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Lower Ordovician Fossils from Junee, Tasmania

By

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PLATE XI

This fauna was discovered in a yellowish cream-coloured mudstone at Junee, Russell Falls River Valley, in the western of the two railway cuttings, two miles west of Junee railway station by Dr. A. N. Lewis. He submitted me his collection for palaeontological study and to him I owe many thanks. In the collection, one species of brachiopod, three species of gastropod and four species of trilobites are identified as follows:

Orusia (?) sp.
Sinuopea (?) sp.
Roubidouxia (?) sp.
Lecanospira tasmanensis Kobayashi
Asaphopsis juneensis Kobayashi
Asaphopsis (?) *gracicostatus* Kobayashi
Tasmanaspis lewisi Kobayashi
Tasmanaspis longus Kobayashi

A few brachiopods are contained in the collection but they are not very well preserved. Judging from the outline and numerous fine ribs which increase by intercalation, they may belong to one species. A mould of a ventral valve (Plate XI, fig. 1) shows a strong median septum and suggests the presence of pseudospondylium. A shallow median sinus appears to exist on the mould of the dorsal valve (Plate XI, fig. 2). Although these observations yield nothing definite for generic determination, they suggest a resemblance to *Orusia* or *Finkelnburgia*. This species is remarkably similar to *Orusia lenticularis* (?) from the Florentine valley, i.e., Tim Shea, although the ribs appear a little coarser in the specimens described by Etheridge (1905).

Apart from *Lecanospira tasmanensis*, there are two specimens of gastropods one of which resembles *Roubidouxia* or some other liospirid and shows three volutions of a conical spire expanding rapidly and having a round apex. The other specimen exhibits the basal side of the broadly rounded last whorl with an open and deep umbilicus. As fine lines of growth faintly impressed in the latter show a bent backward, it belongs most probably to *Sinuopea* or its allies. The last five species in the list which are better preserved will be described in detail later.

Asaphopsis juncensis in addition to *Orusia* (?) sp. is certainly suggestive of close relationship of this fauna to the Tim Shea fauna. *Asaphopsis* is a characteristic trilobite which ranges from upper Tremadocian to Arenigian in the area extending from Southern France to Western Pacific regions through the Himalayan trough. *Lecanospira* is an American element of gastropod which is common in the Canadian, but ranges down to the Upper Ozarkian by Ulrich which, as discussed in my previous papers (Kobayashi, 1933, 1936), approximates to the Tremadocian according to the European standard. Therefore the two genera warrant the Lower Ordovician age of the fauna, the conclusion being supported also by the presence of imperfect brachiopods and gastropods. Incidentally, *Orusia* ranges from Upper Cambrian to Canadian while *Sinuopea* is common in Ulrich's Upper Ozarkian, although the lower limit of the genus is in the Potsdamian.

It is extraordinarily interesting to see that *Asaphopsis* and *Lecanospira*, distinct faunal elements of two different provinces, are found together at the same locality in Tasmania. *Tasmanaspis* is an endemic genus which may be a relic of a certain Cambrian family of trilobite.

The following is a description of the fossils:—

Family EUOMPHALIDAE de Koninck

Genus **Lecanospira** Ulrich, 1930

Many palaeontologists who followed Salter's generic concept of *Ophileta* had misunderstood the genus until Ulrich and Bridge (1930) pointed out that Salter's diagnosis does not fit in *Ophileta levata* on the basis of which Vanuxem's genus had originally been instituted. On that occasion, the joint authors referred six species to *Lecanospira* of Ulrich as follows:—

Ophileta compacta Salter, 1859, (Genotype) from the Beekmantown group of New York and Canada, Nittany dolomite and Longview limestone of the Appalachian Valley, Roubidoux formation of Missouri.

Ophileta nerine Billings, 1865, Quebec group, Div. F, St. John, Newfoundland.

Ophileta alturensis Sardeson, 1896, from the Oneota dolomite of Minnesota, Wisconsin and Iowa; Gasconade dolomite of Missouri.

Lecanospira conferta Ulrich in Adams, Butts, etc. (1926), same distribution as *compacta*.

Lecanospira sigmoidea Ulrich and Bridge, 1930, from the Roubidoux formation of Missouri

and later Dake and Bridge (1932) added:

Lecanospira sancti-saboe (Roemer) from the Ellenburger limestone (Roubidoux equivalent) in Texas

Still later Powell (1935) described two more species,

Lecanospira tenuis Powell, 1935 and

Lecanospira profunda Powell, 1935, both from the Oneota dolomite of Minnesota.

