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PAPER 64-6

ILLUSTRATIONS OF CANADIAN FOSSILS

EARLY LOWER CRETACEOUS (BERRIASIAN AND VALANGINIAN)
OF THE CANADIAN WESTERN CORDILLERA,
BRITISH COLUMBIA

J. A. Jeletzky



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J.A. Jeletzky

D E P A R T M E N T O F

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EARLY LOWER CRETACEOUS (BERRIASIAN AND VALANGINIAN) OF THE CANADIAN WESTERN CORDILLERA, BRITISH COLUMBIA

This report is one of a series planned to provide illustrations of stratigraphically important Canadian fossils and is designed for the use of field geologists. Illustrated herein are some of the index fossils for the early Lower Cretaceous (Berriasian and Valanginian) of the Canadian Western Cordillera of British Columbia. The relative stratigraphic positions of the fossils illustrated and the correlation of their zones with the standard zones of adjacent North American regions are shown in the table on page 3. More detailed information on the zonal indices illustrated in this report will be found in GSC Bulletin 103 (in prep.).

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SERIES	STANDARD STAGES	Fossil zones of the Canadian western Cordillera and northwestern part of the State of Washington, U. S. A. (this report)	Fossil zones of arctic Canada, Greenland and northeastern British Columbia (this report)	Suggested zonal sequence for the States of California and Oregon, (this report)	Inlay's (1959, 1960) zonal sequence for the States of California and Oregon, U. S. A.	
LOWER CRETACEOUS	VALANGINIAN	<p><i>Buchia crassicolis</i> s. str. ?</p> <p>Dicholomites quatsinoensis</p> <p><i>Buchia</i> n. sp. aff. <i>inflata</i></p> <p><i>Buchia</i> <i>folmatschowi</i> s. lato</p> <p><i>Tollia</i> (<i>Tollia</i>) <i>mutabilis</i> s. lato etc.</p> <p><i>Tollia</i> (<i>Tollia</i>) <i>paucicastrata</i> etc.</p> <p>No ammonites known</p>	<p><i>Buchia sublaevis</i> s. lato</p> <p><i>Dicholomites</i> aff. <i>quatsinoensis</i>, <i>Lyficeras</i> sp. ind.</p> <p><i>Dicholomites</i> cf. <i>giganteus</i>, <i>Polyphylites</i> ex gr. <i>keyserlingi</i>, <i>Buchia</i> n. sp. <i>inflata</i></p> <p><i>Tollia</i> (<i>Tollia</i>) cf. <i>talli</i>, <i>Tollia</i> (<i>Tollia</i>) spp.</p>	<p><i>Buchia crassicolis</i> s. str., <i>Dicholomites quatsinoensis</i> and <i>Olcosteophanus pecki</i> (zone apparently absent in California)</p> <p><i>Buchia</i> n. sp. aff. <i>inflata</i>, <i>Dicholomites giganteus</i></p> <p><i>Tollia</i> (<i>Tollia</i>) <i>mutabilis</i> s. lato</p> <p><i>Buchia folmatschowi</i> s. lato</p> <p><i>Buchia uncioides</i> s. lato</p>	<p><i>Olcosteophanus pecki</i> and <i>Homolomites stantoni</i></p> <p><i>Homolomites mutabilis</i> s. lato</p> <p><i>Kilianella craspipicraba</i>, <i>Thurmaniceras californicum</i> and <i>Sarasiniella hyattii</i></p>	VALANGINIAN
		<p><i>Buchia inflata</i> s. lato</p> <p><i>Buchia keyserlingi</i> s. lato</p> <p><i>Buchia uncioides</i> s. lato</p> <p><i>Buchia okensis</i> s. lato</p>	<p><i>Buchia uncioides</i> s. lato</p> <p><i>Buchia okensis</i> s. lato etc.</p>	<p>No fossil evidence. Regional unconformity?</p>	BERIASIAN	
BERIASIAN (= INFRAVALANGINIAN)	<p><i>Spiticeras</i> (<i>Spiticeras</i>) spp., <i>Neocomites</i> n. sp., <i>Graebericeras</i>? n. sp., etc.</p> <p><i>Buchia uncioides</i> s. lato</p> <p><i>Buchia okensis</i> s. lato</p>	<p><i>Buchia uncioides</i> s. lato</p> <p><i>Buchia okensis</i> s. lato, <i>Tollia</i> (<i>Subcraspedites</i>) aff. <i>plicomphalus</i></p>	<p>No fossil evidence. Regional unconformity?</p>	<p>No fossil evidence</p>		

GSC

TABLE 1. Correlation of early Lower Cretaceous fossil zones, Canadian western Cordillera and northwestern part of State of Washington, U. S. A., with those of adjacent regions of western and northwestern North America

PLATE I

- FIGURES 1a-1b: Buchia okensis (Pavlov, 1907) s. lato. West coast of Vancouver Island, west side of the main body of Grassy Island, One Tree Formation, about 14-16 feet above the base of the section and 8-10 feet above the Jurassic-Cretaceous contact. Lower Berriasian. GSC No. 16589. An internal cast of an incomplete giant representative of the species.
1a. Lateral view of the exterior of the left valve. 1b. Anterior view of the same.
- FIGURES 2a-2b: Buchia okensis (Pavlov, 1907) s. lato. West coast of Vancouver Island, main body of Grassy Island, One Tree Formation. Isolated rocky hill on its southeast side overlooking the beach about 100 feet southeast from the only group of trees on the island. Collected from a 2-foot sandstone bed. Lower Berriasian. GSC No. 16592. An extreme Buchia volgensis-like variant of the species preserved as an internal cast with considerable patches of the inner shell-layer in places.
2a. Lateral view of the exterior of the left valve. 2b. Anterior view of the same.
- FIGURES 3a-3b: Buchia okensis (Pavlov, 1907) s. lato. Same locality, etc. as figs. 1a-1b. GSC No. 16591. An internal cast of a small, B. volgensis- and B. terebratuloides-like variant of the species.
3a. Lateral view of the exterior of the left valve. 3b. Anterior view of the same.
- FIGURES 4a-4b: Buchia okensis (Pavlov, 1907) s. lato. Same locality, etc. as figs. 2a-2b. An internal cast (a small patch of the shell-layer is preserved at the margin of the valve) of a medium-sized, fairly typical representative of the species. GSC No. 16590.
4a. Lateral view of the exterior of the left valve. 4b. Anterior view of the same.
- FIGURES 5a-5b: Buchia okensis (Pavlov) var. elliptica (Pavlov). Same locality, etc. as figs. 2a-2b. An extreme and rare representative of the variant. Left valve. GSC No. 17311.
5a. Lateral view of the exterior. 5b. Anterior view of the same.
- FIGURES 6a-6b: Buchia okensis (Pavlov, 1907) var. canadiana (Crickmay, 1930). West coast of Vancouver Island, McQuarry Island, middle part of the main body. One Tree Formation, about 8-10 feet above the Jurassic-Cretaceous contact. A medium-sized, fairly typical representative of the variant, somewhat transitional to B. okensis var. trigonoides (Pavlov non Lahusen) in the outline of the valve. Left valve. GSC No. 16593.
6a. Lateral view of the exterior. 6b. Anterior view of the same.
- FIGURES 7a-7b: Buchia okensis (Pavlov, 1907) s. lato. Locality as in figs. 1a-1b. An almost complete giant representative of the species. An internal cast of the right valve with considerable patches of the inner and outer shell-layer preserved in places. GSC No. 16594.
7a. Lateral view of the exterior. 7b. Oblique, posterior view of the same.
- FIGURES 8a-8b: Buchia okensis (Pavlov, 1907) var. Locality as in figs. 2a-2b. An internal cast of a large representative transitional between the typical form and B. o. var. elliptica (Pavlov, 1907). Patches of the inner shell-layer are preserved in places. The shell is irregularly deformed in the posterior portion of its lower margin. Left valve. GSC No. 16595.
8a. Lateral view of the exterior. 8b. Oblique view of the anterior and lower margins of the same.
- FIGURES 9a-9b: Buchia okensis (Pavlov, 1907) var. elliptica (Pavlov, 1907). Same locality, etc. as figs. 2a-2b. An internal cast of the left valve. The shell is irregularly deformed in the proximity of its lower margin. GSC No. 16595.
9a. Lateral view of the exterior. 9b. Anterior view of the same.
- FIGURES 10a-10b: Buchia okensis (Pavlov, 1907) s. lato. West coast of Vancouver Island, west side of the main body of Grassy Island, One Tree Formation, 551-559 feet above the base of the section and 45 to 53 feet above the Jurassic-Cretaceous contact. Lower Berriasian. GSC No. 16597. An internal cast of a large representative of the species. This right valve almost duplicates the right valve of Aucella cascadiensis Crickmay figured by Crickmay (1930a, Pl. X, fig. 2).
10a. Lateral view of the exterior. 10b. Oblique view of the anterior and lower margins of the same.



