EXPLANATION OF PLATE XI.

(OSTRACODA FROM THE LONDON CLAY.[1])

FIG.

1. *Bairdia subtrigona*, Bornemann.
2. „ *Londiniensis*, sp. nov.
3. „ *ovoidea*, sp. nov.
4. *Cythere arenosa*, Bosquet.
5. „ *scabropapulosa*.
6. „ „ var. *aculeata*, nov.
7. „ *scalaris*, sp. nov.
8. „ *scrobiculoplicata*, Jones.
9. *Cythereis Bowerbankiana*, Jones.
10. *a*, *b*. „ *aranea*, sp. nov.; *b*, ventral aspect.
11. *a*, *b*. „ *Prestwichiana*, sp. nov.; *b*, transverse section.
12. *Cytheridea perforata* (Roem.), var. *insignis*, Jones.
13. „ *glabra*, Jones.
14. *a*, *b*. *Krithe Londiniensis*, sp. nov.
15. *a*, *b*. „ *glacialis*, B. C. and R.
16. *Cytheropteron triangulare* (Reuss).
17. *Cytherella fabacea*, Bornemann.
18. „ *Beyrichi* (Reuss).
19. „ *compressa* (Münster).

(*To be continued.*)

II.—ON SOME BELGIAN FOSSIL REPTILES.

By LOUIS DOLLO, C.E.,
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I HAVE read with much interest the two articles which Messrs. G. A. Boulenger and R. Lydekker have recently published in the GEOLOGICAL MAGAZINE,[2] and I should be very much obliged if you would permit me to make an addition, which appears to me useful, and which I should be glad to see published.

I. PSEUDOTRIONYX.[3]—1. I have remarked with satisfaction that it has been possible for the above-named naturalists to refer to *P. Delheidi*, a Tortoise of the London-clay. This discovery is doubly interesting, in the first place because it shows the existence of the Belgian fossil in England, in the second place, because it establishes the existence of the Bruxellian (Middle Eocene) Chelonian in the Ypresian epoch (Lower Eocene).

2. I do not, however, believe that the absence of the horny scutes in *Pseudotrionyx* would be sufficient to create a new family.[4] In fact, I think, for reasons which I shall explain elsewhere,[5] that the *Thecophora*[6] without horny scutes (Gymnoderms) proceeded from types which possessed them (Lepidoderms). I believe also that

[1] See also woodcuts in the text.

[2] R. Lydekker and G. A. Boulenger, 'On Chelonia from the Purbeck, Wealden and London Clay,' GEOL. MAG. June, 1887, p. 270. R. Lydekker, 'Notes on Hordwell and other Crocodilians,' GEOL. MAG. July, 1887, p. 307.

[3] L. Dollo, 'Première Note sur les Chéloniens du Bruxellien (Eocène moyen) de la Belgique,' Bull. Mus. Roy. Hist. Nat. Belg. 1886, t. iv. p. 75.

[4] R. Lydekker and G. A. Boulenger, 'Chelonia,' etc. p. 274.

[5] L. Dollo, 'Première Note sur les Chéloniens oligocènes et néogènes de la Belgique,' Bull. Mus. Roy. Hist. Nat. Belg. 1887, t. v. (*in the press*).

[6] L. Dollo, 'Chéloniens du Bruxèllien,' etc., p. 79.

the disappearance of the scutes has taken place by a progressive diminution of their rigidity, a diminution in consequence of which the skin has been gradually moulded upon the subjacent bone, taking exactly its reliefs and hollows. At this stage it must have already possessed a vermiculated external surface of the carapace (as happens with the *Thecophora*, which have a soft skin, *Trionyx* for example), but the dorsal tegument was always divided into distinct areas, leaving their trace upon the above-mentioned external face. Such is perhaps *Anostira*,[1] and probably *Chelonia Suyckerbuyki*. Afterwards, these different areas have disappeared, and with them their lines of demarcation on the skeleton: take *Trionyx* and *Pseudotrionyx* as examples. We may then find, by future researches, all the passages between the gymnoderm and lepidoderm *Thecophora*, and I do not understand, consequently, how the presence or the absence of horny scutes could suffice alone to characterize a family.

