doubt that bed (c) at Cat-Hole Lane is equivalent to the top portion of his Bed 1: the Ammonite Bed to his Bed 2: and beds (a²) and (a¹) probably to his Bed 3. His Bed 4 is probably of *scissi* date: Beds 5 and 6 probably of *murchisonæ-Ancolloceras* hemeræ, with ironshot rock (as at the Misterton Lineworks) attached to the top: while his Bed 7 embraces the Top Limestones.

Upon-Lang Quarry, Crewkerne.—The best section of the Top Limestones in the neighbourhood of Crewkerne is at this quarry.

¹ Proc. Geol. Assoc. vol. xxvi (1915) p. 73.

² S. S. Buckman, Q. J. G. S. vol. lxxi (1910) p. 63.

³ L. Richardson, Proc. Geol. Assoc. vol. xxvi (1915) p. 73.

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14. UPON-LANG QUARRY, CREWKERNE.

Thickness in feet inches.

Soil, purplish in places.			
<i>Schlænbacki</i> ...	Microzoa-Beds. Limestone, rubbly in places and iron-stained, with some yellowish marl; <i>Belemnopsis bessina</i> (A. d'Orbigny) (often with <i>Berenicea</i> attached), <i>Ctenostreon</i> sp., <i>Lima corybolus</i> Whidborne, <i>Aulacothyris carinata</i> (Lamarck), <i>Holcotypus hemisphæricus</i> (Agassiz), etc.	2	0
	Marl, yellowish.....	0	3
	Limestone, with 'ochreous bodies' in places ...	2	0
	Marl: 0 to 3 inches	0	1
	Limestones, more thinly-bedded than the strata below, with two layers of marl—showing 'ochreous bodies'—in the lower portion	2	3
	Massive Beds. Limestones: seen	3	0

Top Limestones, similar to those seen at Upon-Lang Quarry, are being worked in a quarry (16) near Viney-Bridge Mills, Crewkerne, and again at a quarry (18) near Hinton St. George. Formerly similar beds were worked at Kithill-Lane Quarry (17), while the highest beds of the Inferior Oolite and some overlying Fuller's Earth were observed by H. B. Woodward at the now abandoned Lye's Brickworks 'south-east of the Brewery at Crewkerne'¹ (19).

Hinton-Park Quarry, Hinton St. George.—Near the Keeper's Lodge in Hinton Park is a quarry (20) in which Top Limestones—very similar to those seen in the quarry at (18)—are displayed above massive, rich brown, ferruginous limestones of *garantianæ* date that call to mind the Hadspen Stone of the Castle-Cary district. When I first visited the quarry in 1913, the lowest stratum of these *Garantiana* Beds seen was a hard, ironshot, conglomeratic limestone that yielded the fossils recorded below; but in 1916 the quarry was not 'in work' and this bed was not exposed.

20. HINTON-PARK QUARRY.

Thickness in feet inches.

<i>Schlænbacki</i> ...	Limestone, with which is associated yellowish marl: seen	2	4
	Limestones, with thin layers of marl.....	6	2
	Marl and rich-brown ochreous matter (oxidized iron-pyrites).....	0	1
? <i>Truellei</i>	Limestone; <i>Belemnopsis bessina</i> (A. d'Orbigny), <i>Entolium demissum</i> (Phillips), etc.	1	6
<i>Garantianæ</i> ...	Limestone, massive, rich brown, ferruginous ...	?	4
	Limestone, hard, ironshot, and conglomeratic; <i>Patoceras annulatum</i> (A. d'Orbigny), <i>Belemnopsis bessina</i> (A. d'Orbigny), <i>Pleurotomaria palæmon</i> A. d'Orbigny, <i>Trochus ?biarmatus</i> Münster, <i>Astarte manseli</i> S. Buckman, <i>Entolium demissum</i> (Phillips), <i>Protocardia</i> sp., <i>Grammatodon</i> sp., <i>Trichites</i> sp., <i>Trigonia costata</i> J. Sowerby, <i>Cidaris ?bouchardi</i> Wright, <i>Pygorhytis ringens</i> (Agassiz), <i>Holcotypus hemisphæricus</i> (Agassiz), etc.	?	1
		6	

¹ 'The Jurassic Rocks of Britain, vol. iv.—The Lower Oolitic Rocks of England (Yorkshire excepted)' Mem. Geol. Surv. 1894, pp. 67-69.

The Top Limestones are worked in a quarry by the side of the Foss Way (22) between Dinnington and Lopen.

Lopen.—At Lopen there is a small outlier of Inferior Oolite and Fuller's Earth, but I could not find any sections. Moore's species, '*Rhynchonella? lopensis*,' came 'from a bed of blue Oolitic Marl, occurring in the neighbourhood of Lopen, near Ilminster.'¹

Furzy Knaps, Seavington St. Mary.—This section—which must not be confused with that at Furzey Knaps, near Yeovil,²—is in the bank by the roadside at (23).

23. SECTION AT FURZY KNAPS.

		<i>Thickness in feet inches.</i>	
? <i>Aalensis</i>	1. Sandstone, hard, yellowish-grey; ? <i>Cotteswoldia</i> sp., <i>Thracia</i> sp., <i>Rhynchonella cynocephala</i> auctt.: seen	2	0
	2. Yellowish sandy marl: 2 to 4 inches	0	3
<i>Aalensis</i>	3. Sandstones, two irregular beds, with an intervening deposit of marl; <i>Thracia</i> sp., <i>Pleuromya</i> sp., <i>Serpula tricarinata</i> auctt.	0	10
	4. Greyish-brown impure sandstone crowded with ammonites — ? <i>Canacarina renustula</i> S. Buckman, cf. <i>Cotteswoldia crinita</i> S. Buckman (one of the <i>Aalensis</i> Group), <i>Walkeriaceras delicatum</i> S. Buckman, <i>Megateuthis voltzi</i> (Phillips), <i>Pleurotomaria</i> sp., <i>Pholadomya</i> cf. <i>acuta</i> Agassiz, etc.	0	4
	5. Greyish-brown and yellowish-brown-streaked indurated, somewhat clayey, sand with sandburrs; <i>Cotteswoldia subeandida</i> S. Buckman, ? <i>C. crinita</i> S. Buckman, <i>Pleydellia leura</i> S. Buckman, <i>Pleuromya</i> sp., <i>Rhynchonella cynocephala</i> auctt., ? <i>Terebratulina deslongchampsii</i> Davidson, <i>Zeilleria</i> aff. <i>whaddonensis</i> S. Buckman, etc.: seen	5	0

