Natural Environment Research Council

BRITISH GEOLOGICAL SURVEY

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TECHNICAL REPORT WA/88/44

SP 71 SW
CHEARSLEY
Part of 1:50 000 Sheet 237 (Thame)

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INTRODUCTION

This report describes the geology of the area covered by the 1:10 000 sheet SP 71 SW which lies in north-west Buckinghamshire 20 km ENE of Oxford and 9 km west of Aylesbury. The area was originally surveyed at the 1:63 360 scale and published as part of the Old Series Sheet 45 SE in 1863 with a revised edition in 1867. The present survey was carried out by A.J.M. Barron in 1987. Fossil determinations were made by B.M. Cox. The survey was supported by the Thames Water Authority.

The present area is dominated by a ridge of hills lying NE-SW across the middle of the ground (the central ridge of this report) and rising to 138m. The village of Chearsley lies at the south-western end and the hamlet of Upper Winchendon stands on the ridge in the north-east. In the north-west corner of the area the small village of Ashendon stands on a hill rising to 158m. A small misfit stream runs south-westwards in the broad valley (the Watbridge valley of this report) between the central ridge and Ashendon hill to join another stream which runs south-east to its confluence with the Thame on the ground to the south. Part of the valley of the River Thame lies to the south east of the central ridge in which is the hamlet of Nether Winchendon. In the south-east corner the village of Cuddington stands on the edge of a plateau overlooking the River Thame. The area is under mixed arable cultivation and grassland with a few copses and minor areas of woodland. The formations to be described are all very poorly exposed.

GEOLOGICAL SEQUENCE

DRIFT

QUATERNARY	Alluvial Fan
	Alluvium
	River Terrace Deposits
	Colluvial Deposits

SOLID

JURASSIC	Whitchurch Sand Formation
	Purbeck Formation

Portland Formation including:
Portland Stone Member
Portland Sand Member
Kimmeridge Clay Formation
Ampthill Clay Formation
Cumnor Formation, Oakley Member
West Walton Formation
Oxford Clay Formation, Upper Oxford Clay Member
(proved only in boreholes)

Reports covering adjacent areas are:

SP 61 NE	Ludgershall	(M.G. Sumbler)
SP 61 SE	Brill	(A.J.M. Barron)
SP 60 NE	Long Crendon	(K. Ambrose)
SP 71 NW	Waddesdon	(M.G. Sumbler)
SP 70 NW	Thame	(R.D. Lake)

JURASSIC

Oxford Clay Formation

Upper Oxford Clay Member

The Upper Oxford Clay Member is thought to have been penetrated in a borehole (Appendix 1, SP 71 SW/2) near Chearsley Furze. It is estimated that approximately 6m of the Member may be present. In adjacent areas it consists of pale grey fossiliferous mudstones, silty in parts, with silty limestones near the base.

West Walton Formation

The uppermost 2m of the West Walton Formation crop out in the extreme north-west of the area where they give rise to a brownish grey clay soil with large fragments of thick oysters. A borehole near Chearsley Furze (SP 71 SW/2) is thought to have penetrated the full thickness of the Formation which is estimated to be about 15m from data from adjacent areas (see Barron, 1988 and Sumbler, 1988a). In these areas it consists of alternating dark and pale grey mudstone, which are silty in parts.

Cumnor Formation, Oakley Member

The Oakley Member crops out only in the extreme north-west where the lowermost 3m or so are faulted against the Kimmeridge Clay. The Member consists of about 5m of pale grey, interbedded silty limestone, marl and clay. At the surface the Member gives rise to a dark grey-brown slightly silty clay soil with common oysters, notably *Nanogyra nana*. The full thickness is thought to have been penetrated in a borehole (SP 71 SW/2) near Chearsley Furze but it cannot be distinguished in the log.

Ampthill Clay Formation

The Ampthill Clay Formation crops out in the lower part of the Watbridge valley and to the north-west of Ashendon hill. It consists of between 15 and 21m of mid to dark grey mudstone with a few thin grey, silty, argillaceous limestone beds (cementstones) generally less than 0.5m thick, in the upper part. Oysters are common, notably *Deltoideum delta* and *Gryphaea dilatata*.

The Formation gives rise to a heavy grey brown, slightly silty clay soil with fairly common fragments of oysters and cementstones. Cementstone beds were traced at the surface in only two places; north of Ashendon [707 149] and north of Decoy Farm [735 148]. Specimens of cementstone were identified and some were related to the standard Ampthill Clay sequence (Appendix 3 and Cox and Gallois, 1979) which assisted in elucidating the structure around Ashendon hill (see Structure).

The Ampthill Clay Formation was penetrated in a number of boreholes (Appendix 1) but it was possible to distinguish it from other formations in only two. In one (SP 71 SW/36) a limestone bed was struck at 3.5m and this is correlated with limestone debris collected from a nearby ditch [7111 1319] which was tentatively identified as from Beds AC40-42 (Appendix 3) of the standard sequence, the highest of the Formation (Cox and Gallois, 1979). It is believed that the same horizon was struck in another borehole (SP 71 SW/41) at 4.6m depth, where it is described as "claystone".

Kimmeridge Clay Formation

The Kimmeridge Clay Formation underlies much of the lower and middle slopes of the hills throughout the area. It comprises between 30 and 40 metres of alternating dark brownish-grey, bituminous mudstone and mid grey mudstone with thin, grey, nodular, argillaceous limestone beds or cementstones in the lower part and lenticular grey fine-grained sand or silt beds mainly in the upper part. Most beds other than the sand are highly fossiliferous. The Formation was not exposed in the area at the time of survey.

The Kimmeridge Clay gives rise to a grey-brown clay soil with rare fragments of cementstone. Within a metre of the surface the Formation weathers to grey and orange mottled clay. The sand beds produce a much lighter soil, which commonly washes downhill across the clay outcrop (see Colluvial Deposits).

The uppermost sand bed is probably equivalent to the Wheatley Sand of Arkell (1947, pp 105-110) proved in the Brill No.1 Borehole (Barron, 1988). It is up to 15m in thickness and is the most persistent sand bed in this area. It was not proved in places around Ashendon [70 14], west of Chearsley [713 107] and south of Cuddington [738 106] but may be undetectable due to cambering (see Superficial Structures) or drift cover. The lower sand beds are less persistent, in places traceable for only a few hundred metres along convex features or by augering. Around Chearsley Furze [711 121] two lenticular sand beds were mapped out within 15m of the base of the Formation. These may be the lateral equivalents of less sandy silty beds proved elsewhere in boreholes (Appendix 1). A cementstone bed (?KC 18 of the standard sequence of Gallois and Cox, 1976) was traced at the surface in only one place: 700m north of Upper Winchendon [743 149]. The same horizon was tentatively identified from specimens collected from fields near Decoy Farm [7381 1451] and Cuckoo Pens [7155 1466] and the immediately subjacent bed from a specimen from a ditch near Ashendon [7084 1389] (see Appendix 3).

