

Venus fluctuosa, Gould (*astartoides*, Beck), is found living in Behring's Straits, Greenland, Spitzbergen, and Newfoundland.

Montacuta bidentata. Prof. E. Forbes mentions 'a Bridlington fossil in Mr. Bowerbank's collection, which appears to belong to this species.'—Catalogue of Shells from the Glacial Beds, Mem. Geol. Survey, vol. i. p. 409. 1846. Mr. Searles Wood has not confirmed this reference.

Panopæa Norvegica. This shell is not found in the Norwich Crag, except at Chillesford, under exceptional circumstances.

NOTE ON THE FORAMINIFERA OF THE BRIDLINGTON CRAG.

In a collection of Foraminifera of the Bridlington Crag, made some years since by Mr. H. C. Sorby, F.R.S., and referred to in the foregoing paper, Messrs. T. Rupert Jones and W. K. Parker have observed the following species and notable varieties:—

Cornuspira foliacea, <i>Philippi</i> .	Dentalina communis, <i>D'Orbigny</i> .
Biloculina ringens, <i>Lamarck</i> .	Cristellaria cultrata, <i>Montfort</i> .
Triloculina oblonga, <i>Montagu</i> .	Polymorphina lactea, <i>W. and J.</i>
Quinqueloculinatriangularis, <i>D'Orbigny</i> .	Cassidulina lævigata, <i>D'Orbigny</i> .
Q. Seminulum, <i>Linn.</i>	Truncatulina lobatula, <i>W. and J.</i>
Lagena sulcata, <i>W. and J.</i>	Nonionina scapha, <i>F. and M.</i>
L. squamosa, <i>Montagu</i> .	Polystomella striatopunctata,
Dentalina brevis, <i>D'Orbigny</i> .	<i>Fichtel and Moll.</i>

These are such as are at present found in Northern Seas from the shore-line to about fifty fathoms; and, excepting *Cassidulina*, all occur in the Crag of Suffolk.—T. R. J.

II. REMARKS ON THE SKELETON OF THE ARCHÆOPTERYX; AND ON THE RELATIONS OF THE BIRD TO THE REPTILE.

By W. K. PARKER, F.Z.S.

IN Plate 1 of Professor Owen's invaluable memoir on the *Archæopteryx* (Phil. Trans. 1863), the fifth vertebra behind the *Acetabula* is seized upon as the first of the caudal series. In Pl. 3, fig. 5, of the same memoir, we have the delineation of a young Ostrich's pelvis; and in that figure the first post-femoral joint is marked as the commencement of the true tail; eight such joints being, even in the young bird, embraced by the posterior processes of the iliac bones.

Noting this discrepancy, I was led to examine the pelves of a large series of birds (see Zool. Proc. 1864); and this led me to see that the least number of post-femoral vertebræ embraced by the iliac bones is three; for instance, in the smaller *Raptores*, in some of the smallest *Insessores*, and in a few of the feeblest *Grallæ*.

In a very large proportion of typical perching and climbing birds, there are four joints thus clamped together behind the thigh-bones; in many of the walking and running land-birds five; whilst in the Swan, the Emeu, and the Diver (*Colymbus septentrionalis*), there are as many as eleven. Taking the average of the whole class, we shall find that the fifth post-femoral joint is—typically—the first caudal: and this agrees with Professor Owen's determination in the case of the *Archæopteryx*.

This enumeration gives us twenty-one caudal vertebræ for this remarkable creature; a number which, at first sight, appears very great as compared with what we see in existing birds. If, however, we examine the 'ploughshare-bone' of a recently hatched Duckling, we shall find that it is composed of ten segments; and then, counting the fifth post-femoral as the first tail-bone, we get twenty-two as really belonging to that category. Following the same plan in other birds, especially amongst the *Aves præcoces*, we shall, in many cases, get an equal result,—as many as twenty-four in the Swan, which, when young, has at least sixty-five vertebræ in all. I am not disposed to overrate the value of these remarks; yet it is well to be accurate even in detail; and it is highly interesting to see how little Nature has gone out of her way, after all, in the construction of this unlooked-for bird—the *Archæopteryx*.

The general relationship of the Bird-class to the true (abranchiote) Reptiles has still to be worked out; and it is difficult to say which Birds are the most *reptilian*. In some respects the Ostriches are, undoubtedly; and yet no living bird comes nearer the Mammal, in many important respects, than the Cassowary.

The excellent qualities and high intelligence of the arboreal Birds would seem to set them at a great distance from the Reptiles; and yet the skull of the Crocodile comes very much nearer that of the Mammal than what is to be seen in any typical Bird.

Moreover it is only in typical Birds (e. g. *Turdus*), that I have found any rudiment of that most characteristic *lacertian* bone, the *pterygoidean columella*; and in these very Birds the *palatine transverse bone* has its best development, a bone which is seen at its best in the *Crocodylia*, *Lacertilia*, and *Ophidia*: but which has no existence below these groups, nor above the Birds; and is either abortive, or quite absent in the greater number of birds having precocious young. There is a curious blending of the characters of the various reptilian groups in the Birds; there has been no exclusive adoption of the mode of

structure of any one scaly type by these feathered vertebrates; those reptilian qualities and excellencies which are best and highest have become theirs; but how much more! This exaltation of the 'Sauropsidan' or oviparous type by the substitution of feathers for scales, wings for paws, warm blood for cold, intelligence for stupidity, and what is lovely instead of loathsomeness,—this sudden glorification of the vertebrate form is one of the great wonders of Nature.

III. ON *ACRODUS ANNINGLÆ*, AGASS.; WITH REMARKS UPON THE AFFINITIES OF THE GENERA *ACRODUS* AND *HYBODUS*.

By E. C. H. DAY, F.G.S.

[Plates III. and IV.]

FEW amongst the Fish-remains preserved to us in the Secondary rocks are more commonly met with than those of Sharks of the genera *Acrodus** and *Hybodus*;† yet, notwithstanding the frequency of their occurrence, we have but little exact knowledge of the form and affinities of the fish to which these remains belonged. Their cartilaginous skeletons have, excepting a few fragments, altogether perished; and it is quite impossible to guess at their outlines, undefined as these were either by scales or hard plates. Nay, more, the remains that are known of these extinct forms present such great differences from the corresponding structures of living fish, that, although a relationship to a single existing genus has long been indicated, the degree of that affinity is still very uncertain.

Of the two genera, the remains of *Acrodus* are the less frequently met with; and its structure is, in consequence, the less known. At the time that Agassiz wrote his celebrated work upon fossil fishes,‡ detached teeth and one or two incomplete palates, or groups of teeth associated in their normal order, and some traces of the shagreen, or skin of the shark, were all the materials at his disposal for determining the characters of the genus. Relying upon these, he referred *Acrodus* and *Hybodus* to different families, assigning the former to the Cestracionts,§ of which the Port Jackson Shark, *Cestracion Philippi*, is one of two existing examples, and making the latter the type of a new family, the Hybodonts.||

* Agassiz, 1838.

† Ibid. 1837.

‡ The volume containing those that form the subject of the present paper was published 1833–43.

§ Agassiz, 'Poissons Fossiles,' vol. iii. p. 139.

|| Ibid. p. 206.