PLATE II

FIGURES 1a-1c: Buchia uncioides (Pavlow, 1907) var. acutistriata (Crickmay, 1930). West coast of Vancouver Island, southern fringe of Grassy Island. One Tree Formation, about 769 to 773 feet above the base of the section and 263 to 267 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp. etc. GSC No. 16604.

An internal cast of a complete, medium-sized, fairly typical specimen. Some patches of shell-layer are preserved in places, especially on the right valve.

1a. Lateral view of the exterior of the left valve. 1b. Lateral view of the exterior of the right valve.
1c. Anterior view of both valves.

FIGURES 2a-2c: Buchia uncioides (Pavlow, 1907) var. acutistriata (Crickmay, 1930). West coast of Vancouver Island, southern fringe of Grassy Island. One Tree Formation, 829-832 feet above the base of the section and 323-326 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp. etc. GSC No. 16603.

A typical, complete specimen with the shell-layer preserved.

2a. Lateral view of the exterior of the left valve. 2b. Lateral view of the exterior of the right valve showing the projecting beak of the left valve. 2c. Oblique view of the hinge and posterior margins of both valves.

FIGURES 3a-3b: Buchia keyserlingi (Lahusen) s. lato. West coast of Vancouver Island, southern rocky fringe of Grassy Island. One Tree Formation, 919 to 920 feet above the base of the section and 413 to 414 feet above the Jurassic-Cretaceous contact. Upper Berriasian. GSC No. 16599.

An internal cast of the left valve of a large representative of this early and rather flat variant. Incomplete in the posterior part.

3a. Lateral view of the exterior. 3b. Anterior view of the same.

FIGURES 4a-4b: Buchia uncioides (Pavlow, 1907) s. lato. West coast of Vancouver Island, west side of the main body of Grassy Island near its southern end. One Tree Formation, about 688 feet above the base of the section and 82 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Lower part of Buchia uncioides zone closely below beds with Spiticeras (Spiticeras) spp. etc. and closely above the "overlap beds" between Buchia okensis and Buchia uncioides zones. GSC No. 16664.

An internal cast of the left valve of a large specimen transitional between B. u. var. acutistriata and var. spasskensisoides.

4a. Lateral view of the exterior. 4b. Anterior view of the same.

FIGURES 5a-5b: Buchia keyserlingi (Lahusen, 1888) s. lato., var. West coast of Vancouver Island, southern rocky fringe of Grassy Island. One Tree Formation, about 828 feet above the base of the section and 322 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp. etc. GSC No. 16615.

An internal cast of the left valve of a medium-sized, typical specimen.

5a. Lateral view of the exterior. 5b. Anterior view of the same.

FIGURES 6a-6b: Buchia uncioides (Pavlow, 1907) s. lato. The same locality, as figs. 4a-4b. GSC No. 16600. An internal cast of the left valve of a large specimen approaching B. uncioides var. spasskensisoides (Crickmay, 1930).

6a. Lateral view of the exterior. 6b. Anterior view of the same.

FIGURES 7a-7c: Buchia uncioides (Pavlow, 1907) var. West coast of Vancouver Island, southern fringe of Grassy Island. One Tree Formation, 765 to 769 feet above the base of the section and 259 to 263 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp., etc. GSC No. 16606. An internal cast of a complete specimen partly covered by the remnants of the inner shell-layer. This somewhat deformed specimen is transitional to Buchia tolmatschowii s. lato.

7a. Lateral view of the exterior of the left valve. 7b. Lateral view of the exterior of the right valve.
7c. Anterior view of both valves.

FIGURE 8: Spiticeras (Spiticeras) sp. indet. juven. West coast of Vancouver Island, southern end of the main body of Grassy Island. One Tree Formation, about 682 feet above the base of the section and 176 feet above the Jurassic-Cretaceous contact. Upper Berriasian. This is the lowermost bed in which representatives of the Spiticeras (Spiticeras) have been found. GSC No. 16609.

Lateral view of the only partially flattened specimen found.

FIGURES 9a-9c: Spiticeras (Spiticeras) cf. scriptus (Strachey, 1865). West coast of Vancouver Island, southern end of the main body of Grassy Island. One Tree Formation, about 699 to 702 feet above the base of the section and 193-196 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp. etc. GSC No. 16618.

9a. Lateral view. 9b. Ventral view. 9c. Dorsal view.

FIGURE 10: Spiticeras (Groebericeras) n. sp. indet.? West coast of Vancouver Island, southern rocky fringe of Grassy Island. One Tree Formation, about 789 to 792 feet above the base of the section and 283 to 286 feet above the Jurassic-Cretaceous contact. Upper Berriasian. Beds with Spiticeras (Spiticeras) spp. etc. GSC No. 16613.

Lateral view of the only uncrushed fragment found.

FIGURES 11a-11c: Berriasella (Protacanthodiscus) n. sp. aff. B. (P.) micheicus (Bogoslovsky, 1897). Locality as for fig. 5. GSC No. 16610.

11a. Right lateral view of the only fragment found. 11b. Cross-section of the septate part of the same.
11c. Cross-section of the living chamber and the venter of the earliest part of the whorl preserved.

FIGURES 12a-12b: Spiticeras (Spiticeras) sp. indet. juven. (possibly a young representative of S. (S.) scriptus Strachey, 1865). Locality as for fig. 9. GSC No. 16608.

12a. Left lateral view of the partially crushed specimen. 12b. Ventral view of the earlier part of the whorl shown in fig. 12a.

