DESCRIPTION OF A SMALL COLLECTION OF TASMANIAN SILURIAN FOSSILS PRESENTED TO THE AUSTRALIAN MUSEUM BY MR. A. MONTGOMERY, M.A., GOVERNMENT GEOLOGIST, TASMANIA,

BY

R. ETHERIDGE, JUN^R.,

Curator, Australian Museum, Sydney.

PLATE.

(Reprinted from the Secretary for Mines' Report.)

1.—INTRODUCTION.

SOME time ago, Mr. A. Montgomery, M.A., Government Geologist of Tasmania, presented to the Australian Museum a small collection of Silurian fossils from Zeehan and Heazlewood.

As so little is at present known of the organic remains occurring in the sedimentary rocks of these important mineral fields, a few notes on their affinities may not be out of place, notwithstanding the very poor state of preservation of the fossils. However, any facts that may be evolved from their elaboration will perhaps be of use to future investigators who may have the good fortune to take up the subject hereafter.

The occurrence of organic remains at the above localities does not appear to have come under the notice of Mr. R. M. Johnston at the time he wrote his valuable work, "The Systematic Account of the Geology of Tasmania;"[1] perhaps even they had not been discovered, and all that I know on the subject is gleaned from the official Reports of Messrs. Thureau and Montgomery.

[1] Quarto, Hobart, 1888. (By Authority.)

2.—GEOLOGY.

Mr. G. Thureau informs us[1] that the rocks containing the silver-lead ores at Zeehan belong to the Silurian series, and consist of very much contorted dark blue shales and grey sandstones. The fossils he noticed were "Trilobites, Polyzoa, Corallites, Crinoids, and Brachiopoda." Of the Zeehan deposits, Mr. Montgomery says[2] the country rock consists of Silurian grits, sandstones, and slates, in many places much bent, contorted, and twisted. The central portion of the Heazlewood District, he remarks,[3] is composed of Silurian sandstones and limestones, &c.

Mount Zeehan is situated in the County of Montagu, on the west coast of Tasmania, to the east of Trial Bay, some distance north of Macquarie Harbour, and between the Badger River and the coast. Heazlewood is still further north, north-east of the town of Corinna, in County of Russell, as shown on "Sketch Map—General Geological Features of Tasmania," in Johnston's work.

3.—LIST OF THE FOSSILS BY LOCALITIES.

Heazlewood.—
Favosites grandipora, *Eth. fil.*
Hausmannia meridianus, *Eth. fil.* and *Mit.*

Zeehan.—(Despatch Limestone.)
Asaphus, *sp. ind.*
Hausmannia meridianus, *Eth. fil.* and *Mit.*
Hausmannia, *sp. ind.*
Illænus Johnstoni, *Eth. fil.*
Amphion? brevispinus, *Eth. fil.*
Leptodomus? nuciformis, *Eth. fil.*
Eunema Montgomerii, *Eth. fil.*
Orthoceras, *sp. ind.*

Heazlewood.—(Blue-grey schistose rock.)
Cornulites tasmanicus, *Eth. fil.*
Cromus Murchisoni, *De Kon.*
Rhynchonella decimplicata, *J. de C. Sby.*
Rhynchonella capax, *Conrad.*
Tentaculites, *sp. ind.*

---

[1] Mount Zeehan Silver-Lead Lodes and other Deposits, 1888, p. 1.
[2] Report on the State of the Mining Industry on the West Coast, 1890, p. 7.
[3] *Ibid*, p. 15.

ZEEHAN.—(Blue-grey schistose rock.)
Cornulites tasmanicus, *Eth. fil.*
Cromus Murchisoni, *De Kon.?*
Rhynchonella borealis, *Schlotheim?*
Rhynchonella cuneata, *Dalman.*
Strophodonta, *sp. ind.*
Tentaculites, *sp. ind.*

ZEEHAN.—(White quartzite.)
Lophospira? *sp. ind.*
Murchisonia, *sp. ind.*
Raphistoma, *sp. ind.*

The Collection also contains other forms too indefinite for determination.

