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NEW JURASSIC SPECIES FROM THE HAZELTON GROUP OF BRITISH COLUMBIA

By *F. H. McLearn*

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INTRODUCTION

The fossils herein described were collected by G. Hanson in the field seasons of 1924 and 1925. They are important because they make possible a very exact dating of a part of the Hazelton group. Grateful acknowledgment is made to Mr. S. S. Buckman, F.G.S., the English authority on Jurassic ammonites, for valuable advice. Without his direction the writer would not have attempted the detailed comparisons of the ammonites with those of Europe. Mr. Buckman in particular aided in the determination of the ammonite genera, the recognition of the affinities of *Guhsania* n. gen., and in the correlation with England. The writer, however, is alone responsible for all statements in this paper.

STRATIGRAPHY AND CORRELATION

The Hazelton group of Hudson Bay and Babine mountains in Hazelton district, B.C., recently studied by G. Hanson, contains¹ an upper sedimentary division, an upper volcanic division of massive breccias, tuffs, flows, etc., a middle sedimentary division, a lower volcanic division of tuffs, etc., and sediments at the base. The middle sedimentary division was found by Hanson to be fossiliferous and collections were made at several localities. The best collection came from a locality about one mile southeast of Silver lake, on Hudson Bay mountain, where fossils occur in the talus from a cliff containing 300 to 400 feet of vertical strata of the middle sedimentary division. The fauna found at this place includes the following:

¹ Hanson, G.: Geol. Surv., Canada, Sum. Rept. 1924, pt. A, pp. 24-26. Also personal communication based on field work of 1925.

TUBICOLA

Serpula socialis Goldfuss

PELECYPODA

Ctenostreon gikshanensis n. sp.*Lima tizglensis* n. sp.*Oxytoma submconnelli* n. sp.*Ostrea weegeti* n. sp.*Perna weelaupensis* n. sp.*Plagiostoma hazeltonense* n. sp.*Trigonia guhsani* n. sp.

AMMONOIDEA

Sonninia hansonii n. sp.*Sonninites silveria* n. sp.*Sonninites skavahi* n. sp.*Guhsania bella* n. sp.*Guhsania ramata* n. sp.

Other pelecypods, a few brachiopods, and rare gastropods are also present.

Among the pelecypods, the presence of a *Trigonia* of the *costatae* section, of a *Ctenostreon* resembling *Ct. pecteniformis* (Schlotheim) and *Ct. electra* d'Orbigny, and of a *Plagiostoma* near *P. giganteum* Sowerby indicates a Jurassic age; as does also the presence of the annelid *Serpula socialis* Goldfuss. The ammonites admit of a finer correlation. A very detailed chronology of the English and continental Jurassic has been built up by S. S. Buckman,¹ based on the succession of ammonites. It embraces about forty-three ages and each age includes a variable number of hemeræ. Each age or hemera expresses an interval of time, the duration of certain species and genera. Now in this chronology the date of the *Sonninia* is the *sauzei* hemera of the Sonninian age; the date of the *Sonninites* is the *alsaticus* hemera of the Sonninian age; the new genus *Guhsania* is related and parallel in development to the *liostraca* group of the genus *Dorsetensia*, the date of which is the *Epalxites* hemera of the Stepheoceratan age. The affinities of the Silver Lake fauna, or faunas, therefore, are with those English faunas that date from the *sauzei* to the *Epalxites* hemera, or from late Sonninian to early Stepheoceratan. Faunas of the Sonninian and Stepheoceratan ages range throughout the Middle Inferior Oolite or Bajocian strata of England. Therefore, the fossiliferous beds of the middle sedimentary division of the Hazelton group, on Hudson Bay mountain, are to be correlated with the middle of the Middle Inferior Oolite or middle Bajocian or early Middle Jurassic strata of England.

English strata	English ages	English hemeræ	
Middle Inferior Oolite	Stepheoceratan	<i>Epalxites</i> <i>parvicarinata</i> <i>Masckeites</i>	} Range of Silver Lake ammonites
	Sonninian	<i>alsaticus</i> <i>propinquans</i> <i>sauzei</i>	

¹ "Type Ammonites", vol. IV, pp. 5-18, 48-49; vol. V, pp. 71-78.