The specimen of ? *Terebratulina deslongchampsii* Davidson was collected by Mr. Charles Upton, and this appears to be the first satisfactory record of its occurrence in this country.³

¹ '*Rhynchonella? lopensis*' was first described as '*Rhynchonella? triangularis* Moore' by Davidson in 1854 ('British Fossil Brachiopoda' Monogr. Palæont. Soc. vol. i, pt. iii—Appendix, p. 30); but, as the specific name was occupied, Moore changed it to '*lopensis*' in 1855 (Proc. Somerset Arch. & Nat. Hist. Soc. vol. v, 1855, p. 114 & pl. i, figs. 9-10). As '*Rhynchonella? lopensis* Moore,' Davidson deals with and figures the species in his Monograph in 1878 ('British Fossil Brachiopoda' Monogr. Palæont. Soc. vol. iv, pt. ii, no. 2, p. 217 & pl. xvii, figs. 8-9). Mr. Buckman informs me (*in litt.*) that he has found 'the same and allied species of this very peculiar and distinctive Rhynchonellid in the Marl Bed (*Garantiana* Beds) of Bradford Abbas: this proves the date of some Lopen deposit.' I have not met with any deposit in the Inferior Oolite of this neighbourhood answering to Moore's description, and it is well to bear in mind that Moore regarded the Yeovil Sands as belonging to the Inferior Oolite Series (Proc. Somerset Arch. & Nat. Hist. Soc. vol. xiii, 1867, pp. 141-43). They contain beds of 'blue marl' in places near their top.

² 'Ammonites of the Inferior Oolite Series' Monogr. Palæont. Soc. Suppl. pt. xiii (1905) pp. clxxii & clxxiv.

³ The specimens on which Davidson founded the species came from France (Ann. & Mag. Nat. Hist. ser. 2, vol. v, 1850, p. 450 & pl. xv, figs. 6-6a). Charles Moore recorded the species from the Middle Lias of Whatley, near

In the lane (24) near Allowenshay yellow sands and sandburrs, full of *Serpula tricarinata* auctt., are exposed. From a hard bed at the top I obtained a number of specimens of a small form of *Rhynchonella cynocephala* auctt., and from one of the sandburrs *Dumortieria arenaria* S. Buckman indicating *moorei* hemera.

There are excellent sections in the Sands in the lanes at Dinnington (21) and Hinton St. George (26).

Manor-House Quarry, North Perrott.—This quarry is the one mentioned by H. B. Woodward as situated 'by New Hall, west of North Perrott Church.'¹

Concerning the quarry, Woodward wrote that it shows 'about 18 feet of false-bedded shell-limestones, interbedded with buff sands and sandy limestones, that . . . occur locally in the upper part of the Midford Sand in this district, and are well represented at Ham Hill. The shell fragments are mostly indeterminable as to species, consisting of *Ostrea*, *Pecten*, and *Aricula*; but Mr. Rhodes obtained *Pecten demissus* and *Belemnites voltzi* (?).' (*Loc. cit.*)

A photograph of this section is reproduced in Pl. XIV.

QUARRY AT NORTH PERROTT MANOR HOUSE.

		<i>Thickness in feet inches.</i>	
<i>Scissi</i>	1. Bluish-grey and pale-yellow, very fine-grained, micaceous, sandy clay; <i>Belemnites</i> sp., <i>Aulacothyris blakei</i> (Walker), <i>Rhynchonella cynocephala</i> auctt., <i>Terebratula</i> cf. <i>T. havesfieldensis</i> Group: about	4	0
? <i>Scissi</i>	2. Limestone, fairly-regular band of whitish-looking sandy limestone, <i>Ostrea</i> sp.	0	6
<i>Opaliniformis</i> <i>Aalensis</i> .	3. Yellow, micaceous, sandy clay, weathering to a pale grey, with rubbly limestone and rolled and often phosphatized fossils in the lower portion; <i>Pleydellia aalensis</i> (Zieten) at the very base; <i>Belemnites irregularis</i> Schlotheim (rolled), <i>Ostrea</i> sp. (some are of an <i>Ostrea-knorri</i> Voltz aspect, others more gryphoid), <i>Aulacothyris blakei</i> (Walker), <i>Zeilleria whaddonensis</i> S. Buckman, <i>Rhynchonella cynocephala</i> auctt., <i>Rh. pentaptycta</i> S. Buckman: about	1	0
'Perrott Stone' (probably <i>moorei</i>).	4. Limestone, brown, practically made up of shell-fragments, shaly in places, very hard, blue-centred and crystalline in others, irregularly bedded; <i>Lytoceras</i> sp. (large and not infrequent): about	18	0
	5. Sand-rock, often soft and very sandy: seen	2	0

The 'Perrott Stone' has been used considerably in the village for building-purposes, and has a very pleasing warm-brown colour.

Frome, Somerset (Proc. Somerset Arch. & Nat. Hist. Soc. vol. xiii, 1867, p. 157); but Davidson states that he was unable to check Moore's identification, because the specimens (Moore's) had been mislaid ('British Fossil Brachiopoda' Monogr. Palæont. Soc. vol. iv, pt. ii, no. 1, pp. 117-18).

¹ 'The Jurassic Rocks of Britain, vol. iv--The Lower Oolitic Rocks of England (Yorkshire excepted)' Mem. Geol. Surv. 1894, p. 71. This section was visited by some members of the Geologists' Association on April 14th, 1914 (Proc. Geol. Assoc. vol. xxvi, 1915, pp. 74-76). It is now within the gardens of the Manor House, which were extended in 1914.

The sandy clay of Bed 3 corresponds to Beds (a^1) and (a^2) of the Cat-Hole Lane section; while the rubbly limestone and rolled and often phosphatized fossils in its lower portion represent the worn remains of probably an attenuated development of the greater portion of the *Opaliniforme* Beds, and the *Aalensis* Beds.

Slade's Quarry, North Perrott.—In two adjacent fields on the south side of Trindlewell Lane are two openings—one, a quarry (Slade's—(28)) 'in work'; the other, an old working under the hedge some 150 yards to the west.

SECTION IN THE OLD WORKING.

