

## On some Carboniferous Marine Fossils.

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I exhibit to-night two good specimens of *Aphanais mitchelli* (M'Coy), and a very large one of *A. gigantea* (De Koninck), which I think is larger and better preserved than any which have hitherto been found. As no account exists in English of the nature of these fossils, a few words will, I think, be useful to palæontological students. Amongst the fossils sent to Europe by the eminent explorer, Sir T. Mitchell, and also by the Rev. W. B. Clarke, to Professor Sedgwick, there were a few specimens from the sandstones of Glendon and Wollongong, which were described by Professor M'Coy\* as a species of *Inoceramus*. It was, however, only with considerable doubt that it was referred to that genus. The diagnosis is as follows:—"Longitudinally ovate, one-fifth longer than wide, slightly oblique, inflated, hinge-line oblique, nearly equalling the width of the shell, forming a slightly compressed wing, beaks pointed, prominent, incurved, close to the anterior end, anterior side nearly straight, abruptly subtruncate surface, with numerous strong, concentric, irregular wrinkles of growth. The hinge margin of this species is much thickened, which removes it from *Posidonia*; while, as in many of the German cretaceous *Inocerami* it is not possible to observe any traces of the transverse ligamentary pits, nor can we be sure whether these species possessed them or not. Meanwhile I shall leave the present species in the same genus as its obvious allies alluded to; and even if future research should prove that ligamentary pits did not exist, we should form a distinct genus for those species which, like the present and the *I. vetustus* (Low), of the mountain limestone, are distinguished from the true semi-membranous *Posidonia* of the lias and paleozoic shales, with which they have been confounded by their thick shells, general form, and thickened hinge margin. Length, two inches three lines; width, one inch nine lines; thickness, about an inch and a-half. Dedicated to Sir Thomas Mitchell, one of the first to make known the existence of fossils in these rocks (Wollongong)."

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\* See Annals of Nat. Hist., vol. xx (1847), p. 299, plate 1, fig. 1.



It will be seen from this passage that Professor M'Coy, while placing these fossils in a mesozoic genus, recognized the palæozoic affinities of the form. It remained thus until the year 1876, when Professor De Koninck, in revising and describing the whole of our fossils, created for this species the genus *Aphanaia* [a Greek derivate (*a* and *φαναος*), not shining, or non-nacreous], which he thus describes:—"Shell, inequivalve, inequilateral, gibbous, with an obtuse posterior wing. Hinge straight, apparently without teeth, separated by a hollow ligamental area. Surface, with deep concentric grooves, generally very unequal, and like certain species of *Inoceramus*. Muscular impressions of adductors double, very large, posterior nearer to the ventral than cardinal margin; diameter of one double that of the other; larger uniform, nearest to the ventral; smaller suborbicular. Foot impression (?) a little behind the hinge margin, and very small."\* The generic character is, of course, mainly depending on the muscular impressions.

*Relations and Differences.*—Shells of this kind, certain species of which attain large dimensions in their general shape and ornamentation, resemble *Inoceramus*, but they are distinguished by their muscular impressions and hinge area. The same characters will separate them from the American genus *Ambonichia* of Hall, which also comprises several species often confounded with *Inoceramus*. The right valve of the latter has a little oreillette, which is never seen in *Aphanaia*. Hitherto, says Professor De Koninck, the genus only comprises two species, one known since 1847, the other of which he describes. "They belong to the Carboniferous formation (lower marine palæozoic), in which they were discovered by the Rev. W. B. Clarke, F.R.S. It is somewhat remarkable that the palæozoic formation of America and Europe, the fauna of which is so much richer in species than that of Australia, has furnished nothing which can be compared to these forms." See also Clarke's *Sedimentary Formations*, 4th edit., 1878, Appendix C, p. 141, &c.

*Aphanaia gigantea*, De Koninck: "Shell very large, transversely oblique, oval-pointed, the right valve much thicker and larger than the left, and bent upon itself by the elevation of the ventral margin. Umbones thick, straight, pointed, and terminal; surface covered with extremely deep, concentric, irregular sulcations. The test appears to have been extremely thin, the hinge only manifesting a somewhat thick rounded callosity. Adductor impressions enormous on the posterior and ventral sides and near the border; one oval, 3 centimètres in its greater

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\* Abridged from *Recherches sur les Fossiles paléozoïques de la N. G. du Sud. Australie*, par L. G. De Koninck. Brussels, 1876. In which figures of all these fossils are given on beautifully executed lithographs.



diameter, and mingling with the other, which is double its size, and rendered emarginate by the entry of the other. Foot impression very small and faint, situate towards the centre, and a short distance from the hinge margin. The specimen was found at Branxton, in a brown micaceous stone. The dimensions of that described, which was the only one ever found, were as follows:—Alt., 12 centimètres; diameter from the hinge to the ventral margin, 27; length of the hinge margin, 9; thickness in the hinge side, 7; and 3 at a distance of 6 from the ventral margin. The present specimen is a much longer and narrower shell, but in every way larger, measuring 35 centimètres in length, 11 in width, 9 in thickness at the thickest portion, and about 3 very close to the edge. It is probable that these fossils belong to an estuarine formation. The strata at the Cemetery Hill, whence these specimens were taken, are light yellowish brown micaceous sandstones, full of a coarse waterworn conglomerate, containing rounded stones and pebbles, varying from  $\frac{1}{2}$  an inch to 4 inches in diameter. Amid the pebbles and other remains are fragments of wood, which seem to be coniferous, a specimen of which I exhibit. I have not as yet examined them microscopically. The thinness of the shells, the deep sulcated growth, and the character of the shells themselves, all point to a brackish water deposit, such as we find at the mouths of rivers, where oyster-beds sometimes accumulate. It is very difficult to point out any affinities to these fossils among recent shells. They would seem to have some of the characters of *Ostrea*, *Unio* and *Mytilus*, and therefore we cannot affirm positively that they lived in either fresh or salt water. As far as analogy will guide us, we may say that the thin structure of the shell would imply nearly fresh water. With these fossils were associated *Spirifer glaber*, W. Martin; *Sanguinolites tenisoni*, De Kon.; *Pleurophorus carinatus*, Morris; and another *Pleurophorus*, which may prove an undescribed species. I may add that the specimen from which De Koninck's figure was taken was destroyed in the Garden Palace fire. That which I possess is at present the only one known.

## EXPLANATION OF PLATES.

Plate IX. Figs. 1, 2, and 3. Front, back, and side views of *Aphanaia gigantea*, De Kon., one-third nat. size.

Plate X. Figs. 4 and 5. Front and side view of *Aphanaia mitchelli*, De Kon., both half nat. size. Fig. 9. *Sanguinolites tenisoni*, De Kon., nat. size.



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