II. Pachyrhynchus.[2]—1. As Messrs. Boulenger and Lydekker have pointed out,[3] this name has already been employed; it will therefore be necessary to change it. In a paper at present in the press[4] I have proposed to substitute for it *Erquelinnesia*, to recall the locality in which the curious Chelonian has been discovered, and where it is so common.[5]

2. As Messrs. Boulenger and Lydekker admit,[6] and contrary to the statement of Mr. E. D. Cope,[7] my *Pachyrhynchinæ*[8] are quite distinct from the *Propleuridæ*[9] of the celebrated Professor of Philadelphia, since the latter have nine pairs of costal plates, whereas the Chelonian of Erquelinnes has only eight.

3. Mr. Cope, notwithstanding the assertion to the contrary of Messrs. Boulenger and Lydekker,[10] does not refer, at least in the paper mentioned by them,[11] any of the species of Sir R. Owen to *Puppigerus*.[12] Besides, as I have said in a former paper,[13] *Erquelinnesia* is, without any doubt, generically different from the American type, since the latter has the xiphiplastrons united by

[1] J. Leidy, 'Contributions to the extinct Vertebrate Fauna of the Western Territories,' Rep. U. S. Geol. Surv. Territories (F. V. Hayden), Washington, 1873, p. 174 and 175, pl. xvi. fig. 1 and 2. E. D. Cope, 'The Vertebrata of the Tertiary Formations of the West' (book i.), Rep. U. S. Geol. Surv. Territories (F. V. Hayden), Washington, 1883, p. 112. L. Dollo, 'Chéloniens du Bruxèllien,' etc. p. 95.

[2] L. Dollo, 'Première Note sur les Chéloniens landéniens (Eocène inférieur) de la Belgique,' Bull. Mus. Roy. Hist. Nat. Belg. 1886, t. iv. p. 129.

[3] R. Lydekker and G. A. Boulenger, 'Chelonia,' etc., p. 270.

[4] L. Dollo, 'Chéloniens oligocènes et néogènes,' etc. (v. *supra*).

[5] L. Dollo, 'Chéloniens landéniens,' etc., p. 129.

[6] R. Lydekker and G. A. Bouleger, 'Chelonia,' etc., p. 271.

[7] E. D. Cope, 'Dollo on Extinct Tortoises,' American Naturalist, November, 1886, p. 968.

[8] L. Dollo, Chéloniens landéniens,' etc., p. 139.

[9] E. D. Cope, 'Tertiary Vertebrata,' etc., p. 111.

[10] R. Lydekker and G. A. Boulenger, 'Chelonia,' etc., p. 271.

[11] E. D. Cope, 'Dollo on Extinct Tortoises' (v. *supra*).

[12] E. D. Cope, 'Tertiary Vertebrata,' etc., p. 112.

[13] L. Dollo, 'Chéloniens landéniens,' etc., p. 131.

sutures. The Turtle of the New World, which the Belgian reptile resembles most, appears to me, as well as to Mr. Cope, to be *Euclastes.*[1] But I shall return to this subject on another occasion.

III. Peltochelys.[2]—Whatever may be the position of this form in classification, I do not believe that it can be identified with *Tretosternum*, as Messrs. Boulenger and Lydekker think.[3] In fact, with regard to *Tretosternum*, according to the naturalists just named, "the plastron is essentially of the *Dactylosternine* type of Cope."[4] Now I can assert that I have not seen the least trace of "more or less open digitations"[5] in the plastron of *Peltochelys*.

IV. Bernissartia.[6]—According to Mr. Lydekker,[7] with whom Mr. Boulenger agrees,[8] *Bernissartia* = *Hylæochampsa*,[9] for there would exist in the latter an orbito-latero-temporal notch.

1. In the first place, I beg leave to point out to these naturalists that Sir Richard Owen says plainly: "The orbits in *Hylæochampsa* are circular and better defined by the postfrontal from the lateral outlets of the temporal fossæ than in *Crocodilus*, and herein they more resemble the orbits in *Teleosaurus*,"[10] which agrees with the figure given by the celebrated palæontologist.[11] And, on the other hand, I can assert that, in *Bernissartia*, the orbito-latero-temporal notch is as clearly marked as in any living Crocodilian. The difference which I have pointed out is therefore quite real, although perhaps less strongly marked than I have stated.

