

On some PODOPHTHALMATOUS CRUSTACEA from the CRETACEOUS
FORMATION of VANCOUVER and QUEEN CHARLOTTE ISLANDS.
By HENRY WOODWARD, LL.D., F.R.S., F.G.S.

SOME time since I received from my friend Mr. J. F. Whiteaves, F.G.S., Palæontologist to the Geological Survey of Canada, several interesting crustaceans from the Cretaceous coal-bearing formation of Vancouver and Queen Charlotte Islands, and, as they offer a close affinity with forms from our own Gault and Greensand, they are deserving of special notice.

The existence of Cretaceous strata in Canada has long been known, and the coal-fields of Nanaimo and Comox on Vancouver Island have been correlated with this formation as well as those of Queen Charlotte Island and Alberta, eastward of the Rocky Mountains.

Mr. F. B. Meek in 1857 gave a description of new organic remains from the Cretaceous of Vancouver Island, including *Baculites ovatus*? Say; *Ammonites* (*Scaphites*) *ramosus*, *A. Newberryanus*, *Dentalium nanaimoensis*, *Thracia* (?) *occidentalis*, *Thr.* (?) *subtruncata*, *Trigonia Evansana*, *Pholadomya subelongata*, *Ph.* (*Goniomya*) *borealis*, *Cardium scitulum*, *Arca vancouverensis*, *A.* (*Cucullæa*) *æquilateralis*, and *Nucula Traskana*. Dr. B. F. Shumard in 1858 added *Inoceramus vancouverensis*, *Pinna calamitoides*, and *Pyrula glabra* to the Nanaimo fauna.

In Prof. H. Y. Hind's 'Report on the Assiniboine and Saskatchewan Expedition' (1859) further lists of fossils are given, 13 in number, all referred to Cretaceous forms, namely:—

Anomia Flemingii.
Inoceramus canadensis.
Avicula linguiformis, E. & S.
— *nebrascana*, E. & S.
Leda Evansi, Hall & Meek.
Rostellaria americana, E. & S.
Natica obliquata, Hall & Meek.

Leda Hindi, Meek.
Avellana concinna, H. & M.
Ammonites placenta, Dekay.
Scaphites nodosus, Owen, var.
— *Conradi*, Morton.
Nautilus Dekayi, Morton.

In 1861 Dr. (now Sir) James Hector instituted a comparison between the strata east of the Rocky Mountains with those of Vancouver Island (Capt. Palliser's Exploring Expedition, 1857–60).¹ The list of Cretaceous fossils contributed by Mr. Etheridge from east of the Rocky Mountains comprised:—

Ostrea anomiaformis.
— *lugubris*, Conrad.
— *cortex*, Conrad.
— *vellicata*, Conrad.
* *Inoceramus Crippsii*, Roemer & C.
Leda Hindi, Meek.

Astarte texana, Conrad.
Cardium multistriatum, Shumard.
Cytherea texana, Conrad.
Pholadomya occidentalis, Morton.
Baculites compressus, Say.

* *Inoceramus Crippsii* (Roemer) and *Baculites compressus* (Say) are stated to be common to the Cretaceous rocks of the plains and of Vancouver Island; while of the whole 18 species no less than 13 are identified with Texan or Mexican species.

¹ Quart. Journ. Geol. Soc. vol. xvii. (1861) pp. 388–445.

Those from Nanaimo, Comox, or Valdez Inlet are :—

<i>Inoceramus texanus</i> , Conrad.		<i>Inoceramus mytiloides</i> , Conrad.
— <i>nebrascensis</i> , Owen.		<i>Trigonia Emoryi</i> , Conrad.
— <i>undulatopectatus</i> , Roemer.		<i>Cytherea leonensis</i> , Conrad.
— <i>confertim annulatus</i> , Roemer.		<i>Ammonites geniculatus</i> , Conrad.

In 1861 Mr. Meek (Proc. Acad. Nat. Sci. Philad. vol. xiii. p. 314) added to the list of Cretaceous fossils from Vancouver *Dosinia tenuis*, from Nanaimo; *Inoceramus subundatus*, *Baculites occidentalis*, *Ammonites vancouverensis*, and *Nautilus Campbelli*, from Comox; *Ammonites complexus*, var. *suciensis*, from Comox and the Sucia Islands; and *Baculites inornatus*, from the Sucia Islands.

In 1864 Mr. W. Gabb, in vol. i. of the 'Palæontology of California,' described and figured two new species of fossil shells, namely :—*Namites vancouverensis* and *Pecten Traskii* from Nanaimo.

For an admirable summary of our knowledge of 'the Cretaceous System of Canada,' see the Presidential Address to the Royal Society of Canada by J. F. Whiteaves, Section iv., May 23rd, 1893, pp. 3-19 (Trans. Roy. Soc. Canada).

