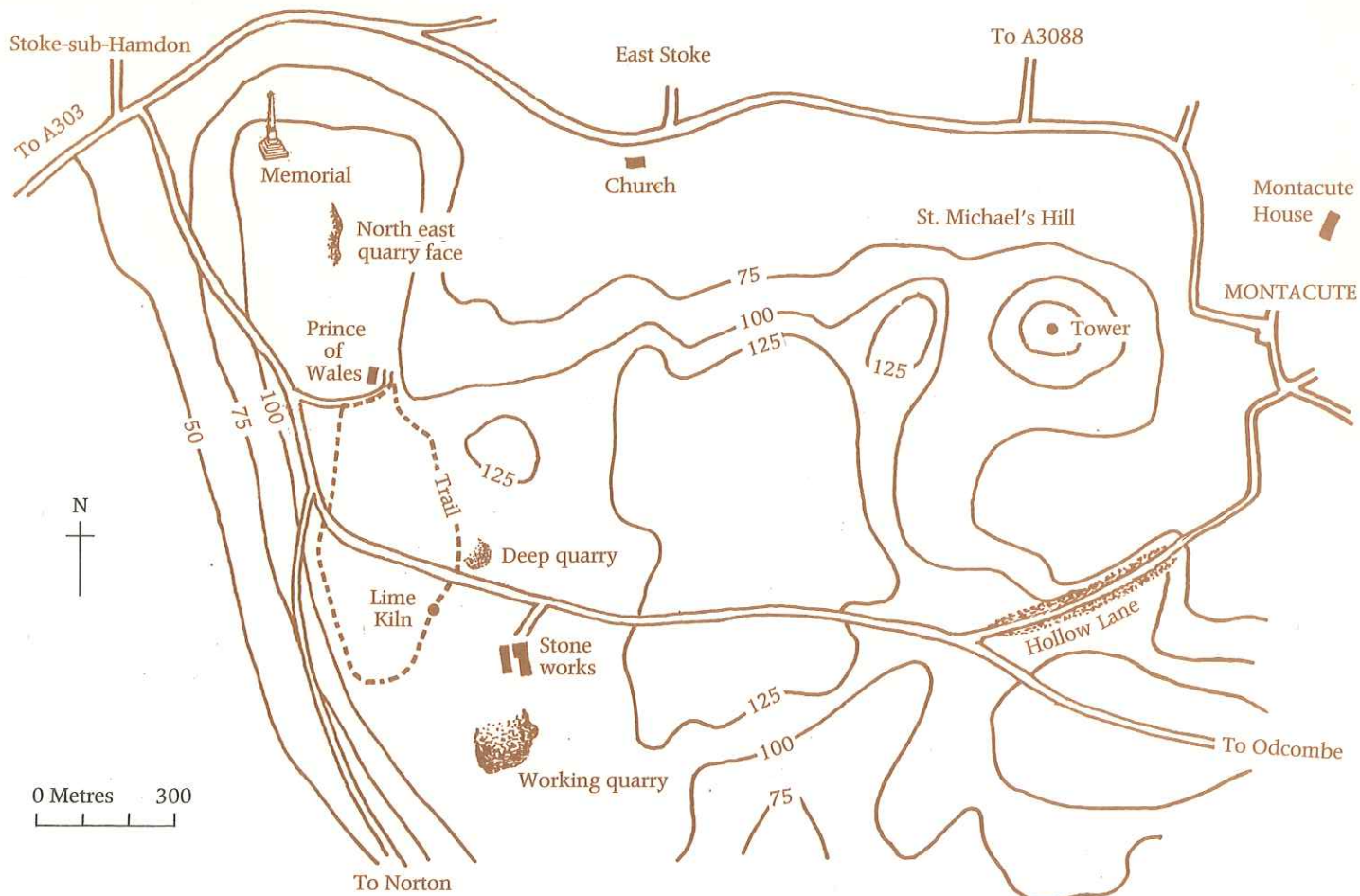
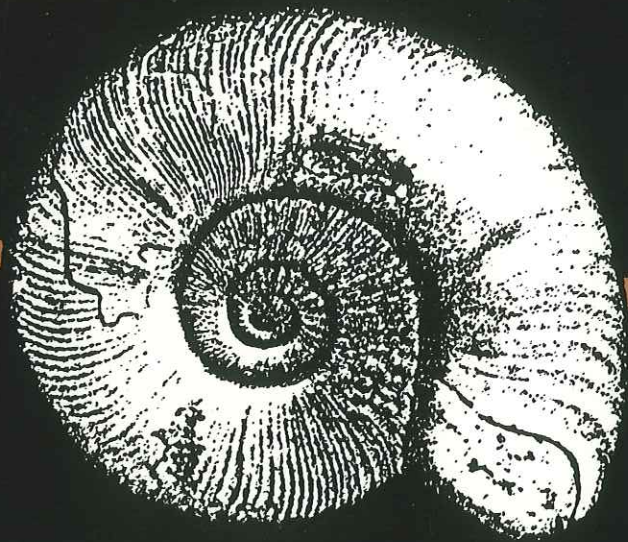


Ham Hill

the Rocks and Quarries

H.C. PRUDDEN



INTRODUCTION

This booklet offers an introduction to the rocks and quarries at Ham Hill Country Park which is some 8km west of Yeovil, Somerset.

The survival of many old quarry faces makes this an important and enjoyable inland attraction for geologists. Ham Hill Stone has been found in Roman buildings and is still quarried today for new building stone and restoration work.

Visitors are recommended to follow the Limekiln Trail starting at the Prince of Wales Pub. This can be followed by a pleasant walk to the Monument at the northern end of the hill and a return through the old quarry workings. In addition, there are a variety of self-guided walks in the area and leaflets are available from the Ranger's Office. A visit to Montacute for a tour of Montacute House and gardens (NT), together with a nearby hollow lane cut in the Yeovil Sands, is recommended.

The first part of the booklet takes the visitor on a self-guided tour around some quarry faces. The remainder attempts to place the observations within a broader context.

Ham Hill Country Park is managed by South Somerset District Council and there is open access, footpaths, car parks, toilets and information.