2. In the second place, I will add that a naturalist peculiarly competent in the question under consideration, and who has also seen the type of *Hylæochampsa*, Mr. A. S. Woodward, is inclined[12] to consider it rather as a Teleosaurian, which supports what I have just said, and removes the English Crocodilian from *Bernissartia*.

3. However this may be, and until I shall have described in a more complete manner (and with numerous figures) the Crocodilians of Bernissart, I may add, to the character which I have already indicated, the following differences between *Bernissartia* and *Hylæochampsa*.

[1] E. D. Cope, 'Synopsis of the Extinct Batrachia, Reptilia and Aves of North America,' Trans. Amer. Philos. Soc. Philadelphia, 1871, p. 147 and pl. vi.
[2] L. Dollo, 'Première Note sur les Chéloniens de Bernissart,' Bull. Mus. Roy. Hist. Nat. Belg. 1884, t. iii. p. 76.
[3] R. Lydekker and G. A. Boulenger, 'Chelonia,' etc., p. 273.
[4] R. Lydekker and G. A. Boulenger, 'Chelonia,' etc., p. 273.
[5] E. D. Cope, 'Tertiary Vertebrata,' etc., p. 111.
[6] L. Dollo, 'Première Note sur les Crocodiliens de Bernissart,' Bull. Mus. Roy. Hist. Nat. Belg. 1883, t. ii. p. 309.
[7] R. Lydekker, 'Crocodilians,' etc., p. 310.
[8] R. Lydekker, 'Crocodilians,' etc., p. 310.
[9] R. Owen, 'Monograph on the Fossil Reptilia of the Wealden and Purbeck Formations,' Supplement, No. VI. Crocodilia (Hylæochampsa), Wealden, Palæontographical Society, London, 1873.
[10] R. Owen, 'Hylæochampsa,' etc., p. 3.
[11] R. Owen, 'Hylæochampsa,' etc., pl. ii., fig. 24.
[12] A. S. Woodward, 'On British Fossil Crocodilia,' Geol. Mag. Nov. 1887, p. 504. A. S. Woodward, 'The History of Fossil Crocodiles,' Proc. Geol. Assoc. Feb. 1886, p. 318.

CHARACTERS.	HYLÆOCHAMPSA.[1]	BERNISSARTIA.
1. *Ornamentation of the cranium.*	"The outer surface of the cranial bones shows a different pattern of sculpture from that in *Goniopholis*; instead of small circular pits, there are short irregular ridges, which, at some parts, the post-frontal, for example, have a tendency to diverge from a reticulate centre; a number of short ridges and clefts radiate from the raised part of the border of the temporal outlet; but all these accentuations of the surface are rather feeble" (pp. 1 and 2).	Ornamentation very accentuated and consisting in small circular pits.
2. *Orbits.*	A. "Circular" (p. 3). B. Antero-posterior diameter shorter than the corresponding one of the supratemporal fossæ; transverse diameter longer than the corresponding one of the supratemporal fossæ. C. Orbits neither horizontal, nor vertical, but intermediate between the two.	A. No; having the form of the figure 8 of which the anterior circle has a much smaller diameter than the posterior one, but being equally well accentuated. B. Antero-posterior and transverse diameters much greater than the corresponding ones of the supratemporal fossæ. C. Orbits horizontal.
3. *Interorbital space.*	Forming very distinctly, in its narrowest part, more than the half of the transverse diameter of an orbit.	Forming, in its narrowest part, very distinctly less than the half of the transverse diameter of an orbit.
4. *Supratemporal fossæ.*	Form very elongated, "teleosauroid" (p. 3).	Form more rounded.
5. *Intersupratemporal space.*	At the narrowest part, at least a third inferior to the transverse maximum diameter of a supratemporal fossa.	Perceptibly equal, in its narrowest part, to the transverse maximum diameter of a supratemporal fossa.
6. *Posterior border of the superior surface of the cranium seen from above.*	With three notches of which one is median.	With two symmetrical notches and a point on the median line.
7. *Pterygo-palatine vacuities.*	Slight, very narrow and elongate.	Enormous and much broader in proportion to their length.
8. *Interpterygopalatine septum.*	Much thicker, at its narrowest part, than the transverse diameter of one of the pterygo-palatine vacuities.	Much thinner, at its narrowest part, than the transverse diameter of one of the pterygo-palatine vacuities.
9. *Choanes.*	A. Rounded. B. Situated very distinctly nearer the occipital condyle.	A. Elongated in the direction of the longitudinal axis of the cranium. B. Placed very perceptibly more anteriorly.
10. *Size.*	At least $\frac{3}{4}$, if not $\frac{1}{2}$, greater than that of our greatest specimen of *Bernissartia*.	The entire cranium of our largest specimen of *Bernissartia* is not greater than the preserved portion of that of *Hylæochampsa*.

