THE GEOLOGY OF DEVIZES, WITH REMARKS ON THE GROUPING OF CRETACEOUS DEPOSITS.

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[PLATE V.]

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PART I. DESCRIPTION OF THE STRATA.*

THE rocks in the immediate neighbourhood of Devizes belong to the Cretaceous system and chiefly to the upper part of that system, the lower part being but feebly represented by certain sands and ironstones. These latter rest upon a floor of Upper Jurassic rocks, which consist of Corallian Beds, Kimeridge Clay, and a tract of Portland Sand, which last is only exposed in the Crockwood valley south of Potterne. It is not unlikely that the Portland Beds, both sand and rock, have a considerable extension to the eastward under the Vale of Pewsey; and that the Purbeck Beds may also come in, as they do in the Vale of Wardour; but at present we have no positive knowledge of their existence.

There is a complete unconformity between the Cretaceous and Jurassic strata, since, in different localities, the former rest on the different Jurassic groups above mentioned. There is, moreover, an important fault which throws the outcrop of the Calcareous Grit from Seend to Rowde, a distance of about three miles, but does not affect the Cretaceous strata at all. This fault is not indicated on the published map of the Geological Survey, and its course is not quite certain; but it appears to skirt the northern slope of Seend Hill and to cut out the Coral Rag at the north-west end of that hill.

FIG. I.—SECTION THROUGH THE WEST END OF SEEND HILL.—

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Horizontal Scale 6 inches to a mile; Vertical Scale 800 feet to an inch.

d. Ironsands.

b. Calcareous Grit.

c. Kimeridge Clay.

a. Oxford Clay.

The Calcareous Grit is a hard calcareous sandstone which disintegrates into a sharp quartzose sand. The Kimeridge Clay has its usual character of a dark shaly clay, but there are no good exposures.

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The Portland Sand presents some curious characters. The lower part is of a soft, fine, yellowish-green sand containing small grains of glauconite; it is therefore a greensand, and may, for this reason, be readily distinguished from the Ironsand or so-called "Lower Greensand," which in this district is always a *brown* and never a *green* sand. In some places the Portland Sand contains very hard, white, siliceous concretions, which yield casts of fossils. The highest beds seen are at Crockwood, where floors of rubbly glauconite limestone, full of fossils, are exposed, resting on glauconite sand with large calcareous doggers.

The several members of the Cretaceous series may be described under the following names :—

7. Upper Chalk.		4. Greensand.
6. Middle Chalk.		3. Malmstone.
5. Lower Chalk.		2. Gault.

1. Ironsands.

(1) *Ironsands.* The lowest beds of this group are the brown, sandy ironstones of Poulshot and Seend, the higher beds consisting of coarse, brown, pebbly sand. The pebbles in these beds are chiefly small, rounded bits of vein-quartz, which have been derived from much older rocks that lie to the west of Wiltshire. Fossils are rare in them, and they would have been credited with few organic remains if Mr. W. Cunningham had not been careful to collect some from the cutting made, in 1849, for the road up Seend Hill. This is an excellent instance of the useful work which a local geologist can accomplish, and the geological members of every local Natural History Society ought to consider it their duty to record and collect from all such exposures while they are fresh and clear. The fossils were found at the very base of the ironstone, where it rested on an eroded surface of the Kimmeridge Clay.

The ironstone, formerly worked at the Seend outlier, is a curious deposit with a variable amount of iron. There is an extensive series of open sections, showing dark brown ironstone and ferruginous sand in alternating and often irregular beds. In one quarry there is much ferruginous conglomerate with irregular and oblique bedding; in another the whole mass consists of sand bound together by a network of ironstone, or it may equally well be described as a network of brown oxide of iron enclosing nests of soft ferruginous sand.

The cutting on the high road shows in one place a lenticular mass, seven or eight yards long, consisting of hard limonitic ironstones interbedded with grey shaly and sandy clays. This is the only place where I saw any clay in the ironsands of Seend; but there are layers of clay and clay-ironstone at Edith Marsh, north of Rowde.

These beds were formed in very shallow water along the borders of an ancient continent, which then lay over the west of

Britain, and must have extended to within a few miles of the Seend outlier.

No more need here be said about the ferruginous sands, except to express a hope that the time may come when the iron-stone they contain may be utilised.

(2) *Gault*. Above the ferruginous sands, and forming the lower part of the slopes below Roundway, Devizes, Potterne, Stert and Urchfont, is a dark grey clay known as the Gault. The brickyards at Dunkirk, Caen Hill, Stert and Lavington are opened in this clay, and its thickness in this district is from 80 to 90 ft. (see Section Fig. 2.)

The lowest beds are well exposed at Caen Hill and Dunkirk brickyards, the middle beds at Lavington. The upper beds were formerly worked on the slope at Dunkirk, but are not now exposed at any place in the district. Here again we are indebted to Mr. Cunningham for collecting from an exposure that proved to be temporary; for the fossils he obtained from this upper Dunkirk brickyard are not the same as those which can be found in the Caen Hill pit. At the latter the prevalent Ammonite is *Ammonites interruptus*, with its variety *A. Benettii* and occasionally *A. Beudanti*; while at the higher pit *A. lautus*, *A. tuberculatus*, and *A. splendens* were found, species which also characterise the upper part of the Lower Gault of Folkestone.

(3) *Malmstone*. The upper part of the gault becomes marly and sandy, and passes up into a soft grey or buff sandy stone, which is known as Malm or Malmstone. This is a peculiar rock, which has not yet been found at any other geological horizon. When examined under the microscope it is seen to consist of a variety of different particles: small grains of quartz sand, little flakes of mica, and grains of a green mineral called glauconite. Mingled with these, and sometimes forming as much as 40 or 50 per cent. of the stone, are particles of a clear, glassy white substance, some of them being long narrow rods with sharp points, and some being very small globular or discoid bodies or lumps of such globules. The rods are the spicules of siliceous sponges, many of which shed their spicules just as many animals shed their hairs. The spicules fall around them, and are spread through the mud or ooze in which the sponges grow, so that we sometimes find layers of stone that are almost entirely composed of sponge spicules. With regard to the globules, they also consist of a peculiar kind of silica similar to that of the spicules, namely, clear colloid silica, which is nearly structureless, like solidified gum-arabic.

We do not exactly know how the globules were formed; but as they always occur with the spicules, we infer that they are derived either from the spicules or, more probably, from the siliceous framework of the sponges, of which few other traces are found. It is known that colloid silica is a very soluble form of