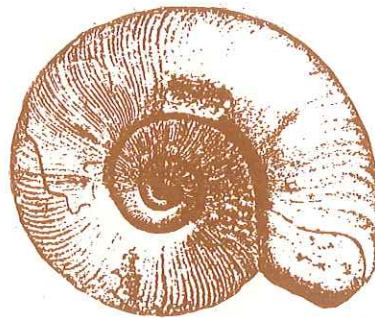
* Indicates inclusion in the glossary.

WARNING

REMEMBER OLD QUARRY FACES CAN BE DANGEROUS AND SHOULD NOT BE CLIMBED. PLEASE DO NOT HAMMER ANY ROCK FACES.

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Front cover. (*Dumortieria moorei*)
Fragments of this ammonite are occasionally found in the Ham Hill Stone.

1

THE LIMEKILN TRAIL

The Trail provides an introduction to the geology of Ham Hill. The route is shown in Figure 1 and is marked by a limekiln symbol on the waymarks. One hour.

1. START

Descend the steps opposite the front of the Prince of Wales and follow the Limekiln Trail signs and bear to the right. Pass sign 'Dangerous Quarry Keep Out' and at next waymark turn left past the 'No access' sign down cinder track among trees.

Natural regeneration of vegetation on old quarry waste has provided a peaceful setting to what was once an active quarry. It is worth pausing to contemplate the rock face. You are face to face with sediments laid down on the sea floor 170 million years ago at the time of the dinosaurs.

Stop 2. DEEP QUARRY

Examine a fresh face of stone using a hand lens if available and note the rock's colour, texture and composition.

Ham Hill Stone is a bioclastic limestone* composed mainly of broken seashells with varying amounts of sand and clay. The angular shell debris suggests the existence of sea creatures such as bivalves, brachiopods, crinoids and echinoids living in clear, shallow, warm water. These were subsequently smashed-up and transported by waves and currents to form either a large shellbank or a channel-fill.

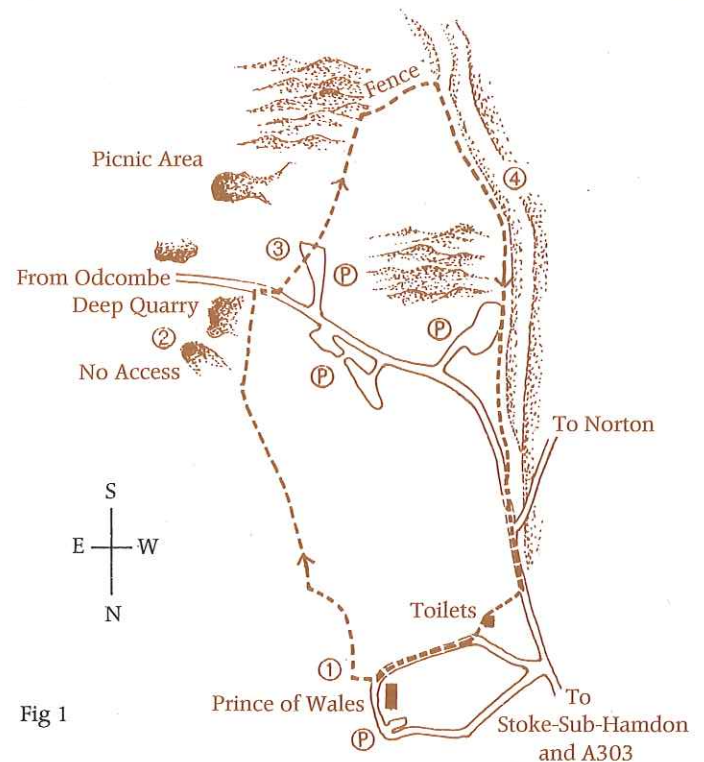


Fig 1

What has changed the once-loose sand hash into a hard rock?

The study of thin sections of the rock with a microscope shows that there has been partial dissolution and re-precipitation of calcite (calcium carbonate) which acts as a cement together with limonite (iron hydroxide). Iron compounds give the rock the brown colouration.

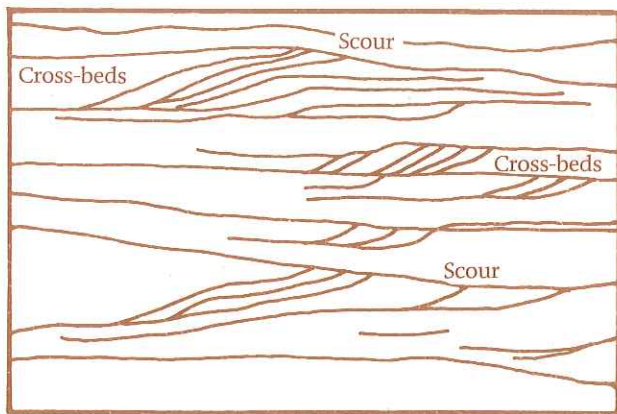


Fig 2

Look for examples of the features shown in figure 2. Find one of the undulating near horizontal lines and see how far it can be followed; do this for several. What happens to the thicknesses of the beds as defined by these lines?

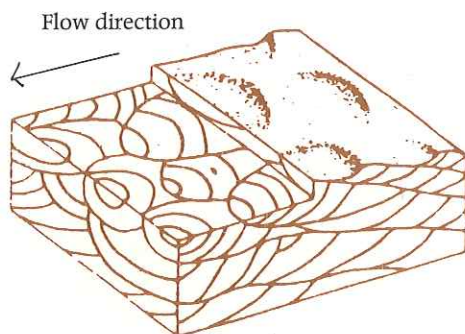


Fig 3

Weathering has etched out weaker beds to reveal the sedimentary structures in the Ham Hill Stone shown in Figure 2. These lines represent trough-shaped scour surfaces where currents have cut across, and partially removed, some of the previously deposited loose shell debris.

Now pick out some sets of cross-bedding showing in Figure 2; note the concave upward profile of the beds.

The slope of the cross-bedding is an indication of the direction of flow of the currents which deposited the cross-beds. The flow seems to have been mainly from south-west to north-east. The quarry faces at right angles to each other provide an opportunity to visualise the sedimentary structures (trough cross-bedding*) in 3-dimensions as shown in Figure 3. Each scour surface represents a time interval separating periods when the cross-beds were being deposited.

Next note the fissures in the quarry faces. Note how they vary in width and occasionally sidestep. There is a tendency for them to become wider with depth. (See Fig 11)

Walter wrote in 1853.