The Kimmeridge Clay was proved in almost all of the boreholes in the area (Appendix 1). Its base is tentatively identified in two

boreholes (SP 71 SW/36 and 41, see also Ampthill Clay Formation) but in many it is not distinguishable from the underlying clay formations. Sand, silt and cementstone beds are differentiated in most boreholes.

Portland Formation

The beds of the Portland Formation form the main body of the plateaux of the central ridge, around Cuddington, and around Mount Pleasant in the south-west. They also underlie the Whitchurch Sand outcrops around and to the north-east of Ashendon.

The Portland of this district has received much attention in the past (see especially Fitton, 1836; Blake, 1880; Woodward, 1895; Davies, 1899; Buckman 1925-27; Arkell, 1947; Ballance, 1963) but because of its very poor exposure there has been no detailed work in the present area. The general sequence of beds of the Portland Formation of this area is as follows:

Off-white, cream and pale grey, shell-detrital pelletal, micritic and semi-porcellanous limestones, sandy in places	up to 5m	Portland Stone Member
Pale brown fine to medium-grained sand	1 to 2 m	
Pale grey shelly pelletal sandy glauconitic rubbly limestone	3 to 5m	
Grey and brown glauconitic clayey fine to medium-grained sand with black 'lydite' pebbles, very fossiliferous, cemented in places	2 to 6m	Portland Sand Member

The uppermost unit is probably the equivalent of the Creamy Limestone of Blake (1880) and has a broad out-crop beneath the Purbeck Formation along the central ridge, which is characterised by abundant limestone debris in the soil in places. The unit was exposed in trenches on Dadbrook, Cuddington (Appendix 2, Localities G and H). The sand unit beneath is probably the equivalent of the Crendon Sands of Buckman (1925-27). It is only mappable to the south-west of Whaddonfield Farm [719 118], and in the knoll [721 115] to the south but it was proved in boreholes elsewhere (Appendix 1, SP 71 SW/24, 27 and 33), and

pale brown and khaki sand of the unit was seen dug in fox earths, badger setts and rabbit burrows in several other places [7153 1164, 7001 1031, 7321 1295, 7415 1280 and 7385 1368].

The limestone unit underlying the sand is probably the equivalent of the Rubbly Limestone of Blake (1880). Ballance (1963) does not separate it from the underlying Glauconitic Beds with which it shares its sandy glauconitic character, but it is included in the Portland Stone by virtue of its induration. It has been possible to map a base to the Portland Stone Member over much of the area because of the contrasting hardnesses of the units. The unit has a broad outcrop along the central ridge and is probably present but not differentiated around most of Ashendon hill. The unit is exposed at Brackwell Farm (Locality B) and Manor Farm, Chearsley (Locality D) and its sandy rubbly debris is common in the soil on its outcrop.

The Portland Sand Member comprises the Glauconitic Beds of Blake (1880) and the Upper Lydite Bed of Arkell (1933). The Member is present throughout the area and is probably the only part of the Formation remaining beneath the unconformity below the Whitchurch Sand around Lower Pollicott [70 12 and 70 13] and Cuckoo Pens [712 148].

Fossils were collected from outcrops of the Portland Sand Member in several places (Appendix 3). Bivalves were found in a burrow near Manor Farm, Lower Pollicott [7009 1281]. Near Cedarwood Bungalow [7363 1324] ammonites and bivalves were seen in field brash and indeterminate shell fragments with lydite pebbles and glauconite were collected from field brash west of Cuddington [7334 1127]. Material from the Member was seen in debris dug from animal burrows near the railway (Locality J), near the astronomical observatory (Locality E) and from foundations in Ashendon (Locality A).

Many of the boreholes in the area (Appendix 1) pass through the Formation but generally the descriptions are insufficiently detailed to do any more than distinguish the sand bed in the Portland Stone and, in some, to distinguish the Members.

Cambering has profoundly affected the outcrops of the Portland Formation and the overlying beds except possibly in the area around Cuddington (contrary to the view of Ballance, 1963, see Superficial Structures). One effect of this process is to substantially increase the apparent outcrop thicknesses of the Members and it has also contributed to the difficulties in dividing the Formation into Members north-west of Chearsley.

The Formation is the main aquifer in the area and there are numerous springs along the outcrop of its base (see Water Supply).

Purbeck Formation

The beds between the Portland and Whitchurch Sand formations west of Ashendon and north-west of Chearsley, and forming outliers along the central ridge and east and south-east of Cuddington are called here the Purbeck Formation although there is evidence that the Whitchurch Sand is also of Purbeck age. The Purbeck beds of this district have received some attention (Fitton, 1836; Davies, 1899; Merrett, 1924 and Ballance, 1963) but there is little detail given for the present area.

In parts of this area, notably around and east of Ashendon [70 14], around Lower Pollicott [70 12 and 70 13] and at Upper Winchendon [74 14], the Purbeck Formation is absent beneath the unconformity at the base of the Whitchurch Sand, but where present elsewhere it consists of up to 10m of pale grey and orange weathering clay, silty in places, cream marl and lenticular off-white porcellanous shelly limestone beds up to 2m thick. Locally around Cuddington it has been possible to trace the limestone beds within the Formation.

The Formation weathers to a grey brown silty clay soil with off-white porcellanous limestone fragments in places. It is not exposed in this area but Davies (1899, p.40) described a pit at King's Cross [7402 1017] in which were exposed almost 3m of multi-coloured marl, clay, sand and limestone ascribed to the Purbeck.

Several boreholes (Appendix 1, SP 71 SW/12, 13, 27 and 30) penetrate the Formation but it cannot be precisely distinguished in any of them.

Whitchurch Sand Formation

The Whitchurch Sand Formation is the youngest solid formation cropping out in the area and forms eight outliers, all but one faulted, on Ashendon hill, the central ridge and the plateau east of Cuddington. There is a substantial unconformity beneath the Formation and it was observed in places to cut out the Purbeck Formation and various beds of the Portland Formation to within 2m of the base.