4.—NOTES ON THE SPECIES.

Corals.

Favosites grandipora, *Eth. fil.?*

F. grandipora, Eth. fil.—Records Australian Museum, 1890, I., No. 3, p. 61, t. 8, f. 6-9.

Obs.—Certain specimens of a Favosite in highly decomposed limestone recall the typical features of this species, the corallites highly thickened internally, and the walls copiously perforated by very large uniserial pores close together. The whole of the tabulæ have been dissolved, leaving no trace of their presence. Beyond an extra amount of thickening of the corallite walls, the present specimens do not add to our knowledge of the structure of *F. grandipora.* It is naturally somewhat difficult to speak with certainty of the species when dealing with such highly decomposed species, but I believe this to be identical with the coral I described under the above name from the Lilydale Limestone of Victoria.

Loc.—Heazlewood, in limestone.

Genus PLEURODICTYUM, *Goldfuss.*

(Petref. Germaniæ, 1829, I., p. 113.)

Pl., Fig. 1.

Obs.—The impression of ten or more corallites is, I believe, referable to this genus. The outline of each individual corallite is polygonal, the spaces formerly occupied by the walls being represented by partial grooves; here and there small connecting processes represent the mural pores.

The size of the corallites would favour the view here advanced, rather than a reference to *Favosites*.

Loc.—Zeehan, in a light coloured schistose rock.

Trilobites.

Genus Hausmannia, *Hall & Clarke.*

(Pal. New York, 1888, VII., pp. xxix. and xxxi.)

Hausmannia meridianus, *Eth. fil. & Mitchell.*

Pl., Figs. 4 & 6.

H. meridianus, Eth. fil. & Mitchell, Proc. Linn. Soc. N.S.W., 1895, X (2), p. 504.

Obs.—A fragmentary pygidium of a large *Hausmannia* occurs amongst the Heazlewood specimens. It corresponds in all particulars,—large size, wide and very long axis, and the greatly increased number of segments in the latter,—to the N. S. Wales examples that Mr. John Mitchell and the writer have distinguished by the name of *meridianus*. The tail apex is not preserved, so that the peculiarities of this portion visible in Bowning specimens need not be referred to.

The size of the specimen is one and a quarter inches long by one and three-quarters broad, and there are eleven or twelve pleural segments more or less exposed to view. The increase in the number of axial segments in the pygidium over and above the normal of the typical *Hausmannia caudatus*, Brün., is not peculiar to the present form. According to Salter[1] the pygidium axis of *H. caudatus* should possess 11-12 segments, but the late M. Barrande mentions[2] as many as 18-19 in *H. Hausmanni*. Numerous instances of more than twelve could be cited ; for example, the American Devonian *H. ohioensis* has seventeen axial segments and a terminal appendage.

Loc.—Heazlewood ; and Zeehan, in the Despatch Limestone.

Hausmannia, *sp. ind.*

Pl., Fig. 5.

Obs.—Several specimens of a possible second form exist as portions of pygidia, having the same general characters as the preceding species. In the best preserved example, however, there are but nine axial segments visible, all of

[1] Mon. Brit. Trilobites, 1864, Pt. 1, p. 49.
[2] Syst. Sil. Bohême, 1852, I., p. 538.

which show traces of a tuberculation that has never been seen on any of the N.S. Wales or Victorian specimens of *Hausmannia*. The limb in decorticated individuals is exceedingly wide and slightly concave. The pleural segments also bore tubercles, and, from the presence of this form of ornament, I am led to expect that the present examples are distinct from those before referred to under the name of *H. meridianus*.

A similar tuberculated pygidium, as well as cephalic-shield exists in *H. verrucosus*, Hall,[1] of the Niagara Group of Indiana, U.S.A.

Loc.—Zeehan, in the Despatch Limestone.

Genus Asaphus, *Brongniart.*

(Crust. Foss., 1822, p. 17.)

Asaphus, *sp. ind.*

Pl., Fig 2.