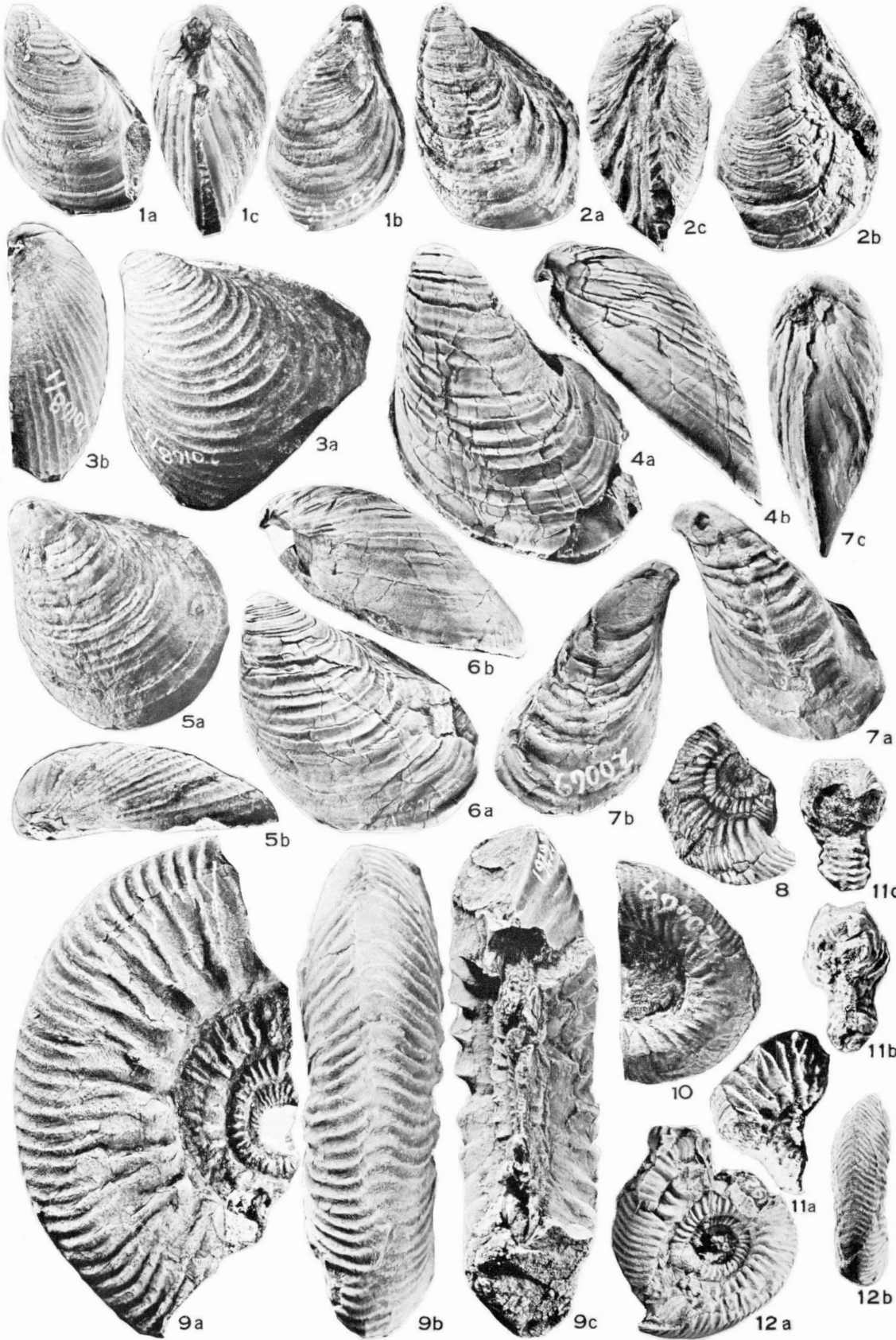


PLATE III

FIGURES 1a-1d: Buchia tolmatschowi (Sokolov, 1908) var. americana (Sokolov, 1908). West coast of Vancouver Island, south-southwest end of a larger islet situated some 400 yards northeast of the main body of Grassy Island and about the same distance northwest of Clark (One Tree) Island. One Tree Formation. Lower Valanginian. From beds with Tollia (Tollia) cf. paucicostata, etc., corresponding exactly to similar beds of the Clark Island section and equivalent to the upper but not the uppermost part of Buchia tolmatschowi zone on Grassy Island. GSC No. 16629.

An internal cast of the left valve of a typical representative with a patch of shell-layer preserved on the beak part of the valve.

1a. Lateral view of the exterior. 1b. Posterior view of the same. Hinge margin is visible (oblique view). 1c. Anterior view of the same. 1d. Hinge margin and beak viewed from above. The beak actually overhangs the right valve as shown in this photo (compare fig. 1b).

FIGURES 2a-2d: Buchia tolmatschowi (Sokolov, 1908) var. West coast of Vancouver Island, Clark (One Tree) Island, north part of the western shore bearing due north from the only trees on the island and some 20-30 feet from the water's edge at high tide. One Tree Formation. Lower Valanginian. Beds with Tollia (Tollia) cf. paucicostata, etc., which correspond to the upper but not the uppermost part of Buchia tolmatschowi zone on Grassy Island. GSC No. 16620.

An extremely sturdy and large variant of the species. The shell-layer is preserved over most part of both valves.

2a. Lateral view of the exterior of left valve. 2b. Lateral view of the exterior of the right valve and the projecting beak part of the left valve. 2c. Anterior view of both valves. 2d. Hinge margins and beaks of both valves viewed from above.

FIGURES 3a-3d: Buchia tolmatschowi (Sokolov, 1908) f. typ. Locality as in figs. 2a-2d. GSC No. 16623.

3a. Lateral view of the exterior of the left valve. 3b. Lateral view of the exterior of the right valve. 3c. Anterior view of both valves. 3d. Hinge margins and beaks of both valves viewed from above. An internal cast of a typical, grown-up representative of the species.

FIGURES 4a-4b: Tollia (Tollia) cf. paucicostata (Donovan, 1953). Locality as figs. 2a-2d. GSC No. 16621.

A juvenile, partly deformed representative of the species. The alternation of dichotomous and trichotomous ribs characteristic of this specimen is diagnostic of this stage of growth in subgenus Tollia.

4a. Left lateral view. 4b. Ventral view.

FIGURES 5a-5b: Tollia (Tollia) cf. paucicostata (Donovan, 1953) var. Locality as figs. 1a-1d. GSC No. 16626.

A fragment of one of the intermediate whorls of a more slender and more finely ribbed variant of the species.

5a. Right lateral view. 5b. Ventral view.

FIGURES 6a-6c: Tollia (Tollia) cf. paucicostata (Donovan, 1953). Locality as figs. 2a-2d. GSC No. 16625.

An essentially undeformed fragment of one of the intermediate whorls showing characteristic ribbing and whorl shape of the species.

6a. Left lateral view. 6b. Ventral view. 6c. Cross-section.

FIGURES 7a-7b: Tollia (Tollia) aff. simplex (Bogoslovsky, 1902). Locality as for figs. 2a-2d. GSC No. 16627.

An almost complete but mostly flattened grown-up specimen. Note the persistence of dichotomous ribbing-habit right to the end of the living chamber.

7a. Right lateral view. 7b. Ventral view of the living chamber.

FIGURE 8: Tollia (Tollia) cf. paucicostata (Donovan, 1953). Locality as in figs. 2a-2d. GSC No. 16628.

Lateral view of the last whorl (mostly living chamber) of an almost complete but flattened representative of the species. Although most or all of the living chamber is preserved, the sculpture does not become weakened even at its aperture.