The Jurassic fauna¹ in the Fernie formation at Minnewanka lake, Alberta, also contains Sonninines and a pelecypod, *Oxytoma mcconnelli* Whiteaves², similar to the Silver Lake *Oxytoma submcconnelli* n. sp.; this is probably, in part at least, another Middle Inferior Oolite or Bajocian³ fauna. Other faunas of similar age, i.e. Middle Inferior Oolite, but containing Stepheoceratidæ and Sphaeroceratidæ, are found in the lower part of the Yakoun formation at Skidegate inlet, at the base of the Fernie formation on Sheep creek, Alberta, and in the Fernie formation on Kananaskis river and at other localities in western Alberta. The Fernie formation of western Alberta and eastern British Columbia contains also other faunas, ranging as high as the middle Upper Jurassic⁴; one of these higher faunas, represented by an ammonite species from Kananaskis river, is similar in composition and age to the Kosmoceratidæ-bearing upper Yakoun fauna of Skidegate inlet.

SYSTEMATIC DESCRIPTIONS

Ctenostreon gikshanensis n. sp.

(*Gikshan*, an Indian tribe)

Plate XIX, figures 3, 4

A somewhat oblique, moderately convex species, having a short hinge-margin, a small anterior, and a large triangular, posterior ear. Commonly seven, rarely six or eight, narrow, somewhat flexuous, curved ribs, separated by wide, shallow interspaces. Somewhat rugose surface. No tubular spines known.

Height 105 mm.; length 100 mm.; thickness 29 mm.

This species has fewer ribs than the European species *Ctenostreon pecteniformis* (Schlotheim)⁵. It is proportionately longer, has narrower ribs with wider interspaces, and commonly has one less rib than *Ctenostreon electra* (d'Orbigny)⁶ of the French Jurassic; in *Ct. electra* the ribs near the umbo are narrow, but before midgrowth they begin to broaden and flatten and continue so to full growth.

Horizon and Locality. From talus of middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Types: Victoria Memorial Museum; holotype, Cat. No. 7700; paratype, Cat. No. 7700a.

¹ Whiteaves, J. F.: Geol. Surv., Canada, Contr. Can. Pal., vol. I, pt. 2, pp. 163-172.

² Whiteaves, J. F.: Geol. Surv., Canada, Contr. Can. Pal., vol. I, pt. 2, p. 166, Pl. 23, figs. 1 a, b.

³ Whiteaves, J. F.: Geol. Surv., Canada, Mes. Foss., vol. I, pt. 4, p. 300.

⁴ McLearn, F. H.: Geol. Surv., Canada, Sum. Rept. 1922, pt. B, p. 6.

⁵ McLearn, F. H.: Geol. Surv., Canada, Sum. Rept. 1922, pt. B, p. 6.

⁶ As figured and described by Morris, J., and Lycett, J.: Mollusca Great Oolite, Pal. Soc., pt. 2, p. 26, Pl. 6, fig. 9 (1853).

⁷ Prodrome, I, p. 255; Annales Pal. 3, p. 197 (61), Pl. 20 (15), figs. 16, 17 (1908).

Lima tizglensis n. sp.

(Tizle, ancient home of Carrier Indians)

Plate XX, figure 1

A moderately convex, semioval, not very oblique species. Abruptly inflected on the long, antero-dorsal submargin. Posterior ear of moderate size and triangular, anterior ear not preserved. Surface covered with forty to fifty irregular, flexuous, radiating costæ of low relief. Approximate measurements are as follows:

Height 75 mm.; length 60 mm.; thickness single valve 11 mm.

Lima occidentalis Hall and Whitfield¹ from the Jurassic of Flaming Gorge, Utah, has straighter and relatively wider radiating costæ, a smaller posterior ear, and a more narrowly inflected antero-dorsal submargin.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7701.

Ostrea weegeti n. sp.

(Weeget, an Indian chief)

Plate XIX, figure 5

A small, ovate, somewhat depressed species. The beak of the right valve is very small, the beak of the left valve is not well defined in type specimen. Plications are well formed on the anterior half of both valves; they are broad and rounded, nine in number, and give rise to crenulate interlocking anterior and ventral margins. On the posterior half of the shell there are incipiently formed plications on the postero-ventral and lower posterior margins only; most of the posterior half is without plications and merely covered with growth-lines, which are strongly curved, convex ventrally. The paucity of plications on the posterior half may be due to attachment to a non-plicate shell or some flat object.²

Height 30 mm.; length 24 mm.; thickness 7.5 mm.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7702.

Oxytoma submconnelli n. sp.

Plate XXIII, figure 1

Only the left valve of this large species is preserved. The semioval body of the shell is oblique, a little longer than high, rather compressed, and narrowly inflected along the very gently curved (concave) postero-

¹ U.S. Geol. Explor. 40th Par., vol. IV, pt. 2, p. 292, Pl. 7, fig. 23.

² Woods has so interpreted some Cretaceous species. Mon. Cret. Lam. England, Pal. Soc., vol. 2, pt. 9, p. 385 (1913).

dorsal margin. Beaks small. All of posterior ear not preserved; fairly long, wide anteriorly, and separated from body of shell by a fairly deep sinus. Anterior ear small, not well preserved, but appears to be convex and separated from body of shell by a narrow sulcus.