The history of research of the beds is given by Pringle (1926) and Barron (1988). The age of the Formation is not yet resolved and it is taken to be in the Portlandian Stage of Wimbledon and Cope (1978) and therefore in the Jurassic System. The BGS Brill No.1 Borehole (Barron, 1988, Appendix 1, SP 61 SE/10) penetrated about 14.7m of the Formation.

The Whitchurch Sand Formation consists of a sequence of alternating orange, grey, yellow and brown, fine to medium-grained sand and pale grey and orange clay beds with subordinate dark brown to black secondary ironstone beds. The maximum thickness in this area is thought to be about 6m at Cuckoo Pens [711 147], north-west of Chearsley [713 114] and near Brookfield Farm, Cuddington [746 114].

The Formation weathers to a brown very sandy clay soil with ironstone fragments, smooth pale clay can be seen ploughed up in places. It is not exposed in this area.

The outcrops of the Whitchurch Sand around Cuckoo Pens are intensely faulted and the beds rest on glauconitic sandy beds of the Portland Formation. The sequence here is the thickest proved (5.6m) in the Formation in this area (Appendix 1, SP 71 SW/34). To the south-west near East Farm the Whitchurch Sand rests on limestone in the Portland Formation and up to 1.0m of pale grey clay on clayey sand was augered. Further south-west through Ashendon village the Formation rests on progressively higher beds; the Portland Stone Member south of the

church [705 141] and the Purbeck Formation between Hill Farm [701 144] and Valley Farm [7007 1375]. The Whitchurch Sand outlier is thought to be fairly thin west of the reservoirs [7020 1407] because limestone debris from the Purbeck is ploughed in the fields and some of the small pits [7023 1406 and 7029 1400] are reported to have been dug for stone (hence Stonepits Cottages).

The broad Whitchurch Sand outlier around Lower Pollicott [702 130] rests on low Portland beds. An auger hole by a barn [7060 1301] near Arrow Cottages proved 0.3m of grey and orange-brown very sandy clay on 0.6m of pale orange and grey medium-grained sand, increasingly clayey with depth, on iron-stained brown silty clay (all Whitchurch Sand). Another hole 15m south-east [7061 1300] and 1.5m below proved 0.9m of Portland beds on Kimmeridge Clay sand beds. There are several boreholes through the Formation in this outlier (Appendix 1, SP 71 SW/16-19 and 35) which show it to consist of up to 4.3m of brown, grey and yellow clay, silt and sand, overlying clay, silt, sand or sandstone of the Portland Formation. A little limestone debris was seen in debris from a fox-earth at the base of the Whitchurch Sand near Manor Farm [7009 1281]. The beds of this outlier have been profoundly affected by cambering (see Superficial Structures) which may have severely disrupted them and has lowered the base at outcrop well below its original elevation, giving a misleading impression of outcrop thicknesses.

The extensive outcrop of the Whitchurch Sand north-west of Chearsley [713 112] has also been affected by cambering. From surface evidence and a borehole (SP 71 SW/13) it is seen to consist of up to about 6m of orange brown sand, clay and dark brown ironstone. The sandstone reported in the borehole at 6.4m may in fact be sandy ironstone and its depth does not concur with the base of the Formation in this vicinity. This may be due to disruption of strata by cambering. The Whitchurch Sand of this outlier overlies the Purbeck Formation except east of Crawley Farm [710 111 and 7115 1090] where the Purbeck is absent and the Formation rests on the Portland.

A small faulted outcrop of the Formation south of Chearsley [717 101]

consists of brown sand, clay and ironstone and overlies the Portland Stone.

There is a small outlier of Whitchurch Sand on the top of the ridge near Brackwell Farm [719 121] consisting of about 3m of brown sand. It is partially masked by sandy colluvial deposits and overlies beds of the Purbeck Formation.

The outlier at Upper Winchendon [745 142] is preserved in a small graben and overlies the Portland Stone Member. It consists of brown sand, grey and orange clay and ironstone and is proved by a borehole (SP 71 SW/32) to be about 3.0m thick.

About 6m of brown sandy clay and clayey sand overlies the Purbeck Formation at Brookfield Farm [744 113] east of Cuddington.

STRUCTURE

The regional dip of the strata in this district is about 0.5° to the south-east. This is considerably modified locally by cambering and valley bulging (see Superficical Structures) and by faulting and folding.

There are a number of minor faults with throws up to about 6m, cutting the Kimmeridge, Portland, Purbeck and Whitchurch Sand formations around Upper Winchendon [74 14], Winchendon Hill Farm [739 126] and west of Ridgebarn Farm [744 116]. They do not have a strong preferred orientation but all but one of them trend between 110° and 180°.

Four of the major faults show a clear preferred orientation between 040° and 050°, parallel to the strike of the rocks. This is consistent with structures seen elsewhere in the district, notably the Charlton Anticline (Ambrose, 1988). The parallel Ashendon and Pollicott faults throw in opposite directions, both with maximum throws of about 20m, and, with several minor faults, enclose blocks of up-faulted strata around Grassy Dell [713 146] and east of Ashendon Church [708 142]. The positions of the Ashendon Fault and another, parallel and to the north, were precisely located by augering. The

minor faults around Ashendon appear to show no strong preferred orientation.

The fault in the extreme north-west (see also Sumbler, 1988b) is also orientated along the NE-SW trend as is the Chearsley Church Fault running north-east up the Thame valley (see below).

The Chearsley Fault runs between the Pollicott and Chearsley Church faults and although nearly 4km long its maximum throw is estimated at about 7m to the south-west. It was precisely located around Chearsley but its position east of Lower Pollicott is approximate.

The Portland beds in Chearsley are estimated to dip around 2.5° to the south-east, substantially more than the regional dip and thought to be tectonic rather than non-diastrophic. After allowing for cambering there is a substantial discrepancy in height between the base of the Portland Formation on the north side of the Thame Valley (around 110 to 120m OD) and that on the south (77 to 80m OD). This cannot be accounted for by the regional dip and in view of the calculated dip around Chearsley is thought to indicate a monoclinal structure parallel to and coincident with the Thame. The throw on the Chearsley Church Fault (about 10m) is insufficient to account for these observations but is thought to increase the effect of the structure.