		<i>Thickness in feet inches.</i>	
<i>Fusæ</i>	Fuller's Earth. Clay; <i>Belemnopsis</i> sp.: seen	2	6
	The Scroff. Yellowish-grey indurated marl: about	0	3
<i>Zigzag</i>	<i>Zigzag</i> Bed. Limestone, rubbly, bluish-grey; <i>Ecotraustes</i> sp.	0	6
<i>Schlænbach</i> ...	Limestones; <i>Terebratula sphæroidalis</i> auctt., <i>Collyrites ovalis</i> (Leske): seen	1	0
28. SLADE'S QUARRY.¹			
? <i>Truellei</i>	Limestones, 'sparry,' largely composed of fragments of isocrinoid-ossicles; <i>Belemnopsis bessina</i> (A. d'Orbigny): seen	2	0
<i>Garantianæ</i> ...	Reddish-brown, ferruginous, clayey deposit: average	0	1
	(a) Limestone whitish, with occasional large grains, very fossiliferous; <i>Parkinsonia</i> sp., <i>Belemnopsis bessina</i> (A. d'Orbigny), <i>Ataphrus acmon</i> (A. d'Orbigny) and varieties, <i>Delphinula</i> sp., <i>Pleurotomaria elongata</i> (J. Sowerby), <i>P. granulata</i> (J. Sowerby) var. <i>colata</i> Deslongchamps, <i>Arca</i> sp., <i>Ctenostreon pectiniforme</i> (Schlotheim), <i>Trigonia costata</i> J. Sowerby, <i>Rhynchonella parvula</i> Deslongchamps. <i>Rh. ?plicatella</i> (J. de C. Sowerby), isocrinoid-ossicles, <i>Cidaris bouchardi</i> Wright, <i>Collyrites ovalis</i> (Leske), <i>Holactypus hemisphæricus</i> (Agassiz), <i>Corynella cribrata</i> Hinde, and <i>Holcospongia sulcata</i> Hinde	1	5
	(b) Limestone, whitish; <i>Belemnopsis bessina</i> (A. d'Orbigny), <i>Astarte manseli</i> S. Buckman, <i>Cidaris</i> sp., isocrinoid-ossicles	0	7½
	(c) Limestone, similar to (b), with a greater quantity of ochreous matter associated	0	4½
	Non-sequence. Deposit of <i>niortensis</i> - <i>bradfordensis</i> hemeræ (inclusive) wanting.		
<i>Murchisonæ</i>	Limestone; <i>Geyerina</i> sp. (1 foot 11 inches from the top of the bed), <i>Cælastarte</i> sp., <i>Cucullæa oblonga</i> J. Sowerby, <i>Entolium demissum</i> (Phillips), <i>Variamussium læviradiatum</i> (Waagen), <i>Gerullia whidbornei</i> Paris, <i>Gresslya abducta</i> (Phillips), <i>Isocardia cordata</i> (J. Buckman), <i>Lima inoceramoides</i> Whidborne (often with <i>Berenicea</i> attached), <i>Opis trigonalis</i> (J. de C. Sowerby), <i>Trigonia ?sculpta</i> Lycett, <i>Terebratula</i> sp.: seen	2	8

¹ This quarry was also visited by the Geologists' Association on April 14th 1914 (Proc. Geol. Assoc. vol. xxvi, 1915, p. 75).

part 2] INFERIOR OOLITE OF THE CREWKERNE DISTRICT. 165

In the old working the beds mentioned may be seen after a little excavating has been done.

The rock of *garantianæ* hemera is very interesting, on account of its highly fossiliferous nature.

The limestone dated *murchisonæ-Ancolloceras* is separable into three layers—the upper two (equivalent to the Blue and Red Beds of Misterton), 22 inches thick; the lowest (equivalent to the Grey or Cockle Bed), 10 inches thick.

The *Scissum* Beds are not exposed; but the quarryman said that the quarry was not worked deeper, because only soft sandy rock would be encountered.

Haselbury Plucknett.—In times past there was a quarry of considerable extent situated to the south of the church (29). It is now filled in, and serves as a small common for the village. Doubtless this was the quarry visited by Hudleston, concerning which he wrote¹:

‘This is a place of considerable importance as a quarry, but it is more remarkable for *Echini* and conchifera than for gasteropoda. *Isocardia cordata* is a noteworthy fossil here, since its occurrence in Dorset has not often come under my notice.*

‘It must be allowed that Profile No. 3 [that is, of this Haselbury section] is very inferior in interest ... to the two preceding [Burton-Bradstock Cliff and Vitney or Vinney Cross], since but few gasteropoda are noted from this quarry. I have introduced it mainly to show the preponderating importance of the Lower Division, and especially of the *Murchisonæ* zone in this area. The massive shell-bed with keeled ammonites certainly represents nothing higher than the *convexus* (*Sowerbyi*) zone, whilst all the rest must be in the *Murchisonæ* zone or lower. The gasteropoda are probably on the same line as at Drympton, which I conceive to be towards the base of the *Murchisonæ* zone.’

* Specimens of this fossil are not uncommon in the beds of (1) *Murchisonæ* and (2) *Ancolloceras-scissi* hemeræ at the Marston-Road Quarry, near Sherborne.

The information given with Hudleston’s ‘Profile’ (*op. cit.* p. 41) is:

		<i>Thickness in feet inches.</i>	
‘[<i>schlœnbachi</i>]	[1].	Top Bed. No fossils noted.....	1 0
	[2].	Brash	0 3
[? <i>bradfordensis</i>]	[3].	Massive shell-bed with large conchifera. Keeled ammonites.....	2 4
	[4].	Massive creamy limestones, with some shells: <i>Ammonites murchisonæ</i> , <i>Lima etheridgei</i> , and <i>Waldheimia anglica</i> : common	2 0
[? <i>Ancolloceras</i>]	[5].	Calcareous rock.....	0 11
	[6].	Shelly towards the top, with a few gasteropoda	1 6
[? <i>Scissi</i>]	[7].	Base-bed	1 4’

Mr. S. S. Buckman considers Bed 7 to be of *scissi* hemera,

¹ ‘The Inferior Oolite Gasteropoda’ Monogr. Palæont. Soc. pt. i (1887) p. 40.

and Beds 5 & 6 probably *Ancolloceras*.¹ From 'the white limestone of the "lower beds" [that is, 4-6], of '*Murchisonæ* hemera,' he records *Paqueria angulata* S. Buckman²; 'probably from Haselbury, Somerset, and certainly from the horizon of *Zeilleria anglica*, for there is a specimen thereof in the matrix,' *Ludwigia tuberculata* S. Buckman³; and 'from the lower beds [that is, 4-6], '*Ludwigia gradata* S. Buckman.⁴ Bed 3, Mr. Buckman suggests to me (*in litt.*), may be *bradfordensis*, but he does not recollect any *bradfordensis* specimens from Haselbury; also he informs me that he does not remember having seen any specimens indicating *garantianæ* hemera from this locality. This is the quarry from which the greater number of the fossils labelled 'Haselbury' came in the seventies and eighties, and is the one referred to as 'Haselbury' in Mr. Buckman's paper on 'The Brachiopoda from the Inferior Oolite of Dorset & a Portion of Somerset.'⁵

The paratype of *Lytoceras sigalœn* S. Buckman, a specimen 16 inches in diameter, came 'from Yeovil Sands, Haselbury, Somerset,'⁶ but Mr. Buckman informs me that its 'more exact horizon is unknown, as the specimen was purchased from a working collector.'

