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Geology of the Brixton Deverill-East Knoyle district (Wiltshire)

1:10 000 sheets ST 83 NE (Brixton Deverill) and ST 83 SE (East Knoyle)
Part of 1:50 000 Sheet 297 (Wincanton)

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Geographical index
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PREFACE

This account describes the geology depicted on 1:10 000 sheets ST83NE (Brixton Deverill and ST83SE (East Knoyle), which form part of the 1:50 000 Wincanton (297) Sheet. The district was first geologically survyed on the one-inch scale by H W Bristow in 1852 as part of Old Series Sheet 15, published in 1856, and W T Aveline (date unknown) as part of Old Series Sheet 14, published in 1857. A revised edition of Sheet 14 was issued in 1859. Revision of the Cretaceous strata at the 1:10 560 scale was carried out by A J Jukes-Browne in 1889 and 1890, and by F J Bennett in 1894-1896. Mr B H Mottram surveyed the area of the Mere Fault and associated disturbance at the 1:10 560 scale in 1950 and 1951 and published the results in the *Proceedings of the Geologists' Association* in 1961; he later donated his maps to the BGS. A Provisional edition, at the 1:63 360 scale, of the Wincanton Sheet, based on Old Series sheets 14 and 15 and Mottram's mapping, was published in 1969. The sheet was reprinted at the 1:50 000 scale without geological revision in 1972.

The 1:10 000-scale revision survey of the district was carried out by C R Bristow in 1994 under the direction of R W Gallois and I R Basham, Regional Geologists.

Cretaceous macrofossils have been identified by M A Woods.

Dyeline black and white copies of the geological maps can be ordered from the British Geological Survey, Keyworth.

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1. INTRODUCTION

The Brixton Deverill-East Knoyle district lies at the western end of Salisbury Plain and encompasses the north-western part of the Vale of Wardour. The central part of the district forms part of a dissected plateau developed on Upper Chalk (Figure 1); this reaches a maximum height of 238 m south-east of Brixton Deverill. In the north-west, there are prominent escarpments capped by the Lewes Chalk on either side of the Wylye valley. In the south, the Mere Fault and associated monoclinal structure play an important part in shaping the landscape. In the west, the chalk rises steeply on the north side of the fault from the clay vale to the south. Between West Knoyle and East Knoyle, the steeply dipping Upper Greensand and Chalk strata give rise to strongly featured ground.

The principal drainage in the northern part of the district is northwards by the River Wylye, the only permanent river on the chalk outcrop and its tributaries. In the south-central area, drainage is eastwards by a series of valleys that coalesce just west of Hindon and ultimately join the River Nadder at Tisbury. In the south, on the clay vale, drainage is south-westwards by tributaries of the River Lodden, and south-eastwards by tributaries of the River Nadder. The lowest point in the district, c.96 m OD, lies in the southern tract.

Soils developed on the Upper Greensand and most of the Chalk are light and well drained. However, soils on the West Melbury Chalk, together with some on the clay-with-flint deposits and Kimmeridge Clay are much heavier and poorly drained.

Agriculture is a mixture of arable and pasture, with the latter dominant on the Kimmeridge Clay Vale. There are few woods, with deciduous woods confined mostly to the clay vale and the relatively newly planted coniferous plantations on the Chalk and Upper Greensand. Agriculture is the only industry in the area.

The soild formations and drift deposits on the 1:10 000 geological sheets ST83NE and SE are shown in Table 1.

Table 1. Geological succession in the Brixton Deverill-East Knoyle district

Drift deposits
Landslip
Alluvium
River Terrace Deposits
Undifferentiated River Terrace Deposits
Head
Older Head
Clay-with-flints

Solid Deposits

	Thickness (m)
Chalk	
Seaford Chalk	45
Lewes Nodular Chalk	25-33
New Pit Chalk	12-15
Holywell Nodular Chalk	12-15
Zig Zag Chalk	10-25
West Melbury Chalk	15-40
Upper Greensand	
Melbury Sandstone	1-5
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Gault	18
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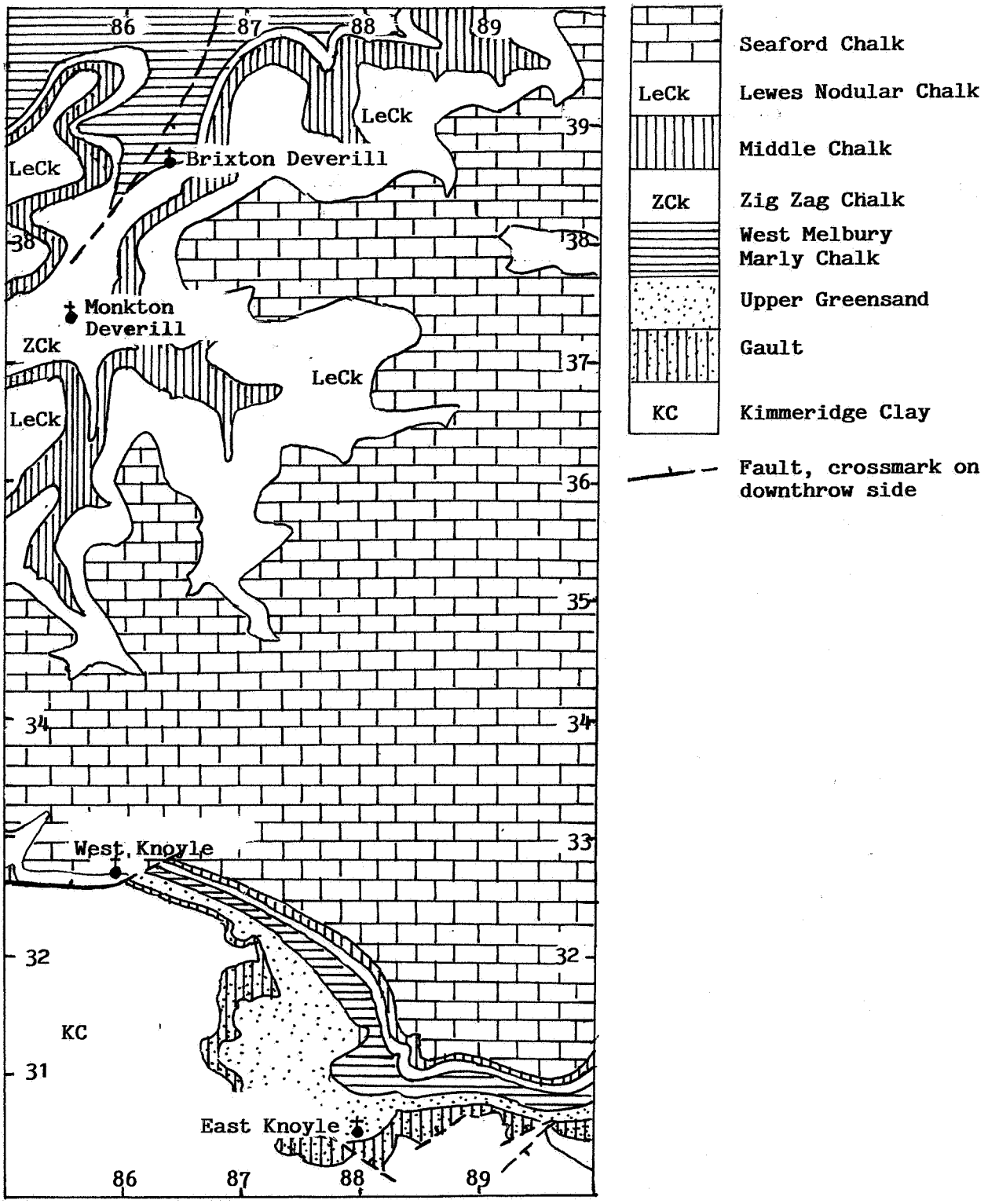

Figure 1. Sketch-map of the solid geology of the Brixton Deverill - East Knoyle district

2. JURASSIC

Kimmeridge Clay

About 185 m of Kimmeridge Clay crop out in the southern part of the district, of which about 30 m belong to the upper part of the Lower Kimmeridge Clay and the rest to the Upper Kimmeridge Clay.

The formation consists dominantly of medium grey, fissile, shelly mudstones, and medium and brownish grey, bituminous shelly mudstones ('oil-shale'). Cementstone beds occur at intervals and appear to form mappable features at three principal levels (Figure 2). The lowest, which is exposed in the stream bed [8653 3076] north-east of Lugmarsh Farm, is a lobate, dense, ?ferroan, highly septarian cementstone which appears to fall in the basal part of KC35 or in the top part of KC34 (at about the level of the Maple Ledge Stone Band of the Dorset coast). The second cementstone, which occurs about 5 m higher, is exposed in the stream bed [8608 3122] north of Lugmarsh Farm, It is a 15 cm thick, brownish grey, densely cemented, septarian cementstone with a fluted top. It is overlain by a fissile, shelly, oil shale. The exact position of this cementstone (Figure 2, locality 8) within the Kimmeridge Clay is problematical as the associated fauna (see details) indicates KC37 near the base of the Upper Kimmeridge Clay (and therefore Yellow Ledge Stone Band), which conflicts with the evidence of nearby faunas downstream [8599 3115] (Figure 2, locality 7) and upstream [8610 3131 and 8613 3137] (Figure 2, localities 9 and 10). Locality 10 yielded the ammonite *Aulacostephanus*, and is therefore firmly fixed in the Lower Kimmeridge Clay (KC35 or below). A presumed cementstone, some 13 m higher than the second, forms an excellent feature across the present area and on to the adjacent district to the south where it was thought to represent the Yellow Ledge Stone Band at the base of KC37 (Bristow, 1993). However, in the present area, faunal evidence suggests that feature represents a stratigraphically lower level than the Yellow Ledge Stone Band, and possibly lies at the Lower/Upper Kimmeridge Clay boundary (i.e. Blake's Bed 42 of the Dorset coast).