'Between the masses of rock are many fissures, or chasms, called by the workmen *gullies* (gulls), running across the hill, which appear to have been formed by a lift from beneath, rending asunder the rock. These are of various width and depth, and lined with stalactite; in them have frequently been found iron and bronze implements, coins and armorial and organic remains.'

Proceedings of the Somerset Archaeological and Natural History Society, vol. 4. p. 78-90.

It is now thought that the gulls formed when there was widespread and rapid melting of permafrost* at the end of the last cold period of the Ice Age. The additional ground water would have increased the pore-water pressure* and decreased the stability of steep hillsides. This was probably the time of massive landslips in the Blackdown Hills.

Admire the vertical quarry faces. Note the many short diagonal indentations.

Wherever possible the quarrymen made use of the natural fissures and bedding planes when removing the stone. However, when this was not possible they had to chip away with picks in order to win the stone. The black oily slime in the corner to the right of the main face is thought to be organic in origin.

Stop 3. LIMEKILN AND QUARRY FACE

Return to footpath, turn left, cross the road, continue on footpath ahead and then turn left and down slope to examine the 9m wide rock face to the right of the limekiln.

The face shows disturbed, rubbly and broken Ham Hill Stone. There are smooth flattish faces with mainly horizontal lineations and grooves; these are aligned in several directions and the faces intersect one another. The very fine lineations appear to be thin growths of calcite covering underlying striations. It would seem that adjacent blocks of rock have moved sideways for very short distances. The features appear to be part of a local north-south zone of disturbed rock. (See 'Northern Quarry Faces' Page 6 and 'Retrospect' Page 8).

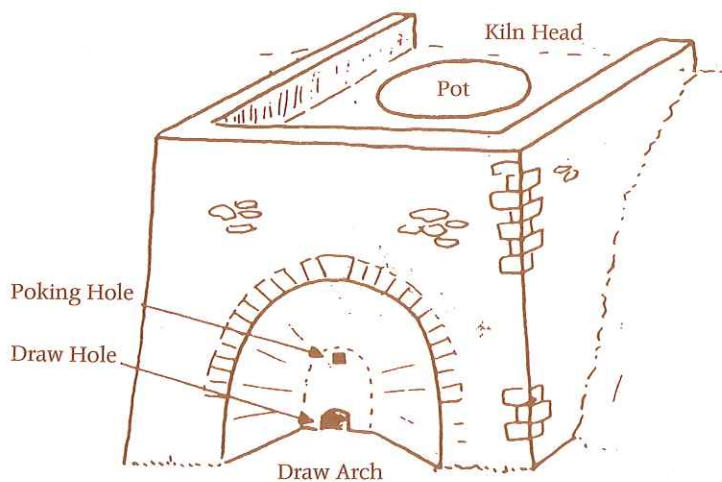


Fig 4

Features of a typical Drawkiln of the Nineteenth Century (Stanier 1993)

Compare the limekiln with the drawing in Figure 4.

Note that part of the front of the kiln is built with Portland Stone: a whitish limestone containing ooliths* and shell fragments (a hand lens is useful). Limestone and coal would have been tipped into the pot which is brick-lined. The whole mixture would be fired and the burnt lime drawn out through the draw hole. Its location may have been influenced by the fact that the nearby disturbed beds of limestone would not have been suitable for building stone.

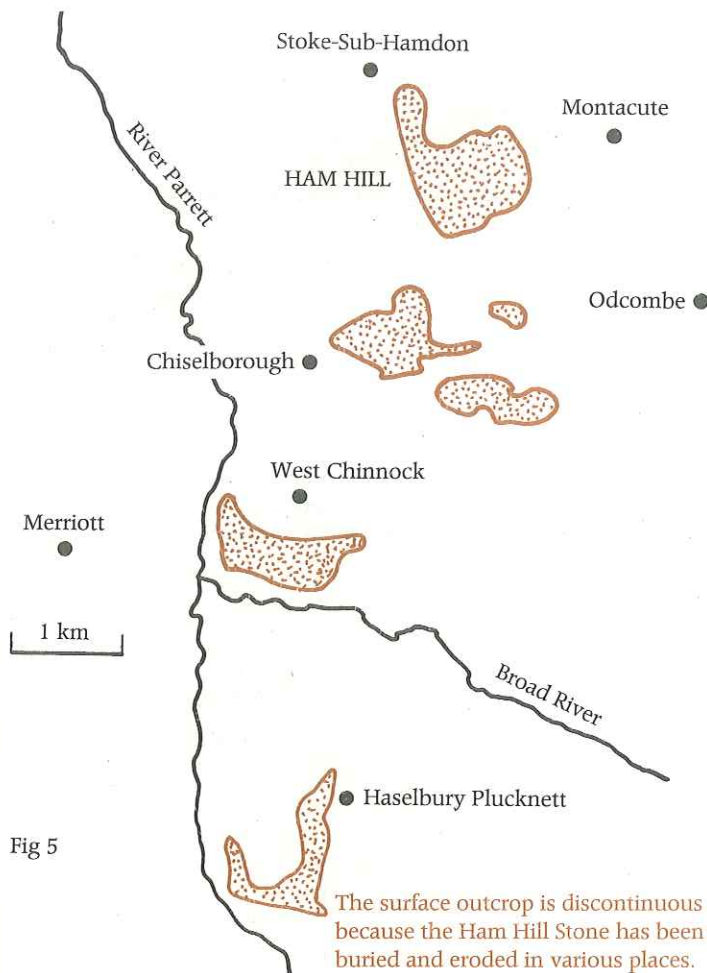


Fig 5

Stop 4. VIEW TO THE WEST FROM THE RAMPARTS

Return to car park and make for display board in front of you. Turn left and proceed between the stones and follow limekiln signs turning right along the side of the sheep fence to the ramparts. Turn right and keep to the top of the Hill; do not descend the Hill. Continue along the ramparts passing through Norton Car Park, eventually reaching the road and layby.

Use the viewpoint panel in the lay-by to pick out features of the landscape. Note the flat-topped Chiselborough Hill to the south which is capped by Ham Hill Stone. Figure 5 shows that the Ham Hill Stone extends in a narrow belt for some 7km to the south. It is entirely missing across the River Parrett to the west where the younger Inferior Oolite limestones rest directly upon the Yeovil Sands. Eastwards the Ham Hill Stone thins rapidly. Erosion has removed all evidence for the existence of Ham Hill Stone to the north of Ham Hill.