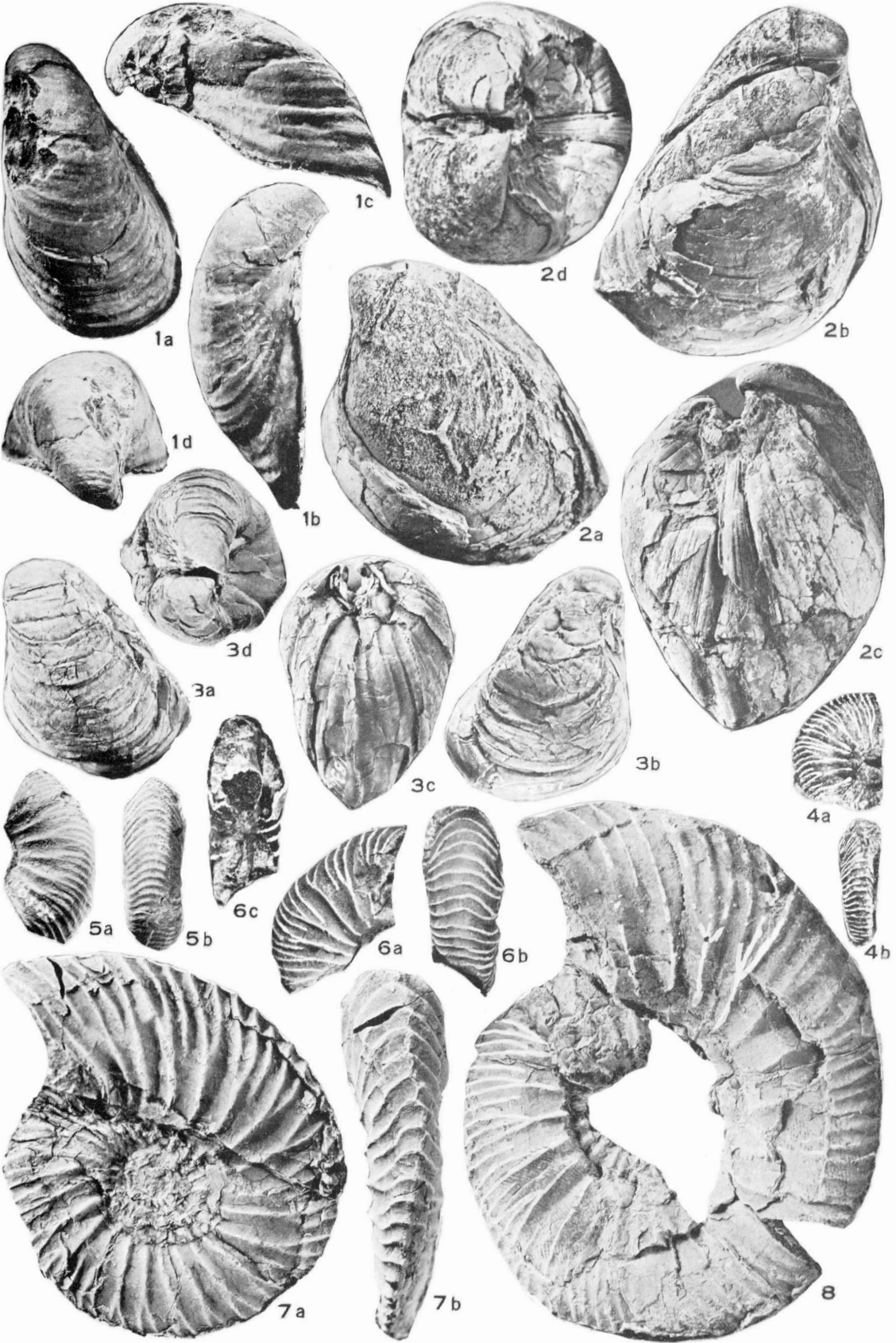


PLATE IV

- FIGURES 1a-1c: Buchia tolmatechowi (Sokolov, 1908) var. americana (Sokolov, 1908). West coast of Vancouver Island, southern end of the southern rocky fringe of Grassy Island. One Tree Formation, 1046-50 feet above the base of the section and 540-544 feet above the Jurassic-Cretaceous contact. Late Lower Valanginian. Beds with Tollia (Tollia) cf. mutabilis s. lato., etc. GSC No. 16641.
Left valve of a typical representative of the late form of the variant. The posterior part is largely an internal cast while the anterior part is completely covered with the shell-layer. Somewhat deformed near the posterior margin.
1a. Lateral view of the exterior. 1b. Anterior view of the same. 1c. Oblique view of the hinge and posterior margins of the same. Note coarse and regular ribbing of the beak part of the valve.
- FIGURES 2a-2b: Buchia n. sp. aff. inflata (Toula) (= B. crassicollis Imlay, 1959 non Keyserling, 1846). Typical representative. Bridge River district, Tyaughton Lake area; in the valley of Mud Creek, a northern tributary of Tyaughton Creek, about 1 1/2 miles above the mouth of Mud Creek and 200 feet above its right bank. Eldorado Group (lower part), Mid-Valanginian. Collected by C.E. Cairnes, 1937. GSC No. 16642.
An internal cast of the left valve with small patches of the shell-layer preserved near the hinge margin (see fig. 2a).
2a. Lateral view of the exterior. 2b. Anterior view of the same.
- FIGURES 3a-3c: Buchia n. sp. aff. inflata (Toula) (= B. crassicollis Imlay, 1959 non Keyserling, 1846) var. West coast of Vancouver Island, southern end of the southern rocky fringe of Grassy Island. One Tree Formation, 1103-1104 feet above the base of the section and 597-8 feet above the Jurassic-Cretaceous contact. Mid-Valanginian. GSC No. 16645.
An internal cast of the left valve of an extreme morphological variant resembling strongly B. keyserlingi f. typ.; it differs from B. keyserlingi, however, in its angular shape, very coarse and widely spaced concentric ribbing and strong left-handed curvature of its beak.
3a. Lateral view of the exterior. 3b. Anterior view of the same. 3c. Hinge margin and beak viewed from above.
- FIGURES 4a-4c: Buchia n. sp. aff. inflata (Toula) var. Locality as for figs. 3a-3c. GSC No. 16651. An internal cast of the left valve. This morphological variant of B. n. sp. aff. inflata was commonly confused with B. crassicollis s. str. by North American workers (e.g. Jeletzky, 1950, p. 41-42; Imlay, 1959, pl. 19, Figs. 3-6, 17).
4a. Lateral view of the exterior. 4b. Oblique view of the hinge and posterior margins of the same. 4c. Fragmentary hinge margin and beak viewed from above.
- FIGURES 5a-5b: Neocomites (Parandiceras) cf. rota (Spath, 1925). West coast of Vancouver Island, southern end of the southern rocky fringe of Grassy Island. One Tree Formation, 1057-59 feet above the base of the section and 550-552 feet above the Jurassic-Cretaceous contact. Mid-Valanginian. Collected 7 to 8 feet above the base of Buchia n. sp. aff. inflata zone. GSC No. 16646.
5a. Right lateral view. 5b. Ventral view.
- FIGURES 6a-6c: Tollia (Tollia) cf. mutabilis (Stanton, 1895) var. tehamaensis (Anderson, 1938). Locality as for figs. 1a-1c. GSC No. 16637.
6a and 6b. Opposite lateral views. 6c. Cross-section of the whorl and the venter of its earlier part.
- FIGURES 7a-7c: Buchia n. sp. aff. inflata (Toula) var. The same locality, etc. as figs. 3a-3c. GSC No. 16650.
An internal cast of the left valve with considerable patches of the shell-layer on the anterior part (see figs. 7a, 7c). This extremely short and wide, distantly and coarsely ribbed variant of the species resembles superficially B. okensis s. lato. It differs from B. okensis s. lato, however, in its pronouncedly left-handedly incurved beak (see fig. 7c)
- FIGURE 8: Tollia (Tollia) cf. mutabilis (Stanton, 1895) var. burgeri (Anderson, 1938). Locality as for the specimen figured in figs. 1a-1c. GSC No. 16639. Lateral view of the flattened specimen.
- FIGURES 9a-9d: Buchia n. sp. aff. inflata (Toula) var. Locality as for figs. 3a-3c. GSC No. 16643.
An internal cast of the left valve with considerable patches of the shell-layer preserved on its anterior part.
9a. Lateral view of the exterior. 9b. Oblique view of the hinge and posterior margins of the same.
9c. Anterior view of the same. 9d. Hinge margin and the beak viewed from above.
- FIGURES 10a-10c: Buchia n. sp. aff. inflata (Toula) f. typ. The same locality, etc., as in figs. 3a-3c. GSC No. 16653.
An internal cast of the right valve typical of the species. Note its swollen, flat-topped appearance and the abrupt truncation of the lower margin (fig. 10b).
10a. Lateral view of the exterior. 10b. Anterior view of the same. The byssus notch preserved as an internal cast is on the extreme right (painted white). 10c. Hinge margin and beak viewed from above.