The oldest strata, belonging to the Eudoxus Zone (KC30), crop out in the unnamed stream on the extreme west of the district, south-west of West Knoyle [8504 3182](Figure 2, localities 1-2). Younger strata, belonging to the Autissiodorensis Zone, have been recognised in streams south-west, south, and south-east of West Knoyle.

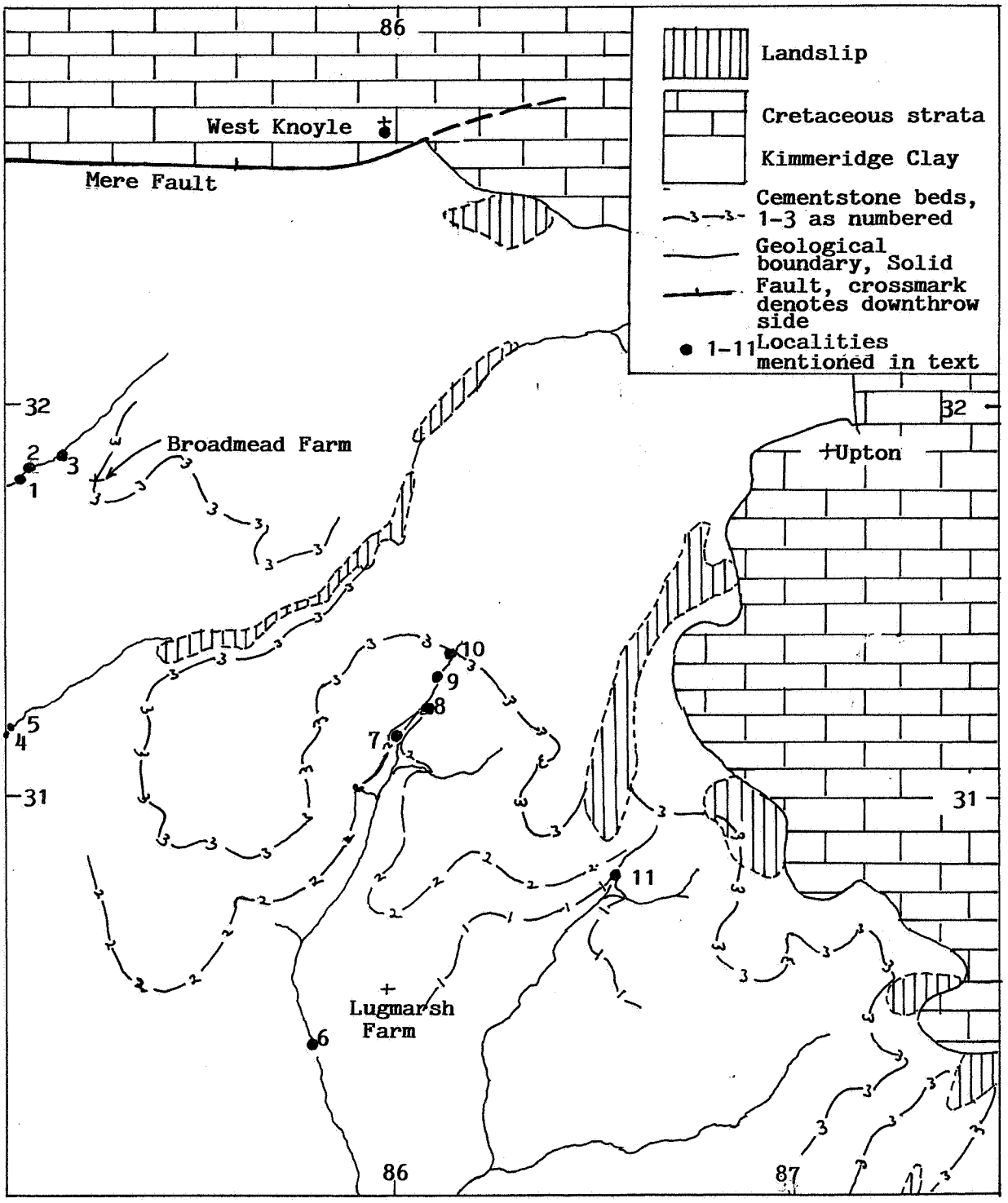

Figure 2. Sketch-map of the landslips and Kimmeridge Clay in the West Knoyle area

Although some 155 m of Upper Kimmeridge Clay crop out in the district, there is no undoubted exposure in this unit. There are possible occurrences of the basal bed (KC36) of the Upper Kimmeridge Clay in two streams [8610 3131 and 8657 3085], but the faunal evidence is equivocal (see Details) and it is thought more likely that these two localities fall in the top part of KC35. One possible occurrence of KC37 [8608 3122] has been mentioned above.

Details

In the stream west of Broadmead Farm, West Knoyle, moderately fissile, medium to pale grey, moderately shelly and shelly mudstones with *Nanogyra virgula, Protocardia* and rare *Amoeboceras (Nannocardioceras) krausei* crop out [8504 3182](Figure 2, locality 1). An associated cementstone yielded *Nanogyra virgula* and a large *Liostrea*. An exposure [8505 3184] further upstream (Figure 2, locality 2) of moderately fissile, medium grey, moderately shelly and shelly mudstones includes abundant *Protocardia morinica, Nanogyra virgula* and rare *Amoeboceras (Nannocardioceras) anglicum*. The fauna from these two localities indicates the Eudoxus Zone (?KC30). A third exposure [8515 3186] (Figure 2, locality 3) still further upstream is in pale and medium grey, rather smooth-textured mudstones with several *Nanogyra virgula* and an indeterminate *Aulacostephanus* fragment; the fauna indicates the Lower Kimmeridge Clay.

Farther south, another stream section [8501 3117] (Figure 2, locality 4) exposes fissile, medium and brownish grey, tough, shelly mudstone with abundant *Aulacostephanus* including *A.* ex gr. *volgensis* and *A. fallax*, indicative of the Autissiodorensis Zone, KC34 or, less likely, KC35. A second exposure [8500 3116] close by (Figure 2, locality 5) of a similar lithology close by yielded *Protocardia morinica* and *Aulacostephanus* including *A.* ex gr. *volgensis*.

Sections along a third stream farther east are all in the Autissiodorensis Zone. The lowest exposure [8579 3037] (Figure 2, locality 6) is in fissile, medium grey, bituminous, moderately shelly mudstones with *Isocyprina minuscula, Nanogyra virgula*, a worn impression of a large ammonite (*?Aulacostephanus autissiodorensis)* and several *Amoeboceras (Nannocardioceras)* probably indicative of KC34. Farther upstream [8599 3115] (Figure 2, locality 7), moderately to sparsely shelly mudstones with bivalves including *Corbulomima suprajurensis, Nanogyra virgula* and *Protocardia morinica* and ammonite fragments including a possible *Subdichotomoceras websteri* suggestive

of KC35 or, less likely, KC34. Some 70 m farther upstream, a densely cemented, brownish grey cementstone with a fluted top forms a small waterfall (Figure 2, locality 8). This is the middle of the three feature-forming beds of the district. From fissile oil shale, estimated to be about 0.3 m above the cementstone were obtained *Nanogyra virgula*, clusters of *Nicaniella extensa*, abundant *Protocardia*, clusters of small trochiform gastropods (*Semisolarium hallami*) and pectinatitid ammonite fragments apparently suggestive of the Scitulus Zone, KC37. However, as mentioned above, this assignment is at variance with the ages of nearby strata both downstream and upstream (see below). For the moment, the problem remains unresolved. Continuing upstream [8610 3131], fissile, brownish grey, moderately shelly mudstone with *?Nanogyra virgula, Protocardia morinica* and pectinatitid fragments, about 5 m below the highest feature-forming (presumed cementstone) bed (Figure 2, locality 9), probably fall in KC35 or, less likely, KC36. The highest locality [8613 3137] collected (Figure 2, locality 10) consisted of fissile, brownish grey mudstones with *Aulacostephanus* fragments and *Corbulomima suprajurensis* indicative of KC35 or, less likely, KC34.

A fourth stream section [8657 3085] (Figure 2, locality 11), the most easterly examined, revealed fissile, medium and brownish grey, shelly mudstones with *Corbulomima suprajurensis, Nanogyra virgula, Protocardia morinica*, the limpet-type gastropod *Pseudorhytidopilus latissima* and ?pectinatitid ammonite fragments suggestive of the Autissiodorensis Zone, KC35, or, less likely, Upper Kimmeridge Clay, Elegans Zone, KC36. These mudstones are associated with a very distinctive, highly reticulate, ?ferroan cementstone, which lies about 5 m lower than the middle feature-forming bed which forms the small waterfall in the third stream section above.