Immediately to the west towards South Petherton lies a tract of Yeovil Sands which is largely arable; brown ploughland in autumn, green in the spring and straw yellow in high summer. Further to the west lie the Blackdown Hills capped by the Upper Greensand. On a clear day one can see the Quantocks, Brendon Hills and Exmoor to the north-west.

Return to the Prince of Wales through old workings.

NORTHERN QUARRY FACES

From the Prince of Wales proceed northward around the edge of the Hill to the War Memorial where one can again identify landmarks if maps are to hand. Refer to Figure 6 which portrays the geological structure of the Hill.

VIEW FROM MEMORIAL

Figure 6 shows that the Ham Hill Stone and the Yeovil Sands form an escarpment and plateau which can be seen to the east. The view northwards extends across the Lower Lias clay vale to the Blue Lias ridge between Langport and Somerton. The Junction Bed limestones form a dip slope to the west of the village of Stoke-sub-Hamdon.

Return down the steps from the Memorial and make for the broad open space which has resulted from some 2000 years of quarrying. There is a prominent single upright slab of Ham Hill Stone some 120m half-left from the Memorial hidden just beyond the undulating ground. It shows typical Ham Hill Stone but what else?

THE CONGLOMERATE

The southern face shows rounded silty-sandstone pebbles which display numerous borings, encrusting serpulid (worm) tubes and oysters. The pebbles are set in a sandy matrix containing shell material including belemnites and bivalves. Please leave fossils for other people to see. This is the underside; note that the pebbles pass up into typical shelly Ham Hill Stone.

It appears that the Yeovil Sands were ripped up and rolled around before the overlying Ham Hill Stone was deposited. This suggests shallow water and either wave action or strong currents. The borings and encrustations indicate that the pebbles then lay on the sea floor for some time until buried by shell sand. The conglomerate* is well-displayed in the walls below the Superdrug shop at the west end of the Quedam in Yeovil. (See Prudden 1993).

Continue in the same direction for some 120m to the old quarry face to the left below the notice 'Warning: Steep Quarry Faces'. Study the rock face with the help of the sketch in Figure 7.

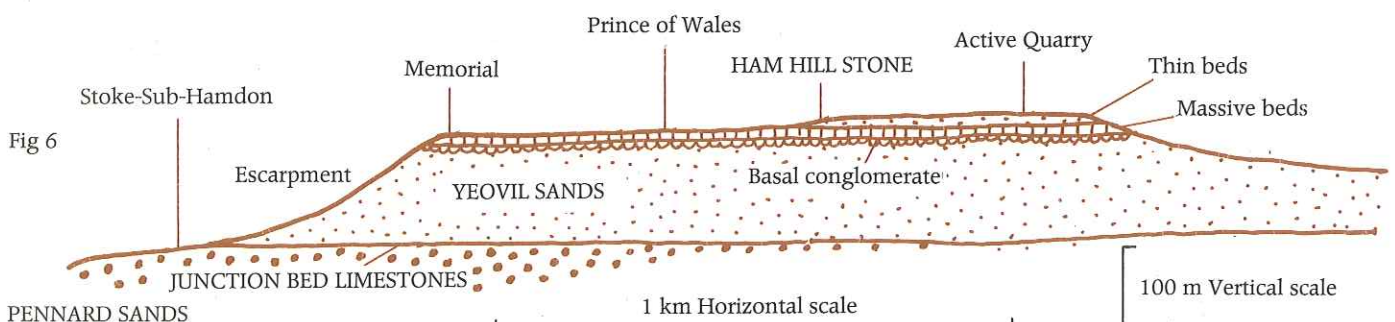


Fig 6

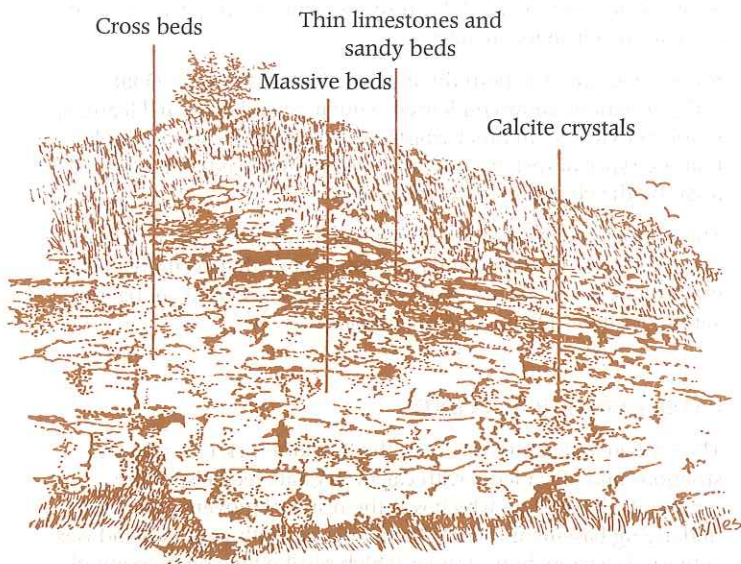


Fig 7

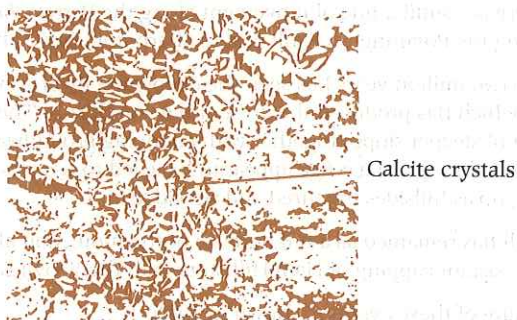


Fig 8

NORTH EAST QUARRY FACE

There is trough cross-bedding halfway up the quarry face together with gulls. The sequence is thinner than that seen in the deep quarry on the Limekiln Trail. Note the alternations of thin sand and shelly beds above the massive shelly beds.

It is difficult to correlate the exposures with those on the Limekiln Trail as there are no useful marker beds. Some of the thinner shelly beds supplied roofing tiles in the past.

Note the series of small patches of sharp-edged calcite crystals; note how the patches mostly face north-west and are associated with horizontal grooving and lineations as shown in Figure 8.