I find that it is impossible here to give a full list of all the fossils obtained from these beds, and I have omitted the fossils of the upper series of deposits entirely, as also the plant-remains.

Besides the mollusca, a decapod crustacean (named but not described as *Hoploparia* or *Podocrastes? dulmenensis*) has been recorded from the Niobrara-Benton group of Manitoba—a long-tailed decapod (*Palæastacus*) from the Pierre Fox Hills or Montana formation, and a beetle, *Hyllobites cretaceus*, Scudder, from the Pierre Shales, Millwood, Manitoba.

The species of crustacea now to be noticed comprise :—

1. Several examples of a small macrurous decapod belonging to the genus *Callianassa*, met with very frequently in the Faxoe Beds, the Maestricht Chalk, the Greensand of Colin Glen, Belfast;¹ and also from lower beds (*C. isochela*),² Kimeridge Clay of the Subwealden boring; and from higher and later ones, namely, *Callianassa Batei*,³ Upper Marine Series, Hempstead, Isle of Wight.

This is a small burrowing crustacean, and is found living at the present day; usually only the chelæ are obtained in dredging, owing to the animal lying in its burrow, and the hands alone protruding from the aperture.

The body- (thoracio-abdominal) segments are nearly soft, owing to the animal's constant habit of lying concealed, only the hands having a hardened calcareous covering.

¹ *Callianassa neocomiensis*, H. Woodw. Brit. Assoc. Rep. (Norwich) 1868, p. 75, pl. ii. fig. 5.

² *C. isochela*, H. Woodw. Quart. Journ. Geol. Soc. vol. xxxii. (1876) p. 47, pl. xxxii. figs. 1, 2.

³ *C. Batei*, H. Woodw. Brit. Assoc. Rep. (Norwich) 1868, p. 74, pl. ii. fig. 4.

I. MACRURA.

Tribe THALASSINIDEA.

Family Callianassidæ.

Genus CALLIANASSA, Leach, 1814.

1. *Callianassa Whiteavesii*, sp. nov. (Figs. 1 & 2.)

General integument of body extremely thin, or semimembranous, except the first pair of feet, which are protected by a hard covering.

Anterior feet (chelipeds) very unequal; length of larger limb 39 millim.; breadth 9 millim.; the dactylus is straight, and is 9 millim. long, but the fixed thumb of the propodos is rudimentary and stout, being only half as long as the movable finger. Length of smaller hand about 20 millim. Surface of hands faintly wrinkled.

There are indications of the segments of the abdomen and of the thin integument with which they were covered, also of the small thoracic legs, but they are too much broken up for detailed description.

In this species from Vancouver Island the fixed thumb of the propodos is shorter than in any of the species hitherto recorded, and the movable finger (dactylus) is straighter.

The species is smaller than that from the Chalk of Dulmen, Westphalia, or from Maestricht, or Belfast. I have designated it *Callianassa Whiteavesii*, in honour of my friend Mr. J. F. Whiteaves, who has done so much for the elucidation of the Cretaceous formation in Canada.

Original specimens preserved in concretionary nodules of Cretaceous age from Comox River, Vancouver Island. Collected by Dr. C. F. Newcombe (1892). Museum of the Geological Survey of Canada, Ottawa.

A nodule from Vancouver Island, in the Geological Society's Museum, contains the remains of the large hands of *Callianassa Whiteavesii*. A second nodule from the same collection contains the carapace of *Plagiolophus vancouverensis*.

Fig. 1.

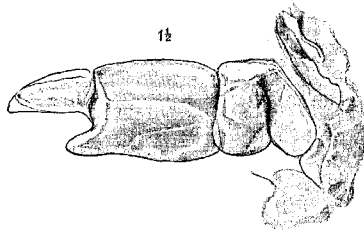
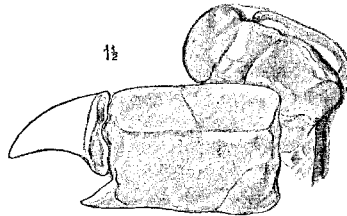


Fig. 2.



II. BRACHYURA—ANOMALA.

Family Homolidæ.

Genus HOMOLOPSIS, Bell.

Carapace longer than broad, quadrilateral; regions of carapace very distinct; branchial region large, triangular; orbits close together, frontal region rather produced; front subtund.

2. *Homolopsis Richardsoni*, sp. nov. (Fig. 3.)

This interesting little crab was obtained by Mr. James Richardson in 1872 from Skidegate Inlet, west of Alliford Bay, Queen Charlotte Island, and is preserved in a hard black limestone-nodule containing plant-remains. Portions of the limbs still remain in their normal position, showing that it was entire when originally buried in the matrix.

Length of carapace 20 millim., greatest breadth 17 millim.; breadth of posterior border 14 millim.; breadth across hepatic region 14 millim.

