THE GEOLOGICAL MAGAZINE.

No. CXIII.—NOVEMBER, 1873.

ORIGINAL ARTICLES.

I.—ON THE ORIGIN OF THE ESTUARY OF THE FLEET IN DORSETSHIRE.

By the Rev. O. FISHER, F.G.S.

MR. MANSEL-PLEYDELL'S Memoir on the Geology of Dorset, contained in the last two Numbers of this Journal (pp. 402 and 438), refers to a theory of the formation of the Fleet proposed by Messrs. Bristow and Whitaker in 1869 (*GEOL. MAG.* Vol. VI. p. 433).

At the time of the appearance of that paper I felt that it was very difficult to conceive how the small streams which run into the Fleet could have excavated a channel between the Chesil Beach and the land, especially when it is considered that their abrading power must cease at the level of the Fleet water. A different explanation of the matter then presented itself to me; and since Mr. Mansel-Pleydell has recurred to the subject, I am induced to forward my notions upon it to the *MAGAZINE*.

There can be no doubt that the formation of a beach, or spit of shingle or sand, depends upon the set of the tides, as governed by the configuration of the coast and the prevailing winds; the conditions of depth, and those for the supply of materials, being at the same time favourable. In the present case it is the Isle of Portland which mainly determines the position and form of the Chesil Beach. The land on the opposite side of the Fleet has really nothing to do with it, excepting that the sea-bottom shelving from it furnishes the "fleetness," or shallowness, necessary for the detention of the pebbles. If this land were removed, the Beach would still remain where it is, for it simply occupies the position where, on the whole, the causes which bring up the pebbles, and the causes which sweep them away, are equally balanced.

If land were to be placed to the westward of the Beach, then, under the present neighbouring configuration, the destructive agencies would exceed the conservative, and the land would be washed away, and the beach carried forward until it found a place of rest in its actual present position. This is analogous to what I believe has occurred. I look upon the Fleet as the eastern half of a submerged valley, similar to, though on a larger scale than, that one which now forms the Weymouth Backwater; its former western side having been encroached upon, and destroyed, by the waves of the West Bay.

If we could take up Portland, and plant it a mile or so to the eastward of the position it now occupies, I believe that the sea would directly begin to advance eastwards, pushing the beach before it,

until soon the Weymouth Backwater would be invaded, and then *its* eastern portion would become a small estuary, inclosed on one side by a beach, exactly as the Fleet is now.

Under this theory the denudation problem is reduced to the formation of estuaries in general, such as we find at Weymouth, Lodmore (almost silted up, and screened by its own beach), Poole, Southampton, and so on. They are all the drowned ends of valleys, excavated at a remote period, when the land stood higher than it does at present, and which was probably long antecedent to that during which the submarine forests, which occur on most low shores, were flourishing.

Such a mode of origin for the Fleet would support the view of the great antiquity of the present surface contour, evidenced in this, as in other instances, by the extensive tracts of land which must have since disappeared. This is proved by the abrupt manner in which the general form of the surface is cut off by the sea-board; presenting either lofty cliffs, low shores, or estuaries, which depend solely upon the already existing form of the ground at the limit to which the sea has advanced.

II.—ON SOME SPECIMENS OF *DITHYROCARI*S FROM THE CARBONIFEROUS LIMESTONE SERIES, EAST KILBRIDE, AND FROM THE OLD RED SANDSTONE OF LANARKSHIRE.

By HENRY WOODWARD, F.R.S., F.G.S., etc.,
of the British Museum, and
ROBERT ETHERIDGE, JUN., F.G.S., etc.,
of the Geological Survey of Scotland.

(PLATE XVI.)

THE nine specimens of Phyllopodous Crustacea about to be noticed are, with *one exception* (that from Lanarkshire), all from the undoubted Carboniferous Limestone series, East Kilbride, a locality already well known to local geologists as having yielded a very rich series of Carboniferous forms.

The specimens from East Kilbride were collected by Mr. A. Paton and Mr. J. Bennie, that from the Old Red of Lanarkshire by Mr. A. Macconochie.

They are all referable to the genus *Dithyrocaris*, of Scouler (originally named by him *Argas*¹), and with *two exceptions* are new species.

1. *DITHYROCARI*S *TESTUDINEUS*, Scouler (Plate XVI. Fig. 1).—*syn*: *Dithyrocaris Scouleri*, M'Coy. Carb. Foss. Ireland, t. 23, fig. 2.

The specimen which we refer to this species was obtained from shale over the Main Limestone at quarries on North Lickprivick Farm, near East Kilbride, and presents us with half of a carapace,² which,

¹ Records of General Science, by Dr. R. D. Thomson, 1835, vol. i. p. 136.

² Probably the other half of the carapace has been folded beneath it, as the posterior margin seems to be doubled.