Each face represents one side of a tension gash, or crack, which opened up when the rocks were subjected to sideways wrenching stresses. The crystals are the rhombohedral form of calcite (CaCO_3) and they appear to have grown in what were solution-filled cavities. Remember that the area where you are standing has been quarried away. Look carefully for more smooth rock faces showing shear fractures similar to those seen near the limekiln (see above). There is a tendency for the NNW-SSE shears to have a dextral (to the right) sense of movement when viewing the opposite face and NE-SW aligned shears to be sinistral (movement to the left).

Note where the rock faces, and sometimes the calcite crystals, have a variable covering of limy deposits (Tufa*).

Acidic rain and soil water have dissolved the limestone and then the calcium carbonate has been re-precipitated on the rock faces when the solution evaporated. These deposits take a number of forms.

Return to the Prince of Wales

7

RETROSPECT

AGE AND ORIGIN OF HAM HILL STONE

The Ham Hill Stone is a lens-shaped mass of shelly limestones and inter-bedded sands within the rock formation known as the Yeovil Sands. Ammonites of the kind shown on the cover indicate that the Ham Hill Stone belongs to the Moorei Subzone* of the Levesquei Zone* (Toarcian Stage*). Its age is approximately 170Ma* (Lower Jurassic Period*) as shown in Table 1.

The outcrop pattern shown in Figure 5 suggests that the mass of shell debris was 1-2km wide and aligned NNE-SSW for some 8km. This is based on the assumption that the present outcrops represent what was once a continuous mass of shell debris. Removal by erosion has destroyed evidence for its extent north of Ham Hill.

It is difficult to account for the deposition of this mass of shell-rich debris. The conglomerate at the base of the Ham Hill Stone, plus cross-bedding, both suggest shallow water conditions with strong currents. Some geologists have suggested that the conglomerate and shell debris accumulated in a tidal channel.

However, recent studies have shown that contemporaneous vertical earth movements accompanied sedimentation during the Jurassic Period. These movements affected the depth of the seas and the deposition of sediments.

Downward movement produced deeper water with thick sequences of sediments. Upward movement produced shallow seas with thin condensed sequences* and partial erosion of sediments.

Therefore an alternative suggestion is that the conglomerate at the base of the Ham Hill Stone is the result of a shallowing of the sea consequent upon uplift of the sea floor which was then subjected to erosion by waves and strong currents. Subsequently the bank of

shelly debris accumulated. In truth it is difficult to speculate as to the reasons for these changes.

It is noteworthy that both the Junction Bed and Inferior Oolite rock formations show condensed sequences and erosional features in the Yeovil area. In other words, there is good reason to think that the types of rock we see today were influenced, in part at least, by the changing depth of the sea.

The Ham Hill Stone and the Yeovil Sands are just a part of the great thickness of clays, sands and limestones that accumulated as the Wessex Basin* subsided during the Jurassic Period, all be it at varying rates at different times and places.

LATER GEOLOGICAL EVENTS

The broken and striated rocks at the limekiln rock face plus the striations and offset faces with calcite crystals seen elsewhere represent a later event which was the result of movements in the underlying basement rocks*. The whole of south west England was subjected to wrenching stresses which resulted in compression of the rocks and sideways and vertical movement along faults* e.g. the NNW-SSE Sticklepath Fault in Devon. It has been suggested that there is a similar line of movement along the Parrett Valley and along the Poyntington Fault east of Sherborne. (See Table 1).

The last two million years has seen the deepening by erosion of valleys which has produced the present-day landforms. The creation of steeper slopes together with changing groundwater conditions during the Ice Age appear to have led to fissures (gulls) opening up as hillsides fractured and subsided.

Ham Hill has remained as a hill because of the protection afforded by the resistant capping of Ham Hill Stone and the Yeovil Sands.

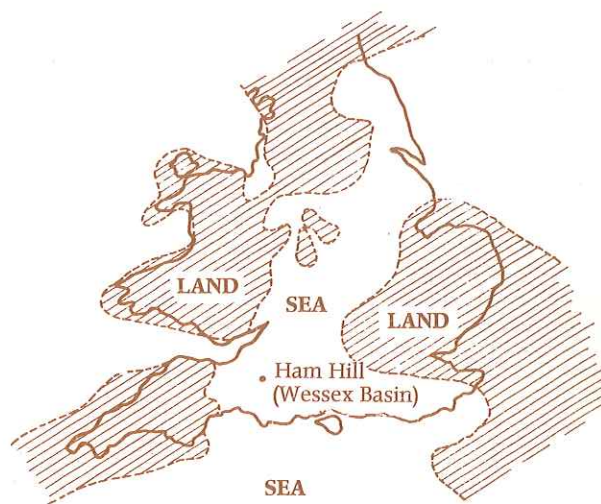
The timing of these events is shown in Table 1.

Table 1 Order of Events

Years	Events
100	Local geological surveys began Montacute House built
1000	Quarrying began
10,000	Permafrost melted and gulls opened
100,000	
1M	Wrenching and shearing
10M	
100M	Deposition of Ham Hill Stone
1,000 M	

Ages are 'Before Present' and are plotted on a log scale in order to compress the long periods of geological time and show more detail for recent events.

Reconstruction of land and sea areas 179 Ma*



Based on, *Atlas of onshore sedimentary basins in England and Wales*. Whittaker, A., 1975. (Glasgow: Blackie).

HOLLOW LANE IN THE YEOVIL SANDS

A visit to Ham Hill is not complete without exploring the hollow lane shown on Figure 9. This deep cutting is entrenched in the Yeovil Sands which are shown in the geological section on Figure 6. There is limited parking near the top of the lane; otherwise park in Montacute and walk up the hill via Townsend.

In the lane take a sample of the sand and note its grain size, colour and friable nature. Also note the regular (tabular) and irregular sandstone beds.

The Yeovil Sands are silty to fine-grade sand; the sandstones are similar to the sands except that they are strongly cemented with calcium carbonate (nearly 50% CaCO₃). The irregular beds are concretions formed as a result of the calcium carbonate migrating through the sands and becoming concentrated in the concretions. The Yeovil Sands contain ammonites similar to those found in the Ham Hill Stone but you will be very lucky to find one and a search is not recommended.

The sunken lane is the result of both natural processes and human activity:

- (a) The fine loose sand is readily washed away.
- (b) Carts and animal traffic would have broken up the bedrock before the road was metalled.
- (c) Torrential rainfall washes the sand down the steep gradient.