The carapace is broadly quadrilateral, but pointed in front; the branchial regions extend to fully one half the length of the carapace; they are roughly triangular in shape, and nearly meet on the middle line behind the cardiac region; cardiac region small, shield-shaped, but elevated; metagastric region marked by two small prominences; hepatic regions prominent. Two very distinct and almost parallel furrows, the branchial furrow and cervical or hepatic furrow, diverge from the sides of the cardiac and metagastric regions

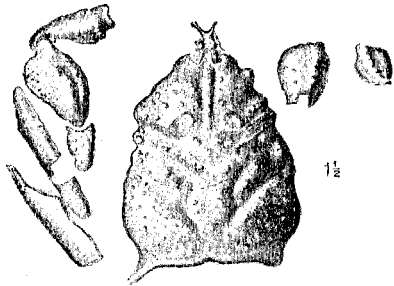
obliquely forward towards the lateral margins of the carapace. Two deep submedian furrows mark the frontal portion of the cephalothorax, reaching to the rostrum, where they converge on the central line. Two small spines (or other appendages) project (as in the genus *Latreillia*) from the rostrum on either side.

The hinder border is extremely wide and straight, and suggests the broad margin for the attachment of the tail as in the females of all the *Anomala*, in which section the abdomen is only partially concealed beneath the cephalothorax.

The surface of the carapace, which is tumid, is coarsely and irregularly covered with small rounded tubercles, which are larger on the gastric and hepatic regions.

The walking-legs were evidently long and fairly large, and the chelipeds curved and tuberculated as in *Homola*.

Fig. 3.



This species has many points of resemblance to Reuss's *Prosopeon verrucosum*, from which, however, it differs in the greater anterior breadth of Reuss's specimen, and in the form of the rostrum and arrangement of the furrows upon the gastric and cardiac regions. Reuss's *P. verrucosum* should probably be placed in Bell's genus *Homolopsis*.

In *Homolopsis Edwardsii*, Bell, from the Gault of Folkestone, the frontal border is broader and the carapace more quadrate than in the North American form, which is pointed in front; the anterior half of the carapace in *H. Edwardsii* is more coarsely ornamented with fewer and larger tubercles, and the arrangement of the lobes differs considerably from that in *H. Richardsoni*.

I would refer this specimen to *Homolopsis*, and dedicate the species to the discoverer, Mr. James Richardson.

The specimen is from the Museum of the Geological Survey of Canada, Ottawa.

Legion OXYSTOMATA.

Family Corystidæ.

Genus PALÆOCORYSTES, Bell.

In this genus the carapace is longer than broad, flattish, becoming narrower gradually towards the posterior border, rostrum short, latero-anterior border dentated. Orbits moderately broad, with two fissures.

The carapace in all the species of this genus at present known is similar to that of the masked crab, *Corystes*, now living on our English coasts.

3. *Palæocorystes Harveyi*, sp. nov. (Fig. 4, p. 226.)

The genus *Palæocorystes*, to which I have referred two of the specimens sent to me by Mr. Whiteaves, is well represented in the Gault, Greensand, Chalk, and Eocene.

Thus we have :—

Palæocorystes Broderipii, Mantell, sp.; Gault, Folkestone.

— *Stokesii*, Mantell, sp.; Gault and Greensand, Cambridge and Folkestone.

— *Normanni*, Bell; Chalk Marl, Isle of Wight.

— *Mülleri*, Bink; Upper Chalk, Maestricht.

— *Callianassarum*, Fritsch; Chalk, Bohemia.

— *isericus*, Fritsch; Chalk, Bohemia.

— *glabra*, H. W.; Lower Eocene, Portsmouth.

Eucorystes Carteri, M'Coy; Greensand, Cambridge.

Both the specimens from Canada are imperfect. One of them (No. 2) shows the anterior upper surface of the carapace, the other (No. 3) the posterior upper surface. From these we are able to make the following diagnosis :—

Specific characters. Length of carapace 35 millim., from the rostrum to the broken posterior border (to this we must probably

add 15 millim. more, making the total length from the rostrum to the posterior border of the carapace 50 millim.); greatest breadth across the hepatic region 37 millim.

(No. 2 was collected by Mr. W. Harvey, Comox River, Vancouver Island, 1892; No. 3 by Dr. C. F. Newcombe.)

Carapace smooth and gently convex in front, and very finely and minutely granulated. Latero-anterior border armed with four serrations on each side, frontal border marked by one prominent and one smaller tooth on either side of the small bifid rostrum, while two fissures mark the margin of each orbit. Under surface of carapace not exposed.