Obs.—A single small pygidium, seen from the concave interior, is, I think, referable to *Asaphus*. It is three-quarters of an inch long, by nearly the same wide. The pygidium appears to have been gently arched, with a flattened border, a narrrow long axis extending to the limb at the apex, and very faint traces of short coalesced pleural segments. The specimen is sufficiently preserved to show the presence of the genus in these rocks, and no more. As compared with the pygidia in the Caroline Creek beds, it is in the first place longer (*i.e.*, from before backwards) than *Asaphus*, sp. *a.*[2], but shorter than in sp. *b.*, but is less oval, and more angular in the centre of the posterior border than either of them. Of the two, it is more nearly allied to sp. *a.*, but I do not think identical with either.

Loc.—Zeehan, in the Despatch Limestone.

Genus Illænus, *Dalman.*

(Kongl. Vet. Acad. Handl., 1826, p. 248.)

Illænus Johnstoni, *sp. nov.*

Pl., Fig. 3.

Obs.—Two specimens are in the collection, both slightly pressed out of shape; one is unquestionably a glabella, the other is more indefinite, and it is difficult to say whether

[1] Indiana Geol. Survey Report, 1881 [1882], XI., p. 345, t. 35, f. 7, 14-17.
[2] Etheridge, Junr., Proc. R. Soc. Tas. for 1881 [1882], t. 1, f. 6.

it is a glabella or pygidium. The glabella measures one inch long, the transverse measurement being the greater—viz., one and a quarter inches. There is every reason to believe that this glabella was fairly convex or gibbous, particularly about the centre. The axial grooves are wide and deep (in the decorticated state), and wide apart, curving slightly outwards, but not sufficiently to form a lobe as is sometimes the case in this genus, such, for instance, as in *I. tauricornis*, Kut.[1]; these grooves are also rather short, extending but little beyond what would be the position of the eyes were the latter preserved. The glabella narrows towards the front, which is steep or highly inclined; posteriorly it slopes off gradually to the neck-furrow, and does not overhang the latter as in some forms. The precise course of the facial suture cannot be followed, from the amount of lateral pressure the specimen has undergone, and the same fact will no doubt to some extent affect the degree of convexity of the glabella. On the side least affected in this way, the facial suture seems to be fairly straight and but little curved.

The neck furrow, from glimpses of it that can be obtained seems to have been very fine and narrow, and the neck-lobe similarly so. In a few species of *Illænus*, such for instance as *I. revalensis*, Holm,[2] the glabella possesses three oval depressions on each side, representing the glabella furrows, but these have left no trace on our specimen. The surface (*i.e.* decorticated) is devoid of sculpture, except along the anterior margin, where a few parallel and semi-anastomosing grooves are visible.

I have never before had the good fortune to see an *Illænus* either from Australian or Tasmanian rocks, nor, so far as I am aware, has the genus been described from those of the latter Colony; but De Koninck has recorded[3] the presence of *I. Wahlenbergii* from the Upper Silurian of New South Wales, but without giving a figure. At the same time there is a strong resemblance, in *I. Johnstoni*, to this species, notwithstanding that the cephalic shield of our fossil is imperfect, showing neither the eyes nor the free cheeks. Under these circumstances the measurements previously given can only be accepted provisionally. On

[1] Holm, Mém. Acad. Imp. Sci. St. Pétersbourg, 1886, XXXIII., No. 8, t. 6, f. 10, & 11*a*.

[2] *Loc. cit.* t. 2, f. 4 *a* & *b*, 5 *a* & *b*.

[3] Foss. Pal. Nouv.-Galles du Sud, 1876, Pt. 1, p. 46.

the other hand, the axial grooves of *I. Wahlenbergii*, Barr.,[1] are considerably longer than those of our form, and more or less circumscribe the glabella, and with these facts before me, I think it better to distinguish the latter by a separate name.

Loc.—Zeehan, in the Despatch Limestone.

Genus Cromus, *Barrande.*

(Syst. Sil. Bohême, 1852, I., p. 821.)

Cromus Murchisoni, *De Koninck.*

Pl., Figs. 7 & 8.