[1] The figures between brackets, in this column, indicate the pages of the Monograph of Sir R. Owen.

To conclude, from the preceding remarks, I think that *Bernissartia* cannot be considered as a synonym of *Hylæochampsa*, and, that consequently, the name of the Crocodilian of Bernissart ought to be retained, instead of placing it in a list of synonyms.

III.—On *Ammonites serpentinus*, Reinecke, *Am. falcifer*, Sowb., *Am. elegans*, Sowb., *Am. elegans*, Young, etc.

By S. S. Buckman, F.G.S.

I HAVE had occasion lately to thoroughly investigate these and other allied Ammonites, partly because it has been important to me that I should know the true affinities of these species, partly because my attention was directed to certain still obscure points with regard to their identification, and partly on account of the statement by the late Dr. Wright that *Am. serpentinus* and *Am. falcifer* were the same species. In pursuing my investigations I have received a great deal of assistance from Dr. E. Haug's Beiträge zu einer Monographie der Ammoniten-gattung Harpoceras,[1] which I am pleased to acknowledge, although I do not find myself able to agree with him in one or two small points which I will presently mention. Meanwhile, by the aid of a few references to well-known works, I will indicate the Ammonites so that they may be understood.

Hildoceras ? serpentinum (Reinecke).

1818. *Argonauta serpentinus*, Reinecke, Maris protog., p. 89, fig. 74–75.
? 1822. *Ammonites Strangewaysi*, Sowerby, Min. Conch. t. 254, fig. 1 and 3.
Non *Am. serpentinus*, D'Orb. (figure reduced), Wright, Bayle, etc.

This Ammonite seems to be extremely scarce. What has been called by D'Orbigny, Wright, and others, *Am. serpentinus*, and is so labelled in museums and private collections, is the *Ammonites falcifer* of Sowerby, which has been erroneously supposed to be the young state of *Am. serpentinus* (Reinecke). Oppel, in his Juraformation, p. 243, noticed that this was not so, and keeps both species distinct; and Dr. E. Haug, in his Beiträge Monog. draws pointed attention to the fact of *falcifer* having been generally figured for *serpentinus*. Dr. Haug corrects this error, and separates the *Am. serpentinus* totally from *Am. falcifer*, placing *Am. serpentinus* in the group of *Am. bifrons*, and consequently in Hyatt's genus *Hildoceras*. The form of the inner margin, the general outline of the ribs, obscure, it would seem, on the inner part of the whorl, seem to warrant this; but at the same time it lacks the furrows on each side of the keel present in *Hild. bifrons*. Of its suture-line I can say nothing, but the suture-line of *Hild. bifrons* is very distinctive. To whatever genus the true *Am. serpentinus* belongs, I feel convinced it does not belong to the same genus as *Am. falcifer*; and that *Am. falcifer* does not belong to the genus *Hildoceras* is very clear, on account of the suture-line, the shape of the inner margin, etc., but especially on a distinctive structural difference in the keel. The keel of *Hildoceras bifrons* is filled by the mould, and is the same shape in reference to the ventral

[1] Neues Jahrbuch für Mineral. Beil. Bd. iii. 1885.