Portland Group

Strata of the Portland Group crop out only in the south-east of the district. The group is divided into two formations, a lower, Wardour Formation, and a higher, Portland Stone Formation, of which only the lower part of the latter crops out in the district.

Wardour Formation

Formerly known as the Portland Sand, the term Wardour Formation is a slight modification of the Wardour Member of Wimbledon (1976). The formation consists of clayey sands and sandy clays; the base is commonly marked by springs. About 15 m appears crop out in the district, but from evidence on the adjacent sheets to the east and south-east, the real thickness is usually much more, with the thickness seen at outcrop usually much reduced by cambering of the overlying limestones.

Portland Stone Formation

Where fully developed in ground to the east, the Portland Stone Formation is divisible into three members, but only the lower, the Tisbury Member, crops out in the present district.

Tisbury Member

The Tisbury Member was formerly known as the Lower Building Stones (Blake and Hudleston, 1877 etc; Woodward, 1895). The latter were subdivided by Wimbledon (1976) into a lower, Chicksgrove Member, and an upper, Tisbury Member. In the field, it has not been possible to map separately the Chicksgrove Member and so the term Tisbury Member as used in this account has been extended downwards to include the Chicksgrove Member.

The Tisbury Member consists of glauconitic, bioclastic sandstones and limestones. Some 10 m crop out in the district. In adjacent areas, the stones have been extensively worked for building stones.

3. CRETACEOUS

Gault

On the old One-inch map of 1856, the Gault is shown as dying out east of East Knoyle. However, Jukes-Browne who resurveyed the ground at the six-inch-to-the-mile scale in 1890, correctly identified the outcrop of the Gault, and noted that its surface was much 'obscured by rainwash from the Greensand above' (Ms, BGS).

The Gault consists of up to 20 m of glauconitic, micaceous, fine-grained sandy clay. Over much of the district, the beds are steeply dipping, with a consequence that there is only a narrow outcrop. However, around Windmill Hill [870 310] the dip flattens and the outcrop widens.

No diagnostic fauna has been found in the area; the only recorded fossil is '*Ammonites [Hoplites] splendens*' from a well on the west side of East Knoyle (Jukes-Browne Ms, BGS).

Details

Jukes-Browne (Ms, BGS) noted that at West Knoyle, 'in the narrow part of the field south-east of Manor Farm there is a boggy place [c. 8611 3259] where weak springs break out, and in this I found a soft ferruginous sandstone or rotten ironstone containing large quartz grains and pebbles as big as a pea. This I took to be the base of the Gault'.

An auger hole [8688 3177] at Upton proved 1 m of clayey, fine-grained sand, on 0.2 m of medium grey, fine-grained, micaceous sand.

A well [8758 3047] was sunk in a field west of the Rectory in 1890 and was, at the time of Jukes-Browne's visit, about 20m deep, the section being as follows:

	Thickness m
Soil	0.6
Gault	
Brown and yellow clay	2.4
Dark grey silty clay	6.1
Dark green glauconitic sand	about 6.1
Kimmeridge Clay	
Dark grey clay	6.1

On the spoil heap from the well he found several small phosphatic nodules and fragments of ammonites, one being apparently '*Ammonites splendens*'. The 6 m of glauconitic sand at the base of the Gault seems excessive, as augering elsewhere in the deposit has not proved such a thickness.

At the cottage south of this field, and at a level 5 or 6 m lower, there is another well [8759 3040], about 10 m deep. After passing through 'clay and silt, a harder rocky bed was encountered, but not too hard to be worked with a pick; water was found below this in sufficient quantity and pretty good, but in the hope of finding another spring, they bored 4.5 or 6 m deeper through clay without success'. Jukes-Browne thought that the rocky bed was the base of the Gault, resting on Kimmeridge Clay, but it is more probable that it is a cementstone bed within the Kimmeridge Clay.

At East Knoyle, a combination of temporary section and augering [8813 3039] proved 1.8 m of stony, sandy, glauconitic clay, on 0.3 m of dark grey, sandy clay.

Upper Greensand

In adjacent areas, the Upper Greensand is divisible into a four-fold ascending sequence of Cann Sand, Shaftesbury Sandstone, Boyne Hollow Chert and Melbury Sandstone. Because of the steep dip (up to 45°) along much of the outcrop, the width of each member is narrow, except on dipslopes. Because the Melbury Sandstone is very thin (maximum of 2 m thick), combined with the steep dip, it means that it has not been possible to map this unit separately.

Cann Sand

The Cann Sand consists of about 13 m of glauconitic, fine-grained, micaceous sand and weakly cemented sandstones. It is equivalent to the 'Malmstone' of Jukes-Browne and Hill (1900). The base is commonly marked by springs.

Shaftesbury Sandstone

The Shaftesbury Sandstone consists of about 15 m of glauconitic, fine-grained and weakly cemented sandstone. At the top, there is a calcareously cemented, bioclastic sandstone known as the Ragstone. The base is usually marked by pronounced negative feature break and the member forms a scarp face rising abruptly from the shelf formed by the Cann Sand. The Ragstone was commonly worked as a building stone, and there were several quarries formerly opened in the district to exploit this stone.

Except in the Ragstone, fossils generally are scarce, but include *Amphidonte obliquatum*, 'Pectens' and *Pycnodonte (?Phygraea) vesiculosum*.

Boyne Hollow Chert

The Boyne Hollow Chert consists of between 9 and 12 m of glauconitic, fine-grained sand with common interbeds of chert nodules. The chert nodules form a common component of the brash developed on this member. The chert beds were commonly worked for roadstone. No fossil has been found in the Boyne Hollow Chert of the district.

Melbury Sandstone

The Melbury Sandstone consists of between 1 and 2 m of fine-grained, weakly glauconitic, fossiliferous, calcareous sandstone. Sections have been seen in the past at two localities, but there has been no recent exposure.

Fossils, especially, brachiopods, bivalves, ammonites and echinoids usually abound. However, much of the fauna is phosphatised and abraded and is probably reworked. Evidence from nearby areas (Bristow, 1994) indicates that *carcitanense* Subzone fossils are probably derived, and the Melbury Sandstone is more likely to belong to the *saxbii* Subzone of the *mantelli* Zone and/or the higher *dixoni* Zone.

Details

Shaftesbury Sandstone

Old quarries [8622 3264] at the western end of Cleeve Hill, West Knoyle, have small exposures of friable, glauconitic sandstone with *Amphidonte obliquatum*. There are several pits at the eastern end of Cleeve Hill. The most westerly [8691 3238] formerly exposed the junction of the Boyne Hollow Chert and Shaftesbury Sandstone, with the strata dipping at 42° north-eastwards. At the present day, a section on the south side of the pit shows 0.4 m of fine-grained, friable, glauconitic sandstone, overlain by 1.5 m of harder glauconitic sandstone; chert beds are exposed on the north side of the pit.

Farther south-east along the hill, another pit [8701 3231] exposes friable, glauconitic sandstone dipping north-eastwards at 35°. A third pit [8707 3227], also in friable, glauconitic sandstone, yields common *Pycnodonte (Phygraea?) vesiculosum*. It appears to be this pit in which Jukes-Browne (Ms, BGS) noted 2.7 or 3 m of sandstone 'of the usual character' with common pectens, including '*P. asper, P. orbicularis, P. interstriatus, P. quinquecostatus* and *Spondylus striatus*'. Close by, and presumably lying south of the above pit was a sandpit, unfortunately not located, where Jukes-Browne (Ms, BGS) saw 3.6 m of laminated green sand with '*Pecten*

quadricostatus and *Exogyra conica'* in one layer of it. The lamination is made visible by the varying amount of glauconite, some layers containing so much as to appear dark green, while in others, quartz is the principal ingredient. This passes down into buff sand with ferruginous stains and finally into firm, buff, micaceous sand, the thickness of these sands being perhaps 6 m, but as there is a northerly dip of 29° here it is not easy to estimate thicknesses.

Between Upton and Milton, the Shaftesbury Sandstone forms well-featured ground. On Haddon Hill, where the dip is quite steep to the north-east, it has a narrow outcrop, but near The Green and west of Clouds House, where the beds are horizontal or with only a slight east-north-easterly dip, the outcrop is wider. In the latter area, the Shaftesbury Sandstone is about 20 m thick. The large sand pit [8760 3063] below Knoyle Hill showed the following section (Jukes-Browne, Ms, BGS):

	Thickness m
Sandy soil	0.30
Boyne Hollow Chert	
Pale grey sand with whitish sponge rock and some nodules of chert	1.22
Shaftesbury Sandstone	
Soft, greenish grey sand	0.46
Soft, greenish grey, sand-rock, consisting of coarse quartz and glauconite grains (not consolidated as it is elsewhere)	2.90
Soft, green sands, with a few hard siliceous concretions in the upper part, weathering into laminae	10.97
	15.85

The sand-rock contains *'Exogyra conica, Pecten interstriatus* and large *Pecten quadricostatus'*. In the lower part of the pit are soft and yellowish micaceous sands, and in the lane below is micaceous sandstone [8756 3058] passing down into malmstone (Cann Sand) [8757 3055]. The beds dip at about 10° north-north-eastwards.