SUPERFICIAL STRUCTURES

The beds of the Kimmeridge, Portland, Purbeck and Whitchurch Sand formations are thought to have been extensively affected by cambering, a process described by Hollingworth, Taylor and Kellaway (1944) and Horswill and Horton (1976) in which beds of competent rock such as limestone and sandstone are disrupted and lowered, particularly at the ends of spurs, by the gradual squeezing and washing out of underlying softer beds, mainly clays, silts and sands. This gives rise to outcrop patterns with greatly increased dips and where the competent beds are thin as in this area, the affects of cambering can be felt by strata hundreds of metres away from the plateau edges where gulls and dip-and-fault structures may form.

The effects of cambering are most striking in this area along the central ridge, around Ashendon and Lower Pollicott and in the spur in the south-west. It is estimated that in places beds at the ends of spurs have been lowered as much as 20m.

Gulls are open joints generally filled with rubble from overlying beds. The orange-brown sandy clay with ironstone seen in a section (Appendix 2, Locality D) in Chearsley is thought to be filling a gull in Portland beds. Some of the anomalies in borehole logs (Appendix 1, e.g. SP 71 SW/13) may be due to boreholes penetrating gull fills. Dip-and-fault structure (see Horswill and Horton, 1976, p.434 and Fig.5) was observed in Portland Stone strata at Brackwell Farm (Appendix 2, Locality B).

It is possible that valley bulging, a process associated with cambering and involving the squeezing-up of clay strata in valley bottoms, may also have taken place in the Watbridge valley. The steep dip of the cementstone beds in the Ampthill Clay north of Decoy Farm may be due to this process.

LANDSLIP

Areas of landslipped material were mapped out on the middle and upper slopes of Ashendon hill and the central ridge north of Chearsley. They mainly affect the Kimmeridge Clay Formation but usually incorporate material and in some places cover the outcrop of the overlying Portland Formation.

Landslips are generally detected by the uneven appearance of the ground which results from rotational slips and mudflows. They generally occur on steeper slopes where water seeping from permeable formations lubricates shear planes in underlying clay beds. In this area the water issues from the base of the Portland Formation and to a lesser extent the sand beds in the Kimmeridge Formation (see Water Supply) and facilitates failure in the Kimmeridge Clay. This can then undermine the higher strata, possibly already weakened and disrupted by cambering (see Superficial Structures) which are then incorporated

in the mass downslope movement. The slip may also override lower formations, for instance north of Ashendon [701 147].

A borehole near Chearsley Furze (Appendix 1, SP 71 SW/11) passes through landslipped material. It comprises here clay with sand pockets and is about 2.9m thick.

QUATERNARY

Colluvial Deposits (Hillwash)

Deposits of brown sandy clay, stony in places, mask slopes, fill the bottoms of minor valleys and cap plateaux and knolls throughout the area. They consist of mainly locally-derived material carried downslope principally by hillwash and soil creep. No evidence for solifluction was seen but it is possible that some of the deposits may be *bona fide* head.

In the Watbridge valley deposits of brown sandy silty clay cover the lower slopes north of Decoy Form [72 14 and 73 14] and merge into the alluvium. On the ground between Marsh, Decoy and Watbridge Farms there are several minor pockets of sandy clay but only one [732 136] forms a discrete mappable deposit. A spur [711 131] and a knoll [717 133] east of Lower Pollicott are capped by thin deposits of brown stony sandy clay, with ironstone clasts probably derived from the Whitchurch Sand. Around the confluence [70 11] west of Chearsley Furze are three deposits; the smallest [7045 1180] including flints and ironstone fragments, the other two being generally just sandy.

Around Chearsley, stony, sandy clay deposits were seen in a steep dry valley [715 108], both principally derived from Whitchurch Sand and Portland formations but including flints and sandstone and quartz pebbles.

At Brackwell Farm [718 123] a very sandy, stony deposit runs from the ridge-top Whitchurch Sand outlier into the valley to the north-west and would appear to have been principally derived from what must have been a much larger Whitchurch Sand outcrop.

In the Thame valley there is a spread of brown, stony, sandy clay [740 121] merging into river terrace deposits east of Nether Winchendon, and near The Limes there is a cone of stony, sandy clay [7445 1350] in a steep valley.

The most extensive spreads of colluvial material are around Cuddington [73 10 and 73 11] where a metre or more of brown, sandy clay, stony in places, drapes the Portland beds plateau and merges downhill with the river terrace deposits. Clasts include limestone and ironstone fragments, black 'lydite' pebbles derived from local formations, and flints, quartz and sandstone pebbles.

The colluvial deposits mapped on the Purbeck Formation outcrop in the south-east [749 107 and 748 103] are quite stony and sandy. Just south of the A418 pieces of sandy ironstone were seen which may be derived from the Lower Greensand or Wealden Beds. Ballance shows these deposits as solid Wealden (1963).

River Terrace Deposits

In this area, the floodplain of the River Thame is flanked along much of its length by deposits of brown clayey sand, some stony. The upper surfaces of the deposits occur between 0.5 and 3m above the surface of the alluvium, but in places the boundary between the deposits is not precisely placed, notably around the sewage works [738 118] and north-west of Ridgebarn Farm [745 121]. The boundary with the colluvial deposits is uncertain, notably west of the sewage works [737 116] and south of Cuddington Mill Farm [730 106], partly because the slopes are gentle and there is no clear topographical break, also because the river terrace deposits are at least in part derived from the hillwash and are lithologically very similar.

From a plot of the thalweg of the river to the south-west it is provisionally concluded that these deposits are of the Second Terrace.

Alluvial Fan

A broad fan of slightly sandy silty clay spreading onto a floodplain

west of the railway [704 109] is interpreted to be alluvial fan deposits. It derives from material carried down a broad valley which is mainly on the area to the west (Barron, 1988).

Alluvium

The River Thame, the stream in the Watbridge valley and various minor tributaries are flanked by tracts of alluvial deposits, generally comprising grey-brown silty clay with minor sand and gravel lenses. The floodplain of the Thame is mainly between 100 and 300m wide and the deposit here may be as much as 10m thick in places. The floodplain of the stream running alongside the railway in the south-west averages about 150m wide and that of the stream in the Watbridge valley is between 50 and 100m wide. Boreholes near Chearsley Furze (Appendix 1, SP 71 SW/2 and 6) prove alluvium thicknesses of 4.3 and 2.3m.

The two main valleys run approximately parallel to the strike of the rocks in the area (see Structure) and their trends may be partially controlled by folding or faulting.

