DORSET LOCAL GEOLOGICAL SITES SURVEY

Site number G ST70/11

Site name Bookham Farm, Buckland Newton

Summary description

Cretaceous, Upper Greensand and Lower Chalk.

Cenomanian: a section in Zigzag Chalk is exposed, glauconitic and sandy at base with some phosphatic nodules. This is the type section of the Bookham Conglomerate with clasts of glauconitic, phosphatised, shelly sandstone in sandy, shelly chalk matrix. This overlies disconformably – Albian: Shaftesbury Sandstone, a glauconitic, greenish grey, rubbly sandstone, overlying Cann Sand, a massive poorly cemented glauconitic sandstone and a soft, well-burrowed glauconitic sand (previously named Foxmould).

Site description

Cretaceous, Upper Greensand and Lower Chalk.

The rocks at Bookham Farm are the Upper Greensand with Chalk above. These rocks are Cretaceous in age, about 99 to 93 million years old. The Upper Greensand was deposited under a shallow sea on a continental shelf. The older Jurassic rocks underneath (205 to 142 million years old) had formed on the edge of a very large continent in which today's North America, Europe and Asia were joined together. As this continent began to split apart the Jurassic rocks were pushed above sea level. Over millions of years the tilted land was worn down to a level plane. The opening of the North Atlantic was achieved by magma rising on the mid-Atlantic ridge and pushing the two continental plates apart. This displaced sea water onto the surrounding land (a phenomenon that geologists call a marine transgression) in the early Cretaceous (121 million years ago).

Within Dorset the sea was encroaching from the south east, different types of sediment being deposited in similar order as a result of similar environments, but at different times. The general order was silty clay, poorly cemented glauconitic sands, massive or rubbly well cemented glauconitic sandstone, chert beds and coarse well cemented sandstone. Glauconite is a dark green mineral glassy in appearance, one of the micas containing K, Al, Fe and Mg. Across mid Dorset at this time there was an east-west shoal, whose highest part was between Evershot and Ansty, resulting in different sequences of deposits on top of the shoal and on its sloping margins. Bookham was on the shallower area.

To describe the rocks at Bookham from the lowest upwards, we move in time from oldest to youngest. Precise dating of sedimentary rocks is not possible, but those at the bottom are certainly older than those at the top. The upper part of the Cann Sand visible is a fine-grained glauconitic, weakly cemented sandstone that, where visible in other places, such as Cann near Shaftesbury, has uncemented sand underneath it. This Cann Sand is massive (a continuous bed about 0.65 m thick), that is orange-stained at the top, and contains a few cherty lenses. The orange staining would be from the presence of iron. The top of the Cann Sand is uneven, suggesting erosion.

Above this is the Shaftesbury Sandstone, a nodular, lumpy glauconitic sandstone, greenish grey containing bivalves such as scallops and Devil's Claw. The Shaftesbury Sandstone at Shaftesbury is not nodular but even in texture and is used for building. The top of the Shaftesbury Sandstone is very irregular, so that its thickness may be measured at between 1 and 2 metres, but on average here at 1.2 m. In other parts of Dorset this same bed is full of Exogyra fossils and is known as the Exogyra Bed. At Evershot the top is dark green – phosphatised – a condition that indicates erosion.

The Bookham Conglomerate above contains some phosphatised fossils, and consists of phosphatic reworked pebbles and clasts of Shaftesbury Sandstone in a chalky matrix. It also contains fossils of Chalk age such as echinoids. It occurs in isolated pockets up to 1m thick in the top of the Shaftesbury Sandstone over the shallowest area between Dogbury Hill through Buckland Newton to Okeford Fitzpaine extending northwards towards Iwerne Minster as the lowest bed of the Melbury Sandstone. Erosion of the Shaftesbury Sandstone left a very uneven surface where hardened pebbles or fossils gathered in the depressions and were covered in the overlying Chalk deposits.

The soft, grey, marly Chalk above has been named Zig Zag Chalk, from its reference section on Zig Zag Hill near Cann. At the base the Chalk is glauconitic and sandy, with some phosphatic nodules, indicating that the environment of deposition was only slightly changed from that of the underlying Greensand. However,

the main Chalk beds have increasing proportions of the characteristic fine white sediment thought to be the remains of marine algae known as coccoliths.

The chert beds found elsewhere in Dorset are not present at Bookham, either because they were not deposited on this shallow area or because the necessary algal conditions did not exist in the higher energy environment of shallow water. The uppermost coarse sandstone, also absent, differs between west Dorset, where it is a coarse grit (Eggardon Grit) with no glauconite, and north Dorset, where it is a glauconitic sandstone similar to the Shaftesbury Sandstone (Melbury Sandstone).

References.

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