Haselbury-Mill Quarry, Haselbury Plucknett.—The section displayed in this quarry is of very considerable interest, but has not been noticed by any previous author.

30. HASELBURY-MILL QUARRY.

		<i>Thickness in feet inches.</i>	
Chocolate-coloured clayey soil, with numerous flints.			
	Fuller's Earth. 1a. Brownish-yellow clay, with darker layers. 'Snuff-boxes' occur in the lowest portion; <i>Belemnopsis</i> sp.: about...	3	0
<i>Fusæ</i>	Equivalent to the Scroff. 1b. Chocolate-coloured clayey marl, with large specimens of <i>Terebratula sphaeroidalis</i> auctt.: average.....	0	2
<i>Zigzag</i>	2. <i>Zigzag</i> Bed. Limestone, rubbly, bluish-centred, but weathering whitish, and having a layer of chocolate-coloured clayey marl below; <i>Morphoceras</i> aff. <i>inflatum</i> (Quenstedt), <i>M. polymorphum</i> (A. d'Orbigny), <i>M.</i> aff. <i>polymorphum</i> (A. d'Orbigny), <i>M. pseudo-anceps</i> (Ebray), cf. <i>Parkinsonia planulata</i> (Wetzl, ?non Quenstedt), <i>Procerites procerus</i> (Seebach), <i>Amberteya</i> sp., <i>Opis lunulatus</i> (J. Sowerby), <i>Acanthothyris spinosa</i> (Linné), <i>Terebratula sphaeroidalis</i> auctt., etc.: average.....	0	4

¹ Q. J. G. S. vol. lxxvi (1910) p. 79.

² 'Ammonites of the Inferior Oolite Series' Monogr. Palæont. Soc. Suppl. (1905) p. lxxvii.

³ *Ibid.* p. lxxix.

⁴ *Ibid.* p. lxxi.

⁵ Proc. Dorset Nat. Hist. & Ant. F. C. vol. iv (1882) pp. 5, 20, 23, 26, 29, 36, 43.

⁶ Geol. Mag. dec. 3, vol. ix (1892) p. 260.

		<i>Thickness in feet inches.</i>	
<i>Schlænbach</i> ...	3. Limestone, very shelly, weathering into three irregular layers; <i>Oppelia subradiata</i> (A. d'Orbigny non Sowerby), cf. <i>Procerites evolutoides</i> Siemiradzki, belemnites, <i>Ataphrus</i> sp., <i>Natica</i> sp., <i>Pleurotomaria</i> sp., <i>Trochus</i> sp., <i>Trigonia costata</i> J. Sowerby, <i>Trochocyathus</i> sp.	0	9
	4. Limestone, fairly massive-looking, with an irregular nether surface. Numerous lamelli-branches in places. <i>Belemnopsis bessina</i> (A. d'Orbigny), <i>Ataphrus</i> sp., <i>Pleurotomaria</i> sp., <i>Acanthothyris panacanthina</i> Buckman & Walker, <i>Rhynchonella</i> sp., <i>Trochocyathus maguervilleanus</i> (Michelin), <i>Serpula</i> sp., isocrinoid-ossicles, etc.	1	3
	5. Sponge-Bed—a greyish-white deposit of marl and rubble with numerous examples of the sponges <i>Craticularia foliata</i> (Quenstedt), <i>Holcospongia liasica</i> (Quenstedt), and <i>Tremadictyon sparsum</i> Hinde; <i>Serpulæ</i> and microfossils (see list below). <i>Alectryonia</i> cf. <i>costata</i> (J. de C. Sowerby), <i>Chlamys</i> cf. <i>ambigua</i> (Münster), ¹ <i>Dimyodon sollasi</i> (Whidborne), ² <i>Aulacothyris cretekerniensis</i> S. Buckman, <i>Rhynchonella</i> sp., <i>Zeilleria waltoni</i> (Davidson), etc.: average	1	0
? <i>Truellei</i>	6 a. Limestone, with innumerable isocrinoid-ossicles showing on the weathered surface. Oxidized iron-pyrites	0	8
	6 b. Limestone, similar to a	0	6
<i>Garantianæ</i> ...	7. Rich yellowish-brown marl and ochreous matter: 0 to 3 inches	0	2
	8. Limestone, grey, with large granules. Oxidized iron-pyrites. <i>Terebratula sphæroidalis</i> auctt.	0	6
	Non-sequence. Deposits of <i>niortensis-murchisonæ</i> hemeræ (inclusive) wanting.		
<i>Ancolioceras</i>	9. Limestone, hard, grey, sandy, passing down into more sandy and softer rock weathering brownish. Has some rich reddish-brown ochreous matter in cavities. Belemnites, <i>Entolium demissum</i> (Phillips), <i>Variamussium læviradiatum</i> (Waagen), <i>Ceromya concentrica</i> (J. de C. Sowerby), <i>Isocardia cordata</i> (J. Buckman), <i>Trigonia ? sculpta</i> Lycett: seen	1	8
<i>Scissi</i> .			

The lowest bed (9) seen in this quarry is dated as *Ancolioceras-scissi* on the basis of comparison, because I did not obtain any evidence from ammonites.

I did not obtain here a single specimen of *Zeilleria anglica* (Oppel)—the characteristic brachiopod of the *Murchisonæ* Beds of the neighbourhood of Beaminster.

The lithic characters of the rock dated as *garantianæ* call to

¹ This form is similar to those, noticed as being closely allied to *Chlamys ambigua* (Münster), from the *Truellei*- and *Schlænbach*-Beds of Burton Bradstock: E. T. Paris & L. Richardson, Q. J. G. S. vol. lxxi (1915-16) p. 526.