However, the dry sands and sandstones forming the walls of the lane are relatively strong, compared with the clays at Charmouth for example, and are thus able to maintain near-vertical walls.

Features of the Hollow Lane.

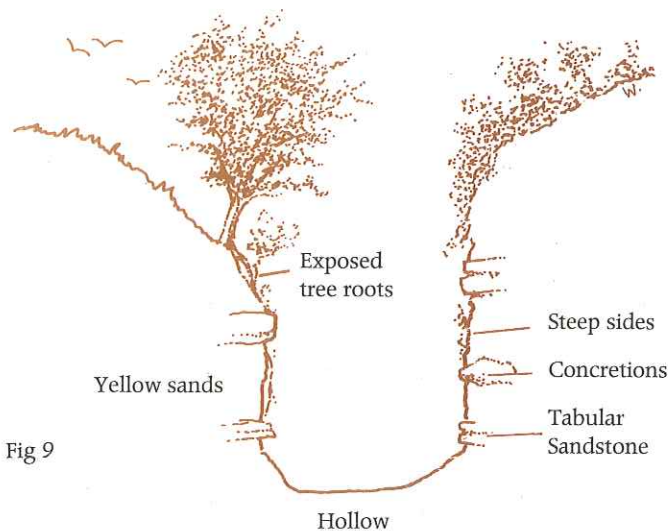


Fig 9

MONTACUTE HOUSE



Montacute House

This Elizabethan house is built of Ham Hill Stone and is in the care of the National Trust. It is sited on a platform underlain by the thin beds of Junction Bed limestones. (See Figure 6). There is a shop, restaurant and large car park.

A walk around Montacute will reveal the great variety of styles of stonework and buildings which add spice to the village scene.

The church at East Stoke has Norman stonework and is well worth a visit.

'It (Ham Hill Stone) is one of England's most seductive stones, and places such as Crewkerne, Ilminster, Martock and Montacute owe it an unending debt. It is attractive to lichens, which can give it a mottled appearance, but, far from being a disfigurement, this is usually an asset. Like all iron-tinted stones, it may seem rather to soak up the sunshine than to reflect it back, but in the contemplation of these rich, golden brown surfaces spotted with lichens, usually of freestone and here and there sumptuously dressed, the eye may find insatiable pleasure.'

Alec Clifton-Taylor, *The Pattern of English Building*. (1972)

11

QUARRYING THROUGH THE AGES

THE WORKING QUARRIES AND STONEWORKS

The working quarry at the southern end of Ham Hill is an important source of stone for new buildings and restoration work. The stone is readily worked and weathers well. It is prepared on site and available for sale; enquiries are welcome. The quarry workings are not generally open to the public; permission to visit them should be sought at the office.

Permission has been given for a limited amount of quarrying at the northern end of the hill. This will not only make valuable stone available for which there is a demand but also improve the safety and appearance of this part of Ham Hill.

GLIMPSES FROM THE PAST

There was a marked decline in stone extraction after the 1950s until the recent revival. The following extracts from topographical writers allow us to look back at past activity.

'In Norman times it was used very largely, far and near, in churches, abbeys and castles in Somerset and Dorset. How such enormous quantities of stone could have been conveyed to such distances, between the tenth to the early part of the sixteenth centuries, to Sherborne Abbey and Castle, Ford Abbey, Cerne Abbey, for churches at Lyme Regis, Taunton, Bridgwater, Bridport, as well as to the churches and other buildings in the immediate neighbourhood, at a time when there were no hard roads, is a matter of astonishment to all who are conversant with labour of that kind.

The ground from which the stone for all our old buildings was obtained is on the western side of the hill, and mostly in the parish of Norton. These old workings were only about twenty feet deep in stone, at the most, and the heading was of rubble and thin layers of stone. The stone tiles, with which so many of our buildings are covered were quarried near the surface, over the workable stone, chiefly from the north part of the hill. Instead of the ochre or sand beds of the deep modern quarries, there were here thin layers of hard stone, which were worked to an even thickness by a tile-pick. The working of tiles is now a lost art on the hill.

There has been a great development in the working of these quarries in the last fifty years, half a century ago the wages of the best workmen did not exceed thirteen shillings per week. There was not so much as a hand-crane on the hill forty years ago. There are now three powerful steam cranes for lifting the stone out of the quarries and bringing it to the surface of the ground, where it is put on tramways for removal as required. Steam power is also employed for sawing and working the stone. In fact, without these appliances, the quarries might as well be closed so far as any extended sale of the stone is concerned. There are about two hundred men employed in different capacities in the business, and the wages of the best workmen are now sixpence per hour or thirty shillings per week, instead of thirteen shillings a week fifty years ago.

Charles Traske, *Norton-sub-Hamdon: notes on the parish and the manor and on Ham Hill* (1898).

A simple crane as used on Ham Hill at the end of the nineteenth century.