A sunken lane [8882 3082] north-east of East Knoyle shows glauconitic, fine-grained sandstone dipping northwards at 20°. Farther east along Knoyle Ridge, another section [8968 3069] (see Melbury Sandstone details) showed about 3.66 m of firm, glauconitic sand-rock, on soft, yellowish sands, micaceous below and passing down into micaceous sandstone (no thickness given) (Jukes-Browne and Hill, 1900 and Ms, BGS). The dip is very steep, about 30° to the north, and it is impossible to estimate the thickness of the sands below the sand-rock.

Boyne Hollow Chert

Chert is common as brash on the crest of Cleeve Hill, West Knoyle. Chert beds are exposed on the north side of a pit [8691 3238] on Cleeve Hill, West Knoyle, where they were described (Jukes-Browne and Hill, 1900) as consisting of soft, marly sand with many thick, irregular layers of whitish sponge rock, and some lenticular masses of black and brown chert near the top.

Between Upton and Milton, the outcrop of the Boyne Hollow Chert broadens and brash of chert is common on the surface. Chert was formerly dug, presumably for road metal, from small pits [8772 3160 and 8770 3178], but there is now no exposure.

Mottram (Ms, BGS) noted the junction of the 'Warminster Greensand' and the chert beds in a lane [8798 3125] at Milton. The Boyne Hollow Chert was formerly exposed at the top of pits [8760 3063] on Knoyle Hill and south of Knoyle Corner [8968 3069] (see above).

Melbury Sandstone

A pit [8725 3225] at Upton formerly exposed a section from the Boyne Hollow Chert to the West Melbury Marly Chalk (Jukes-Browne, Ms BGS; Mottram, Ms, BGS). There, Jukes-Browne (Ms, BGS) noted grey sandy chalk on the eastern side of the pit, and fragments of hard, glauconitic marl on the south side. The dip is 35° north-east. This is presumably the pit at 'Upton' from which J Rhodes collected an extensive fauna. However, the locality details on the BGS register state that the pit lies *north-west* of Upton. This is believed to be a typographical mistake and should read *north-east*, since there is no pit to the north-west of Upton in which the West Melbury Marly Chalk was exposed. The fauna from the 'Upper Greensand' (Melbury Sandstone) includes worn and phosphatised specimens of *Boubeithyris diploplicata*, *Dereta pectita*, *Grasirhynchia grasiana*, *?Ovatathyris ovata*, *Aucellina gryphaeoides*, *Entolium orbiculare*, *Gryphaeostrea canaliculata*, *Lima subovalis*, *Mimachlamys* ex gr. *robinaldina*, *Rastellum* (*Arctostrea*) ex gr. *carinatum*, *Schloenbachia varians*, *Discoides subuculus* and *Salenia* (*S.*) *petalifera*, indicative on face value of the *mantelli* Zone, *carcitanense* Subzone, but the fauna may well be reworked into a younger subzone or zone. From the 'Chloritic Marl' in the pit were obtained *Cucullaea* aff. *mailleana*, *Plicatula inflata*, *Mantelliceras* aff. *couloni* and *M. mantelli* (phosphatised), which, if indigenous, could indicate the *mantelli* Zone, *carcitanense* Subzone, but the fauna may well be reworked. *Mantelliceras couloni* characterises a Lower Cenomanian horizon at the top of

the *carcitanense* Subzone (*'couloni* Horizon'), in the *mantelli* Zone (WrightKennedy, 1984).

In the lane south of Knoyle Corner [8967 3070], Jukes-Browne and Hill (1903) recorded the following section:

	Thickness m
Chalk Marl	0.91
Melbury Sandstone	
Glauconitic Marl	
9. Hard, sandy and glauconitic chalk	0.15
8. Soft, glauconitic chalk, marly at top, very sandy below	0.76
Rye Hill Sands	
7. Very hard, glauconitic sandstone with a few phosphates (see p.)	0.61
6. Line of small decomposed ferruginous nodules	0.05
5. Hard, coarse, glauconitic sandstone with large quartz grains (contains *Pecten asper)*	0.30
4. Soft yellowish sand	0.91
Boyne Hollow Chert	
3. Greyish sand with layers of chert	9.14
Shaftesbury Sandstone	
2.Firm, glauconitic sand-rock about	3.66
1. Soft, yellowish sands, micaceous below and passing down into micaceous sandstone	?

The dip is about 30° to the north. There is a complete passage from the upper sands to the Chalk, and the interbedding of hard and soft glauconitic marls is noticeable.

Chalk

The Chalk is divided into three formations, the Lower, Middle and Upper Chalk, which in turn are divided into members, each easily recognisable by its lithology. In the present district, only the two lowest members of the Upper Chalk are preserved.

Lower Chalk

The Lower Chalk consists of a lower unit, the West Melbury Marly Chalk, between 15 to 40 m thick, of buff, cream and off white marly chalk with thin interbeds of hard chalk, and an upper unit, the Zig Zag Chalk, between 18 and 25 m thick, dominantly of white and off-white, blocky chalk.

West Melbury Marly Chalk

The member has a narrow outcrop in the zone of steep dips in the south of the district. In the north, in an area of gentle dip, the West Melbury Marly Chalk forms a prominent shelf, at least 500 m wide, at the foot of the escarpment formed by the Zig Zag Chalk. The dominantly marly nature of the West Melbury Marly Chalk gives rise to heavy clay soils. The unit appears to be thinner in the south, about 15 m thick, and thicker, up to 40 m thick, in the north of the district.

Fossils are locally common, especially the ammonite *Schloenbachia varians*, but none have been recorded in the present district. Evidence from nearby (Bristow, 1994) indicates that the member ranges from the *dixoni* Zone to the *rhotomagense* Zone, *costatus* Subzone.

Zig Zag Chalk

The Zig Zag Chalk forms the base of the main chalk escarpment and rises steeply from the shelf formed by the West Melbury Marly Chalk. The member consists dominantly of blocky, off-white and white chalk; at the top, but not exposed in the district, is an alternating sequence of greenish grey marls and off-white chalk - the Plenus Marls.

Fossils are not common, but included inoceramids, oysters and ammonites (particular *Acanthoceras*).

Middle Chalk

The Middle Chalk comprises two units of more or less equal thickness, a lower, Holywell Nodular Chalk and a higher, New Pit Chalk. The thickness of the Middle Chalk is constant across the whole district at about 25 m. A well [8830 3652] at Lower Pertwood Farm proved 24.2 m of Middle Chalk (Jukes-Browne and Hill, 1903).

Holywell Nodular Chalk

The member consists dominantly of hard nodular chalk. There are marly wisps between some of the nodules. The base of the Holywell Nodular Chalk is sharp, with hard, commonly ironstained, nodular chalk resting abruptly on marly chalk or marl of the Plenus Marls. In the field, the hard basal beds commonly form a positive feature, and the basal boundary of the member is one of the easiest of the chalk boundaries to map. In the higher part of the succession, the nodularity decreases and thin non-nodular beds are interbedded with nodular

beds over an estimated 1 to 2 m transition zone with the overlying New Pit Chalk. Specimens of *Mytiloides*, especially *M. mytiloides* and *M. labiatus*, both whole and fragmentary, are common in the middle and upper part of the Holywell Nodular Chalk.

New Pit Chalk

The New Pit Chalk consists of firm, white, slabby chalk. Thin-shelled *Mytiloides* species (*M. hercynicus* and *M. subhercynicus)* of distinctly flattened morphology and typically lacking preserved shell, occur locally. As mentioned above, the basal boundary is transitional over a metre or so.

Upper Chalk

Where fully developed, the Upper Chalk consists of five mappable members, but only the two lowest, the Lewes Nodular and Seaford chalks, are preserved in the present district. The base of the Upper Chalk is defined at the base of the first significant incoming of hard nodular chalk above the New Pit Chalk.

Lewes Nodular Chalk

The base of the Lewes Nodular Chalk is well defined by the development of hard nodular chalk above the softer chalk of the New Pit Chalk. About 2 m above the incoming of nodular chalk, is a hard, massive, porcellanous chalkstone with four or five, glauconitised hardground surfaces, some 1 to 1.5 m thick; this unit is known as the Chalk Rock. Flints make the first significant appearance in the Chalk Rock. Collectively, these basal strata form a positive feature which, combined with the distinctive brash derived from the Chalk Rock, makes this, like the Holywell Nodular Chalk, one of the easiest chalk boundaries to map. The Chalk Rock is succeeded by hard, nodular, flinty chalk which gradually decreases upwards in hardness and nodularity and passes over a transition zone of some ?3 to ?4 m into the Seaford Chalk. The thickness of the member varies between 25 and 35 m.

Fossils are locally common in the Lewes Nodular Chalk and consist of brachiopods, inoceramids and echinoids, especially *Micraster* species. The member ranges from the top part of the *lata* Zone, through the *plana* Zone to the top of the *cortestudinarium* Zone. In the Shaftesbury area to the south, it locally extends into the early *coranguinum* Zone (Bristow et al., 1994).

Seaford Chalk

The Seaford Chalk consists of up to 45 m of firm, white, flinty chalk. As noted above, the basal boundary is transitional over a few metres.

Fossils, especially inoceramids, are common; the lower part of the member is typified by specimens of the inequivalved genus *Volviceramus*, whilst the sheet-like genus *Platyceramus* is more long ranging, overlapping in range with *Volviceramus* at the base and extending throughout much of the rest of the member. *Micraster coranguinum* can be found quite commonly. Within the present district, the lowest part (from evidence to the south, about 16 to 18 m of strata) of the Seaford Chalk falls in the late *cortestudinarium* Zone, but the bulk of the Seaford Chalk falls in the *coranguinum* Zone. The top is not preserved in the present district and the position of the highest strata within the *coranguinum* Zone is uncertain, but probably does not extend beyond the Coniacian part of the zone.