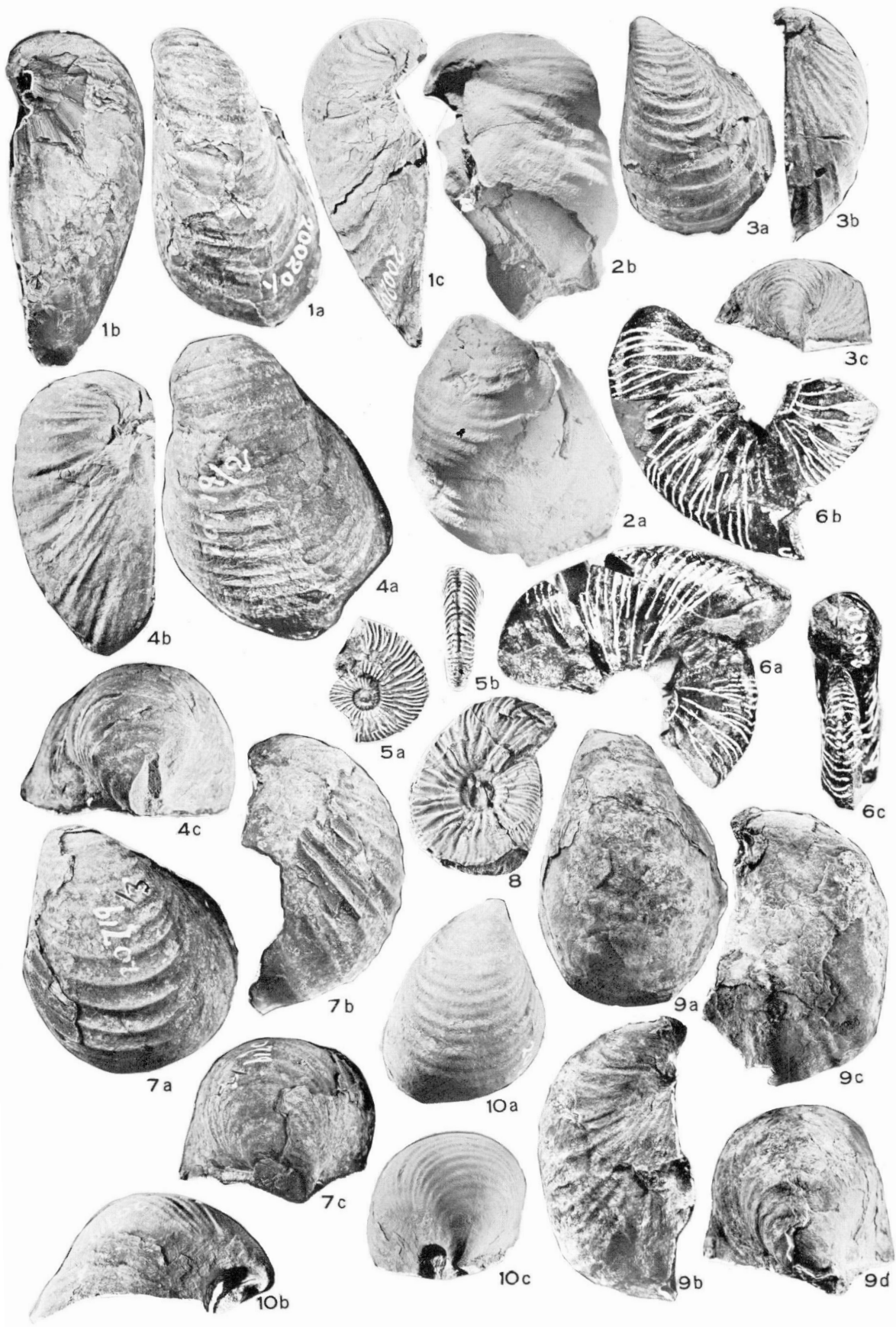


PLATE V

- FIGURES 1a-1d: Buchia sublaevis (Keyserling, 1846) s. lato. var. Bridge River district, Tyaughton Lake area; north bank of Tyaughton Creek. Eldorado Group (lower part). Mid-Valanginian. Collected by C.E. Cairnes, 1937. GSC No. 17330.
An internal cast of a complete, large specimen.
1a. Lateral view of the exterior of the left valve. 1b. Lateral view of the exterior of the right valve and the protruding beak of the left valve. 1c. Anterior view of both valves. 1d. Hinge margins and beaks of both valves viewed from above.
- FIGURES 2a-2d: Buchia inflata (Toula, 1874) var. crassa (Pavlov, 1907). Bridge River district, Tyaughton Lake area; along north bank of Tyaughton Creek, a few hundred feet west of the mouth of Camp Creek. Eldorado Group (lower part). Mid-Valanginian. Collected by C.E. Cairnes, 1937. GSC No. 17331.
An internal cast of a complete, large specimen typical of the species and the variant. Associated with the predominant B. pacifica n. sp.
2a. Lateral view of the exterior of the left valve. 2b. Lateral view of the exterior of the right valve and the projecting beak of the left valve. 2c. Anterior view of both valves. 2d. Hinge margins and beaks of both valves seen from above.
- FIGURES 3a-3e: Buchia aff. inflata (Toula, 1874) s. lato. Locality as for the specimen shown in fig. 1. GSC No. 17332.
A complete, large specimen apparently transitional between B. inflata s. lato and B. pacifica n. sp. An internal cast with considerable patches of the shell-layer preserved on its lower part (fig. 3d).
3a. Lateral view of the exterior of the left valve. 3b. Lateral view of the exterior of the right valve.
3c. Anterior view of both valves. 3d. Oblique view of the hinge and posterior margins of both valves.
3e. Hinge margins and beaks of both valves seen from above.
- FIGURES 4a-4d: Buchia inflata (Toula, 1874) var. crassa (Pavlov, 1907). Same locality, etc. as for the specimen shown in fig. 1. GSC No. 17333.
A medium-sized, complete specimen typical of the species and the variant. An internal cast.
4a. Lateral view of the exterior of the left valve. 4b. Lateral view of the exterior of the right valve and the protruding beak of the left valve. 4c. Anterior view of both valves. 4d. Hinge margins and beaks of both valves viewed from above.
- FIGURES 5a-5d: Buchia cf. sublaevis (Keyserling, 1846) s. lato. Bridge River district, Tyaughton Lake area, just north of Tyaughton Creek (1,000 feet plus), 17,400 feet on bearing 280° from junction of Tyaughton Creek and Spruce Lake. Eldorado Group (lower part). Mid-Valanginian. Collected by V. Dolmage, 1928. GSC No. 17334.
A complete specimen, apparently transitional between B. keyserlingi f. typ. and B. sublaevis f. typ. but closer to the latter in its shape. An internal cast. Associated with fairly numerous B. n. sp. aff. inflata (Toula), B. tolmatschowi s. lato. and Dichotomites cf. giganteus (Imlay, 1960).
5a. Lateral view of the exterior of the left valve. 5b. Lateral view of the exterior of the right valve.
5c. Anterior view of both valves. 5d. Hinge margins and beaks of both valves viewed from above.
- FIGURES 6a-6e: Buchia inflata (Toula, 1874) f. typ. Bridge River district, Tyaughton Lake area, 300 yards northwest of the north end of Spruce Lake. Eldorado Group (lower part). Mid-Valanginian. Collected by C.H. Crickmay, 1939. GSC No. 17335.
An internal cast of a complete but somewhat deformed (compressed laterally), medium-sized specimen typical of the species. Associated with rare B. n. sp. aff. inflata (Toula).
6a. Lateral view of the exterior of the left valve. 6b. Lateral view of the exterior of the right valve.
6c. Oblique view of the hinge and posterior margins of both valves. 6d. Anterior view of both valves. The right valve is squeezed into the interior of the left valve thus reducing considerably the thickness of the specimen and making it similar to B. keyserlingi f. typ. 6e. Hinge margins and beaks of both valves viewed from above.