Body of shell ornamented with about fourteen radiating, narrow, rounded (umbrella-like) ribs, separated by shallow, broadly concave interspaces in which are numerous radiating striæ. Some of these striæ are a little coarser than the others; these, however, do not increase in size much ventrally and do not become radii of higher order. The ears are covered with radiating striæ.

Length 63 mm.; height 55 mm.; thickness (of left valve) 9 mm.

This species is very close to *Oxytoma mcconnelli* Whiteaves¹ from the Fernie formation of Minnewanka lake, Alberta, in size, outline, and in general character of ornament. The Minnewanka Lake species, however, has more ribs on the body of the valve, the striæ are coarser and more uneven, and the sinus below the posterior ear is more shallow.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7703.

Perna weelaupensis n. sp.

(*Weelaup*, a big stone mountain)

Plate XIX, figures 1, 2

A curved, semioval species, produced in the antero-dorsal angle and expanded ventrally. The dorsal margin is fairly long and almost straight, the anterior margin deeply concave, the ventral margin long and rounded, and the posterior margin gently rounded, long, and inclined to the dorsal margin. The valves are flattened and are narrowly inflected along the anterior margin. The umbo is triangular and produced forward considerably in advance of the main body of the shell. The surface is not well preserved, but apparently has irregular lines of growth. Serial multi-vincular ligament preserved, but is not distinct.

Height 39 mm.; length 43 mm.; thickness 8 mm.

The shell from the Great Oolite of Minchinhampton, Yorkshire, England, identified by Morris and Lycett² as *Perna rugosa* Munst., is similar, but is larger, the umbo is not produced forward so much, the posterior margin is not so much inclined, and the outline does not widen so much ventrally.

Horizon and Locality. In talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7704.

¹ Whiteaves, J. F.: Geol. Surv., Canada, Mes. Foss., vol. I, pt. 4, p. 300 (1900).

Whiteaves, J. F.: Geol. Surv., Canada, Contr. Can. Pal., vol. I, pt. 2, p. 166, Pl. 23, figs. 1 to 1b (1899).

² Mon. Mollusca Great Oolite, pt. 2, Pal. Soc., p. 25, Pl. 3, fig. 1 (1853).

Plagiostoma hazeltonense n. sp.

Plate XXI, figure 1; Plate XXII, figures 1-5

A very large, semioval, somewhat oblique, moderately convex species. Broadly inflected on the long, antero-dorsal submargin. Hinge-margin short. Anterior ear longer than wide; posterior ear as long, but wider and flatter.

The ears and most of the inflected antero-dorsal area have concentric growth-lines and ridges only. The remainder of the shell surface has radial ornament as well as concentric growth-lines: on the posterior part are small, narrow, wavy striations, which toward the middle of the shell become broad, irregular bands separated by narrow, wavy grooves; on the anterior part of the shell, the ornament is striate, also, rather than banded, for narrow, wavy, small striations are preserved on the border of the antero-dorsal inflected area. The ornament is weakest on the middle part of the shell.

Height 155 mm.; length 160 mm. (est.); thickness one valve 35 mm.

Plagiostoma giganteum Sowerby¹ is very similar, but is more elongate in outline and has feebler ornament.

One of the Silver Lake specimens is more elongate than the typical specimens of the species described above, and has a narrow, inflected area. This may be a variety of the species.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7705; paratypes, Cat. Nos. 7705 a to d.

Trigonia guhsani n. sp.

(Guhsan, an Indian chief)

Plate XX, figures 2, 3

A large, moderately convex, ovate species, much longer than high. The dorsal margin is about half the length of the shell. The posterior margin is oblique and angular. The beaks are near the anterior end. Anterior part of shell covered with about twenty-one narrow costæ which turn abruptly in a postero-ventral direction adjacent to the marginal carina. The area has about ten radiating small costellæ, which are crossed by what appear to have been fairly conspicuous growth-lines. This species belongs to the *costatæ* section of the genus.

Height 66 mm.; length 100 mm.; thickness single valve 14 mm.

Trigonia americana Meek² from Jurassic strata near the lower canyon of Yellowstone river, Montana, is smaller, is not so elongate, and has coarser sculpture on the area. *Trigonia bachelieri* d'Orbigny³ is smaller, has finer and more closely arranged costellæ on the area and a more pronounced median carina.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group, exposed in cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7706.

¹ Sowerby, J.: "Mineral Conchology"; vol. I, p. 176, Pl. 77.