Details

West Melbury Marly Chalk

In the north of the district, the West Melbury Marly Chalk crops out on either side of the River Wylye from Brixton Deverill northwards to the edge of the district. There is no exposure, but the upper boundary with the Zig Zag Chalk is well defined by feature. In the north-west of the district, there is a wide, gently sloping, outcrop which gives rise to heavy clay soils.

A borehole [8570 3805] which commenced almost at the top of the member proved 41.5 m of West Melbury Marly Chalk above the Upper Greensand. A second borehole [8590 3834] 400 m north-east, sited on the floodplain of the River Wylye, which may have started in the base of the Zig Zag Chalk, proved 41 m of chalk above the Upper Greensand.

In the south of the district, because of the steep dip, the member has only a narrow outcrop. This fact, combined with a persistent wash of sandy chert debris and lack of feature at the base of the Zig Zag Chalk, makes it difficult to separate the two members by augering alone. Augering consistently proves greyish brown clay or marl. There are few exposures. A small scrape [8649 3265] at West Knoyle in off-white and pale grey marly chalk yielded *Inoceramus* sp. and *Limaria elongata* (Woods, 1994c).

The basal beds must formerly have been exposed in the pit [8725 3225] at Upton where 'Chalk Marl' was recorded (Jukes-Browne, Ms BGS; Mottram, Ms, BGS). The 'Chloritic Marl' noted by Jukes-Browne between the Boyne Hollow

Chert and the Chalk Marl in this pit is regarded herein as part of the Melbury Sandstone (see details). Grey marl can be augered in the sides of the pit.

The basal beds were also exposed at Knoyle Corner [8967 3070], where Jukes-Browne and Hill (1903) noted 0.9 m of 'Chalk Marl' above the Melbury Sandstone.

Zig Zag Chalk

In the north-west of the district, there are small exposures [8518 3911, 8525 3928, 8529 3934, 8547 3952 and 8594 3958] on the north and north-west side of Brims Down. Marly chalk and marl close to the top of the member and exposed in the banks of the track [8579 3913] on the south-east side of Brims Down is probably part of the Plenus Marls.

Near Monkton Deverill, firm, white, blocky chalk is exposed in scrapes [8553 3793 and 8557 3797] on the steep bank of the old river cliff.

North-east of Brixton Deverill, marly chalk in a ploughed field [8729 3975] is probably part of the Plenus Marls. A little farther east, blocky, white chalk [8780 3967 and 8788 3970] was ploughed up a short distance below nodular chalk of the Holywell Nodular Chalk.

In the south of the district, because of the steep dip, there is only a narrow outcrop of the Zig Zag Chalk and that is distinguished with difficulty from the West Melbury Marly Chalk.

At West Knoyle, on the steep, south-facing bank of The Warren, greyish green marl of the Plenus Marls was exposed beneath nodular chalk of the Holywell Nodular Chalk in a small scrape [8664 3268].

Blocky white chalk close to the top of the member was seen beneath head deposits in a cutting behind a barn [8706 3241] at Chapel Farm, Upton.

The large pit [8971 3078] at Bull Pits east of East Knoyle must formerly have exposed a good section in the member. The pit is now overgrown, but there are scrapes in the side of massive, blocky, white chalk. Jukes-Browne (Ms, BGS) recorded 6 m of greyish white chalk 'probably nearer the top than the base, as the Melbourn Rock crops out in the bank above the pit.

Holywell Nodular Chalk

In the north-west of the district, the member is about 15 m thick. Nodular chalk, commonly with *Mytiloides* is common on the hillside all the way around Fir Clump and southwards to Whitecliff Farm and beyond. In the banks [8525 3908] on the south side of Fir Clump, nodular chalk close to the base of the

member yielded *Orbirhynchia?*, *Mytiloides mytiloides* and *M. labiatus* (Woods, 1994b). Near Monkton Deverill, nodular chalk includes common *Mytiloides mytiloides* [8528 3765, 8516 3759 and 8549 3802] and *Orbirhynchia* aff. *herbeti* [8543 3698] (Woods, 1994b).

South of Monkton Deverill, nodular chalk with rhynchonellids [8543 3699] was noted at one point. An old quarry [8596 3705] just off the Hindon Road is overgrown, but nodular chalk with *Mytiloides* is visible in small scrapes.

On the eastern side of the Wylye valley, nodular chalk with *Mytiloides* can be found all along the valley sides. North-east of Brixton Deverill church, *Mytiloides mytiloides* [8674 3906], *Inoceramus* ex gr. *pictus* [8672 3909] and *Mytiloides labiatus* and *M. mytiloides* [8695 3948] were found in brash. The specimen of *I. pictus* was found in very hard chalk at the base of the Holywell Nodular Chalk, and was overlain by nodular chalk with common *Mytiloides*.

The outcrop of the Holywell Nodular Chalk can be readily traced by the nodular chalk brash with *Mytiloides* along the valley sides around Lord's Hill Farm and Sutton Bottom. In this latter area, where the Holywell Nodular Chalk is about 20 m thick, *Mytiloides mytiloides* is common [8844 3986] (Woods, 1993d).

A well [8830 3652] at Lower Pertwood Farm proved 24.2 m of Middle Chalk (Jukes-Browne and Hill, 1903). The Melbourn Rock at the base is described as 2.6 m of 'hard chalk, partly very hard'.

In the south of the district, because of the steep dips associated with the Mere structure, the outcrop of the member is very narrow and there are few exposures. The junction with the Plenus Marls [8664 3268] was noted on the north side of The Warren. Close by, and 2 or 3 m higher, nodular chalk with *Inoceramus* sp. was exposed in a small scrape [8656 3270]. Hard nodular chalk with *Mytiloides mytiloides* crops out on the hill top [8666 3264] by the triangulation point east of West Knoyle (Woods, 1994b).

At Chapel Farm, Upton, nodular chalk was exposed beneath head deposits in excavations [8704 3241 and 8707 3244] behind a barn.

At East Knoyle, an old pit [8875 3109] formerly exposed the whole thickness of the Holywell Nodular Chalk. Jukes-Browne and Hill (1903 and Ms) noted that rough nodular chalk of the Melbourn Rock was exposed behind the lime-kiln, and that at the base of the quarry, there was a 0.6 m thick bed of hard, cream, nodular chalk overlain by a greenish marl, and then a vertical face of New Pit Chalk (q.v.).

Hard, nodular chalk was exposed at the top of the Bull Pits [8973 3082] on the eastern margin of the district.

New Pit Chalk

A narrow belt of firm, white chalk can be traced all the way round the hillside at Fir Clump in the north-west of the district. South of Fir Clump, firm, white, slabby chalk with *Mytiloides* ex gr. *hercynicus-subhercynicus* occurs as brash [8560 3878 and 8570 3863] (Woods, 1994b).

From Monkton Deverill southwards, brash of firm white chalk was only noted intermittently. On the east side of the River Wylye, firm white chalk with *Mytiloides* was noted in one area [8625 3817 to 8631 3822].

There are two small inliers [8505 3265 and 8585 3262] of New Pit Chalk on the north side of the Mere Fault. East of the Mere Fault, firm to hard, flintless chalk was noted above the track [8715 3246 to 8722 3242] at Chapel Farm, Upton.

In the road bank [8840 3116] north of East Knoyle there is brash of firm, white chalk with *Mytiloides* ex gr. *hercynicus-subhercynicus*.

On the Hindon Road at East Knoyle, an old pit [8875 3109] formerly exposed 15.2 m of firm white chalk in thick beds beneath the Chalk Rock.

Lewes Nodular Chalk

On the interfluve on the west side of the Wylye valley between Brixton and Monkton Deverill, chalkstone and hard nodular chalk is common on the wide outcrop of the Lewes Nodular Chalk. Glauconitised chalkstone was noted at three localities [8578 3938, 8536 3895 to 8547 3884 and 8558 3865]. Nodular chalk with *Gibbithyris* sp. was seen at one point [8521 3775].

South of Monkton Deverill, the interfluves on the west side of the tributary valley to the River Wylye are also capped by Lewes Nodular Chalk. Glauconitised chalkstone was only noted at the base of the member in two places [8501 3675 and 8512 3678].

On the east side of the Wylye valley, there is a wide outcrop of Lewes Nodular Chalk extending up all the tributary valleys. In the south-west, glauconitised chalkstone was seen at one point [8552 3560]. Some 350 m east, *Cremnoceramus?* preserved in flint was found in brash [8585 3565]. Nearby, and about 5 m higher, *Micraster cortestudinarium* was found (Woods, 1994b).

South-east of Monkton Deverill, glauconitised chalkstone was seen in three places [8627 3674, 8650 3668 and 8681 3663]. On the opposite side of the

valley from this last locality is an old quarry [8695 3660]. Although largely obscured, three glauconitised chalkstones, separated by 0.9 and 0.7 m of nodular chalkstone, can still be seen (Figure 3). Glauconitised chalkstone brash was also noted nearby on the north side of the valley [8712 3675, 8661 3690, 8664 3721, 8660 3718 and 8613 3758]. West of this last locality, one specimen of *Micraster* sp. was found in brash [8626 3726]. About 35 m higher, a single specimen of *Cremnoceramus schloenbachi?* was found loose [8662 3752] (Woods, 1994b); this is indicative of the *cortestudinarium* Zone.

