

*The Gastroplites and Other Lower Cretaceous Faunas of the Northern Great Plains\**

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As announced in a recent paper, the *Gastroplites* fauna is of about early Albian date<sup>1</sup> and occurs on the lower and northern part of Peace River, near and below the mouth of Cadotte River (see fig. 1) in the northern marine, thin-bedded sandstone and shale phase of the upper sandstone member of the Peace River formation.<sup>2</sup> It is also found far to the west in the Peace River canyon (see fig. 1), where Lower Cretaceous beds reappear on the west side of the broad shallow trough, in the Fort St. John shale above the Gates sandstone.<sup>3</sup> It includes on the lower part of Peace River, *Gastroplites canadensis* (Whiteaves), *Gastroplites canadensis* var., *Gastroplites allani* n. sp., *Gastroplites stantoni* n. sp., *Gastroplites anguinus* n. sp., *Gastroplites spiekeri* n. sp., *Trigonia albertensis* McLearn, *Dicranodonta dowlingi* McLearn, *Cyprina* sp., starfishes, and probably *Inoceramus cadottensis* n. sp. In the west it includes, near the mouth of Deep creek, in the Peace River canyon, *Gastroplites kingi*, n. sp., *Inoceramus* cf. *cadottensis* n.sp., *Panopaea* sp., and a starfish. It is thus possible to date the beds of the Fort St. John shale in the canyon which carry this fauna and to correlate them with the beds of the Upper Sandstone member of the Peace River formation in the east. It follows that even if the term Fort St. John be confined to the beds over the Gates sandstone, the Fort St. John shale of the west extends down lower stratigraphically than the Fort St. John of the east, and the lower part at least of the Fort St. John shale is of Albian age.

At some localities beds of apparent nonmarine origin occur at the horizon of the *Gastroplites* zone. If the upper sandstone member of

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<sup>1</sup>McLearn, F. H., Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. iv, p. 6 (1930). With acknowledgment to Dr. L. F. Spath.

<sup>2</sup>McLearn, F. H., Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. iv, p. 6 (1930) and earlier papers.

<sup>3</sup>McLearn, F. H., Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. iv, p. 6 (1930).

