sectional area as is it approaches Portland. It is evident that the force of the insetting tidal current, assisted by the prevailing wind, must increase in angular intensity as it approaches and is deflected from the hollow of the bend of the bank produced by the promontory of Portland. At this point also will the wind waves have the greatest power. It is also easy to understand that the amount of material cast up above high water will vary as the energy of wave action varies, and consequently the largest stones will be thrown up at the point of intensest action. As the shingle of all sizes travels eastward along the beach the smaller stones are cast up first, the larger ones being weightier have less lateral upshore movement, and so travel further. In fact I conceive the phenomenon must necessarily follow from the application of the known mechanical law of the inclined plane—the greater weights travelling up a more extended and therefore lesser gradient, until they come within the range of waves sufficiently powerful to cast them upon the bank itself.

It is quite clear to me that the whole bank is the result of causes now at work, and which have continued with remarkable uniformity since the last relative change of level of land and sea. With Mr. Fisher I agree that the irregular shingle-banks and inclosed lagoons on the coast of Ireland, mentioned by Mr. Kinahan, are not at all parallel phenomena.

Heath House, Blundellsands,
Liverpool, *April 7th*, 1874. T. Mellard Reade, C.E.

HYBODUS, A COAL-MEASURE FISH.

Sir,—While examining a work by Pictet this morning, entitled "Traité de Paléontologie," I stumbled upon the following remarks in the second volume, p. 256; he is speaking of *Hybodus*: "Beaucoup d'autres sont connues seulement par leurs dents. Deux espèces sont citées dans les terrains carbonifères. Ce sont les *Hybodus carbonarius* et *vicinalis*, Giebel de Wettin."

His authority for this statement is Giebel, in his work on the "Fauna der Vorwelt." I was much surprised, and yet gratified, to find that my opinion of *Hybodus* being a Coal-measure Fish, arrived at quite independently, should be corroborated by so eminent a palæontologist. Of course my statement that *Hybodus* had never been described previously to my paper as a Coal-measure Fish is erroneous; but considering that Agassiz, Owen, Huxley, Pander, Munster, M'Coy, Newberry, etc., etc., do not refer to the work, nor to the fact in any way, I consider myself quite justified in making it. However, Giebel and I have arrived, quite independently, at the conclusion that the teeth of *Hybodus* are to be obtained in the Coal-measures, and we coincided so far that, in a list of Palæozoic Fishes I am preparing, I had actually named our English Coal-measure *Hybodus*, *H. carbonarius*. This name, however, I must withdraw, if my species does not resemble his; but, unfortunately, I have not any means of comparing their characteristics: for Giebel's work is not among the

geological books I have access to; so the specific name of the *Hybodus* from our Carboniferous formations must for the present be in abeyance.

NEWCASTLE-ON-TYNE, *April 24th*, 1874. W. J. BARKAS, L.R.C.P.L.

MAGISTER SCHMIDT ON THE SHIELDS OF *PTERASPIS* AND *SCAPHASPIS*.[1]

SIR,—I have just received, by the kindness of Herr Magister Schmidt, a paper by him entitled, "On Pteraspids in general, and on *Pteraspis Knerii* in particular," which, I dare say, may come to the notice of some of your readers. Herr Schmidt reiterates the view which I have previously discussed as to the nature of the shields for which I proposed the genus *Scaphaspis*. Let me again say here that *no evidence whatever* is adduced by Herr Schmidt in support of the notion that *Scaphaspis* is the ventral shield of *Pteraspis* and *Cyathaspis*. That such a connexion is a possibility, I do not mean to deny; but with a very much larger number of specimens to study than Schmidt or Kunth have had, and with the same hypothesis present in my mind, I have been unable to find justification for its adoption.

With regard to the Galician *Pteraspis*, I have already stated in the GEOLOGICAL MAGAZINE,[2] after examining specimens from this locality in Vienna, I was led to doubt the specific distinctness of the *Pt. Knerii*. The Viennese specimens come very close indeed to *Pteraspis rostratus* and *Scaphaspis Lloydii*. The specimen of a disc now figured by Schmidt comes so close to that of *Pt. Crouchii* that it must probably be assigned to that species. Magister Schmidt is mistaken in assuming an *exclusive* association of *Pt. rostratus* with *Sc. rectus*. On this matter I should be glad if some of my friends at Ludlow and elsewhere in the Cornstone area would give their experience.

The asserted presence of bone-lacunæ in the Heterostraci certainly cannot be accepted on such evidence as that which Herr Schmidt adduces. Either his sections do not show definite bone-lacunæ or they have been very inadequately lithographed.

NAPLES, *April 25th*. E. RAY LANKESTER.

[1] For Magister Schmidt's letters see GEOL. MAG. 1873, Vol. X. pp. 152 and 330.
[2] For Mr. Lankester's reply see *op. cit.* Vol. X. pp. 190 and 478.

COMMUNICATIONS HAVE BEEN RECEIVED FROM:—

Miss Alder, Messrs. J. Milne, W. J. Henwood, H. P. Malet, Robert Mallet, W. H. Hudlestone, J. Wetherell, G. A. Lebour, E. B. Tawney, Dr. Barkas, Chas. W. Peach, Dr. O. G. Ward, A. H. Swinton, James Thomson, A. Gillett, J. W. Judd, Henry Johnson.