ECONOMIC GEOLOGY

The Portland, Purbeck and Whitchurch Sand formations have all been dug in the past for vernacular building materials and disused shallow pits can be seen in many places on their outcrops, mainly around villages and farm buildings. Pits in the Portland Sand Member, apparently extending downwards into the Kimmeridge sand beds were seen at Hill Farm, Ashendon [700 145] and Musk Hill Farm [7217 1286]. The beds of the Portland Stone Member have been dug for rough building stone and for a local building material called "witchett", in many places (see below). Around Ashendon [704 139] some of the stone pits are on the Whitchurch Sand outcrop where no doubt, the sand and any intervening Purbeck beds would have been put to use. There are several stone pits on the north side of Upper Winchendon [742 142] and it was reported that stone and witchett were dug within Chearsley village. Witchett (probably 'white earth') was soft fine-grained

micritic limestone ground up and mixed with water to make a weak mortar.

There are pits in the Purbeck Formation north-west of Chearsley [7128 1082 and 7162 1100], near Budnall Farm [7402 1017] (see Purbeck Formation) and in a limestone bed east of Brookfield Farm [7499 1137], from which clay, marl and limestone would have been taken.

There are several pits in the Whitchurch Sand beds around Ashendon [703 141] and north-west of Chearsley [7160 1124 and 711 110] presumably dug principally for sand extraction.

It is thought that sand and gravel was extracted from a pit in colluvial deposits [7418 1211] east of Old Mill.

WATER SUPPLY

In "The water supply of Buckinghamshire and of Hertfordshire from Underground Sources" Whitaker (1921) recorded a well at Watbridge Farm [7209 1433] 16 feet (4.9m) deep obtaining "water from corallian Oolite below Kimmeridge Clay", probably indicating limestone beds within the Ampthill Clay Formation or possibly the Oakley Member. All other records and evidence of water supply relate to the beds of the Portland Formation.

The sand and limestone beds of the Portland Formation form a minor aquifer of higher permeability especially where disrupted by faulting and cambering. Despite the sandiness of the underlying Kimmeridge beds, the base of the Portland beds outcrops has a spring line, which is especially strong in this area, along the south-eastern side of the central ridge. The water from many of these springs was collected and pumped in pipes to villages and farms in the past, notably those on Barrack Hill [7307 1240], near Marsh Farm (known as 'The Old Woman') [7258 1314] and on the north side of Chearsley [7178 1104]. All the villages and probably all the farms are now on mains water and it is unlikely that any local spring water is used other than for occasional agricultural purposes.

It is notable that all but one of the villages in this area are situated on the Portland outliers where it would be possible to tap the aquifer from shallow wells. Several wells were shown in Chearsley on old 1:10560 maps but none were identified in the current survey.

APPENDIX 1

BOREHOLES

Abbreviations:

AmC	Ampthill Clay Formation	c	Circa (approximately)
G.L.	Ground level	KC	Kimmeridge Clay Formation
MG	Made Ground	Oa	Oakley Member
O.D.	Ordnance Datum	Pb	Purbeck Formation
Pl	Portland Formation	PlS	Portland Sand Member
PlSt	Portland Stone Member	S(KC)	Sand in Kimmeridge Clay
S.L.	Surface level	S(PlSt)	Sand in Portland Stone
TD	Terminal depth	UOxC	Upper Oxford Clay Member
WhS	Whitchurch Sand Formation	WW	West Walton Formation

		Depth m
2.	**Bucks Water Board No. 1**	
	[7090 1226] S.L. + 70.8m OD	
	Topsoil, clayey	0.5
Alluvium	Clay, brown and grey mottled, gravelly from 3.0 to 3.5	4.3
AmC, Oa, WW and UOxC undivided	Clay, dark grey, laminated	8.8
	Clay, dark grey, silty; laminated in places with shell fragments and layers of clayey silt; slightly organic at 15.5; brown mottled from c36.6 to TD at	45.7
3.	**Bucks Water Board No. 2**	
	[7087 1241] S.L. + 71.7m OD	
	Topsoil, grey, clayey	0.3
KC, AmC and Oa undivided	Clay, brown, sandy, silty; dark grey from 2.1	3.0
	Clay, dark grey, silty, laminated in places with shell fragments and layers of clayey silt; mottled brown and sandy from c12 to TD at	24.4
4.	**Bucks Water Board No. 3**	
	[7075 1247] S.L. + 75.0m OD	
	Topsoil, grey, clayey	0.5
KC and AmC undivided	Clay, brown	0.6
	Clay, grey and brown mottled, silty	2.7
	Clay, dark grey, laminated in places with shell fragments and layers of clayey silt	12.6
	Clay and siltstone, interbedded	16.0
	Clay, dark grey, silty, laminated in places with shell fragments and layers of clayey silt to TD at	24.4

App.1 Cont

		Depth m
6.	**Bucks Water Board No. 5**	
	[7080 1215] S.L. + 69.8m OD	
	Topsoil, grey, clayey	0.5
Alluvium	Clay, grey	2.3
AmC, Oa and WW undivided	Clay, dark grey, laminated in places with shell fragments and layers of clayey silt to TD at	24.4
8.	**Bucks Water Board No. 7**	
	[7102 1220] S.L. + 71.4m OD	
	Topsoil, grey, clayey	0.5
AmC, Oa and WW undivided	Clay, brown	0.9
	Clay, dark grey, laminated in places with shell fragments and layers of clayey silt; occasional claystones from c15	20.7
	Clay, dark grey, silty, laminated with shell fragments and occasional claystones to TD at	24.4
10.	**Bucks Water Board No. 9**	
	[7109 1198] S.L. + 79.4m OD	
	Topsoil, grey, clayey	0.5
KC and AmC undivided	Clay, brown, mottled	1.5
	Clay, dark grey	2.7
	Clay, chalky with limestone	3.7
	Clay, dark grey-brown	4.3
	Clay, dark grey, laminated with occasional shells and layers of claystone and clayey silt, silty from 12.2 to TD at	24.4
11.	**Bucks Water Board No. 10**	
	[7123 1180] S.L. + 90.6m OD	
	Topsoil	0.5
Landslip	Clay, brown and grey mottled, silty; yellow sand pockets from 2.4	2.9
KC, S(KC) and AmC undivided	Clay, multi-coloured, with shells; silty from 4.0	4.6
	Clay, blue grey, silty, laminated with occasional shells; numerous claystones from 12.2; layers of hard limestone from 17.8 to 18.0 and 18.3 to 18.5; bands of broken shells below to TD at	30.5