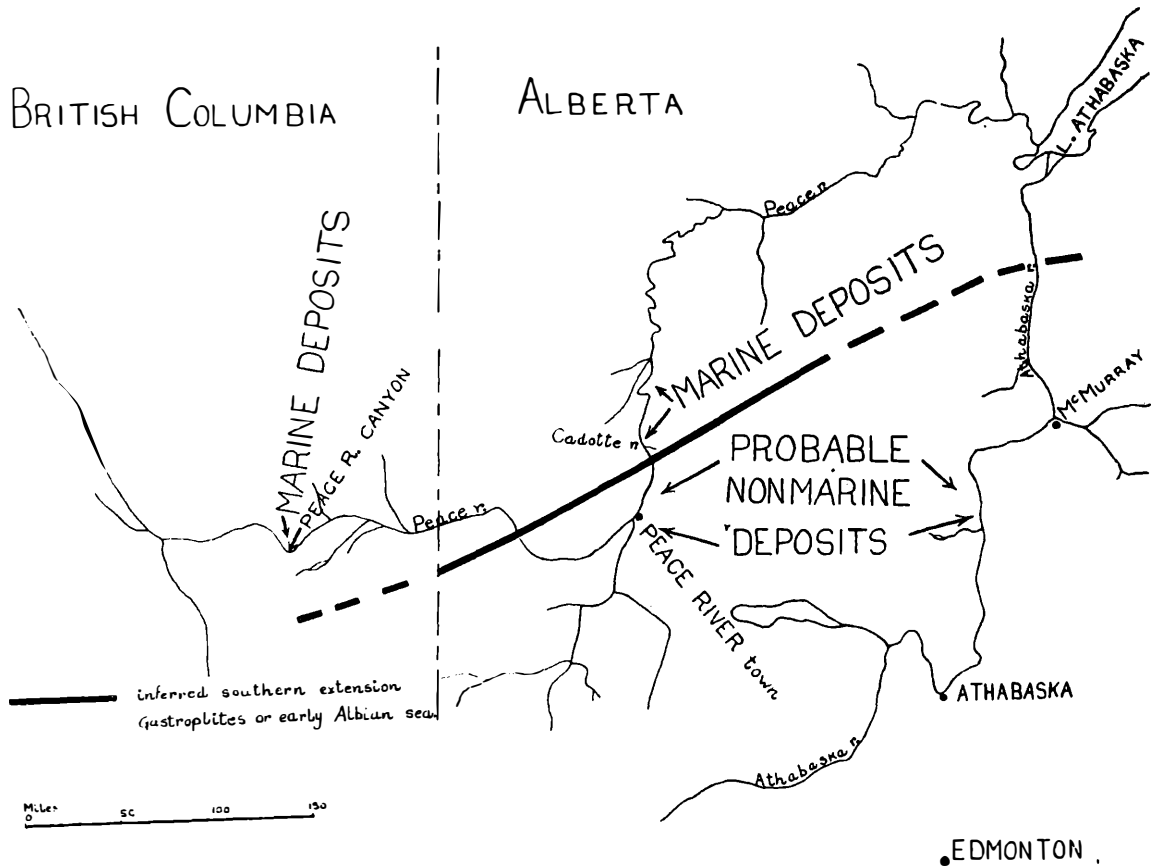


FIGURE 1

the Peace River formation is traced to the south it becomes more arenaceous and massive, and near the town of Peace River consists of massive sandstone with a coaly and carbonaceous layer near the top. In this phase the upper sandstone member may be in part at least of nonmarine origin. On the lower part of Athabaska river the upper part of the Grand Rapids sandstone appears to represent the horizon of the upper sandstone member of the Peace River formation on Peace River. It consists mostly of massive sandstone with a thin coal seam near the top which is underlain by sandstone carrying what appear to be fossil roots. The upper part of the Grand Rapids, therefore, is assumed to be at least partly nonmarine. (The base is marine). There is thus evidently a change in the character of the sediment deposited in the southeast as compared with the north and west. This was marked in the southeast by a greater accumulation of sand and by probable nonmarine deposition; *i.e.*, there was in this part of the interior a probable marginal alluvial or delta plain. Possibly the sands of the Peace River and Grand Rapids formations came not directly from the west but from the southwest or other direction.

The *Gastropilites* fauna appears to have been of a northern sea which probably did not extend very far to the southeast, *i.e.*, not to lower Athabaska river, because of silting up of the sea there and the building out of marginal alluvial plains. It extended farther west, however, to the site of the Peace River canyon and flooded an area which at a former time was the scene of deposition of nonmarine beds of late Kootenay or Lower Blairmore age, *i.e.*, the beds of the coal-bearing Gething member of the Bullhead Mountain formation.

In southwestern Alberta it is possible that the upper part of the nonmarine Blairmore formation approximately represents the horizon of the *Gastropilites* beds. In a former paper<sup>4</sup>, the writer has discussed, as an alternative to a Cenomanian, a possible Albian age of the Upper Blairmore. At any rate some part of the Blairmore is probably Albian.

At a somewhat lower horizon than the *Gastropilites* is the *Beaudanticeras affine* fauna of late Aptian or early Albian age<sup>5</sup>. It occurs in the bottom of the Lower sandstone member of the Peace River formation and in the top of the Loon River shale on lower Peace River. This fauna includes *Beaudanticeras affine* (Whiteaves), *Beaudanticeras glabrum* (Whiteaves), *Pinna curvilinearata* McLearn, *Tellina dowlingi* McLearn, *Oxytoma camSELLI* n. sp. and *Nemodon mcCONNELLI* McLearn.

<sup>4</sup>McLearn, F. H., Nat. Mus. Can., Bull. 58, p. 103 (1929).

<sup>5</sup>McLearn, F. H., Trans. Roy. Soc. Can., Ser. 3, vol. 24, sec. iv, p. 6 (1930).

With acknowledgment to Dr. L. F. Spath.

The same or almost the same fauna, the Clearwater fauna, occurs in the Clearwater shale of lower Athabaska River and includes there *Beudanticeras ? mconnelli* (Whiteaves), *Tellina dowlingi* McLearn, *Inoceramus dowlingi* McLearn, *Brachydontes athabaskensis* McLearn, *Laevicardium onestae* n. sp., *Nucula athabaskensis* n. sp., *Yoldia kisoumi* n. sp. and undescribed species of *Pecten*, *Entolium*, *Goniomya*, *Cyprina*, etc. The Clearwater sea extended much further in the southeast than the *Gastropilites* sea, *i.e.*, at least to the site of lower Athabaska river (and perhaps much further), but it is not known whether it extended west as far as the site of the Peace River canyon or whether the beds of the nonmarine Gething member of the Bullhead Mountain formation represent in that area a coeval marginal alluvial plain or delta. This will be known only when the downward extension of the *Gastropilites* fauna in the western or canyon section is known, and when it is determined whether or not the *B. affine* or the closely related Clearwater fauna are present in the Gates sandstone or Moosebar shale. The Gething member has been correlated with the top of the Kootenay or the lower Blairmore, more probably the latter, of southwestern Alberta.<sup>6</sup>

A yet earlier fauna is in the transition beds between the Clearwater and McMurray formations. It is a brackish or a marine fauna and includes "*Astarte*" *natosini*, n. sp.