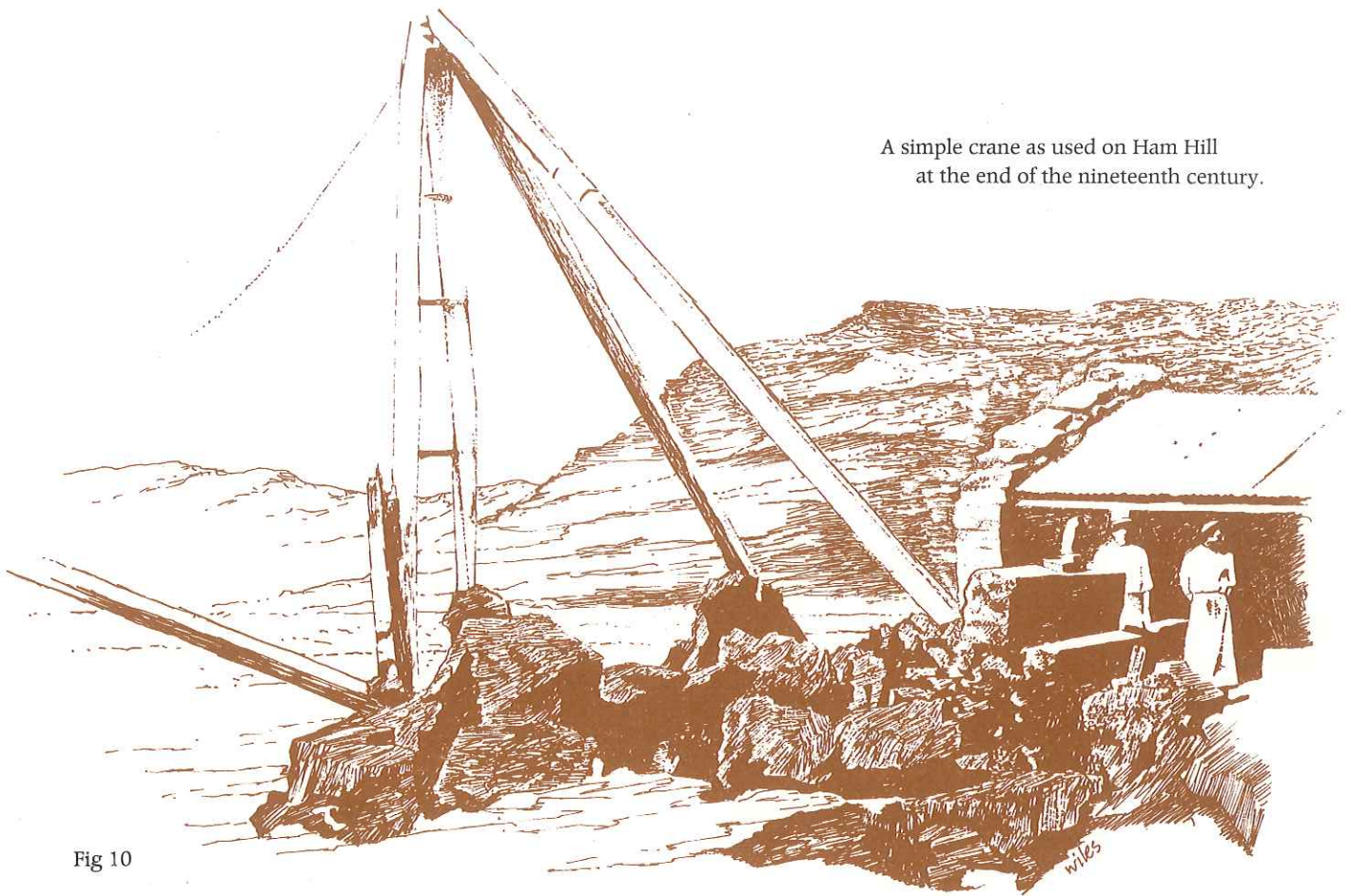


Fig 10

GLIMPSES FROM THE PAST (continued)

NORTON PARISH

'It has been noted for many ages for its quarries of fine stone, whereof there are four on it lying within the precincts of this parish. The surface of the hill, for about a foot in depth, is a light sandy soil, yielding a short sweet herbage for depasturing sheep. From thence to about the depth of sixteen or eighteen feet, is a loose small stone fit only for repairing roads. Six or eight feet lower is a stratum of good tile stone; and under that, for the depth of forty feet, are different strata of a fine hard stone, lying one on another, without any intervening earth. These strata are from one foot to three feet in thickness; the lower weighing a hundred and a quarter by the solid foot. The perpendicular fissures, or what the quarrymen call gullies, are from ten to thirty feet apart. Some quarries on the south east side of the hill have, at the depth of about twenty feet below the surface, a stratum of yellow sand ochre of three feet thickness.'

MONTACUTE PARISH

'This hill has been remarkable for many ages for its freestone quarries, the produce of which possess the excellent quality of hardening by time, and by that means becoming exceedingly durable, retaining for centuries all the acute points and edges of its workmanship. Most of the churches for many miles round, both in this and the adjacent counties, are built with this stone, and are in general esteemed very handsome edifices.'

J. Collinson, *The History and antiquities of Somerset* (1791)

'Having thus farr coasted Hamden Hill, I will desire your company to the topp of it, where besides the pleasure of this prospect, I hope to find something that may countervaile your pains. For you shall see on the north side where wee rise up from Stoke unto it, the footings of that Fort I have before spoken of; on the south, the goodlyest quarry of freestone that ever I saw, which for beautie largenesse, lasting and antiquitie I presume gives place to none. I am sure in the western parts the antiquity is sufficiently shewen, in that all our ancient Castells, Churches and Mansion houses both here, in Dorsett, and a part of Devonshire, shewe it; the beautie is both in the Couller, being a faire yellow or oker couller, for amongst it is found in vaines much okar with which they wash over and clesne foule stones; and largenesse, for out of it they take stones of what bigness the workmen please, and I never sawe any quarry to come near this in Couller an goodness save one within two miles of Northampton the principall towne to North'tonshire; for lasting, if it be out of a good bedd, it endures fire water and all things else. The masons here have a pretty kind of commonwealth; they have their courtes in which all trespasses against each other are judicially tried; and the Quarreys themselves seeme rather little parishes then quarreys, soe many buildings have they under the vast workes to shelter themselves in wet weather, and their wrought stones in winter.'

T. Gerard, *Particular description of Somerset* (1633)
Somerset Record Society, Vol IV

'The notable Quarre of Stone ys even therby at Hamden, out of the which hath beene taken many a Day Stones for al the goodly buildings therabut in al Quarters.'

Leland's Itinerary (1535-1543)

GEOLOGICAL CONSERVATION

The large working quarry at the southern end of Ham Hill contains a geological *Site of Special Scientific Interest* and is protected. The quarry has the thickest succession: 14m of massive beds overlain by 9m of alternating shelly limestones and friable sands. The rock faces mentioned in this booklet are scheduled as *Regionally Important Geological Sites*. (R.I.G.S.)

QUARRYMEN'S TERMS

CLOUT	The bottom bed in the quarries.
LACE	Veins of crystalline calcite lining narrow cracks.
SLUNS	Lines of weakness in the stone along which the stone may split. They occur where the beds are weakly cemented or there is a thin seam of clay.
VENTS	Dark iron-rich thin veins which form a zig-zag pattern perpendicular to the bedding. They appear to represent vertical fractures formed when the rocks were wrenched and small cracks opened up. They are best seen in smooth newly cut stone and are quite common. Unhappily, the masons find that they form lines of weakness in the stone.