All of the nine species have so far been confined to the formations in North America which Ulrich referred to the Upper Ozarkian or Canadian. Therefore the discovery of *Lecanospira tasmanensis* in Tasmania, indeed bears, more than ordinary value for the study of palaeogeography.

Lecanospira tasmanensis Kobayashi, n.sp.

PLATE XI, FIG. 11

Shell of medium size planispiral, composed of four or five gradually expanding volutions; spire slightly sunken; diameter of a whorl less than twice that of the preceding; the ultimate whorl tends to detatch from the penultimate one. The apertural margin on the umbilical side with the exception of one which shows a part of the apical side. In this specimen, the lateral wall of the last whorl is seen to be moderately convex. There is a low carina on the apical side from which the inner slope forms a concavo-convex curvature. None in the collection shows growth-line or any other facial marking. Most of the specimens are compressed laterally to some degree.

In the cross section of the whorl this resembles *L. alturensis*, but the umbilical side is nearly flat and the volution expands more rapidly in this species. It also stimulates *L. sigmoidea* in the mode of coiling, but the number of coiling is no more than five in this whereas there are six to seven in *sigmoidea*.

Family DIKELOCEPHALIDAE Miller

Subfamily *DIKELOKEPHALININAE* Kobayashi

Genus **Asaphopsis** Mansuy, 1920

1920. *Asaphopsis* Mansuy, Mem. du Serv. géol. de l'Indochine vol. 7, Fasc. 1, pp. 10-12.
1934. *Asaphopsis* Kobayashi, Jour. Coll. Sci. Imp. Univ. Tokyo, Sect. 2, vol. 3, pt. 8, pp. 489-491.
1936. *Asaphopsis* Kobayashi, Japan. Jour. Geol. Geogr. vol. 13, p. 175.

The genus ranges from Upper Tremadocian to Arenigian and possibly extends into the lower Llandeilian and is distributed in the area extending from Southern Europe through the Himalayan trough to South Chosen on one side and to Tasmania on the other in the Western Pacific region. Eight species and one variety referred to this genus are as follows:

(1) *Dickelocephalus* (?) *villebruni* Bergeron, 1895 from the Tremadoc superieur of Montagne Noire, Southern France.
(2) *Dickelocephalus florentinensis* R. Etheridge, jr. 1904, from the Lower Ordovician of the Florentine Valley, West Tasmania.
(3) *Asaphopsis jacobi* Mansuy, 1920.
(4) *Asaphopsis reedi* Mansuy, 1920 and
(5) *Ogygites* (?) *annamensis* Mansuy, 1920 (except the free cheek in fig. 6a) from the Lower Ordovician Dongson sandstone of Thanh-hoa, North Annum.
(6) (?) *Asaphus elegantulus* Gortani, 1934, (see Gortani, 1934), from the Lower Ordovician of Chisil Pass, Caracorum.
(7) *Taihungshania welleri* Sheng, 1934, (see Sheng, 1934), and *Taihungshania welleri* var. *brevica* Sheng, 1934, from the Lower Ordovician Yinchufu series of NE Kiente-hsien, Chekiang, China.
(8) *Asaphopsis nakamurai* Kobayashi, 1936, from the Tremadocian Tomkol shale of Doten-ri, Keisho-hokudo, South Chosen.

Asaphopsis juneensis from Junee, Tasmania is an addition. *Asaphopsis* (?) *gracicostatus* from the same locality is, though fragmentary, unquestionably a new species of the genus or an unnamed one closest to *Asaphopsis*.

Asaphopsis juneensis Kobayashi, n.sp.

PLATE XI, FIGS. 6-9

A cranidium in Plate XI, fig. 6 is strongly compressed laterally, reducing its original breadth but, nevertheless, the characteristics of dikelocephalid can hardly be overlooked.

The glabella tapers gently forward and is rounded in front. The axial furrow is rather deep. Three shallow lateral glabellar furrows seen on the left side of the cranidium from the observer are oblique and more or less deepened at a short distance from the axial furrow with which they appear to join. The occipital furrow is transversal, shallow and narrow, and the neck-ring is almost uniform in breadth. On the left fixed cheek is observed a faint accurate groove which encloses a semicircular area adjacent to the glabellar base. The palpebral lobe located on the side of the glabellar center is relatively small, semicircular in outline, and slightly elevated; palpebral ridge almost indiscernible on the specimen. The preglabellar area is as long as two-thirds the glabella, broadly expanded and slightly concave.

