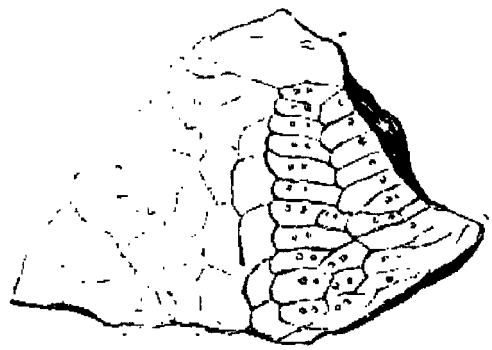
# ON A NEW GENUS OF ECHINODERM, AND OBSERVATIONS ON THE GENUS PALÆCHINUS.

By Fort-Major Thomas Austin, F.G.S.



Genus, Protoechinus (Austin).
Species, *Protoechinus anceps* (Austin). Natural size.

*Test.*—Shape not well defined in the specimens obtained. Ambulacral areas wide; the two rows of pores in double pairs near the margin, with alternate additional perforated plates near the widest spread of the ambulacra; where these additional plates intervene the pores become quadruple; interambulacral areas wide.

*Differences and Affinities.*—The Protoechinus differs wholly from Palæchinus; and bears but little affinity to any recent or fossil echinoderm with which I am acquainted.

*Locality and Stratigraphical Range.*—The only three specimens yet discovered were found in the lower beds, but not the very lowest, of the Carboniferous Limestone, at Hook Point, county of Wexford.

Some years since, when visiting the Hook district, in company with my son, Mr. T. Austin, this new and beautiful sea-urchin was discovered; but unfortunately, in my son's eager endeavours to extricate the fossil from the matrix, part of it was destroyed. Enough, however, remains to prove that it is generically distinct from Palæchinus. I obtained a second specimen, but the plates are a good deal displaced, and the ambulacra are not so well seen as in the one figured. Another and more perfect specimen was subsequently obtained; but before I could secure it, it unfortunately fell into unscientific hands, and was lost to science.

Although present during the removal of hundreds of tons of limestone, and diligently and repeatedly searching every bed and cranny in the locality, I was unable to detect the least indication of a fourth specimen. It may therefore be inferred that Protoechinus is of rare occurrence; and that when the Hook limestone was accumulating at the bottom of the Carboniferous sea, it had just appeared on the stage of life among the then living echinoderms.

As far as can be judged from the three specimens procured, I consider it to be a true echinus, and in all probability the primitive form of that now extensively diffused genus. Believing that Protoechinus was one of the first, if not the very first true echinus, that appeared on our globe, I have adopted the name as suggestive of that fact.

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*Observations on the Genus Palæchinus.*

From specimens of Palæchinus which I have in my cabinet, there is great reason to infer that the different species belonging to that genus possessed columns similar to the true crinoids, and were attached to the ocean-bed as the crinoids were. I had long considered this as probable: and, on carefully re-examining my specimens, I found one in which the indications of the fact are so apparent that they almost force conviction that my first surmises were correct. In the specimen alluded to the ambulacra are seen terminating at, and against, a circular plate with radiating striæ on its surface, and close along side is a short portion of a column, each of the radii on which is a *fac simile* of those on the body-plate, from which the column has apparently been separated, and but slightly displaced by the pressure that broke assunder the columnar support, and left it in close proximity to its original place of attachment

I was first led to entertain a doubt about Palæchinus being a free echinoderm from finding portions of columns lying close to specimens of that genus, and which I could not refer to any known crinoid. The striæ on the articulating surfaces of the circular columnar joints, which probably belong to Palæchinus, are more deeply grooved near their margin than in Actinocrinus, or other allied forms.

Another circumstance that rather favours the supposition that Palæchinus possessed a column is the fact that it is occasionally found lying on its side, a position the true crinoids are mostly seen in; and as the lower or under side has a larger and more depressed surface than the rotund, or highly convex, lateral ones, it is a natural inference that some restraining influence produced this almost universal identity of position, and what more probable than that a column was the cause of this uniformity? Of course the presence of a column would prevent the Palæchinus, after death, falling in any other way than on its side. Among the numerous specimens which I have examined, I have never met more than two that differed in

this respect in the slightest degree, and the same exceptional cases as rarely occur among the true crinoids.

If we examine the echinoderms from the Oolite, the Chalk, or the Tertiary beds, we find them one and all reclining on their broadest diameters, in fact, obeying the laws of gravitation, but which appears to have been overcome in Palæchinus by some countervailing influence, which resisting force was probably an elongated column.

It must be understood that I do not positively maintain that Palæchinus was attached to the sea-bed by a jointed flexible column, but that one evidence in favour of such an addition to its character is strong, if not convincing.

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## GEMS OF PRIVATE COLLECTIONS.

### UNIO AND PALUDINÆ.

*From the Wealden Beds of Kent, in the collection of*
MR. W. HARRIS, F.G.S., OF CHARING.

THE Sussex Marble, or Bethersden Marble, as it is indifferently termed according to its occurrence in Kent or Sussex, is found also in Surrey, near the foot of Leith Hill. It occurs in thin courses of variable thickness and extent, but seldom presenting a bed one foot thick, in the weald clay.

It is made up chiefly of the shells of *Paludinæ*, whole or in fragments. Occasionally the shells retain their form, as in the specimen figured, and weather out on exposure; but often only their casts are exposed, the matrix being calcareous matter derived from the disintegration of the shells. The shells of Uniones also occur; rarely, as in the specimen figured, retaining this form; more often as casts. Cypridæ also occur in abundance; but the small size of the tiny shells or valves of these little entomostraca cause them to be overlooked. The *Cypridea Valdensis* is the common species. The animal matter of the Paludinæ appears to be often preserved in this marble, and gives to the polished sections the dark grey and black markings so characteristic of the stone. Purbeck marble is a similar stone, older than that of the weald clay, and formed of a Paludina of smaller size.

The Paludina of the Sussex marble is scarcely to be distinguished from that of the existing rivers and ponds, namely, the *P. vivipara*; but Sowerby points out that it has a thicker shell, and is somewhat turbo-like in aspect; and has termed it *P. fluviorum*, (Min. Conch., pl. 31. fig. 1; vol. i, p. 77, and vol. vi. p. 192). A larger form from