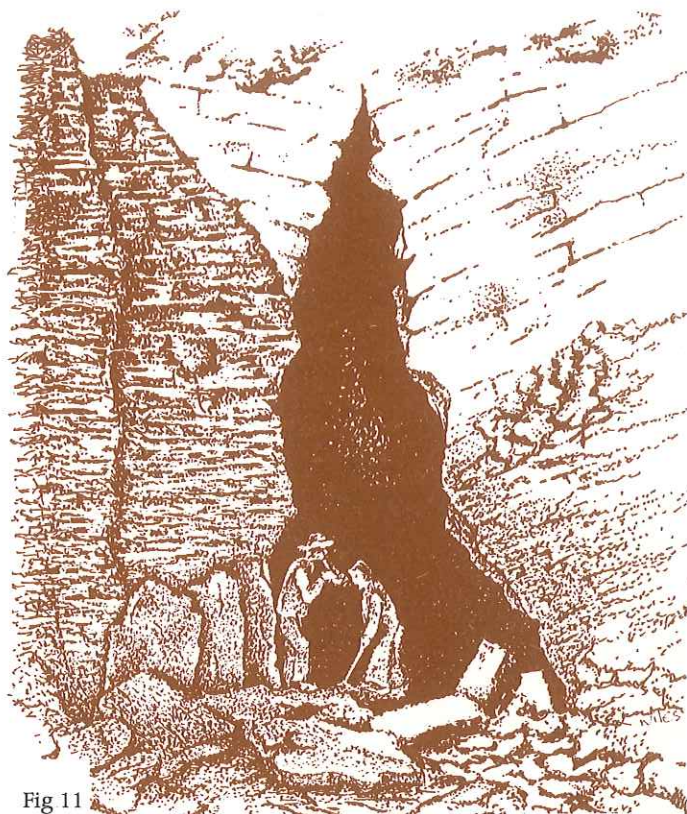


Fig 11

Chasm at Ham Hill in which various skulls and remains were found. The old man appears to light his pipe whilst a young lad breaks up the rock. The chasm is a large gull* which gets wider downwards. Note how the strata have opened out and tilted. (Based on an illustration by R. Walter 1852)

15

GLOSSARY

BASEMENT ROCKS	The much older rocks of the earth's crust which underlie the younger strata.	OOLITHS	Small spherical grains with a coating of calcite.
BIOCLASTIC	Broken shell debris.	PERMAFROST	Ground permanently or seasonally frozen.
BIOTURBATION	Disturbance of sediments by burrowing animals.	PORE WATER PRESSURE	Pressure exerted on its surroundings by water held in spaces in a rock and which has a buoyancy effect that reduces the shear strength of the rock.
CONDENSED SEQUENCE	Strata representing an unusually long period of geological time as a result of slow deposition and/or erosion of sediments.	TERTIARY PERIOD	A division of geological time 2-65 Ma.
CONGLOMERATE	Sediment partly composed of pebbles.	TOARCIAN STAGE	Period of time based on fossil evidence 178-187 Ma.
CROSS-BEDDING	Depositional sedimentary structure with inclined sets of short beds.	TROUGH CROSS-BEDDING	Cross-bedding with scooped-shaped bases.
FAULT	An abrupt dislocation of the rock.	TUFA	Deposits of calcium carbonate (CaCO ₃) formed by deposition from solution of calcium bicarbonate (Ca [HCO ₃] ₂).
JURASSIC PERIOD	A division of geological time 145-208 Ma.	SHEAR FRACTURES	Fracture in the rock where the rocks on either side of the fracture have slipped passed each other.
Ma	Age in million years.	WESSEX BASIN	An intermittently subsiding area between what is now the Mendips and the English Channel.
MOOREI ZONE	The rocks deposited during the period of time characterised by the ammonite <i>Dumortieria moorei</i> . A subzone of the Levesquei Zone. (See front cover).		

FURTHER READING

Green, G. W. 1992. Bristol and Gloucester Region. *British Regional Geology*. 3rd edition. British Geological Survey. HMSO. A valuable work of reference which includes the geology of South Somerset.

Melville, R.V. 1982. Hampshire Basin. *British Regional Geology*. HMSO.

Prudden, H.C. 1993. *Geological Trails in Yeovil*. South Somerset District Council, Yeovil. This described the local building stones seen in Yeovil (including the Ham Hill Stone) together with the landscape near Yeovil.

Wilson, V et al. 1958. Geology of the country around Bridport and Yeovil. *Memoir Geological Survey of Great Britain*. HMSO. This a very detailed technical account of the local geology covered by Sheets 312 and 327.

Geological map. Sheet 312 (Yeovil), 1:50 000, British Geological Survey. The map shows the geology of much of South Somerset. Geological maps can be ordered at bookshops.

The following general publications are recommended:-

Roberts, J.L. 1989. *The Macmillan field guide to geological structures*. Macmillan. 250 colour photographs of geological structures and an invaluable guide to field study especially for amateurs.

Tucker, M.E. 1989. *The field description of sedimentary rocks*. Geological Society of London Handbook. Open University Press.

Fortey, R. 1993. *The hidden landscape: a journey into the geological past* (paperback). Pimlico.

A folder containing geological papers with reference to Ham Hill, published over the last 150 years, has been deposited in Yeovil Public Library Reference Room (Tite Collection S00 551). The Library also stocks the geological memoirs and maps for the area and a good range of general texts.

The Local History Library at Taunton holds a collection of black and white glass slides featuring the quarries and stoneworks.

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Thanks are due for permission to reproduce illustrations and quotations from the following sources:

Clifton-Taylor, A. 1972. The pattern of English building. Faber and Faber. Quotation.

Stanier, P. H. 1993. Dorset limekilns: a first survey. *Proceedings Dorset Natural History and Archaeological Society*, Vol. 115. Fig. 3.

Tucker, M. E. 1989. *The field description of sedimentary rocks*. Geological Society of London Handbook. Open University Press. Fig. 2.

Walter. *Collection 5813 Somerset Archaeological and Natural History Society, Taunton*. Fig. 11.

Sketch of Montacute House. R. Sturgeon. Fig. 10.

Somerset Record Society, Vol IV. Quotation from Gerards (1633) *Particular description of Somerset*.

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For further details contact

Countryside Management Service
Council Offices

Brympton Way, Yeovil BA20 2HT
Telephone: 01935 462462