		Depth m
12.	**Bucks Water Board No. 11**	
	[7135 1153] S.L. + 122.7m OD	
	Topsoil	0.3
Pb and Pl undivided	Clay, brown, silty, sandy	1.1
	Sand, green-grey, fine-grained, silty	1.2
	Clay, grey mottled, silty, with large sandstone and and limestone lumps	5.0
	Interbedded light grey limestone and clayey sand	6.7
	Silt, yellow-brown, sandy, with limestone lumps	10.4
	Sand, coarse-grained, with shells and limestone lumps	12.5
	Silt, grey and brown mottled, sandy	15.2
S(KC)	Silt, blue-grey, clayey with shell fragments	24.7
KC and S(KC)	Clay, blue grey, laminated in places with shell fragments	31.6
	Silt, grey, sandy, slightly clayey	32.2
	Limestone, grey, hard	32.5
	Silt, blue-grey, sandy, clayey	34.8
	Clay, blue-grey, laminated in places with occasional shell fragments	36.9
	Silt, blue grey, clayey, sandy	41.2
	Interbedded blue grey clay and silt with shells; claystone at 45.0 to TD at	45.7
13.	**Bucks Water Board No. 12**	
	[7118 1142] S.L. 118.0m OD	
	Topsoil, grey, clayey	0.5
WhS, and Pb undivided	Clay, brown, sandy with weathered stone	3.7
	Clay, grey-brown mottled	6.4
	Sandstone, reddish-brown, laminated	7.3
	Clay, chalky with limestone layers	11.0
Pl, S(KC) and KC undivided	Limestone, light grey, with yellow-brown silt beds	17.1
	Silt, grey and brown mottled	17.8
	Silt, blue-grey, clayey, sandy	21.9
	Clay, blue-grey, sandy, very silty, laminated in places with occasional shells to TD at	30.6

App.1 Cont

			Depth m
14.	**Bucks Water Board No. 13**		
	[7159 1162] S.L. + 113.5m OD		
	Topsoil, grey, clayey		0.3
Pl	Clay, chalky with limestone beds		2.6
	Clay, brown and grey, sandy, brown from 4.3		5.5
S(KC)	Silt, dark grey, sandy, clayey		11.6
KC	Clay, dark grey, silty, laminated	to TD at	16.2
15.	**Bucks Water Board No. 14**		
	[7053 1264] S.L. + 97.7m OD		
	Topsoil, grey, clayey		0.5
KC, S(KC)	Clay, brown, silty, sandy		2.9
and AmC	Clay, dark grey, silty, laminated in places with		
undivided	shell fragments and layers of clayey silt, slightly		
	organic at 14.5	to TD at	36.6
16.	**Bucks Water Board No. 15**		
	[7040 1285] S.L. + 114.0m OD		
	Topsoil, grey, clayey		0.5
WhS	Clay, brown, silty		0.9
Pl	Silt, grey, sandy		3.7
KC and	Silt, dark grey, clayey		6.7
S(KC)	Clay, dark grey, silty, laminated in places with		
	shell fragments and layers of clayey silt	to TD at	27.4
17.	**Bucks Water Board No. 16**		
	[7019 1288] S.L. + 110.0m OD		
	Topsoil, grey, clayey		0.5
WhS	Clay, brown and grey mottled		2.3
	Clay, chalky		4.0
Pl	Sand, brown, fine-grained, silty		4.3
	Clay, brown and grey, silty, sandy		7.3
KC	Clay, dark grey, silty	to TD at	15.2

App.1 Cont

		Depth m
18.	**Bucks Water Board No. 17**	
	[7027 1319] S.L. + 120.2m OD	
	Topsoil	0.5
WhS	Silt, yellow, clayey	2.0
	Sand, yellow, fine-grained, silty	3.1
	Sand, yellow, fine-grained	3.7
	Clay, yellow-grey	4.3
Pl	Silt, yellow-grey, sandy	7.9
S(KC)	Silt, yellow-brown and yellow-blue and grey	9.1
	Silt, dark grey, clayey	10.1
KC	Clay, dark grey, with shells, laminated in places with layers of clayey silt; silty from c15	17.4
	Clay, blue grey, with shells, laminated in places with layers of clayey silt to TD at	24.4
19.	**Bucks Water Board No. 18**	
	[7052 1328] S.L. + 118.2m OD	
	Topsoil	0.3
WhS	Clay, yellow-grey, silty	1.2
Pl	Sandstone, brown and yellow, clayey	4.6
	Sand, yellow, silty, with fine gravel; clayey in places	5.9
S(KC)	Sand, yellow, silty with occasional clay layers	9.6
KC	Clay, blue-grey, silty, laminated, with shells to TD at	13.9
20.	**Bucks Water Board No. 19**	
	[7047 1350] S.L. + 124.0m OD	
	Topsoil	0.2
Pl	Clay, brown and grey mottled, silty, sandy with pieces of sandstone	
KC	Clay, dark grey, silty, laminated, with shells;	11.6
	sandy from 10.7	12.2
	Claystone	
	Clay, dark grey, silty, sandy, laminated with shells to TD at	14.2

		Depth m
21.	**Bucks Water Board No. 20**	
	[7024 1350] S.L. + 122.2m OD	
	Topsoil	0.5
KC	Clay, yellow-grey, silty with pieces of limestone	1.5
	Clay, multi-coloured, silty	2.3
	Clay, yellow and grey, silty	3.4
	Clay, blue-grey, silty with shells	8.8
S(KC)	Silt, dark grey, clayey, with shells	11.0
KC	Clay, dark grey, silty, laminated, with shells	15.2
	Clay, black, laminated, with shells to TD at	18.3
23.	**Bucks Water Board No. 40**	
	[7291 1314] S.L. + 121.0m OD	
	Topsoil, grey, clayey	0.3
PlSt	Clay, brown and grey	0.6
	Clay, chalky	0.9
	Limestone, very hard, in layers with clay pockets	5.8
PlS	Sand, brown, fine-grained	6.6
	Silt, light grey, sandy with layers of limestone	11.3
S(KC)	Silt, dark grey, sandy	16.8
KC	Clay, dark grey, sandy, silty to TD at	21.3
24.	**Bucks Water Board No. 41**	
	[7316 1298] S.L. + 128.3m OD	
	Topsoil	0.3
PlSt	Clay, grey	0.9
	Limestone	2.9
S(PlSt)	Sand, clayey with pieces of sandstone	4.0
PlSt	Limestone with pockets of brown sand	7.9
PlS	Sand, brown, clayey with layers of sandstone and limestone	11.0
KC and	Clay, dark grey, silty, sandy	11.3
S(KC)	Silt, dark grey, sandy	
	Clay, dark grey, silty, sandy, with occasional shells to TD at	22.9