Goldfuss, J.: *Petrefacta Germaniae*, pt. 2, p. 80, Pl. 101, figs. 1 a, b.

² 12th Ann. Rept., U.S.G. and G.S. Terr., pt. I, p. 148, Pl. 38, figs. 1 a, b (1883).

³ *Proderone*, vol. I, p. 338.

Annales Pal., vol. 14, Fasc. 4, p. 150 (18), Pl. 18 (39), figs. 6-8.

Sonninia hansonii n. sp.

Plate XXIII, figures 2, 3

Diameter.....	76.5* mm.	56.0* mm.
Height of whorl.....	41.0%	39.5%
Thickness of whorl.....	25.8%	29.1%
Width, umbilicus.....	27.8%	30.0%
*Without keel		

Except the part showing in the umbilicus, only the core is preserved. Living chamber not preserved. As the size of the keel is not known, the measurements are given without it.

A compressed serpenticone. Fairly involute, the inclusion about 50 per cent. Sublatumbilicate, gradumbilicate. Umbilical margin of inner whorls angular, of outer somewhat rounded. Whorl-section compressed obovate, becoming trigonal on outer whorl, much higher than thick. Whorls somewhat flattened on the sides. Venter narrowly rounded, becoming convexi-fastigate on outer whorl. A hollow (septate) keel of unknown size, leaving a smooth partition-band on the core, but neither ridge nor sulci. The outer whorl is presumably smooth; the core shows no ornament. The whorls in the umbilicus have numerous, straight, very fine ribs with just a suspicion of marginal swelling; the ventral projection of this ornament, however, is not known.

The suture-line is complex. The external saddle is deep and rather narrow. The first lateral lobe is longer than the external, is rather broad-stemmed, rather symmetrical, and the median lobule is longer than the two lateral ones. The first lateral saddle is deep and extremely narrow. The second lateral saddle is deep and very narrow, but not so deep as the first lateral. The inner margin of the suture-line is retracted a little and the auxiliary lobes and saddles slant.

In shape and ribbing this species resembles the European species, *A. sowerbyi carinodiscus* Quenstedt,¹ but is not so compressed and the ribbing is even finer. The greatest difference is in the suture-line: for Quenstedt's species has a much more asymmetrical first lateral lobe, a much broader first lateral saddle, and a shorter second lateral lobe. *Sonninia corrugata* Sowerby² is also similar, but has somewhat higher and thinner whorls, a smaller umbilicus, and a different suture-line, including a more narrow-stemmed and asymmetrical first lateral lobe and no retraction of the inner part. The first lateral lobe of *S. hansonii* is rather broad-stemmed and symmetrical for a *Sonninia*, but the surface is much worn and the true line may not be recorded. It is placed in *Sonninia* on account of its marked resemblance in form, proportions, and ribbing to undoubted species of the genus.

The species name is given for G. Hanson of the Geological Survey.

Horizon and Locality. From talus of middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7707.

¹ Annon. Schwab. Jura, Pl. 63, fig. 5 only.

² See Buckman, S. S.: Type Ammonites, vol. IV, Pl. 412 (1923).

Sonninites silveria n. sp.

(Silveria, the Silver Lake country)

Plate XXIV, figure 3

Diameter.....	100 mm.	32 mm.
Height of whorl.....	37.3%	37.0%
Thickness of whorl.....	20.4%	34.4%
Width, umbilicus.....	36.5%	37.2%

Owing to distortion and imperfection of the specimen, the above measurements are only approximate; the keel is included; allowance is made for compression of the outer whorl. Chiefly core, very little of test preserved. Definitely septate to within 18 mm. of anterior end of outer whorl.

Inner whorls serpenticonic. Outer whorl compressed serpenticonic or platyconic. The umbilicus shallow, latumbilicate. Whorls moderately embracing, the amount of inclusion about 25 per cent. Venter of inner whorls broad, rounded; keel marked on core by a ridge, with small furrows on either side; a very small amount of test preserved shows a moderately sized hollow (septate) keel. On outer whorl venter narrow, rounded; keel marked by a very low ridge on core with very faint furrows on either side; a little of test remaining shows a hollow keel of fairly large size, without ventral furrows, but with faint lateral furrows.

On the inner whorls are rather closely set, small ribs of fairly strong relief, almost straight on the sides, but bending forward ventrally; the total forward curvature cannot be determined, however, for there is not enough test preserved to trace the growth-lines on; each rib appears, however, to well overlap the next rib. On the anterior part of the second last whorl the ribs increase, somewhat irregularly, in size and spacing. On the last or outer whorl the ribs decrease in relief and become merely broad, low undulations; thus the ornament is approaching smoothness; these undulations are almost straight on the side and bend forward as they approach the venter, but owing to absence of the test the total forward curvature cannot be determined.