In a pygidium in Plate XI, fig. 7 which is not deformed the anterior margin is somewhat arcuate. The axial lobe tapers gradually backward and is divided into more than eleven rings. The pleural lobe may be composed of about ten pleurae, the posterior ones of which are gradually bent backward. Except the articulating one which is regularly convex, the pleural ribs incline gently forward and rather steeply backward, forming terraces. Its marginal border is unpreserved.

Another pygidium in fig. 8 is similarly multisegmented. The same number of pleurae may be counted. The axial lobe is conical and appears somewhat pointed in the hind part. The doublure is considerably broad. A short spine which is a projection of the border issues from the middle point of the postero-lateral margin.

Still another specimen in fig. 9 which is an external cast is depressed longitudinally. The axial lobe is as wide as one-fifth the pygidium. The pleural segmentation becomes gradually absolete from the axis to the margin until at length it disappears in a broad flat border.

In the last mentioned feature the third pygidium disagrees with the first one in which the furrows pass through the pleural lobe as far as the lobe is preserved on the specimen. Therefore should more material be procured, the difference may prove to be of specific value. Not one of the three pygidia is, however, complete and two of them are deformed rather badly.

Seeing that the doublure covers the outer half of the pygidium in the second specimen and that the furrows die out in the part of the pygidium in the third specimen, the difference of the furrows between the first and third pygidia may be introduced secondarily by the deformation through which the surface-relief was more reduced in the part where the dorsal shield was underlain by the flat doublure. While the third pygidium is depressed antero-laterally the second is compressed laterally. Nevertheless, they agree with each other in the conical axis, its proportion to the pleural lobe, broad flat brim and posterior spine, and the second has the same number of pleurae as the first pygidium. Therefore the reference of the three pygidia to identical species is for the time being, the best suggestion.

The semicircular area in the fixed cheek is the characteristic of *Dikelokephalina* and *Asaphopsis*. The former genus has generally a median postule on the neck ring which is absent in this species. A trace of the eye-ridge which is mostly

distinct in these genera can be seen on one side of the glabella, but on the other side, interrupted by an accidental oblique fold which was caused by the lateral compression, it is almost completely obsolete. The broadly rounded preglabellar field appears to suggest an alliance to *Dikelokephalina* more than to *Asaphopsis* but in the relatively posterior position of the pygidial spine which is one of the chief distinctions between the two genera shows it to be a member of *Asaphopsis*.

This cranidium can easily be distinguished from those of *nakamurai* and *villebruni* by its subcircular preglabellar area. The pygidium of this species is quite different from those of *villebruni*, *nakamurai* and *elegantulus* in outline. The axial lobe is broader and the posterior spine is shorter in this pygidium than in those of *welleri* and *welleri brevica*. The segmentation is more numerous in this than in the pygidia of *reedi* and *jacobi*. If the pygidium of *florentinensis* is correctly illustrated, the pleural groove is much stronger in that species. Besides these distinctions, the nearly straight lateral margin which is subparallel to the axis and the short spine which is produced posteriorly are the distinguishing characteristics of this species.

Asaphopsis(?) gracicostatus Kobayashi, n.sp.

PLATE XI, FIG. 10

An incomplete pygidium at hand, insofar as can be judged from its nearly flat or slightly convex marginal border, short postero-lateral spine and pleural ribs which die out gradually within the border, belongs more probably to *Asaphopsis* than to any other genus. A groove along the inner margin of the border may be a crack along the inner outline of the doublure which was introduced by the secondary depression in the dorso-ventral direction.

The most distinct characteristic of this species lies in its fine relatively numerous elevated pleural ribs which are intervened by flat and broad depressions, the feature of which cannot be seen in all other species of *Asaphopsis* so far known. Therefore either this is an aberrant form of *Asaphopsis*, or it belongs to an unnamed genus close to *Asaphopsis*, the decision depending upon the find of other parts of the carapace.

Family ASAPHISCIDAE Raymond (?)

Genus **Tasmanaspis** Kobayashi, n. gen.

This comprises Lower Ordovician trilobites having subovate glabella without lateral furrows with the exception of the occipital one, relatively large eyes close to the posterior of the glabella and the frontal limb and rim forming convexo-concave curvature.

It resembles Upper Cambrian *Blountia* and its allies rather than any Ordovician genera. Its relatively large posterior eyes and faint frontal groove are distinguishing characteristics of the genus.

Type *Tasmanaspis lewisi* Kobayashi.

Tasmanaspis lewisi Kobayashi, n.sp.