Yet lower in the McMurray formation is a freshwater or non-marine fauna, consisting of undescribed species.

Higher than the *Gastropilites* fauna and in the upper part of the Fort St. John shale, 100 or 150 feet below the Dunvegan contact, is the *Neogastropilites* fauna. It includes *Neogastropilites cornutum* (Whiteaves), other species of *Neogastropilites*, *Nucula dowlingi* McLearn and *Inoceramus nahwisi* n. sp. and is of Albian date. As the *Gastropilites* fauna in the lower part of the formation is of about early Albian age, all or nearly all of the Fort St. John shale is of Albian date. As the overlying Dunvegan formation is of upper Cretaceous age the contact between lower and upper Cretaceous must come at the top or nearly the top of the Fort St. John. The Dunvegan can be dated Cenomanian, at least tentatively, as P. S. Warren has recently suggested. The Dunvegan, however, can hardly be correlated with any part of the Blairmore formation of Blairmore, none of which at that locality is likely younger than Albian or late lower Cretaceous.

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<sup>6</sup>McLearn, F. H., Geol. Surv. Can., Summ. Rep. for 1917, part C, p. 17c (1918). Tentative Lower Blairmore dating.

Berry, E. W., Trans. Roy. Soc. Can., ser. 3, vol. 20, sec. 4, p. 202 (1926).

Grateful acknowledgement is made to Dr. L. F. Spath for important advice in the interpretation of the ammonoids.

A tentative correlation table, showing the relations of the formations and faunas described above is given below. It is the best that the writer can offer at present, and will require alterations when further studies are made.

#### NEW SPECIES

At a later time it is hoped that a complete systematic treatment of these Lower Cretaceous faunas will be possible. The starfish in particular are interesting. Meanwhile the following preliminary descriptions are given.

*Gastropilites stantoni* n. sp. Pl. 1, fig. 4. Compared with *Gastropilites canadensis* (Whiteaves), this species has relatively higher and thinner whorls and a narrow, somewhat convex, not broad, venter. Nat. Mus. Can., holotype, cat. no. 6336.

*Gastropilites allani* n. sp. Pl. 1, fig. 10. Has high, thick whorls, becoming thinner and more compressed at about 37 mm. diameter. Nat. Mus. Can., holotype, cat. no. 6337.

*Gastropilites anguinus* n. sp. Pl. 1, fig. 11. Has a wider umbilicus than any known species of *Gastropilites* and the conch is a flattened serpenticone. On the venter the ribs are of low relief, but continuous across and bent forward. Nat. Mus. Can., holotype, cat. no. 6338.

*Gastropilites spiekeri* n. sp. Pl. 2, fig. 2. This is an involute, compressed species having a smooth arched venter and differs from other species in an almost pseudoceratitic suture line. Nat. Mus. Can., holotype, cat. no. 6339.

*Gastropilites kingi* n. sp. Pl. 1, fig. 9. This species has flattened sides and venter and stout ribs which are also stout across the venter. The whorls are thinner than those of *Gastropilites canadensis* (Whiteaves). Nat. Mus. Can., holotype, cat. no. 6340.

*Oxytoma camSELLi* n. sp. Pl. 1, figs. 7, 8. This is a smaller species than *Oxytoma nebrascana* E. and S., and is less produced in the postero-ventral angle. Nat. Mus. Can., holotype, cat. no. 6341, paratype, cat. no. 6342.

*Inoceramus cadottensis* n. sp. Pl. 2, fig. 3. This is a large, moderately convex species with nearly terminal beaks. The middle and dorsal part of the shell is ornamented with even concentric costae which decline anteriorly and postero-dorsally. They become irregular ventrally and posteriorly. Compared with a primitive Cretaceous species like *Inoceramus dowlingi* McLearn<sup>7</sup>, it is larger and the even

<sup>7</sup>Geol. Surv. Can., Mus. Bull. 29, p. 11, pl. 3, figs. 7, 8 (1919.)

CRETACEOUS

LOWER,

Europe	Athabaska river	Lower Peace river	Peace River town	Peace River canyon	Blairmore
Albian	Pelican shale	Fort St. John shale	Fort St. John shale	Fort St. John (Neogastrolites) shale	Upper (U. Blairmore Flora) Blairmore
	Grand Rapids ss.	Peace River formation	Peace River formation	(Gastrolites) Upper ss. (Fauna)	
Shale member				Upper ss.	Gates ss.
Lower ss.				Shale member	?
?		(B. affine Fauna)		Moosebar shale	?
Aptian	Clearwater (Clearwater fauna) shale	Loon River shale	Loon River shale	Bullhead-Mountain formation	Lower (L. Blairmore Flora and Fauna) Blairmore
?				Gething (Lower Blairmore Flora) member	?
Barremian	("A" natosini fauna) McMurray (Nonmarine Fauna)			?	?
				Lower member	Kootenay (Kootenay Flora)
				?	?

costae become irregular with growth. Nat. Mus. Can., holotype, cat. no. 6343.