A well [8830 3652] at Lower Pertwood Farm proved 31.7 m of Lewes Nodular Chalk (Jukes-Browne and Hill, 1903):

	Thickness m
Soft, but lumpy chalk with a few scattered flints	14.63
Chalk lumps with soft chalk with some layers of flint	10.97
Beds of solid chalk	3.66
Chalk Rock - hard rocky chalk in three beds	2.44
New Pit Chalk	
Solid, soft chalk with flints at two levels	12.80
?Holywell Nodular Chalk	
Solid chalk without flints, harder below	8.84
Hard chalk, partly very hard (Melbourn Rock)	2.44
Zig Zag Chalk	
Firm chalk	5.79
Marly chalk with plenty of water near bottom	24.99

South of Brixton Deverill, glauconitised chalkstone was seen in two areas [8639 3822 and 8665 3834]. About 7 m above this last occurrence, one specimen of *Cremnoceramus defformis?*, suggestive of the *cortestudinarium* Zone, was found [8668 3831 (Woods, 1994b).

East of Brixton Deverill, where there is a large outcrop on the interfluve [around 872 389], glauconitised chalkstone is common at the base of the member [8687 3865, 8687 3899 to 8698 3936, 8755 3934, 8753 3890 to 8781 3882]. Around Little Down, glauconitised chalkstone was noted at four points [8757 3843, 8800 3869, 8820 3869 and 8833 3872]. On the opposite side of the valley, *Micraster* in flint preservation was found [8825 3882].

A section [8805 3946] at Lord' Hill Farm showed 90 cm of porcellanous chalkstone, with glauconitised hardgrounds at the top, 12 cm below and at the base of the section (Figure 3). Glauconitised chalkstone is common both west [around 8800 3947] and east [8823 3943] of the above section. Similar lithologies were seen at the eastern end of Parsonage Down [8918 3935 and 8920 3942] and near Sutton Bottom [8903 3969, 8860 3993 and 8848 3998].

In the south, the Lewes Nodular Chalk has a very narrow outcrop due to

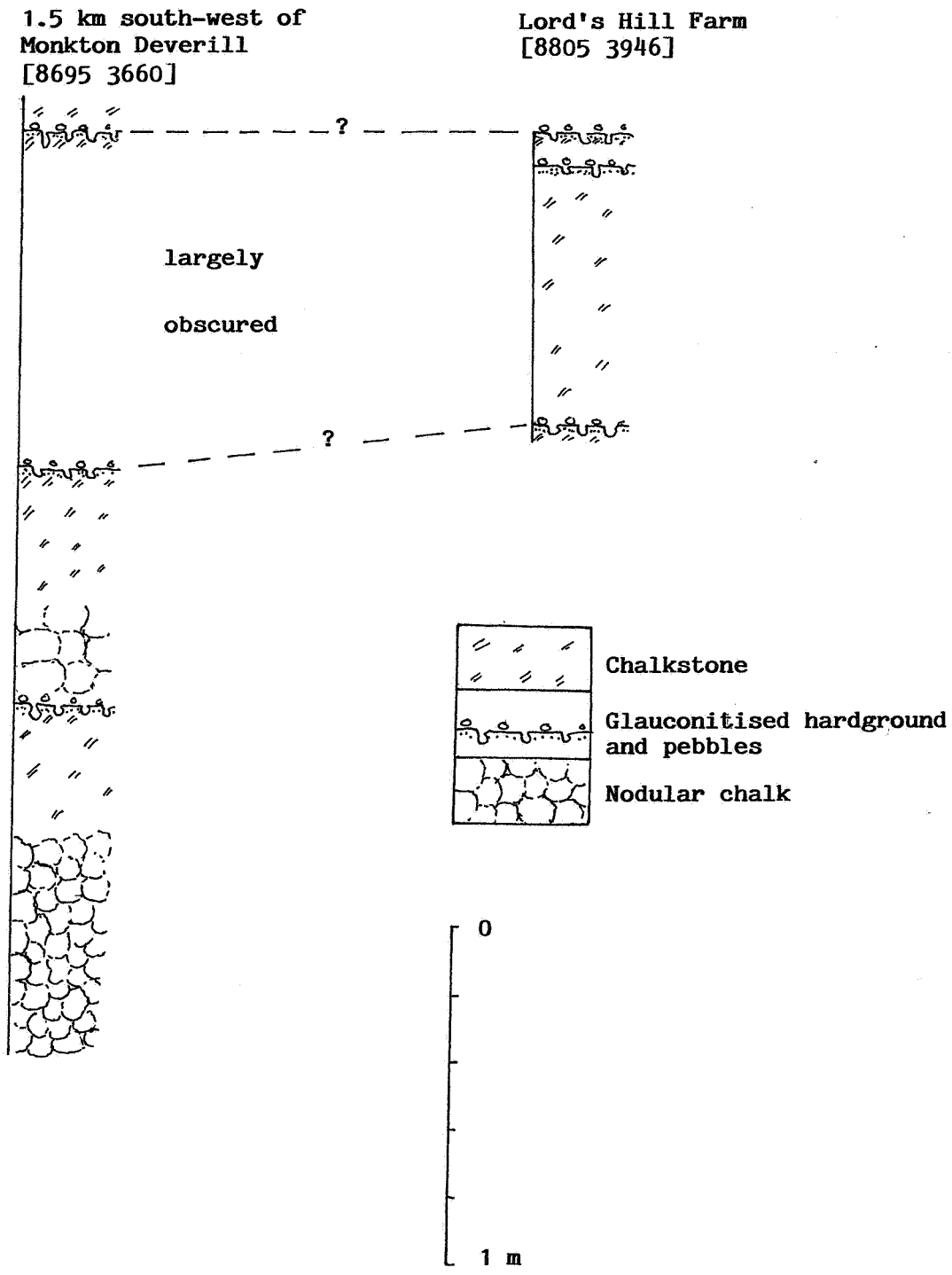

Figure 3. Sketch of hardgrounds in the Chalk Rock

the steep dips associated with the Mere structure. Hard Chalk Rock, dipping c. 9°north-north-east was noted by Mottram (Ms, BGS) on the western margin [8506 3273] of the district. Nearby, in an old pit [8514 3266], now largely filled, Mottram noted 'Chalk Rock' on the south side. Chalk Rock also appears to have been worked in a pit [8569 3262] some 600 m farther east. Glauconitised chalkstone was found in brash close by [8575 3262].

A good exposure of chalk the *planus* Zone was seen in a quarry [8726 3244] by the road to Chapel Farm, Upton (Jukes-Browne, Ms); the beds dip at about 25° north:

	Thickness m
Rather hard, white chalk with many layers of irregular flint nodules, large and small	6.10
Rather hard, white chalk with 3 continuous seams of flint	0.61
Hard, rough, yellowish rock passing into rough gritty chalk	0.46
Hard, nodular, cream-coloured chalk with a few flints, *Micrasters* common	6.10
Hard limestone, with two layers of green-coated nodules, forming a ridge at the bottom of the pit	0.91

Jukes-Browne thought that *planus* Zone was confined to the lowest 7.5 m exposed.

The basal beds (below the Chalk Rock) of the member were seen in a temporary pit [8817 3162] north of East Knoyle. There, about 1.6 m of firm to hard, white, lumpy, flintless chalk was exposed; one specimen of *Spondylus spinosus* was found.

A good section was formerly exposed in the large quarry [8875 3110] east of East Knoyle (Jukes-Browne and Hill, 1904, p.75 and Ms).

	Thickness m
Lewes Nodular Chalk	
1.White chalk with many flints, some nodular and some finger-shaped, also several continuous layers or seams of flint	6.10
2.Rough, nodular, sandy chalk with green grains and a few flint nodules	0.46
3.Hard, gritty nodular chalk with a layer of yellow-coated nodules at top, and others, less conspicuous below; a *Micraster* found	3.66
4.Hard, yellowish limestone in one massive bed, with layers of green-coated nodules in it	1.07
New Pit Chalk and *Holywell Nodular Chalk*	
5.Firm white chalk in thick beds	15.24
Holywell Nodular Chalk	
6.Hard cream-coloured chalk, seen for	0.61

Jukes-Browne and Hill (1904) regarded beds 3 and 4 as comprising the Chalk Rock. However, it seems more likely that Bed 4 is the Chalk Rock as used in this account; the nodular layer at the top of Bed 3 is probably the East Knoyle/Hope Gap Hardground (see below). The lower part of the quarry is now filled, but about 8.5 m of the upper part of the section is still visible (Woods, 1994c, loc. 7) (Figure 4). The dip in the quarry is 20° northwards. The new collecting shows that *Micraster normanniae* does not range above the East Knoyle Hardground in the lower part of the section. The morphological features of a *Micraster* from the surface of the hardground are transitional between *M. normanniae* and *M. cortestudinarium*, suggesting a correlation with the Hope Gap Hardground of Sussex, in the lower part of the *cortestudinarium* Zone (Mortimore, 1986). The fauna from the higher part of the section is dominated by *Cremnoceramus*, which are typical of the *cortestudinarium* Zone (Mortimore, 1986). In Sussex, *Cremnoceramus schloenbachi* predominates above the Hope Gap Hardground (Mortimore, 1986), as it does above the East Knoyle Hardground and provides further support for the correlation. Other species of *Cremnoceramus* (e.g. *C.* ex gr. *waltersdorfensis?* and *C.* ex gr. *rotundatus*) above the East Knoyle Hardground, however, occur more typically below the Hope Gap Hardground in Sussex (Mortimore, 1986). A crushed *M. cortestudinarium* 0.1 m above Flint 8 is consistent with a level above the Hope Gap Hardground. A specimen of *M. cortestudinarium*, not accurately located, occurs in hard, iron-stained and glauconitised chalk, and may have come from the East Knoyle Hardground, supporting its correlation with the Hope Gap Hardground of Sussex. Up to 2.5 m of section occurs beneath the East Knoyle Hardground, but there is no unequivocal evidence of the *plana* Zone at this level. In Sussex, the Hope Gap Hardground is c. 5 m above the base of the *cortestudinarium* Zone (Mortimore, 1986).