² G. F. Whidborne, Q. J. G. S. vol. xxxix (1883) p. 515 & pl. xv, figs. 21-22.

mind those of the Marl Bed and subjacent limestone of the neighbourhood of Bradford Abbas; and those of Bed 6, the rock queried as *truellii* at Slade's Quarry, North Perrott.

The most interesting deposit in this section is the Sponge-Bed. It is similar in appearance to the well-known spongiferous beds at Shipton Gorge (Dorset).¹ The sponges here at Haselbury, however, are represented by few species.

Mr. Upton has examined for me a sample of the marl from the Sponge-Bed, and reports the occurrence of the following fossils:

BRACHIOPODA.²

- Crania canalis* Moore.
- ? *Spiriferina minima* Moore.
- ? — *oolitica* Moore.
- Thecidella granulosa* (Moore).
- *serrata* (Moore).
- sp.
- Zellania davidsoni* Moore.

POLYZOA.

- Fragments of several forms.

OSTRACODA.

- Bairdia fullonica* Jones & Sherborn. Common.
- Cytheridea* sp. Similar to a specimen found in Bed 2 (? *fuscæ*) of King's Pit, Bradford Abbas.³
- Cythereis* sp.
- Polycope* sp.
- Several undetermined forms.

ANNELIDA.

- Serpula* sp.
- Spirorbis midfordensis* Richardson.⁴

HOLOTHUROIDEA.

- Chirodota convexa* Whidborne.⁵
- Two specimens were obtained from the Sponge-Beds at Peas-Hill Quarry, Shipton Gorge.

SPONGIDÆ.

- Reniera* sp. Spicule.

FORAMINIFERA.

- Biloculina* sp.
- Cornuspira cretacea* Reuss.

Cristellaria acuta Fichtel & Moll.

— *cultrata* Montfort.

— *exilis* Reuss.

— *gladius* (Phillips).

— *italica* DeFrance.

— *rotulata* (Lamarck).

— *tricarinata* Reuss.

Flabellina pulchra A. d'Orbigny.

Frondulularia oolitica Terquem.

Glandulina humilis Römer.

Lagena elongata Ehrenberg.

— *lævis* Montfort.

Lingulina semiornata Reuss.

Marginulina bullata Reuss.

— *contracta* Terquem.

— *inæquistriata* Terquem.

Nodosaria brevis (A. d'Orbigny).

— *communis* (A. d'Orbigny).

Very common.

— *nitida* A. d'Orbigny.

— *radicula* (Linné).

— *raphanistrum* (Linné).

— *raphanus* (Linné).

Planularia bronni (Römer).

— *crepidula* Fichtel & Moll.

— *harpula* (A. d'Orbigny).

— *pauperata* Jones & Parker.

— *recta* A. d'Orbigny.

— *remeri* (Reuss).

Polymorphina fusiformis Römer.

— *lactea* Walker & Jacob.

Rhabdogonium cf. *hærengense* (Gümbel).

Textularia trochus A. d'Orbigny.

Vaginulina cf. *heteropleura* Terquem.

— *striata* A. d'Orbigny.

¹ L. Richardson, Proc. Geol. Assoc. vol. xxvi (1915) pp. 60-61. See also E. A. Walford, Q. J. G. S. vol. xlv (1889) pp. 561-74 & pls. xvii-xix; and *ibid.* vol. l (1894) pp. 72-78 & pls. ii-iv.

² Mr. Upton remarks that all these species of brachiopods occur also in the Upper Coral-Bed of Dundry Hill, near Bristol.

³ Proc. Geol. Assoc. vol. xxii (1911) p. 262.

⁴ L. Richardson, Q. J. G. S. vol. lxiii (1907) p. 435.

⁵ See C. Upton, Proc. Cotteswold Nat. F. C. vol. xix (1917) p. 116.

From the occurrence of the Thecidellæ and specimens of *Spiriferina oolitica* Moore, Mr. Upton is inclined to regard the deposit as being of *truellei* hemera: that is, of the date of the Upper Coral-Bed of Dundry Hill (near Bristol), Midford (near Bath), and the Cotteswolds. I have regarded it as *schlænbachi*, because of the apparent absence of corals (*Isastræa*), the occurrence of *Tremadictyon sparsum* Hinde, its similarity to the Sponge-Beds—definitely of *schlænbachi* hemera—of Shipton Gorge and Burton Bradstock; and because of its stratigraphical relations to beds above and below.

Barrows-Hill Quarry, East Chinnoek, near Haselbury.¹—In this quarry (32) is seen—in ascending order—the top-portion of the equivalent to the ‘Perrott Stone’; yellow and grey sandy clay (10 inches) similar to that of Bed 3 at the Manor-House Quarry, North Perrott; and sandy clays, with subordinate bands of greyish-white limestone (8 feet seen), which contain in abundance specimens of *Aulacothyris blakei* (Walker), *Rhynchonella cynocephala* auctt., *Terebratula whaddonensis* S. Buckman, and *Terebratula* sp.

Chiselborough Hill.—The ‘Roadstone,’ which is worked in a quarry (33)² on this hill, is very similar to the Perrott Stone and comparable with the ‘Riddings’ of Ham Hill. It is most likely of *moorei* date.

Ham Hill.—At Ham Hill (see p. 145 of this paper) the portion of the Yeovil Sands of *dumortieriæ* date consists of yellow micaceous sands, with irregular bands of sand-rock and sand-burrs, about 90 feet thick. They are excellently exposed in a deeply-sunken lane (36) south-west of Montacute. The portion of *moorei* date is exposed in the big quarry on the hill (35) and the main mass of it is a ‘freestone’—the celebrated Ham-Hill Building-Stone.

In the big quarry the sequence is as follows:³

	<i>Thickness in feet.</i>
1. Sand: seen about	10
2. ‘Riddings’	30
3. Ham-Hill Stone { ‘Yellow Beds’	33
{ ‘Grey Beds’	15
4. ‘Bottom-Bed’—hard sandstone	1½

¹ This is the ‘near Haselbury’ of Mr. Buckman’s paper of 1882 (Proc. Dorset Nat. Hist. & Ant. F. C. vol. iv, pp. 16, 33, & 43); ‘Middle Chinnoek’ of his paper of 1895 (Q. J. G. S. vol. li, p. 453); and ‘Little Silver’ of his 1910 paper (Q. J. G. S. vol. lxxvi, p. 101).

² ‘The Jurassic Rocks of Britain, vol. iv—The Lower Oolitic Rocks of England (Yorkshire excepted)’ Mem. Geol. Surv. 1894, p. 71.