PLATE VI

- FIGURE 1: Dichotomites cf. giganteus (Imray, 1960). Bridge River district, Tyaughton Lake area, along north bank of Tyaughton Creek a few hundred feet west of the mouth of Camp Creek. Eldorado Group (lower part). Mid-Valanginian. Collected by C.E. Cairnes, 1937. GSC No. 17323. Medium-sized, partly flattened specimen septate to the end. Lateral view. Associated with B. n. sp. aff. inflata (Toula).
- FIGURES 2a-2c: Buchia n. sp. aff. inflata (Toula) f. typ. West coast of Vancouver Island, at the southernmost end of the southern rocky fringe of Grassy Island. One Tree Formation. Top bed of the section overlooking the sea, 1146 to 1148 feet above the base, and 640 to 642 feet above the Jurassic-Cretaceous contact. Mid-Valanginian. Middle part of Buchia pacifica zone. GSC No. 16649. An internal cast of the left valve with some remnants of the inner shell-layer. A half-grown but typical representative of the species corresponding to the top part of the specimen shown in Pl. VI, fig. 2 only. 2a. Lateral view of the exterior. 2b. Anterior view of the same. 2c. Hinge margin and the beak viewed from above.
- FIGURES 3a-3b: Buchia n. sp. aff. inflata (Toula) var. West coast of Vancouver Island, southern end of the southern rocky fringe of Grassy Island (about 40 feet north from the sea). One Tree Formation, 1112-1113 feet above the base of the section and 606-607 feet above the Jurassic-Cretaceous contact. Mid-Valanginian. GSC No. 16648. A half-grown right valve mostly covered by the internal shell-layer. Although still thin, the valve begins to develop the truncation of its lower margin characteristic of the species (see fig. 3b). 3a. Lateral view of the exterior. 3b. Anterior view of the same. The byssus notch is on the extreme right of the photograph. The byssus ear is not preserved.
- FIGURES 4a-4d: Buchia n. sp. inflata (Toula) var. Bridge River district, Tyaughton map-area, 1/4 mile west of Spruce Lake. Eldorado Group (lower part). Mid-Valanginian. Collected by H. Freboid, 1958. GSC No. 17324. An internal cast of a large, right valve possibly belonging to the same individual as the left valve figured in fig. 7. 4a. Lateral view of the exterior. 4b. Anterior view of the same. 4c. Oblique view of the hinge and posterior margins of the same. 4d. View of the hinge margin, beak and byssus ear from above.
- FIGURES 5a-5c: Buchia n. sp. inflata (Toula) var. Locality as for the specimen shown in fig. 3. GSC No. 16644. An internal cast of the left valve with considerable patches of the shell-layer on the anterior and beak parts. This specimen is much like B. tolmatschowi var. americana in its outline but differs in its heavy and regular concentric ribbing. Almost duplicates the specimen of B. pacifica n. sp. var. from California erroneously referred by Sokolov (1908b), Pl. I, fig. 14, to B. uncitoides (Pavlov). 5a. Lateral view of the exterior. 5b. Anterior view of the same. 5c. Hinge margin and beak viewed from above.
- FIGURES 6a-6c: Buchia n. sp. aff. inflata (Toula) var. West coast of Vancouver Island, at southern end of the southern rocky fringe of Grassy Island. One Tree Formation, 1103-1104 feet above the base of the section and 597-598 feet above the Jurassic-Cretaceous contact. Mid-Valanginian. GSC No. 16655. A large left valve mostly covered with shell, except in its lower part. In its general shape, and widely spaced and coarse concentric ribbing, this variant resembles strongly B. okensis var. canadiana (Crickmay, 1930) but differs from it in the marked left-handed curvature of its beak (see fig. 6a). 6a. Lateral view of the exterior. 6b. Anterior view of the same. 6c. Oblique view of the hinge and posterior margins of the same.
- FIGURES 7a-7d: Buchia n. sp. aff. inflata (Toula). Locality as for fig. 4. GSC No. 17324. An internal cast of the left valve of a large, B. crassicolis-like variant of the species. The concentric ribbing is subdued over most part of the valve but the pronounced left-handed curvature of the beak, large size and posteriorly oblique outline of the valve distinguish it from B. crassicolis s. str. 7a. Lateral view of the exterior. 7b. Anterior view of the same. 7c. Hinge margin and the beak viewed obliquely from above. The beak is raised in order to show the ligamental slate preserved as an internal cast. 7d. Same view as last but directly from above to show the overhang of the left beak over the right valve.
- FIGURES 8a-8d: Dichotomites cf. giganteus (Imray, 1960). Bridge River district, Tyaughton Lake area, along the north bank of Tyaughton Creek. Eldorado Group (lower part). Mid-Valanginian (top part of Buchia n. sp. aff. inflata zone?). Collected by C.E. Cairnes. GSC No. 17328. An undistorted, medium-sized specimen showing suture line and the characteristic ornament lacking bidichotomous branching diagnostic of D. quatsinoensis. Note that the suture-line is much simpler than that of D. quatsinoensis. Associated with Buchia inflata (Toula) B. inflata var. crassa (Pavlov), B. sublaevis (Keyserling) s. lato B. n. sp. aff. inflata and B. aff. crassicolis (Keyserling) var. solida (Lahusen). 8a. Left lateral view. 8b. Cross-section and the venter of the earlier part of the whorl. 8c. Two cross-sections of the earlier part of the whorl (see the left side of fig. 8a). 8d. Venter close to the aperture (see the right side of fig. 8a).
- FIGURES 9a-9c: Dichotomites cf. giganteus (Imray, 1960). Locality as for the specimen figured in fig. 8. GSC No. 17329. An older specimen with the ornament showing definite weakening in the middle of the flanks. Markedly swollen lower parts of primaries are visible in fig. 9a. The specimen is septate to the end. 9a. Left lateral view. 9b. Right lateral view. Suture line is visible at the lower end. 9c. Cross-section (somewhat deformed laterally).