At Knoyle Corner, hard, nodular chalk and chalkstone occurs at the top of a small pit [8967 3093].

Seaford Chalk

In the north-east of the district, excavations [8977 3847] for a house exposed about 2.5 m of firm, white, blocky, flinty chalk. Fragments of *Platyceramus* and *Volviceramus involutus* are common, together with a possible *Micraster coranguinum* (Woods, 1994b). The co-occurrence of *V. involutus* and *Platyceramus* indicate the lower part of the *coranguinum* Zone. Acme occurrences of *V. involutus* are associated with the Seaford Chalk interval containing the Seven

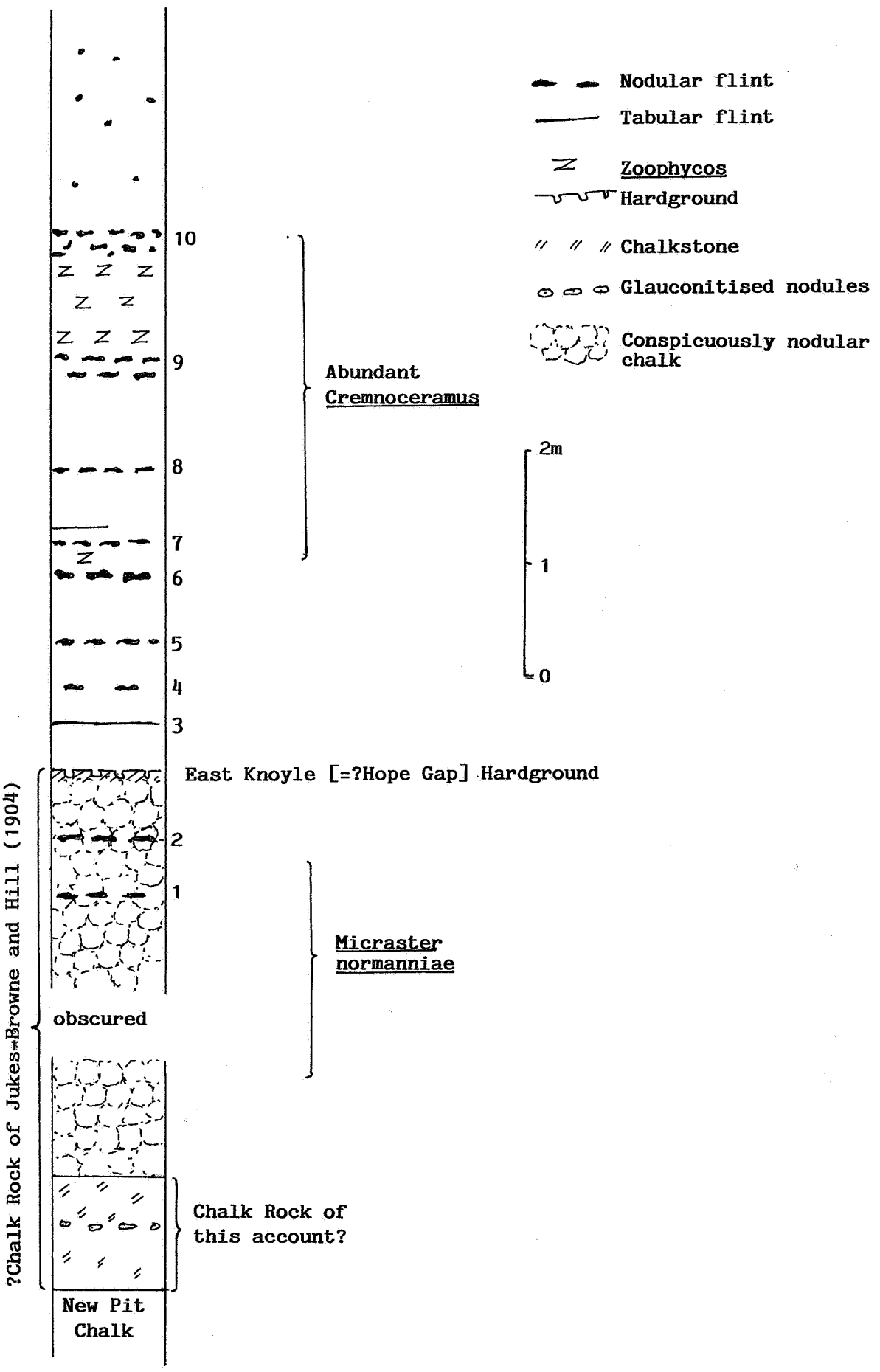

Figure 4.Section in the Lewes Chalk at the East Knoyle Chalk pit [8875 3110] (based on Jukes-Browne and Hill (1904) and Woods (1994c))

Sisters Flint, about 17 m above the base of the Seaford Chalk (Mortimore, 1986). This locality lies about 35 m above the base of the Seaford Chalk (c. 18 m above the base of the *coranguinum* Zone). Fragments of *Platyceramus* were found about 15 m lower [8977 3835], south of the above section, and near the base of the Seaford Chalk on the opposite side of the valley [8978 3775].

South-south-east of Brixton Deverill, fragments of *Platyceramus* were found 10 [8656 3801] and 15 m [8658 3797] above the base of the member. Further up the hill, about 23 m above the base (c.7 m above the base of the *coranguinum* Zone), a specimen of *Volviceramus involutus* in flint preservation was found (Woods, 1994b). On the south side of the hill, *Platyceramus* fragments were again noted [8677 3766, 8684 3766 and 8687 3765].

Firm, white chalk with *Platyceramus* was noted north-east [8917 3690], south-east [8880 3626] and south-west [8753 3566] of Lower Pertwood. At Pertwood, a shallow excavation [8907 3575] revealed firm white chalk with common *Platyceramus*. *Platyceramus* was also found in the valley bottom [8929 3545 to 8944 3543] south-east of Pertwood.

Platyceramus and a possible *Volviceramus* (identification by CRB) were found as brash [8936 3440] west of Knoyle Down Farm.

At West Knoyle, *Platyceramus* fragments were found about 25 m above the base of the Seaford Chalk [8533 3337]. The position above the base of the member of another occurrence [8575 3269] of *Platyceramus?* is difficult to estimate because of probable steep dips associated with the Mere Fault.

North-east of Manor Farm, West Knoyle, an old pit exposes about 2 m of firm white chalk with common *Platyceramus* and *Volviceramus involutus* in two places [8619 3283 and 8619 3286]. Although the bedding in the pit is apparently horizontal (Mottram, Ms, BGS), steep dips associated with the Mere Fault are likely between the pit and the fault which runs along the head-filled valley to the south. For this reason, it is difficult to work out the height of these occurrences of *V. involutus* above the base of the Seaford Chalk, but the lower is not less than 20 m and the higher not less than 25 m above the base (i.e., not less than 4 and 9 m respectively above the base of the *coranguinum* Zone). Some 350 m east of the pit, *Micraster* aff. *bucaillei*, suggestive of the *coranguinum* Zone, was found in brash.

Farther east, *Platyceramus* was found in brash [8706 3263] close to the base of the Seaford Member in an area of presumed steep dip, north of Upton, and higher in the sequence in areas of gentle dip north-west [8807 3255 to 8832 3256] and north [8900 3255] of Sheephouse Farm, East Knoyle.

3. STRUCTURE

The dominant structural feature of the district is the Mere Fault and associated monoclinal fold south-east of the fault. The Mere Fault, formerly known as the Great Fault (Bartlett and Scanes, 1916, p.120), was first named by Edmunds (1938, p.174). An east-west section of the Mere Fault is readily traceable over a 1 km length in the west of the district, where Chalk is faulted against Kimmeridge Clay. At West Knoyle, the fault swings slightly northwards and trend east-north-eastwards for about 500 m along a head-filled valley, beyond which it cannot be recognised as a fracture at the surface. East of the fault, there is a sinuous belt of steep dips (the overall strike is south-easterly, with dips up to 42° in a general northerly direction) traceable to the eastern margin of the district and beyond (Figure 5). To the north and north-east of this structure, the dip rapidly flattens out and subhorizontal strata, or with only a very gentle (c. 1°) dip to the east or south-east, crop out over the central and northern part of the district. In the north-west of the district, a north-north-easterly trending fault along the Wylye valley has a downthrow of about 10 m east.