App.1 Cont

			Depth m
25.	**Bucks Water Board No. 42**		
	[7332 1280] S.L. + 98.5m OD		
	Topsoil		0.3
KC	Clay, grey and brown mottled		3.2
S(KC)	Sand, clayey, brown		4.3
KC	Clay, dark grey, silty with shells	to TD at	13.7
26.	**Bucks Water Board No. 43**		
	[7207 1265] S.L. + 105.7m OD		
	Topsoil		0.3
Hillwash	Clay, yellow, silty, sandy		1.8
KC	Clay, blue-grey and yellow		4.9
	Clay, blue-grey with shells, silty from 8.2		10.7
	Clay, black with shells	to TD at	13.9
27.	Bucks Water Board No. 44		
	[7223 1246] S.L. + 125.9m OD		
	Topsoil		0.5
?Pb	Clay, grey with boulders		1.8
PlSt	Limestone		3.7
S(PlSt)	Sand, brown, fine-grained		4.3
PlSt and PlS	Limestone, greyish white, with beds of yellow-brown clayey sand and occasional limestone lumps		12.2
S(KC)	Silt, brown, grey, clayey, sandy		15.8
KC	Clay, blue-grey, silty with shells		24.4
	Clay, blue-grey with shells		28.0
	Silt, blue-grey, clayey		29.4
	Siltstone		29.6
	Clay, blue-grey, silty	to TD at	30.6
28.	**Bucks Water Board No. 45**		
	[7230 1222] S.L. + 117.8m OD		
	Topsoil		0.3
PlSt	Clay, grey and brown mottled, with limestone pieces and pockets of sand		2.9
	Limestone in hard and soft layers, occasional clay, sand and mudstone		9.1
PlS	Sand, brown, fine-grained, clayey with limestone pieces		10.7
S(KC)	Silt, light grey, sandy, dark grey from 12.2		17.8
KC	Clay, dark grey, silty with occasional shells	to TD at	22.9

App.1 Cont

		Depth m
30.	**Bucks Water Board No. 47**	
	[7170 1186] S.L. +124.3m OD	
	Topsoil, sandy	0.5
Pb and	Limestone, hard with occasional sandy clay	3.4
PlSt	Sand, clayey	4.0
	Limestone, hard with occasional sandy clay	8.5
PlS	Clay, brown mottled grey, silty, sandy	10.7
	Sand, green, clayey	12.5
KC and	Clay, blue grey, silty with occasional shells and clayey	
S(KC)	silt; very silty from 24.7; thin claystone at 26.5	27.0
	Clay, grey-blue, silty with occasional shells to TD at	40.5
31.	**Bucks Water Board No. 48**	
	[7382 1348] S.L. + 112.7m OD	
	Topsoil	0.2
KC and	Clay, yellow, mottled, silty with occasional clayey silt	4.9
S(KC)	Clay, blue-grey, silty, with occasional clayey silt; shelly from 6.1; laminated; claystone at 16.8, 23.2 and 25.6 to TD at	30.6
32.	**Bucks Water Board No. 49**	
	[7451 1419] S.L. + 137.5m OD	
	Topsoil, brown, sandy, clayey	0.3
WhS	Clay, grey and brown, sandy silty	3.0
PlSt	Clay, grey and brown with stone beds	4.4
	Limestone, very hard, interbedded with sand, silt and clay	13.7
PlS	Sand, grey, silty with limestone beds	16.6
	Rock, grey and green	18.0
KC	Clay, dark grey, very silty with occasional shells and clayey silt to TD at	33.7

		Depth m
33.	**Bucks Water Board No. 50**	
	[7495 1456] S.L. + 135.3m OD	
	Topsoil, brown, sandy, clayey	0.3
MG	Clay, brown, silty, sandy	1.2
PlSt	Limestone in soft layers with clay and silt	6.1
S(PlSt)	Sand, brown, fine-grained	6.4
PlSt and	Limestone, very hard in layers with clay and silt	10.7
PlS	Rock, green, very hard with silty clay	11.6
KC	Clay, dark grey, silty with shells, laminated in places to TD at	45.1
34.	**Bucks Water Board No. 52**	
	[7107 1469] S.L. + 131.6m OD	
	Topsoil, ashy	0.5
WhS	Sand, yellow, silty, clayey in places, grey and yellow from 2.4	4.1
	Clay, blue-grey, silty	4.7
	Ironstone	4.9
	Clay, blue-grey, silty	5.6
Pl	Sand, brown, clayey, with clay beds	7.9
S(KC)	Clay, blue-grey, sandy, silty, laminated	11.6
KC	Clay, blue-grey silty, laminated in places	16.5
	Silt, blue, clayey	17.1
	Clay, blue-grey, silty with shells, laminated in places; claystone at 26.5 and from 30.2 to 31.7 to TD at	47.9
35.	**Bucks Water Board No. 53**	
	[7034 1302] S.L. + 120.9m OD	
	Topsoil	0.3
WhS	Clay, yellow-brown, sandy	1.5
	Sand, yellow-brown, clayey	3.5
Pl	Sand, grey brown, clayey	5.5
S(KC)	Clay, grey brown, sandy, silty; blue grey from 6.7	7.9
KC	Clay, blue grey, silty, shelly, laminated in places with layers of clayey silt	14.9
S(KC)	Clay, blue-grey, very sandy, silty	16.8
KC	Clay, blue grey, silty, shelly, laminated in places; claystone at 29.0	29.3
	Clay, brown-blue, silty, shelly, laminated in places; blue-grey from 32.6 to TD at	37.2

App.1 Cont

			Depth m
36.	**Bucks Water Board No. BM1**		
	[7099 1313] S.L. + 83.1m OD		
	Topsoil		0.3
KC	Clay, brown, yellow and grey, silty with limestone pieces		3.5
AmC	Limestone, grey and yellow		4.0
	Clay, blue-brown		5.2
	Clay, blue-grey, silty, laminated, shelly	to TD at	7.6
39.	**Bucks Water Board No BM4**		
	[7110 1350] S.L. + 83.5m OD		
	Topsoil		0.3
KC and AmC	Clay, brown, yellow and blue		4.3
	Clay, blue-grey, silty, laminated, shelly, boulder at 5.2	to TD at	7.6
40.	**Bucks Water Board No. BM5**		
	[7166 1261] S.L. + 81.8m OD		
	Topsoil		0.3
KC and AmC	Clay, brown, yellow and blue, slightly chalky		2.0
	Clay, blue-grey, silty, laminated, shelly near top; claystone at 6.6	to TD at	7.6
41.	**Bucks Water Board No. BM6**		
	[7181 1285] S.L. + 81.4m OD		
	Topsoil		0.3
KC	Clay, yellow grey, silty		1.5
	Clay, blue-grey		3.0
	Clay, blue-grey, silty, very silty with depth		4.6
AmC	Claystone		5.2
	Clay, blue-grey, laminated, very silty	to TD at	7.6