C. Murchisoni, De Koninck, Foss. Pal. Nouv.-Galles du Sud, 1876, Pt. 1, p. 54, t. 1, f. 8.

Obs. The larger portion of a cephalic shield and four pygidia, all with the test removed.

De Koninck has complicated the discrimination of this and allied species by erroneous references to his figures. For instance, he describes the head and tail of *Encrinurus Barrandei*, De Kon., but refers to the figure (his Fig. 8, Pl. 1) only. He likewise describes the cephalic shield of *Cromus Murchisoni*, and refers to the figures of both cephalic shield and pygidium (his Figs. 9–9*b*, Pl. 1), at the same time stating that both the thorax and pygidium were unknown to him. In other words, Prof. De Koninck reversed the numbers of the figures on his first plate. Fig. 8 should be *Cromus Murchisoni*, and Figs. 9–9*b* should be referred to *Encrinurus Barrandei*. That such is the case is evident by bearing in mind the generic differences of the cephalic shield of the two forms in question.

In the Tasmanian specimens the larger portion of the glabella, the neck segment and portions of the fixed cheeks, are preserved. The positions of the glabella furrows are distinctly marked by the large five primary tubercles on each side, the furrows in the cast being short and somewhat wide. Between each of these points the surface is occupied by four or five secondary tubercles ranged in a line, whilst on the anterior part of the glabella smaller tubercles of a tertiary order become numerous. The neck segment is strong and wide. Neither of the pygidiums are wholly preserved. There are twenty-six coalesced segments at least in the axis, which tapers to a very fine apex. The central line is devoid of segmentation, and

[1] Syst. Sil. Bohême, 1852, I., p. 684.

there appear to be only four strong tubercles along it. The coalesced pleuræ are very much less in number.

Another Australian Trilobite of this group has been described[1] by Mr. A. F. Foerste as *Encrinurus Mitchelli*, but whether I am correct or not in my determination of the Tasmanian forms, I think Foerste's species is identical with them.

Loc.—Heazlewood, in a blue-grey schistose rock; ? Zeehan, in the same matrix.

Genus Amphion, *Pander*.

(Beiträge Geog. Russich. Reiches, 1830, p. 139.)

Amphion? brevispinus, *sp. nov.*

Pl., Fig. 9.

Obs.—Two small pygidiums, disassociated from other parts, are referred to under this name. In the number of the coalesced segments, backward direction of the pleuræ, embracing as they do the termination of the axis, and spinose free ends, these fossils seem to agree with the pygidium characters of the genus *Amphion*.

There are five axial segments, and a terminal appendage, and five pleuræ, the whole of the component parts being rather widely separated from one another by deep grooves, whilst the outward terminations of the axial segments are slightly nodular. The pleuræ are a good deal arched downward, and the two last on each side quite posteriorly directed. The terminal appendages are large relatively to the size of the pygidiums, but this is not uncommon in the genus. The free ends of the pleuræ do not project far beyond the margins, and are more perceptible in a portion of one of the specimens, as a bluntly-toothed edge.

The brevity of the pleural spines causes a resemblance to the pygidium of *Amphion Fischeri*, Eichwald, as figured by Hoffmann,[2] but not only is the terminal appendage in *A.? brevispinus* longer, and generally larger, but the whole pygidium of the latter is shorter and wider than that of the European tail.

A.? brevispinus is probably nearest to *A. pseudoarticulatus*, Portlock,[3] resembling this British species both in the number of its segments and shortness of its spines.

Loc.—Zeehan, in the Despatch Limestone.

---

[1] Bull. Sci. Lat. Denison Univ., 1888, III., t. 13, f. 2, 3, 20.

[2] Verhandl. Russ-K. Min. Gesellsch. St. Petersb., Jahr. 1857-58 [1858], p. 34, t. 3, f. 4.

[3] Report Geol. Londonderry, &c., 1843, t. 3, f. 5 c.

Annelida.

Genus Cornulites, *Schlotheim.*

(Petrefaktenkunde, 1820, p. 378.)