Suture line complex. The external saddle is deeper than wide and divided into two branches, the inner of which is the larger. The first lateral saddle is deep and very narrow. The first lateral lobe is longer than the external, has a rather broad stem and three branches or lobules, the centre of which is longer than the two lateral; it is almost symmetrical. It has only been possible to prepare a little of the second lateral lobe. It is about two-thirds as long as the first lateral lobe. A preparation of the suture-line on an inner whorl shows a deep, second lateral saddle and an inclined auxiliary lobe. The inner edge is not dependent, however.

This species is very similar to *Sonninites alsaticus* (Haug),¹ but is smaller and has finer, more regular, and more closely spaced ribs on the inner whorls. *Dorsetensia lennieri* Brasil² has much thinner whorls, fewer and more widely spaced ribs, a non-septate keel, and deeper ventral furrows.³

Horizon and Locality. From the talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7708.

¹ See Buckman, S. S.: Type Ammonites, vol. VI, Pls. 528, 528A (1925).

² Ceph. nouv. jur., Bull. Soc. geol. Norm., 16, p. 10, Pl. 3, fig. 10 (1895).

³ The writer has not access to Brasil's publication and is indebted to Mr. S. S. Buckman for the comparison.

Sonninites skawahi n. sp.

(Skawah, an Indian legendary name)

Plate XXIV, figures 1, 2

Diameter.....	55 mm.
Height of whorl.....	40%
Thickness of whorl.....	31.3*% ⁹⁷
Width, umbilicus.....	33.2*% ⁹⁷
*very approximate	

The specimen is entirely septate and the outer whorl or whorls are not preserved. The preservation is almost entirely in the form of core, i.e. mould of the interior. Allowance is made in the measurements for a keel 2 mm. high.

Slightly compressed serpenticone, latumbilicate, the whorls moderately embracing, somewhat compressed ovate, and flattened on the sides. The venter broad and gently rounded. The keel, which is not preserved, leaves on the core a ridge and two narrow sulci. The size of the keel is unknown. On the sides, the strong ribs are almost straight and ventrally they curve forward; but the total amount of forward curvature cannot be determined, owing to the absence of test; it must be considerable, however, each rib overlapping the next. The ribs are jugate on the inner margin.

The suture line is complex. The external saddle is deep, moderately broad, and divided by a small lobule. The lateral saddles are deep and extremely narrow. The first lateral lobe is cruciform, rather broad-stemmed, and longer than the external lobe. The second lateral lobe is long and very narrow. The auxiliary lobe is short and slanting. There is no retraction of the inner end of the suture-line, however.

Owing to absence of the outer whorl, a complete comparison of this species with *Sonninites silveria* n. sp. cannot be made, but they certainly differ in details of the suture-line, for *S. skawahi* has much narrower and more deeply cut lateral saddles and a longer and more slender median lobule in the first lateral lobe. *S. skawahi* is very close in form, proportions, and suture-line to *Sonninites alsaticus* (Haug),¹ but has higher whorls, somewhat weaker ribs, and much less ventral sulcation. Compared with *A. tessonianus falcatus* Quenstedt² the Canadian species has higher and thinner whorls, less umbilication (i.e., a smaller umbilicus), and probably a smaller keel. The Canadian species is an advance in development over both of these European species.

Horizon and Locality. From talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7709.

¹ See Buckman, S. S.: Type Ammonites, vol. VI, Pls. 528, 528A (1925).

² Ammon. Schwab. Jura; Pl. 63, fig. 10.

Guhsania n. gen.*(Guhsan, an Indian chief)*

Compressed serpenticonic, evenly ribbed inner whorls passing to oxyconic coarsely ribbed outer whorl. Septicarinat. Sublatum-gradumbilicate. Angular umbilical margin. Fairly developed suture-line, with wide-stemmed, tripartite, slightly asymmetric first lateral lobe. For further details see description of the genotype.

This genus is parallel in development to the "*liostraca* group" of the genus *Dorsetensia* S. Buckman¹ and like it attains the oxyconic outer whole and upright angular inner margin, but retains the ribbing through all stages of growth, a broader umbilication, and a more developed suture-line. Genotype, *Guhsania bella* n. sp.

Guhsania bella n. sp.*(bellus, trim)*

Plate XXV, figure 1

Diameter.....	Mm.	138	111.7	81.8	45.2
Height of whorl.....	Per cent.	42.1	42.5	42.7	42.7
Thickness of whorl.....	"	21.3	23.0	24.8
Width, umbilicus.....	"	28.6	28.4	28.8

The specimen is somewhat distorted and the measurements are approximate; allowance is made for the keel. Chiefly core, very little of test preserved. Entirely septate.