³ S. S. Buckman, Q. J. G. S. vol. xlv (1889) p. 449.

In the Rock Quarry (34)¹ the Sand (I above) is seen overlying some 20 feet of 'Riddings.'

IV. CONCLUSION.

In this communication a detailed description has been given of the Inferior Oolite and immediately sub- and superjacent deposits of the Crewkerne district.

Roughly speaking, the Upper Liassic Sands of *dumortieræ-moorei* hemeræ south-west of a line joining South Petherton, Crewkerne, and South Perrott, are very similar to their equivalents in the Burton-Bradstock-Beaminster-Broadwindsor District. North-west of that line, however, limestones—largely composed of shell-débris—replace a considerable portion of the yellow sand of *moorei* hemera, 'thickening' from about 18 feet at North Perrott ('Perrott Stone') to 78 feet at Ham Hill ('Riddings and Ham-Hill Building-Stone').

In the extreme south-western portion of the district, around (say) Drimpton, the *Aalensis* Beds are probably also very similar to their equivalents in the Burton-Bradstock-Beaminster-Broadwindsor district, and at Furzy Knaps, near Seavington St. Mary (4 miles north-west of Crewkerne), what is seen of them is highly fossiliferous. East of Crewkerne, however, these beds 'attenuate,' and fail altogether between North Perrott and Yeovil Junction.

At Broadwindsor, Whaddon Hill (near Beaminster), and Chiddock Quarry Hill (near Bridport), the *Opaliniforme* Beds comprise, in descending order—

- (a) Rusty Bed,
- (b) Very fossiliferous sandstone, and
- (c) Sands and sandburrs.

The equivalent of Bed *b* is readily recognized at the Cat-Hole-Lane Section, Crewkerne, where it is very rich in ammonites. Above are deposits 20 inches thick, with little doubt equivalent to the Rusty Bed of more southern localities. East of Crewkerne, the *Opaliniforme* Beds—like the *Aalensis* Beds—'attenuate,' the lower beds apparently disappearing first. Also, like the *Aalensis* Beds, they fail somewhere between Crewkerne and Yeovil Junction: to be more exact, between East Chincock and the Junction.

The *Scissum* Beds are 6 feet 2 inches thick at Broadwindsor and rich in specimens of *Gryphæa cygnoides* Whidborne, *Lima inoceramoides* Whidborne, *Folsella sowerbyana* (A. d'Orbigny), etc. They retain the characters exhibited at Broadwindsor in the area south of the L. & S.W. Railway; but at North Perrott—on the

¹ Not the 'Rocks' Quarry, as it has been previously denominated in Proc. Geol. Assoc. vol. xxii (1911) p. 259 and Proc. Cotteswold Nat. F. C. vol. xvii (1914) p. 113.

ANALYSIS OF THE PRINCIPAL SECTIONS IN THE CREWKERNE DISTRICT.

Hemeræ.	CONEGAR-HILL SECTION, BROAD-WINDSOR, DORSET.	1. DRIMPTON, DORSET.	5. HILL-FARM SECTION, SOUTH PERROTT, DORSET.	4. LECKER-BRIDGE SECTION, NEAR SOUTH PERROTT.	MISTERTON, SOMERSET. 9. QUARRY NEAR THE CHURCH. 3. LIME-WORKS.	14. UPON-LANG QUARRY. 13. CAT-HOLE-LANE SECTION.	20. HINTON-PARK QUARRY. 23. FURZY KNAPS, SEAVINGTON ST. MARY.	NORTH PERROTT. 28. SLADE'S QUARRY. 27. MANOR-HOUSE QUARRY.	30. HASELBURY-MILL QUARRY, HASELBURY PLUCKNETT.	32. BARROWS' HILL QUARRY, EAST CHINNOCK.
<i>fusca</i> .					QUARRY NEAR THE CHURCH. The Scroff.			IN OLD WORKING. Fuller's Earth, seen: 2 ft. 6 ins. The Scroff, about 3 ins.	Fuller's Earth, seen: 3 ft. ? The Scroff, average: 2 ins.	
i <i>A. zigzag</i> .					[Probably represented.]			6 ins.	4 ins.	
ii, i. <i>schlœnbachi</i> .	Limestones (? <i>schlœnbachi</i>), seen: 3 ft.		Limestones (? <i>schlœnbachi</i>), seen: 2 ft.	Limestones (? <i>schlœnbachi</i>), seen: 2 ft.	LIME-WORKS. Microzoa-Beds, seen: 2 ft. 2 ins. Massive Beds, 3 ft. 7 ins.	UPON-LANG QUARRY. Microzoa-Beds, seen: 6 ft. 7 ins. Massive Beds, seen: 3 ft.	HINTON-PARK QUARRY. <i>Schlœnbachi</i> Beds, seen: 8 ft. 7 ins.	<i>Schlœnbachi</i> Beds, seen: 1 ft.	<i>Schlœnbachi</i> Beds—Limestones; 2 ft. Sponge-Bed, 1 ft.	
iv, iii. <i>truellei</i> .	[? wanting.]		[? wanting.]	[? wanting.]	? <i>Truellei</i> Bed, 1 ft. 4 ins.	[?]	? <i>Truellei</i> Bed, 1 ft. 6 ins.	SLADE'S QUARRY. ? <i>Truellei</i> Bed, seen: 2 ft.	? <i>Truellei</i> Bed, 1 ft. 2 ins.	
vi, v. <i>garantianæ</i> .	—		—	3 to 7 ins.	2 to 4 ins.	[Probably represented.]	Limestone (cf. Hadspen Stone); about 4 ft. 8 ins. Limestone, conglomeratic; about 1 ft. 6 ins.	2 ft. 6 ins.	8 ins.	
vii. <i>niortensis</i> .	—		—	—	—	—	—	—	—	
viii. <i>blagdeni</i> .	—		—	—	—	—	(See footnote, p. 152.)	—	—	
ix. <i>sauzei</i> .	—		—	—	—	—	—	—	—	
xi, x. <i>witchellia</i> .	—		—	—	—	—	—	—	—	
xii. <i>shirbuirniæ</i> .	—		—	—	—	—	—	—	—	
xiv, xiii. <i>discitæ</i> .	—		—	—	—	—	—	—	—	
xix, xv. <i>concavi</i> .	—		—	—	—	—	—	—	—	
xxi, xx. <i>bradfordensis</i> .	—		—	—	<i>Rh.-ringens</i> Beds horizon: 0 to 4 ins. [<i>P.-brebissoni</i> Bed not represented.]	[Probably deposits similar to those at the Lime-Works, Misterton, are present.]	(For remarks on the possible occurrence in this neighbourhood of deposits of these hemeræ, see p. 151.)	—	—	
xxiii, xxii. <i>Murchisonæ</i> .	[Upper strata wanting.] Bottom stratum—1 ft. 1 in.	Upper strata— <i>Zeilleria-anglica</i> Beds. [Lower strata probably represented.]	—	—	Blue Bed, 1 ft.	—	—	[Upper strata— <i>Zeilleria-anglica</i> Beds wanting.] seen: 2 ft. 8 ins.	[Upper strata— <i>Zeilleria-anglica</i> Beds apparently wanting. Probably the lower strata also.]	
xxiv. <i>Ancolloceras</i> .	2 ft.	[Probably represented.]	} <i>Ancolloceras</i> or <i>scissi</i> .—1 ft. 8 ins.	} <i>Ancolloceras</i> or <i>scissi</i> .—1 ft. 8 ins.	Red Bed, 8 ins. Grey Bed, 1 ft. 1 in.	—	—	[Probably represented.]	—	
xxv. <i>scissi</i> .	7 ft. 2 ins.	[Probably represented.]			seen: 6 ft.	seen: 3 ft. 10 ins.	Surface seen.	CAT-HOLE LANE. Sandstone in loose pieces.	[Probably represented.]	MANOR-HOUSE QUARRY. Sandy clay, seen: 4 ft. Limestone (? <i>scissi</i>), 6 ins.
xxvi. <i>opaliniformis</i> .	(a) Rusty Bed, 6 ins. (b) Very fossiliferous sandstone, 1 ft. 6 ins. (c) Sand-rock and sands, ? 4 ft. 3 ins. to 5 ft. 3 ins.					<i>a</i> ¹ , <i>a</i> ² . Marl and marly sandstone, 1 ft. 8 ins. <i>b</i> . Ammonite Bed, 1 ft. <i>c</i> . Sands and sandburrs, seen: 1 ft. 6 ins.	[Probably represented.]	(Bed 3.) Sandy clay (corresponding to <i>a</i> ¹ and <i>a</i> ² at the Cat-Hole Lane Section), with rubbly limestone and rolled and often phosphatized fossils at the base.		Sandy clays corresponding to Bed 3 at Manor-House Quarry, North Perrott.
xxvii. <i>aalensis</i> .	Yellow Sands.						FURZY KNAPS. ? <i>aalensis</i> -sandstone and marl, 2 ft. 3 ins. <i>aalensis</i> -sandstones, clayey sand, sandburrs and sand, seen: 6 ft. 2 ins.			[Apparently not represented.]
<i>moorei</i> .								Perrott Stone (probably <i>moorei</i>).		Top of 'Perrott Stone' seen.