Cornulites tasmanicus, *sp. nov.*

Pl., Fig. 10 & 11.

Obs.—Several decorticated casts of this interesting supposed Tubicolar Annelid occur at both localities. The longest example is one and a half inches, and in that space portions of at least thirteen or fourteen rings or annulations are visible. In a small fragment preserved in the round, the greatest diameter is three-eighths of an inch. The inverted conical annulations are broad, measuring fully one-eighth of an inch in the direction of their growth, and with the semi-imbricating appearance common to the genus.

As the specimens are but casts of the interior, it cannot be expected that any trace of the fine longitudinal microscopic striæ that ornament the exterior of these organisms would be preserved, but one impression, apparently of an outer surface, exhibits a concentric wrinkling that may possibly represent the irregular outer surface of a *Cornulites*. A similar irregularity of surface is excellently shown in Prof. Hall's figure of *C. proprius*[1] from the Niagara Group of Indiana State. The internal annulated casts are very like those of the characteristic *C. serpularius* of the European Wenlock beds, but the annulations are longer (*i.e.*, longitudinally). The sharp and distinctly annulated form of the segments in these tubes also finds a counterpart in *C. armoricanus*, Œhlert,[2] from the French Devonian rocks. Again, a striking resemblance exists in the strongly imbricate and subindibuliform condition of the segments in our casts to Prof. Hall's figures of *C. chrysalis*,[3] a species of the Lower Helderberg Group of N. America. Many other comparisons might be made, but these are sufficient to indicate the relations of our form.

Loc.—Heazlewood, in a blue-grey schistose rock; Zeehan, in a white to grey schistose rock.

---

[1] Indiana Geol. Survey Report, 1881 [1882], XI., p. 327, t. 32, f. 4; 28th Ann. Report N. York State Mus. Nat. Hist., 1879, t. 31.

[2] Bull. Soc. Etudes Sci. Angers, 1887, t. 10, f. 5, 5 *a* & *b*.

[3] Pal. N. York, 1888, VII. t. 116, f. 26-28.

Brachiopoda.

Genus Rhynchonella, *Fischer.*

(Notice Foss. Gouv. Moscou, 1809, p. 35).

Rhynchonella decimplicata, *J. de C. Sby.*

Rhynchonella decimplicata (J. de C. Sby.), Davidson, Mon. Brit. Sil. Brachiopoda, 1869, III., Pt. 7, No. 3, p. 177, t. 23, f. 20-24.

Rhynchonella decimplicata, M'Coy, Prod. Pal. Vict., Dec. V., 1877, p. 26, t. 47, f. 3-6.

Obs.—A number of crushed examples of this species are associated with the remains of *Cromus Murchisoni*, but are sufficiently well preserved to exhibit the distinctive features of the species. *R. decimplicata* has already been met with in the Upper Silurian of Victoria by M'Coy, and although figured by Mr. R. M. Johnston in his "Geology of Tasmania," is not, I think, from Tasmanian rocks.

Loc.—Heazlewood, in a grey-blue schistoze rock.

Rhynchonella cuneata, *Dalman.*

Pl., Fig. 16.

Rhynchonella cuneata (Dalman), Davidson, Mon. Brit. Sil. Brachiopoda, 1867, Pt. 7, No. 2, p. 164, t. 21, f. 7-11.

Rhynchonella cuneata, Johnston, Syst. Acc. Geol. Tas., 1888, t. 7, f. 9.

Obs.—An impression of a single ventral valve possessing the general characters of this species tends to confirm Mr. Johnston's recognition of it as a Tasmanian fossil, but the number of costæ seem to separate it as a variety. In *R. cuneata*, Dalm., the costæ are from ten to fourteen, of which four or five occur on the fold of the dorsal valve, and three or four in the sinus of the ventral. On the impression from Zeehan there are ten costæ, but only one of these occurs in the sinus. The shell evidently possessed the same cuneate form and elevated umbo. There is, however, no trace on this cast of a punctate surface similar to that of the American shell. Prof. James Hall has referred to this species, and erected it into a separate genus under the name of *Rhynchotreta*;[1] neither did Dr. T. Davidson recognise this structure in European examples of *R. cuneata*.