Compressed serpenticonic on inner whorls, becoming lenticular oxyconic on outer whorls. Moderately involute, sublatumbilicate, gradumbilicate, umbilical margin angular, umbilical area very narrow and vertical to plane of symmetry of shell. Whorl section of inner whorls compressed ovate, sides somewhat flattened. Section of outer whorl becoming sagittate, thickest near the inner side. Venter of inner whorls rounded (amblygastric), surmounted by a rather small, hollow keel, which leaves a low ridge and traces of sulci on the core. Venter of outer whorl fastigate (oxygastric), with rather small, hollow keel (septicarina) which leaves, on the core, a smooth, narrow partition band truncating the sharp venter. The oxygastric venter begins at a diameter of about 80 mm.

The inner whorls have numerous, small ribs, nearly straight on the sides and curved forward near the venter. The outer whorl has, on the dorsal part, straight, broad, low, rounded undulations, which die out ventrally. The total amount of forward curvature of the ribs and growth-lines cannot be determined, for so little of the test is preserved; it must be considerable, however, at least on the inner whorls.

The suture-line is fairly complex, with somewhat deep saddles, and the external saddle is narrow, relatively of about the width of the lateral saddles. The first lateral lobe is a little longer than the external lobe,

¹ Mon. Infer. Ool. Ammon., Pal. Soc., p. 308 (1892).

is broad-stemmed, and has three lobules, the median of which extends a little below the lateral ones and is slightly asymmetric. The auxiliary lobes slant somewhat, but the inner edge of the suture-line is not retracted.

The inner whorls resemble the more primitive species of *Dorsetensia* S. Buckman and are like *D. edouardiana* var. δ S. Buckman,¹ but have a rounded venter and obsolescent ventral furrows like *D. edouardiana* var. γ S. Buckman.² The outer whorl is oxyconic as in the "*liostraca* group" of *Dorsetensia*,³ but is ribbed, not smooth, and is not so involute. The suture-line, also, is more developed.

Horizon and Locality. From the talus of the middle sedimentary division of the Hazelton group, exposed in a cliff about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7710.

Guhsania ramata n. sp.

(*ramus*, a branch)

Plate XXII, figures 6, 7

Diameter.....	115 mm.
Height of whorl.....	38.8%
Thickness whorl.....	14.8%
Width, umbilicus.....	

The above measurements are approximate. Only the core of about one-quarter of one whorl and a fragment of an inner whorl are preserved. The outer whorl is partly septate and partly living chamber. This whorl is compressed, the height being about 2.6 times the thickness. The whorl section is sagittate and the venter fastigate (oxygastric). A smooth, narrow partition band on the core. A small part of preserved test shows a hollow keel about 2 mm. high. The core shows slightly curved undulations on the sides which die out ventrally. The fragment of inner whorl has a compressed ovate section, a rounded venter, and, marked on the external mould, a 1.8 mm. keel. The suture-line is deeply cut, the saddles are deep, and have slender, twig-like branches. The first lateral lobe is broad-stemmed and has a long, median lobule. The inner margin of the suture-line is strongly retracted. This species differs from *Guhsania bella* n. sp. in the more compressed whorl and the more deeply cut suture-line with its twig-like branches, its longer median lobule on the first lateral lobe, and its retracted inner margin.

The suture-line shows some resemblance to that of the Hammer-toceratidæ, but owing to the marked resemblance in whorl-shape and ribbing to *Guhsania bella* n. sp., this species is for the present placed in the same genus.

Horizon and Locality. From the talus of the middle sedimentary division of the Hazelton group, exposed in a cliff, about 1 mile southeast of Silver lake, Hudson Bay mountain, B.C.

Type: Victoria Memorial Museum; holotype, Cat. No. 7711.

¹ Mon. Infer. Ool. Ammon., Pal. Soc., Pl. 52, figs. 21, 22 (1892).

² Mon. Infer. Ool. Ammon., Pal. Soc., Pl. 52, figs. 18, 19 (1892).

³ Mon. Infer. Ool. Ammon., Pal. Soc., p. 308 (1892).

PLATE XIX

Perna weelaupensis McLearn n. sp.

FIGURE 1. Ligament of right valve of holotype. Vict. Mem. Mus., Cat. No. 7704. (Page 93.)

FIGURE 2. Right valve. Same specimen. (Page 93.)

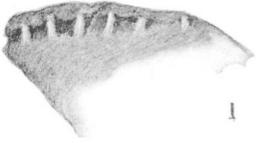
Ctenostreon gikshanensis McLearn n. sp.