- FIGURES 1a-1b: Buchia crassicolis (Keyserling, 1846) s. str. Vancouver Island, Quatsino Sound, Forward Inlet, north-eastern shore of Winter Harbour, 7/8 of a mile north of the mouth of a nameless creek that falls into the inlet opposite the village of Winter Harbour. Some 15 to 20 feet above the base (an unconformity) of the Cretaceous section. Upper Valanginian. GSC No. 16656. An internal cast of the left valve of a typical representative of species. Small patch of the shell-layer is preserved in the beak part (see fig. 1b).
- 1a. Lateral view of the exterior. 1b. Anterior view of the same.
- FIGURES 2a-2b: Buchia crassicolis (Keyserling, 1846) s. str. Same locality, etc. as for the specimen shown in fig. 1. GSC No. 17337. An internal cast of the left valve of a specimen transitional between the typical form and B. c. var. solida (Lahusen, 1888). Small patches of finely striated shell-layer are preserved near the lower margin and the beak.
- 2a. Lateral view of the exterior. 2b. Anterior view of the same.
- FIGURES 3a-3b: Dichotomites quatsinoensis (Whiteaves, 1882). San Juan Islands, Washington, U.S.A., north shore of Spieden Island. Sandstone and shale member near the base of Spieden Island Formation, at the base of Spieden Bluff. U. of Wash. Pal. Coll., No. 6961. Early growth-stage of the species showing transition from the Tollia-like to bidichotomous ribbing-habit. This specimen retains Tollia-like ribbing-habit to a later growth-stage than most other representatives of the species.
- FIGURE 4: Dichotomites quatsinoensis (Whiteaves, 1882). Harrison Lake, east shore of the Peninsula, 200 yards north of Lonetree Island. Brockenback Hill Formation. Upper Valanginian. GSC No. 9697. This is the reproduction of the holotype of Homolosomes poecilochotomus (Crickmay, 1930a, Pl. XXI, fig. 2). Lateral view of the flattened and fragmentary living-chamber. Note the feebly developed but broad and distinctly swollen basal parts of two primaries at the umbilical margin.
- FIGURES 5a-5b: Buchia crassicolis (Keyserling, 1946) s. str. Locality, as in fig. 1. GSC No. 16660. An internal cast of the right valve of a typical representative of the species with considerable patches of well-preserved shell-layer. Surface of cast is smooth but shell-layer is very densely and finely ribbed.
- 5a. Lateral view of the exterior. 5b. Posterior view of the same.
- FIGURES 6a-6b: Dichotomites aff. quatsinoensis (Whiteaves, 1882). Unfigured toptotype of D. quatsinoensis of Whiteaves (1882). Vancouver Island, Quatsino Sound, Forward Inlet, east side of Winter Harbour. Collected by G.M. Dawson, 1885. Upper Valanginian. GSC No. 4799a. This specimen differs from the typical representatives of the species in being more heavily ribbed and in retaining the Tollia-like ribbing-habit to a later growth-stage than any of its other representatives known to the writer and in its ribs being markedly flexuous. It is, similar to Dichotomites cf. giganteus (Imlay, 1960), (see Pl. VI, fig. 8) in these same features.
- 6a. Lateral view. 6b. Cross-section and the ventral view of the earlier part of the whorl.
- FIGURE 7: Dichotomites quatsinoensis (Whiteaves, 1882). The same locality, etc. as in fig. 4. GSC No. 9696. This is a reproduction of one of Crickmay's (1930a, Pl. XXI, fig. 4) paratypes of Homolosomes poecilochotomus introduced for the purpose of the comparison with the types of Olcostephanus quatsinoensis Whiteaves, 1882. Early growth-stage.
7. Lateral view. Note the same change from the Tollia-like to the bidichotomous ribbing-habit near the end of the whorl as in specimen shown in fig. 3a.
- FIGURE 8: Dichotomites quatsinoensis (Whiteaves, 1882). Vancouver Island, Quatsino Sound, Forward Inlet, south-east end of a small wooded islet inside of Winter Harbour and about 1 1/4 mile north of Greenwood Point. Some 40-50 feet above the visible base of the Cretaceous section. Upper Valanginian. GSC No. 16657. Lateral view of a juvenile specimen representing an earlier growth-stage than those shown in figs. 3 and 7. Note the prevalence of the Tollia-like dichotomous to trichotomous ribbing-habit throughout.
- FIGURES 9a-9c: Buchia crassicolis (Keyserling, 1846) var. solida (Lahusen, 1888). The same locality as for D. quatsinoensis figured in fig. 3. U. of Wash. Pal. Coll., No. 6963. A complete specimen covered with the perfectly preserved shell-layer throughout. Only very fine and closely spaced ribs or striae cover the surface of shell-layer.
- 9a. Lateral view of the exterior of the left valve. 9b. Lateral view of the exterior of the right valve and the projecting beak part of the left valve. 9c. Oblique view of the hinge and posterior sides of both valves.
- FIGURES 10a-10c: Dichotomites quatsinoensis (Whiteaves, 1882). Locality, etc. as for fig. 3. Early to very early growth-stages. The change from the Tollia-like to bidichotomous ribbing-habit occurs near the end of the whorl (fig. 10a). U. of Wash. Pal. Coll., No. 6959.
- 10a. Lateral view. 10b. Undistorted cross-section showing the low and circular appearance of one of the earliest whorls and the change to much higher, narrowly rounded at the venter, hoof-like cross-section within the next whorl. 10c. Ventral view of the end part of the other whorl.
- FIGURES 11a-11c: Dichotomites quatsinoensis (Whiteaves, 1882). Same locality, etc. as for the specimen figured in fig. 3. U. of Wash. Pal. Coll., No. 6962. About the same growth-stage as the last two whorls of the specimen shown in fig. 10. The change from the Tollia-like to the bidichotomous ribbing-habit takes place earlier than in any of the other specimens known to the writer.
- 11a. Lateral view. 11b. Cross-section at the end of the whorl and the ventral view of its earlier part. 11c. Cross-section of a somewhat earlier part of the whorl and the ventral view of its earliest exposed part.
- FIGURES 12a-12c: Dichotomites quatsinoensis (Whiteaves, 1882). Holotype. The same locality, etc. as for the toptotype shown in figs. 6a-6b. GSC No. 4799.
- 12a. Lateral view. The subparallel appearance of the flanks and the relatively wide umbilicus of this specimen are due to its strong distortion and partial flattening. 12b. Same view as in 12a but X2 and partly marked to show the detail of the characteristic bidichotomous ribbing-habit of the species. 12c. Cross-section (distorted).
- FIGURES 13a-13b: Dichotomites quatsinoensis (Whiteaves, 1882). The same locality, etc. as for the specimen shown in fig. 8. GSC No. 16662. A juvenile specimen distorted and flattened in exactly the same way as the holotype of the species shown in fig. 12.
- 13a. Lateral view. 13b. Ventral view.
- FIGURES 14a-14d: Buchia crassicolis (Keyserling, 1846) f. typ. Harrison Lake, Lonetree Island, off the south tip of the Peninsula. Crickmay's (1930a, p. 41) foss. loc. No. 40. Collected by J.A. Roddick, 1954. Brockenback Hill Formation. Upper Valanginian. GSC No. 16659. A smooth internal cast of the left valve of a typical representative of the species.
- 14a. Lateral view of the exterior. 14b. Anterior view of the same. 14c. Oblique posterior view of the same showing hinge margin in the upper part (beneath the beak). 14d. Hinge margin and the beak part of the valve viewed from above. Note that the beak is only very feebly left-handedly incurved.
- FIGURES 15a-15b: Buchia crassicolis (Keyserling, 1846) var. solida (Lahusen, 1888). Locality as for fig. 8. Collected some 150 feet above the visible base of the section. Upper Valanginian. GSC No. 16661. An internal cast of the broad and large left valve (somewhat distorted) with some shell-layer preserved around the beak.
- 15a. Lateral view of the exterior. 15b. Anterior view of the same.
- FIGURES 16a-16b: Buchia crassicolis (Keyserling, 1846) var. solida (Lahusen, 1888). Vancouver Island, Quatsino Sound, Forward Inlet, west end of a small, wooded islet inside of Winter Harbour and about 1 1/4 mile north of Greenwood Point. Collected some 300 feet higher stratigraphically than the specimen figured in fig. 8. Upper Valanginian. GSC No. 16658. An internal cast of the thick and somewhat ribbed left valve. A considerable patch of the shell-layer preserved around the beak.
- 16a. Lateral view of the exterior. 16b. Oblique posterior view of the same with the hinge margin visible underneath the beak.

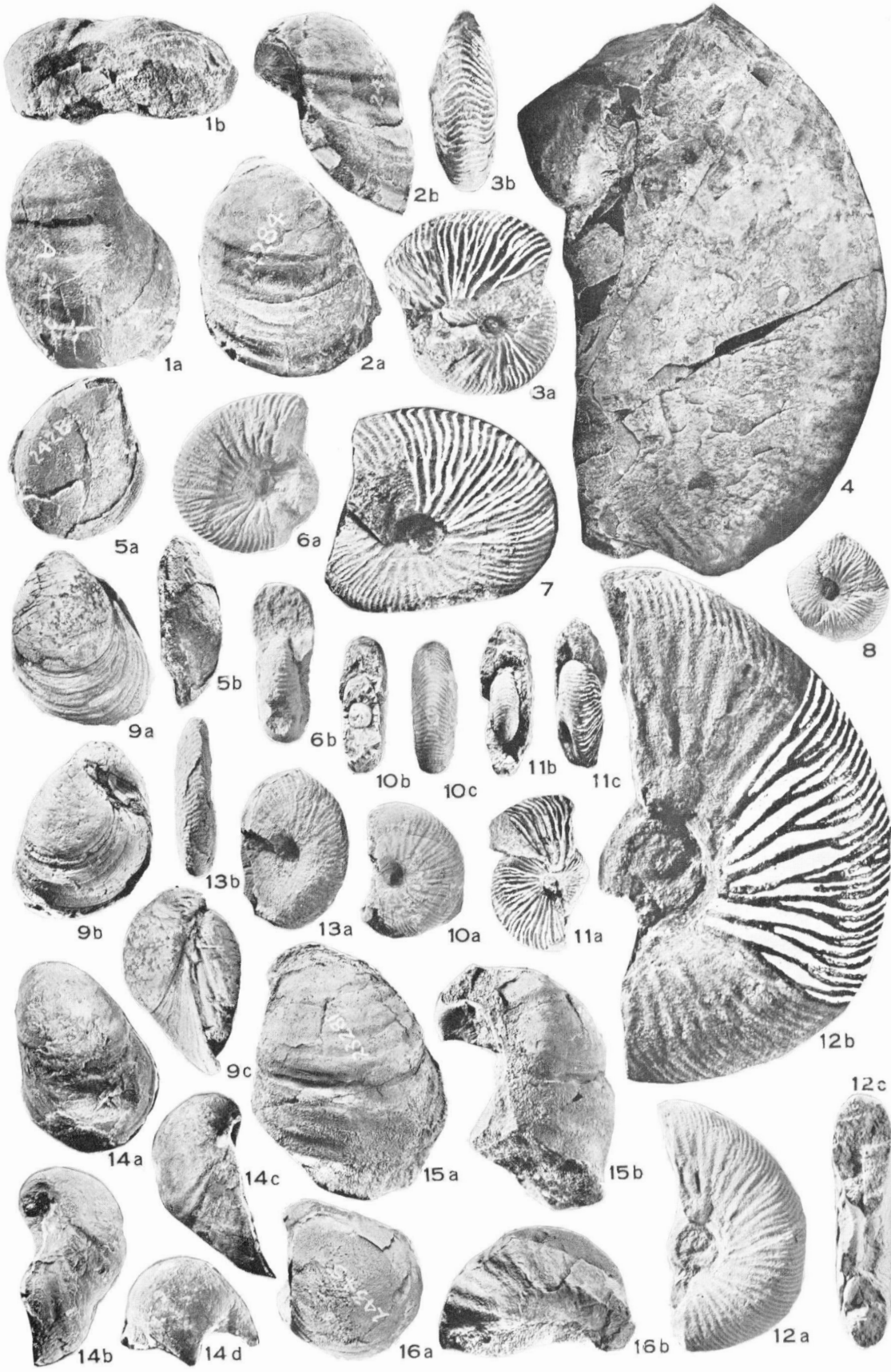


PLATE VIII

FIGURES 1a-1c: Buchia keyserlingi (Lahusen, 1888) var. gigas (Crickmay, 1930). Holotype. Harrison Lake, east shore of the Peninsula, 200 yards north of Lonetree Island. Brockenback Hill Formation. Upper Valanginian. GSC No. 9664.