*Inoceramus nahwisi* n. sp. Pl. 2, fig. 1. The valves are almost bilaterally symmetrical, are compressed, and unlike *I. dowlingi* and *I. cadottensis* the umbones are only a little in advance of the middle. The hinge line is not very long. There are concentric, not very regular, undulations. Nat. Mus. Can., holotype, cat. no. 6334.

*Laevicardium onestae* n. sp. Pl. 1, fig. 1. This is a subquadrate, posteriorly obliquely truncate, moderately convex species, with the umbones a little anterior to the middle. The surface has fine, irregular growth lines. It is more quadrate, less orbicular than *L. annulatum* Gabb. Nat. Mus. Can., holotype, cat. no. 6345.

*Yoldia kissoumi* n. sp. Pl. 1, figs. 2, 3. A moderately convex species, somewhat rostrate in the postero-dorsal angle. The surface has fine, even-growth lines, and also, on middle of side of valve, horizontal striae that cross the growth lines slightly. *Y. evansi* is longer, more depressed, less rostrate, etc. Nat. Mus. Can., holotype, cat. no. 6346; paratype, cat. no. 6347.

*Nucula athabaskensis* n. sp. Pl. 1, fig. 5. This is an almost subovate, rather compressed, species with beaks almost posterior in position and with a very short truncate posterior end. The surface has irregular growth lines. There are only rare traces of scarcely perceptible radiating striae much weaker than in *N. planimarginata*. It is less convex than *N. gabbi*. Nat. Mus. Can., holotype, cat. no. 6348.

"*Astarte*" *natosini* n. sp. Pl. 1, fig. 6. A small, somewhat orbicular species with fine-growth lines, denticulate inner borders, two cardinals in left valve, one in right valve, and not very strong anterior and posterior laterals. Nat. Mus. Can., holotype, cat. no. 6349.

*Neogastrolites* n. gen. This is similar in form and ornament to *Gastrolites* but differs in the presence of tubercles and in some species, a median thickening of the ribs on the venter. It appears to represent a later Albian development of *Gastrolites*. The genotype is *Buchiceras? cornutum* Whiteaves (Trans. Roy. Soc. Can., vol. 2, sec. 4, pp. 239-240 (1885)). The type of the genotype is in National Museum of Canada; type cat. no. 5039.

In a recent paper<sup>3</sup> the writer has described the Triassic species *Steinmannites (Meginoceras) meginiae*. This belongs to the genus *Paratrachyceras* Arthaber in the broad sense.

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<sup>3</sup>McLearn, F. H., Trans. Roy. Soc. Can., 3rd ser., vol. 24, sec. IV, p. 16 (1930).

## EXPLANATION OF PLATES

### PLATE I

(All illustrating natural size unless otherwise stated)

- Figure 1. *Laevicardium onestae* n. sp. Holotype, left value. Nat. Mus. Can., cat. no. 6345.
- Figure 2. *Yoldia kissoumi* n. sp. Paratype, left value. Nat. Mus. Can., cat. no. 6347.
- Figure 3. *Yoldia kissoumi* n. sp. Holotype, right value. Nat. Mus. Can., cat. no. 6346.
- Figure 4. *Gastropilites stantoni* n. sp. Holotype. Nat. Mus. Can., cat. no. 6336.
- Figure 5. *Nucula athabaskensis* n. sp. Holotype. Nat. Mus. Can., cat. no. 6348.
- Figure 6. "*Astarte*" *natosini* n. sp. Holotype, left value. Nat. Mus. Can., cat. no. 6349.
- Figure 7. *Oxytoma camselli* n. sp. Paratype, left value. Nat. Mus. Can., cat. no. 6342.
- Figure 8. *Oxytoma camselli* n. sp. Holotype, left value. Nat. Mus. Can., cat. no. 6341.
- Figure 9. *Gastropilites kingi* n. sp. Holotype. Nat. Mus. Can., cat. no. 6340.
- Figure 10. *Gastropilites allani* n. sp. Holotype. Nat. Mus. Can., cat. no. 6337.
- Figure 11. *Gastropilites anguinus* n. sp. Holotype. Nat. Mus. Can., cat. no. 6338.

### PLATE II

- Figure 1. *Inoceramus nahwisi* n. sp. Left value. Holotype. Nat. Mus. Can., cat. no. 6344.
- Figure 2. *Gastropilites spiekeri* n. sp. Holotype. Nat. Mus. Can., cat. no. 6339.
- Figure 3. *Inoceramus cadottensis* n. sp. Right value. Holotype. Nat. Mus. Can., cat. no. 6343.



PLATE I