FIGURE 3. Left valve of half-size specimen, showing proportions of posterior ear. Eight ribs. Paratype. Vict. Mem. Mus., Cat. No. 7700a. (Page 91.)

FIGURE 4. Right valve of holotype. Seven ribs. Vict. Mem. Mus., Cat. No. 7700. (Page 91.)

Ostrea weegeti McLearn n. sp.

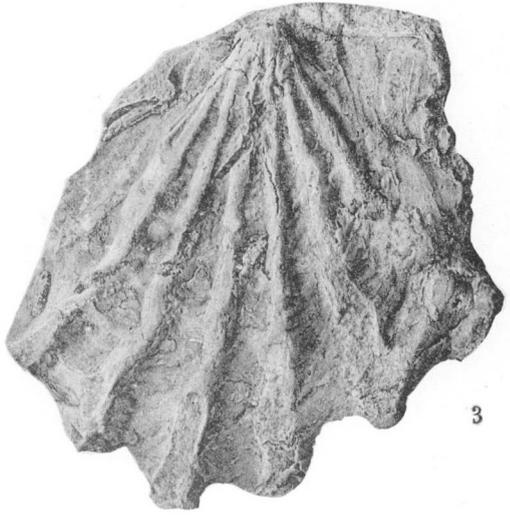
FIGURE 5. Right valve of holotype. Vict. Mem. Mus., Cat. No. 7702. (Page 92.)



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PLATE XX

Lima tizglensis McLearn n. sp.

FIGURE 1. Both valves of holotype. Vict. Mem. Mus., Cat. No. 7701. (Page 92.)

Trigonia guhsani McLearn n. sp.

FIGURE 2. Top view of right valve of holotype. Vict. Mem. Mus., Cat. No. 7706. (Page 94.)

FIGURE 3. Right valve, same specimen. (Page 94.)



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PLATE XXI

Plagiostoma hazeltonense McLearn n. sp.

FIGURE 1. Left valve of holotype. Vict. Mem. Mus., Cat. No. 7705. X $\frac{9}{11}$. (Page 94.)



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PLATE XXII

Plagiostoma hazeltonense McLearn n. sp.

- FIGURE 1. Radiating striae near posterior end of right valve of a paratype. Vict. Mem. Mus., Cat. No. 7705d. (Page 94.)
- FIGURE 2. Small specimen showing posterior ear of a paratype. Vict. Mem. Mus., Cat. No. 7705c. (Page 94.)
- FIGURE 3. Dorsal view of a half-size specimen showing inflected area and anterior ear. Paratype Vict. Mem. Mus., Cat. No. 7705a. (Page 94.)
- FIGURE 4. Ornament at posterior end of the right valve of a paratype. Vict. Mem. Mus., Cat. No. 7705b. (Page 94.)
- FIGURE 5. Ornament a little posterior to middle of left valve of a paratype. Broad, flat bands separated by narrow grooves. Vict. Mem. Mus., Cat. No. 7705a. (Page 94.)

Guhsania ramata McLearn n. sp.

- FIGURE 6. End view of holotype. Vict. Mem. Mus., Cat. No. 7711. (Page 99.)
- FIGURE 7. Side view of same specimen. (Page 99.)

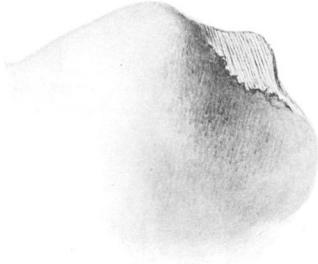
PLATE XXII



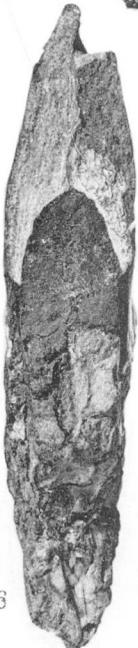
7



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PLATE XXIII

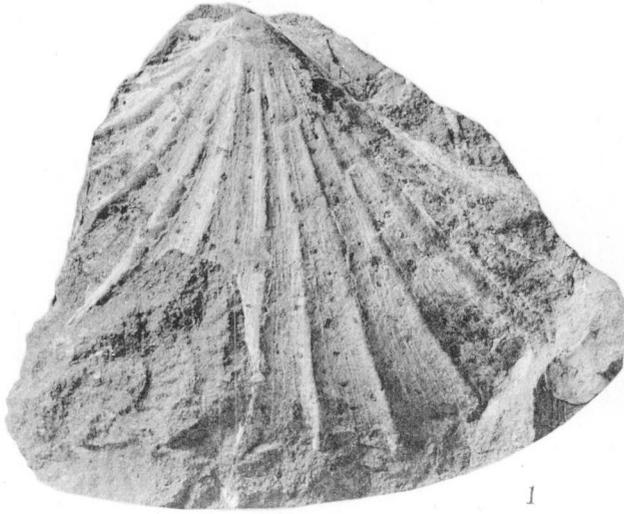
Oxytoma submccconnelli McLearn n. sp.