This is the reproduction of the holotype of the variant (Crickmay, 1930a, Pl. XI, figs. 4-6). The left valve is an internal cast while the right valve is mostly covered with the shell-layer. The specimen is distorted and partly flattened so as to simulate a large Buchia volgensis (Lahusen) s. str.; its comparison with undistorted topotypes (fig. 2) reveals, however, its true affinities.

1a. Lateral view of the exterior of the left valve. 1b. Lateral view of the exterior of the right valve and the projecting beak part of the left valve.
1c. Anterior view of both valves.

FIGURES 2a-2b: Buchia keyserlingi (Lahusen, 1888) var. gigas (Crickmay, 1930). Harrison Lake, Lonetree Island, off the south tip of the Peninsula. Crickmay's (1930a, p. 41) foss. loc. No. 40. Collected by J.A. Roddick, 1954. Brockenback Hill Formation. Upper Valanginian. GSC No. 16663.

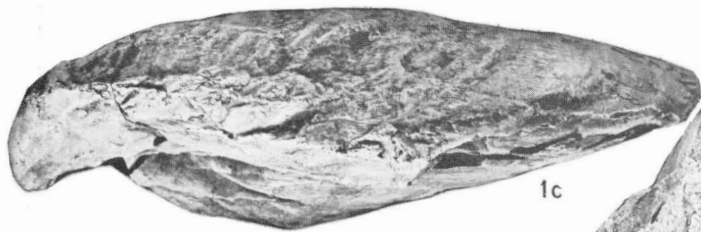
Plaster cast of a rock mould (internal cast) of a fragmentary but undistorted left valve of the variant.

2a. Lateral view of the exterior. 2b. Oblique posterior view of the same showing the hinge margin at the right side of the photograph. Most of the beak is broken off.

FIGURES 3a-3d: Buchia aff. crassicollis (Keyserling, 1846) var. solida (Lahusen, 1888). Bridge River district, Tyaughton Lake area, south side of the ridge between Gun and Leckie Cricks, 6,300 feet elevation. Eldorado Group (lower part). Upper Valanginian. Associated with B. crassicollis f. typ. and advanced forms of B. keyserlingi. Collected by C.H. Crickmay, 1939. GSC No. 17336.

An internal cast of a complete specimen morphologically transitional between B. sublaevis s. lato. var. (Pl. V, fig. 1) and B. crassicollis var. solida (Lahusen) (Pl. VII, figs. 9, 15-16).

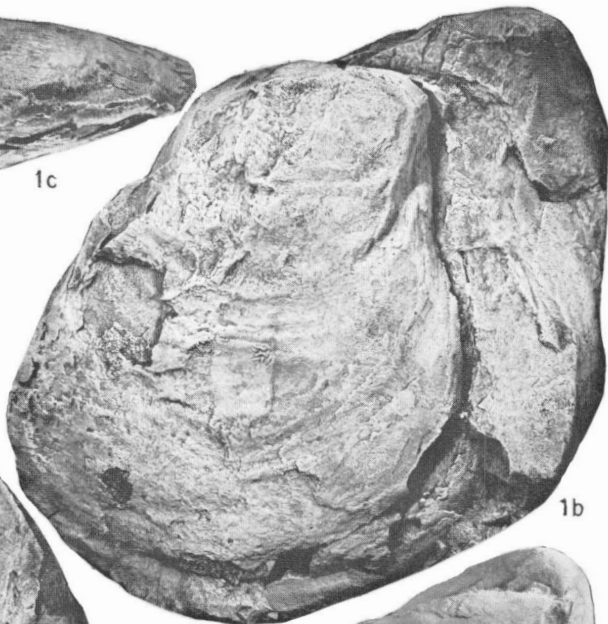
3a. Lateral view of the exterior of the left valve. 3b. Oblique posterior view of both valves. 3c. Lateral view of the exterior of the right valve and the projecting part of the beak of the left valve. 3d. Hinge margins and the beak parts of both valves viewed from above. Note that the beak of the left valve has only a feeble left-handed curvature similar to that of B. c. var. solida or B. sublaevis s. lato. var.



1c



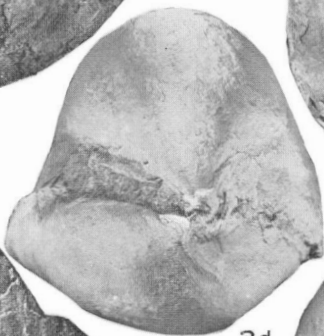
1a



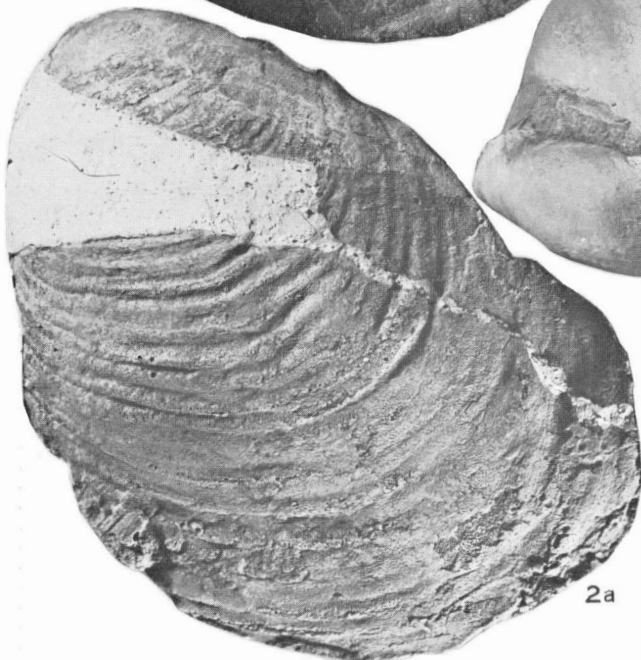
1b



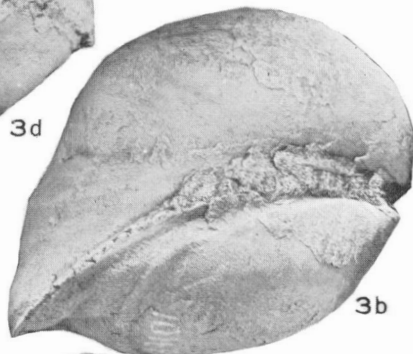
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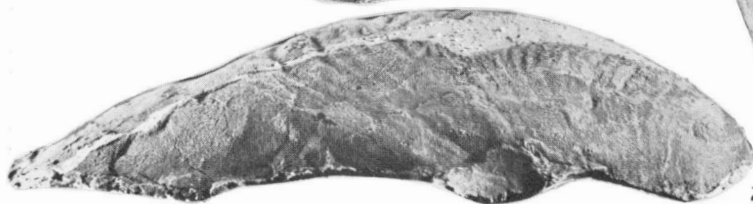
3d



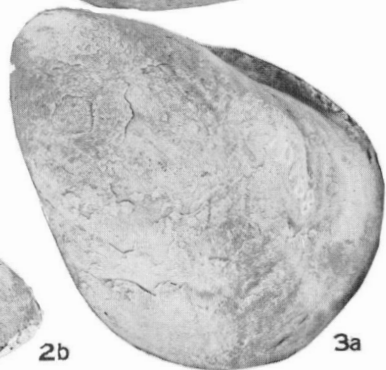
2a



3b



2b



3a