

JANUARY 21, 1857.

C. Greaves, Esq., C.E., G. A. Ibbetson, Esq., M.R.C.S., and C. F. A. Courtney, Esq., M.R.C.S., were elected Fellows; and M. E. Lartet was elected a Foreign Member.

The following communications were read :—

1. *On some FOSSILIFEROUS IRONSTONE occurring on the NORTH DOWNS.* By JOSEPH PRESTWICH, Esq., F.R.S., F.G.S.

(The publication of this paper is postponed.)

[Abstract.]

BESIDES a drift of red loam with flints, and the few local outliers of lower tertiary sands and pebble-beds, there are scattered on the summit of the North Downs from Folkestone to Dorking a few masses of sand, gravel, and ironstone, which present a certain regularity of structure and uniformity among themselves, and are clearly different from and of a later age than the outliers of eocene tertiaries on the same hills. Mr. Prestwich had long been acquainted with these ferruginous sands near Vigo Hill, where they are about 20 feet thick; and at Paddlesworth and other places near Folkestone, where they are even better developed; but though the ironstone fragments derived from these beds are frequently found dispersed about the Downs, it was long before he met with any fossils in these beds, with the exception of a piece of fossil wood pierced by *Teredo*, and an obscure cast of a bivalve shell, near Paddlesworth.

In December 1854, however, some blocks of gritty ferruginous sandstone, full of casts of shells, were communicated to the author by Messrs. W. Harris and Rupert Jones, who had met with the specimens in some sandpipes in the Chalk at Lenham, eight miles east of Maidstone, and regarded them as belonging to the Basement Bed of the London Clay. This fossiliferous ironsand on close examination yielded casts of bivalve and univalve shells belonging to nearly thirty genera, besides indications of *Lunulites*, *Diadema*, &c. The presence of a *Terebratula* very like *T. grandis*, with several species of *Astarte*, and afterwards his finding a large *Lutraria*-like shell, led Mr. Prestwich to conclude that these sandy beds belonged to the Lower Crag. Mr. Searles Wood, to whom the fossils have been submitted, states that, as far as the evidence goes, he thinks they may be referred to the Upper Tertiaries, and in all probability to the Lower Crag period; the occurrence of a *Pyrula* and an *Emarginula* more especially strengthening this view.

Mr. Prestwich assigns without any doubt this shelly ironstone to the ferruginous sands above referred to, and points to the peculiar concentric arrangement of the contents of the sandpipes of the locality in question as definitely indicating (in accordance with the observations he formerly published in the Society's Journal\*) the

\* Vol. xi. p. 64.

former existence of horizontal strata of—1. (lowermost) loam with flints,—2. greenish sands with ironstone nodules,—3. yellow and reddish sands,—superposed on the bare chalk, after the eocene beds were for the most part denuded, and before the sandpipes were formed, into which these overlying beds were here and there let down and thereby preserved when further denuding agencies removed the later tertiary beds.

Regarding then the outliers of ferruginous sands and sandstones above referred to as of the age of the Lower Crag, Mr. Prestwich pointed out the relative position of beds of similar structure on the Downs between Calais and Boulogne, and on the top of Cassel Hill near Dunkirk; and of others at Louvain, and at Diest in Belgium, mentioned by M. Dumont and Sir C. Lyell. This extensive range of Crag-beds to the south of the typical Suffolk area, and their considerable elevation above the sea, are of course matters of great interest, not only as pointing out the relative age of some of the drifts, but especially as giving us a still nearer date to limit the denudation of the Weald, and indicating marginal sea-beds now stretching far inland and ranging once probably over the Wealden area,—possibly connected too with the Carentan beds of Normandy.

With regard to the denudation of the Weald, Mr. Prestwich suggests that, the anticlinal axis of the Weald having been somewhat raised during the cretaceous period, and the lower tertiaries partly constructed from its *débris* and gradually distributed over its area, it was again denuded to a further extent in the later tertiary period, some island or islands of the lower cretaceous rocks remaining in its area from which for the most part these sandy ferruginous Crag-beds were derived. The great or final elevation and denudation of the Wealden area was necessarily subsequent to the deposition of these pliocene beds, for their outliers, resting on an old flint-drift, occur on the very edge of the upraised chalk-escarpments of the Weald. This elevation being also subsequent in time to the first or Lower Crag period, Mr. Prestwich suggests, that we have here evidence of the physical cause of the distinction of the two Crag periods. The first Crag sea was open to the south, and of considerable extent; but the last Wealden elevation, cutting off the southern portion, so altered the hydrographical conditions of the period, that a sea open only to the north remained, in which the Red or Upper Crag, with its partially boreal fauna, was then deposited.

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## 2. *On some PERMIAN FOSSILS from DURHAM.*

By J. W. KIRKBY, Esq.

[Communicated by T. Davidson, Esq., F.G.S.]

[PLATE VII.]

THIS communication comprises a notice of the occurrence of a malacostracous Crustacean and of a new species of *Chiton* in the