north—what appears to be equivalent to their lowest portion is softer and thicker. The *Scissum* Beds also fail between East Chinnock and the Junction.

The *Scissum* Beds are succeeded by the *Ancolioceras* Beds—at the Conegar-Hill section, Broadwindsor, two strata, each 1 foot thick. The *Ancolioceras* Beds extend into the Crewkerne district. They are well exposed at the Misterton Limeworks and at other sections in the neighbourhood, and apparently were proved in the now filled-up quarry in Haselbury-Plucknett village. Probably the *Ancolioceras* Beds persist throughout the Crewkerne district.

The upper portion of the *Murchisonæ* Beds is the main horizon for *Zeilleria anglica* (Oppel). In the neighbourhood of Beaminster specimens of this brachiopod are very abundant. The true *Zeilleria-anglica* Beds are absent from the Conegar-Hill section, but occur at Drimpton in the extreme south of the district under consideration. They have apparently been met with in the now filled-up quarry in Haselbury Plucknett; but I have not detected them elsewhere in the district.

Attached in places to the top of the *Murchisonæ-Ancolioceras*-Beds is ironshot rock, probably of *bradfordensis* hemera: perhaps of late *bradfordensis* date—the date of the *Rhynchonella-ringens* Beds of the Sherborne District. A thicker deposit of *bradfordensis* hemera may be present in the neighbourhoods of Dinnington and Haselbury Plucknett, for fossils have been found by previous workers which suggest that this is the case; but I personally have not obtained any evidence. Ammonites in the Moore Collection at Bath point to the occurrence of deposits of *concavi* and *discitæ* hemeræ in the neighbourhood of Dinnington; but I have not detected any deposit in the district that belonged to a hemera between those of *bradfordensis* and *garantianæ*. Traces of rock of *blagdeni* hemera may occur, however, in the neighbourhood of Dinnington.

There is thus a great hiatus in the Inferior Oolite Series of the Crewkerne district, there being—except possibly in the neighbourhood of Dinnington—no rock present assignable to any hemera between those of *bradfordensis* and *garantianæ*—the latter the date of the wide-spreading Upper *Trigonia* Grit of the Cotteswolds.

The rock of *garantianæ* hemera varies a good deal in lithic characters, thickness, and the number of fossils that it contains in the Crewkerne district. Thus, at the Misterton Limeworks it is from 2 to 4 inches thick and practically unfossiliferous; it is wanting at South Perrott; is very fossiliferous at North Perrott; contains few fossils at the Haselbury-Mill Quarry; but at Hinton St. George is probably 6 feet thick, and very similar in appearance to the Hadspen Stone of the Castle-Cary district.

It has not been possible to identify definitely the *Truelli* Bed in the district. Not more than the lowest 2 feet of the Top Limestones may be of this hemera: the main part of those limestones is of *schlœnbachi* date. The *Schlœnbachi* Beds 'attenuate' east of Crewkerne; but at Haselbury-Mill Quarry, in

what I regard as their lower portion, is a very interesting Sponge-Bed, similar in appearance to that exposed in the Peas-Hill Quarry, Shipton Gorge (Dorset). The Sponge-Bed is rich in microzoa, and Mr. Charles Upton—on the evidence that they supply—would correlate the deposit with the Upper Coral-Bed (early *truelliei*) of Dundry Hill, Midford, and the Cotteswolds.

The *Zigzag* Bed has been observed at North Perrott and Haselbury Mill.

The Scroff—the horizon of *Aulacothyris cucullata* S. Buckman—was apparently observed by J. F. Walker in a quarry near Misterton Church.

Fuller's-Earth clay succeeds the Scroff.