App.1 Cont

			Depth m
42.	**Bucks Water Board No. BM7**		
	[7201 1312] S.L. + 82.3m OD		
	Topsoil		0.3
KC and AmC	Clay, grey brown and yellow, silty		2.0
	Mudstone, grey and yellow, calcareous		3.2
	Clay, blue-grey, silty, laminated, shelly	to TD at	7.7
45.	**Bucks Water Board No. BM10**		
	[7128 1405] S.L. + 83.3m OD		
	Topsoil		0.5
KC and AmC	Clay, brown, yellow and blue		2.0
	Clay, blue, grey and yellow, silty from 3.4		4.9
	Claystone		5.5
	Clay, blue grey, silty		6.7
	Claystone	to TD at	7.6

APPENDIX 2

LOCALITIES

For abbreviations see Appendix 1

		Thickness m
A.	**Temporary excavation, Ashendon** [7045 1438]	
Pl	Khaki to dun glauconitic sand, cream to off-white marl and pale grey, pelletal, fine-grained limestone debris dug from foundations.	
B.	**Section behind barn, Brackwell Farm** [7186 1227]	
PlSt	Limestone, pale grey and grey brown, shelly, shell-detrital, sandy, peloidal, roughly bedded to rubbly, common large ammonites, bivalves and oysters	c0.4
	Strata severely affected by dip-and-fault and form blocks dipping c20° to 350	
C.	**Section under fallen trees, Chearsley Hill House** [7104 1081]	
Pl	Limestone, pale grey, sandy, glauconitic Limestone, off-white, shelly, pelletal, micritic	
	(Possibly cambered and severely disrupted section) Well head 5m to SE. Water level c10m below G.L.	
D.	**Section by tennis court, Manor Farm, Chearsley** [7166 1050]	
	Topsoil Obscured	1.2
PlSt	Marl or soft limestone, cream to off-white; passing into off-white chalky very fine-grained limestone with bivalves passing into pale grey orange-stained sandy glauconitic pelletal micritic rubbly limestone	c1.0
	Orange-brown sandy clay with ironstone in gull in north-east corner	
E.	**Badger sett near observatory** [7395 1332]	
PlS	Sand, light brown to khaki, fine-grained, clayey, glauconitic, abundant black pebbles.	

App.2 Cont

F.	**Temporary section, Chearsley** [7172 1102]
P1	Limestone, grey, shelly, micritic; limestone, grey sandy, glauconitic; sand, khaki and light brown
G.	**Trench, Cuddington** [7390 1091]
P1St	Limestone, pale grey, shell-detrital, pelletal
H.	**Trench, Cuddington** [7391 1087]
P1St	Limestone, grey, shell-detrital, sandy, pelletal
J.	**Burrow, Crendon Road** [7138 1029]
P1S	Sand, pale khaki, medium-grained, clean, well sorted, a little glauconite and serpulid debris.

APPENDIX 3

PALAEONTOLOGY

Identifications by B.M. Cox

7250 1416 Field drain, 960m on 260° from Decoy Farm, Upper Winchendon
Fragments of *Gryphaea dilatata* (J Sowerby), some lightly encrusted with small oysters and tiny serpulids; plus a small piece of smooth cementstone with oysters. Horizon : Ampthill Clay (?Bed AC12 or AC14 of standard sequence)

7381 1451
Field brash, 400m on 061° from Decoy Farm, Upper Winchendon
Slightly silty cementstone with indeterminate shell fragments.
Horizon : Kimmeridge Clay (?Bed KC 18 of standard sequence)

7155 1466
Field brash, 1130m on 066° from Ashendon Church, Ashendon.
Small pieces of slightly silty cementstone with indeterminate shell fragments.
Horizon : Kimmeridge Clay (?Bed KC 18 of standard sequence)

7111 1319
Field brash, 1180m on 148° from Ashendon Church, Ashendon.
Tiny piece of 'porcellanous' septarian cementstone.
Horizon : ?Ampthill Clay (?Beds AC 40-42 of standard sequence)

7429 1484
Field brash, 470m on 320° from Upper Winchendon Church, Upper Winchendon.
Small piece of cementstone with perisphinctid ammonite fragment (coarse bifurcating ribs) and *Modiolus*? plus loose *Nanogyra* valve with others encrusting.
Horizon : Kimmeridge Clay (?Bed KC 18 of standard sequence)

7084 1389
Ditch, 460m on 134° from Ashendon Church, Ashendon.
Piece of silty? septarian cementstone with indeterminate shells.
Horizon : Kimmeridge Clay (?Bed KC 17 of standard sequence)

7177 1411
390m on 240° from Watbridge Farm, Ashendon.
Very small and worn oyster fragments with borings.
Horizon : Ampthill Clay

7009 1281
Burrow, 1450m on 196° from Ashendon Church, Ashendon.
Sandstone or sandy limestone with serpulids and oysters (including *Nanogyra*?), some bored.
Horizon : Portland Formation

App.3 Cont

7347 1099
Field brash, 350m on 230° from Cuddington Church, Cuddington.
Broken specimen of *Camptonectes lamellosus* (J Sowerby).
Horizon : Portland Formation

7200 1074
Field brash, 440m on 358° from Chearsley Church, Chearsley.
Glauconite limestone with trigoniid bivalve fragment and small 'chert' pebble; ammonite whorl fragment *(Glaucolithites?)* with encrusting fauna of tiny ?bivalves.
Horizon : Portland Formation

7334 1127
Field brash, 390m on 279° from Cuddington Church, Cuddington.
Whorl fragments of indeterminate ammonites with lydite and glauconitic pebbles in matrix.
Horizon : basal Portland Formation

7363 1324
Field brash, 800m on 083° from Marsh Farm, Nether Winchendon.
Small whole fragments of ammonites *(Glaucolithites?)* with rarer indeterminate bivalve fragments; fragment of *?Protocardia dissimilis* (J de C Sowerby) with common small ?bivalves and a lydite pebble in matrix.
Horizon : Portland Formation (?basal)

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