The regions of the carapace are very indistinct; two slightly divergent raised lines about 5 millim. in length mark the frontal region just behind the rostrum, and there is a faint ridge down the centre of the carapace. A small tubercle on either side, behind the frontal region, marks the epigastric lobe. A faint curved and bifurcating line separates the gastric from the cardiac regions, while two slightly rugose and incised lines curve outward and forward from the central cardiac region, marking the limits of the branchial region on either side.

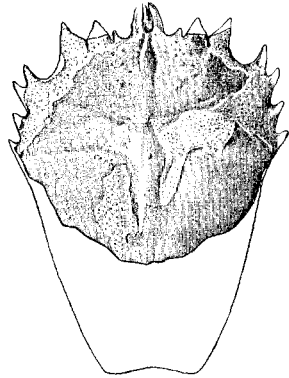
Of the several species of *Palæocorystes* known, the present form, which I have ventured to call *P. Harveyi* after its discoverer, approaches most nearly to *P. Broderipii* from the Gault of Folkestone, but is probably one-third larger. The latero-anterior border of the former (*P. Harveyi*) has four spines on each side, whilst *P. Broderipii* has only two. The orbital regions differ in form, as well as the markings on the regions of the carapace.

We must await more complete materials before attempting a fuller and more careful description; meantime it is interesting to meet with a species from so distant a locality which approaches so nearly to our own Gault species *P. Broderipii*.

Formation.—Cretaceous. *Localities*.—Hornby Island (No. 2); and Comox River, Vancouver Island (No. 3).

No. 2 belongs to the Provincial Museum, Victoria, Vancouver Island; No. 3 belongs to the Geological Survey of Canada.

Fig. 4.



Legion CYCLOMETOPA.

Family Cancridæ.

Genus PLAGIOLOPHUS, Bell.

In this genus the carapace is transversely ovate, the regions of the cephalothorax are distinctly marked, front somewhat prominent,

the eyes subdistant, superior border of the orbits with two fissures, etc.

4. *Plagiolophus vancouverensis*, sp. nov. (Figs. 5 & 6.)

This crab is represented by four specimens, three of which I received from Mr. Whiteaves, and the remaining one is preserved in the Museum of the Geological Society.

The carapaces vary in size from :—

	Millimetres	
	long.	broad.
1. Geological Society's specimen	22	28
2. From Comox River, Vancouver Island (fig. 5)	20	25
3. N.W. side, Hornby Island	16	20
4. N.W. side, Hornby Island (fig. 6) . .	10	13

No. 1 and No. 2 are $\frac{1}{4}$ broader than long, No. 3 is $\frac{1}{5}$, and No. 4 is $\frac{1}{4}$ broader than long.

The frontal border is straight; the rostrum is bifid, with two small rounded elevations divided by a groove; the orbital region is smooth and but little indented; the lateral borders are very gently rounded, the posterior border is nearly straight. The cardiac and metabranchial lobes, the metagastric and epibranchial lobes, and the two mesogastric lobes form three almost parallel lines across the carapace, giving it a very unique linear arrangement; there are also two much smaller lobes, one behind each of the orbits, flanked laterally by a small tubercle, and a small rounded tubercle on each epibranchial lobe; the lateral border was bluntly dentated.

Fig. 5.

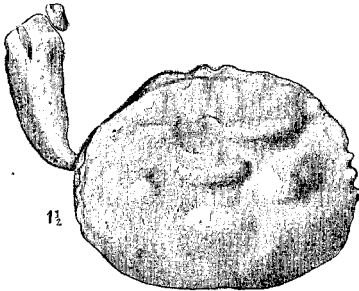
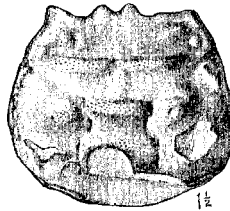


Fig. 6.



When not waterworn (as in specimen No. 4), the surface of the carapace is in parts very finely granulated.

These specimens are very distinct, but without more materials I should not feel justified in separating them generically. I prefer rather to place them in Bell's genus *Plagiolophus*, which was proposed to receive *P. Wetherelli*, from the London Clay of Sheppey.

The same species—described under the name of *Glyphithyreus affinis* (Reuss)—was figured and described by Reuss nearly at the same date. Reuss also adds another species, *Glyphithyreus formosus*, Reuss, from the Upper Cretaceous of Mecklenburg.

I feel satisfied to leave these Vancouver Island crabs in this genus, and to designate them by the trivial name of *vancouverensis*.

Two specimens were collected on the north-western side of Hornby Island, and one on Comox River, Vancouver Island, British Columbia. The locality of the Geological Society's specimen is not marked, but it is from Vancouver Island.

Nos. 3 and 4, from Hornby Island, belong to the Provincial Museum of Victoria, Vancouver Island.

No. 2 specimen shows traces of limbs, and the flattened propodos of a chelate fore-arm 13 millim. long \times 8 millim. broad.