PLATE XI, FIGS 3-4

Cranidium broad; glabella subovate, occupying two-thirds the length of cranidium and half the breadth of the cranidium measured through the eyes; circumglabellar and occipital furrows deep; no lateral glabellar furrows; occipital ring

narrows laterally from the median point; palpebral lobes large and opposed on both sides of the glabella in line with its center; palpebral ridge absent; postero-lateral limb of the fixed cheek transversally elongated and grooved along its middle; frontal limb convex in the inner and concave in the outer side and bordered by a narrow and slightly elevated frontal rim; anterior branch of the facial suture describes a semicircle in front of the eye; the suture posterior to the eye transversal and abruptly bent backward near the lateral extremity of the postero-lateral limb of the fixed cheek.

A free cheek found associated with the cranidium is convex and bordered by a narrow groove and rim; genal spine short. The course of the facial suture and curvature of the cheek in adjacence to the suture fit fairly well with those of the cranidium.

Tasmanaspis longus Kobayashi, n.sp.

PLATE XI, FIG. 5

At a glance this appears to be a deformed cranidium of the preceding species by lateral compression, but close examination will soon reveal specific distinctions. This cranidium differs from the preceding in its elongated cranidium, almost straight anterior facial suture, distinct eye-band and uniform breadth of the neck-ring. The length of the preglabellar area corresponds to about half of the glabella in the preceding and to about one-third of it in the present species. Furthermore the palpebral lobe is relatively posterior in this species.

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PLATE XI

FIGS. 1 – 2.—*Orusia* (?) sp. Ventral and Dorsal Valves. x2

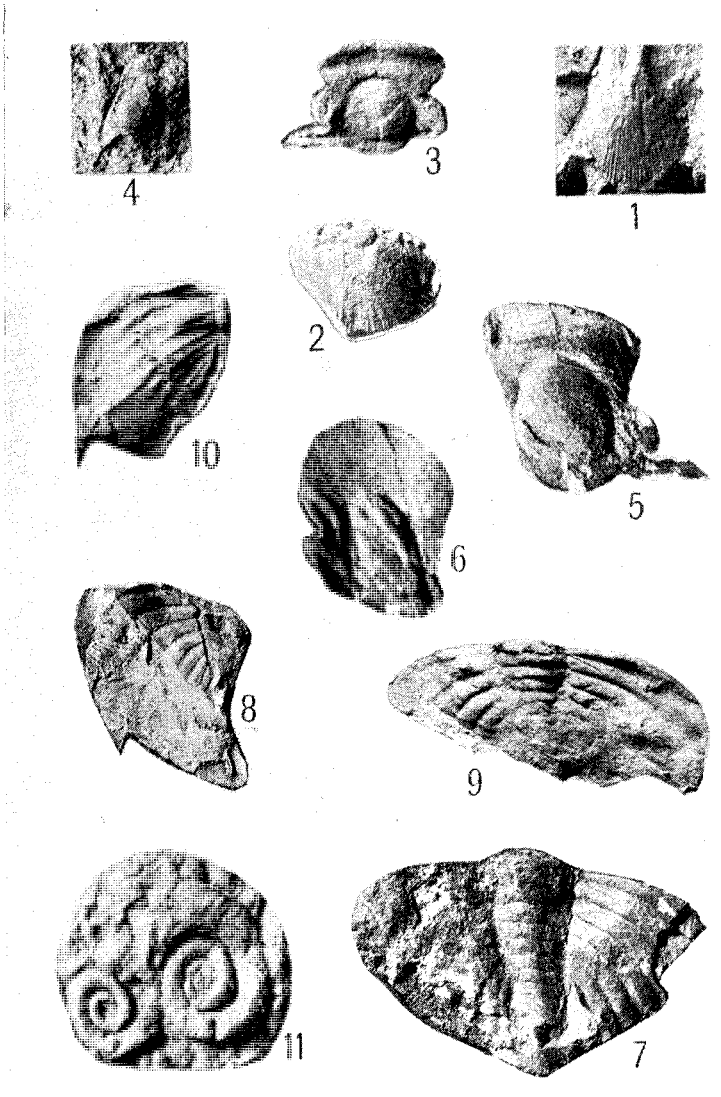
FIGS. 3 – 4.—*Tasmanaspis lewisi* Kobayashi. Holotype Cranidium and Associated Free Cheek. x3

FIG. 5.—*Tasmanaspis longus* Kobayashi. Cranidium. x3

FIGS. 6 – 9.—*Asaphopsis juncensis* Kobayashi. Holotype Cranidium and three paratype Pygidia. Natural size

FIG. 10.—*Asaphopsis* (?) *gracicostatus* Kobayashi. Pygidium. Natural size

FIG. 11.—*Lecanospira tasmanensis* Kobayashi. Umbilical view. Natural size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