FIGURE 1. Left valve of holotype. Vict. Mem. Mus., Cat. No. 7703. (Page 92.)

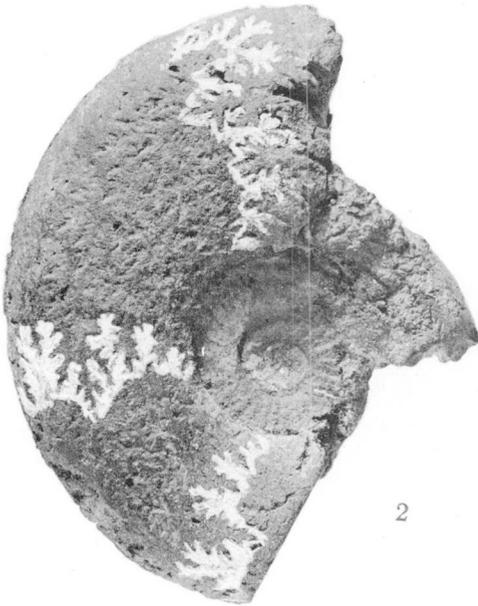
Sonninia hansonii McLearn n. sp.

FIGURE 2. Side view of holotype. Details of first lateral lobe of first marked suture line imperfect. Vict. Mem. Mus., Cat. No. 7707. (Page 95.)

FIGURE 3. End view same specimen. (Page 95.)



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PLATE XXIV

Sonninites skawahii McLearn n. sp.

FIGURE 1. Side view of holotype. Vict. Mem. Mus., Cat. No. 7709. (Page 97.)

FIGURE 2. View of periphery of same specimen. Note ventral sulcation. (Page 97.)

Sonninites silveria McLearn n. sp.

FIGURE 3. Side view of holotype. Remnant of keel at *a* removed in error. Vict. Mem. Mus., Cat. No. 7708. (Page 96.)

PLATE XXIV

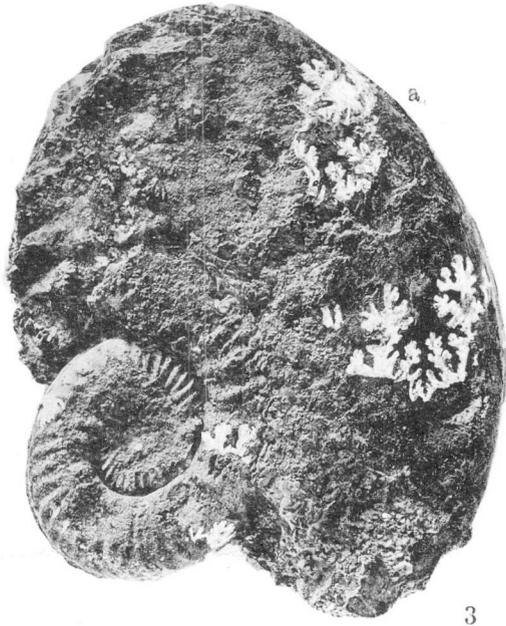
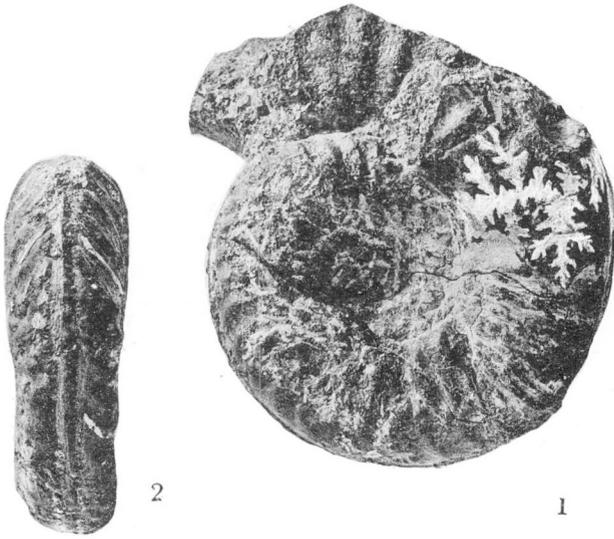


PLATE XXV

Guhsania bella McLearn n. sp.

FIGURE 1. Side view of holotype. Vict. Mem. Mus., Cat. No. 7710. (Page 98.)



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