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[July 9th, 1919.]

EXPLANATION OF PLATES XIV-XVI.

PLATE XIV.

Quarry in 'Perrott Stone,' at North Perrott Manor House, near Crewkerne (Somerset). (See p. 163.)

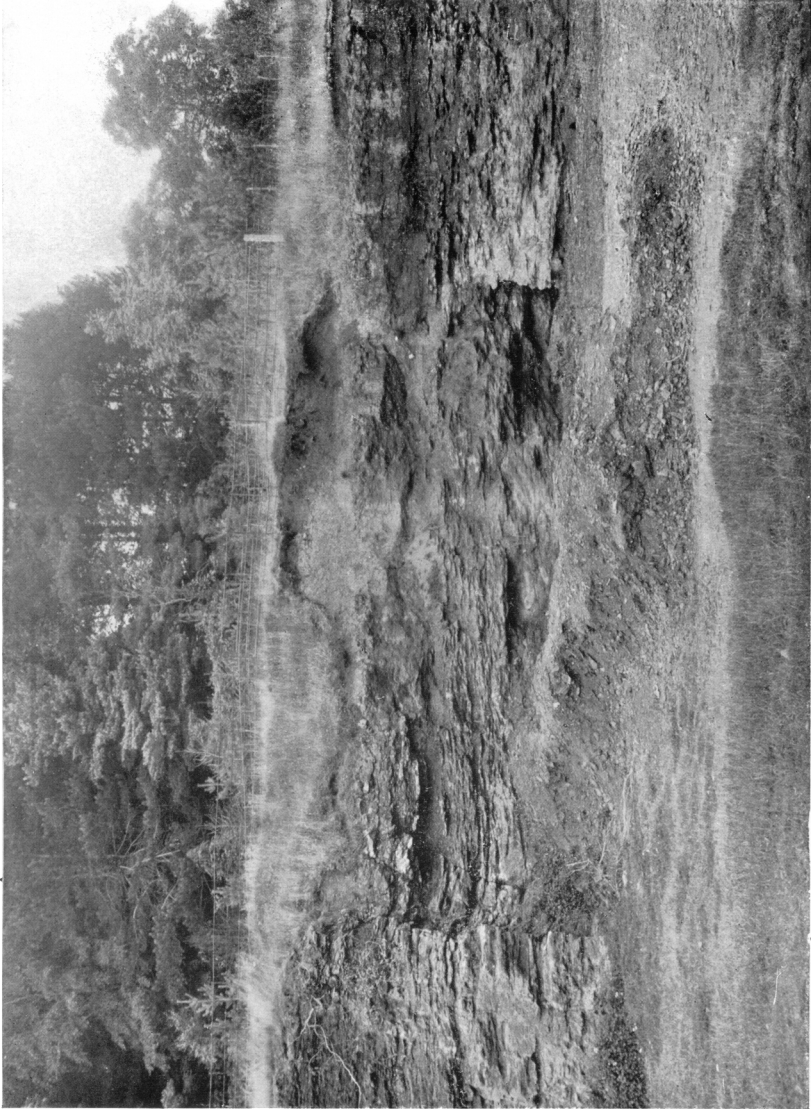
PLATE XV.

View of a portion of a quarry at the Misterton Limeworks, near Crewkerne (Somerset). (See p. 154.)

PLATE XVI.

Fig. 1. View of a portion of the big quarry on Ham Hill, near Yeovil (Somerset). (See p. 169.)

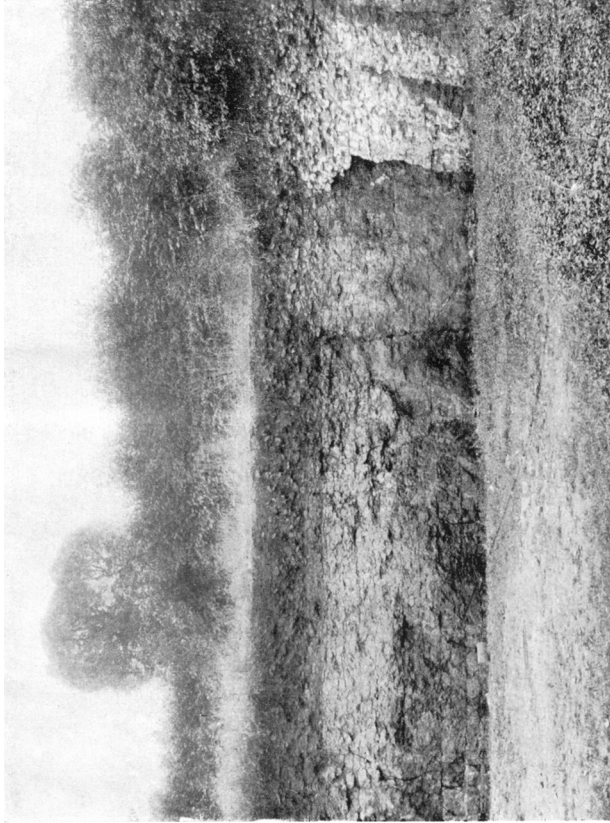
Fig. 2. View of another portion of the same quarry, showing the Ham-Hill Building-Stone. 1=Sand; 2='Riddings'; 3=Ham-Hill Building-Stone.



- 1. *Scissi*,
- =2. ? *scissi*,
- 3. *Opaliniformis*
 atensis,
 'Perrott Stone'
 (18 feet thick ;
 probably of
 moorei date).
[Sandrock. Not
now exposed.]

L. R. photo.

QUARRY IN 'PERROTT STONE,' AT NORTH PERROTT MANOR HOUSE, NEAR CREWKERNE (SOMERSET).



Microzoa
Beds. }
Massive
Beds. }
Garrattiana Bed. —
Ironshot Rock, / Blue Bed.
probably of Red Bed.
bradfordensis Red Bed.
hemera. Grey Bed.

L. R. photo.

VIEW OF A PORTION OF THE QUARRY AT THE MISTERTON LIME-WORKS,
NEAR CREWKERKE (SOMERSET).

Fig. 1. VIEW OF A PORTION OF THE BIG QUARRY ON
HAM HILL, NEAR YEOVIL (SOMERSET).



T. W. Reader photo.

Fig. 2. VIEW OF ANOTHER PORTION OF THE SAME QUARRY,
SHOWING THE HAM-HILL BUILDING-STONE.



T. W. Reader photo.

[1 = Sand; 2 = Riddings; 3 = Ham-Hill Building-Stone.]