The throw of the Mere Fault is idfficult to calculate because the amount of pre-Cretaceous erosion is not known. All that is known is that is that New Pit Chalk and Lewes Chalk on the north side of the fault are downthrown against Kimmeridge Clay which probably lies close to the Lower/Upper Kimmeridge Clay boundary. A minimum of 120 m of Cretaceous strata are cut out by the fault. Around East Knoyle, there are smaller faults associated with the monoclinal structure, in which the base of the Gault is downthrown about 15 m.

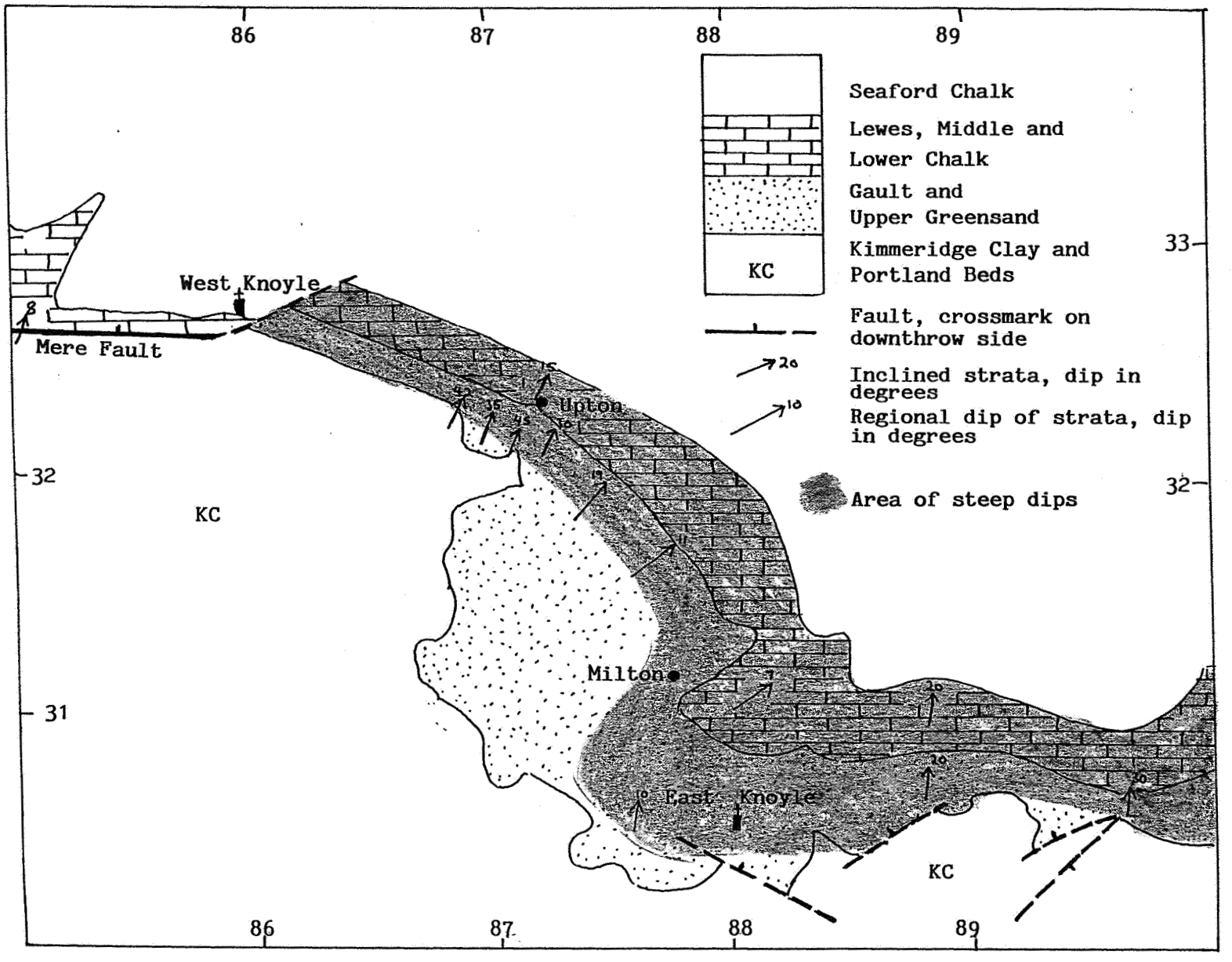

Figure Sketch-map of the Mere Fault and associated monoclinal structure

4. DRIFT

Clay-with-flints

Clay-with-flints is developed on the Seaford Chalk principally in the eastern central part. The deposits vary from almost a flint gravel [particularly between 870 380 and 889 377, and around 8915 3875] with very little clay matrix, to flinty clay. The two deposits appear to merge with one another. No section has been sen through the deposit and its maximum thickness is unknown - it is probably in the range 2 to 3 m.

Older Head

There are two patches of older head to the east [886 305] and south-east [891 300] of East Knoyle. They consist of sandy, pebbly clay with common chert clasts. A thickness of more than 2.2 m was proved in an auger hole [8884 3064].

Head

Heterogeneous deposits of sandy clay, clayey sand and pebbly sandy clay and clayey sand occur principally along valley bottoms and sides. At West Knoyle, the deposits contain much chalk debris [around 860 325]. Head deposits in a slightly different situation occur along the Mere Fault where they occupy a depression up to 1.4 m deep [e.g.8500 3261]. A third situation in which head deposits occur is the sheet-like spread [865 302] near Moor's Farm in the angle formed by the confluence of two streams. In this last situation, a thickness greater than 2.2 m of sandy clay was proved locally [8646 3029], although where it was possible to auger through the deposits, they consisted of between 1 and 2 m of sandy clay, resting on between 0.1 and 0.6 m of clayey gravel. This last occurrence may be degraded river terrace deposits.

The most extensive spreads border the River Wylye and occupy the bottoms of its tributary valleys in the north-west of the district. The thickness of this spread is unknowm, but it probably rarely exceeds 2 m. At East Knoyle, 2.9 m of head deposits, consisting of 0.8 m of chalk and flint gravel, on 0.5 m of silt with some chalk fragments, on 1.4 m of silty clay with some flint gravel, on 0.2 m of silty sandy clay with some flint and chert fragments, rests on Upper Greensand.

In places [e.g. 8872 3966 and 8872 3962], there is a distinct step down where a tributary valley joins a more major valley. A similar feature has been noted in the Shaftesbury area (Bristow et al., 1994, p.141).

Undifferentiated River Terrace Deposits

In the south-west of the district, patches of sandy clay with a gravelly base occupy hill tops at various heights above the present streams. The capping [856 311] south of West Knoyle is more of a clayey gravel. Because of their gravelly and generally planar base, they are regarded as river terrace deposits, but some may be dissected remnants of sheets of older head, such as recorded in the Gillingham area to the south-west (Bristow, 1993). The maximum thickness proved in the district is greater than 1.4 m [8509 3239].

First River Terrace Deposits

A spread of flinty clay, about 0.5 to 1 m above the present floodplain, borders the River Wylye in the north of the district. Its thickness is unknown.

Alluvium

The principal tract of alluvium is along the River Wylye in the north-west of the district. There, the width of the alluvium varies from 40 to 150 m. No detail of the litholgy is available, but it probably consists of an upper unit of silty, organic clay, resting on a gravel. The thickness is unknown.

Landslips

Several landslips involving the Gault and Kimmeridge Clay occur in the south-west of the district (Figure 2). Some [863 325, 8885 3160, 889 310, 8740 3056 and 8750 3037] are related to springs issuing from the base of the Gault, others [859 316, 861 320, 8655 3100 and 893 300] occur on the steep sides of actively eroding streams. All those in the latter category are actively moving at the present day, as is the one [8750 3037] of the former category south of the Holloway.

Swallowholes

Scattered swallowholes have been noted along some of the chalk valleys [8707 3755, 8778 3853, 8835 3650, 8865 3655, 8864 3540 and 8911 3457].

5. ECONOMIC GEOLOGY

Building stone

The Ragstone at the top of the Shaftesbury Sandstone has been widely dug, presumably for building stone, in the West Knoyle-Upton area [8620 3264, 8690 3238, 8701 3231 and 8707 3228]. There are pits [8722 3109 and 8758 3064] in similar situations at Milton.

Roadstone

Chert from the Boyne Hollow Chert has been locally dug [8771 3179, 8772 3160 and 8771 3154], presumably for roadstone. Chert was also dug from the more easterly of the pits in the Upton area (see above).

The Chalk Rock was formerly widely used as roadstone in the district, and it is probable that many of the pits [8514 3266,, 8578 3262 and 8695 3660] that were opened at this level were for roadstone.

Some of the very flinty Clay-with-flints [around 880 379] may have been worked for raodstone.

Lime and marl

Chalk was certainly dug for lime from the large pit [8877 3111] on the east side of Hindon; there used to be a kiln in this pit. The large pit (Bull Pits) [8972 3078] at Knoyle Corner, which worked the Zig Zag Chalk, was probably opened for lime. In the north of the district, another pit [8597 3962] which was also opened in Zig Zag Chalk, may have been for lime.

Brick clay

Kimmerdige Clay was worked for bricks on the west side of East Knoyle [8700 3065].

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