Johnston's figure, from the shading, I take to be a dorsal valve, with three costæ on the fold.

Loc.—Zeehan, in a blue-grey schistose rock.

[1] 28th Ann. Report N. York State Cab. Nat. Hist., 1879, p. 166.

Rhynchonella capax, *Conrad*, sp.

Pl., Fig. 17 & 18.

Rhynchonella capax (Conrad, sp.), Meek, Report Geol. Survey Ohio, 1873, I., Pt. 2, p. 123, t. 11, f. 6*a-f*.

Obs.—A number of very beautiful external impressions, often of the united valves, seem to me to be referable to this species. They represent a rounded sub-globose form, with close rather inrolled beaks, a well-marked fold and and sinus, and numerous sub-angular costæ, sometimes very fine, crossed by innumerable decussating laminæ. The costæ do not exceed twenty in number, but vary from sixteen to twenty, seven to eight on the flanks, one to three on the dorsal fold, seldom three, however, and only one or two in the ventral sinus. The convexity of the valves is about equal, and the fold relatively wider than the sinus. The zigzag laminæ increase rapidly in width and prominence towards the front.

In general habit, casts taken from these impressions are very like *Rhynchonella capax*, of the Hudson River Group of North America, and equally so of *R. Lewisii*, Davidson,[1] from the Wenlock Limestone of England, for indeed the latter shells differ but little from one another.

In *R. capax* the lateral costæ are from four or five to seven, on the dorsal fold four, and in the ventral sinus three. In *R. Lewisii* there are from two to five costæ in the fold, and one to four in the sinus.

The Tasmanian impressions are certainly after the type of these closely allied species, but apparently closer to *R. capax*, in fact separated chiefly by the relative number of costæ. I therefore propose for our shell the varietal name of *meridionalis*, and would write it in full as *R. capax*, var. *meridionalis*, Eth. fil.

Rhynchonella anticostiensis, Billings,[2] is also a close ally, in fact Meek regards it as a synonym of *R. capax*. It possesses four ribs on the fold and three in the sinus.

In addition to the number of costæ, the Tasmanian shells differ only in being relatively smaller and less globose than the American.

Loc.—Heazlewood, in a blue-grey schistose rock.

---

[1] Mon. Sil. Brachiopoda, 1869, Pt. 7, No. 3. p. 180, t. 23, f. 25-28.
[2] Pal. Foss. Canada, 1862, I., Pt. 3, p. 142, f. 119*a-c*.

Rhynchonella borealis, *Schlotheim ?*

Pl., Fig. 19 & 20.

Rhynchonella borealis (Schl.), Davidson, Mon. Brit. Sil. Brachiopoda, 1869, Pt. 7, No. 3, p. 174, t. 21, f. 14-20.

Obs.—Numerous examples of a crushed *Rhynchonella* have yielded characters that place it very near to the above species, particularly one variety figured by Davidson (*see* his. t. 21, f. 18, 18*a*.)

I believe the fossils are the remains of a subtrigonal shell, with the fold of the dorsal valve abruptly raised, with wide smooth sides, and the crown of the fold longitudinally and narrowly sulcate, the single rib or costa thus formed on each side being sharp and well defined. The flanking costæ, from three to four in number, are also prominent and sharp. The sinus of the ventral valve is wide and deep, with two insignificant costæ at the bottom close together. There are four costæ on each flank, and the intercostal spaces or valleys on both valves are deep. The whole surface of the valves is crossed by very strong concentric frills.

Our fossils are not only closely allied to the form of *R. borealis*, already indicated, but also to its variety *diodonta*, Dalman, and they have some characters in common with *R. bidentata*, Hisinger,[1] and *R. altiplicata*, Hall,[2] of the Lower Helderberg Group of North America, but, as regards the former of these, not possessing so high a dorsal fold, and more costæ.

Loc.—Zeehan, in a greyish-white schist.

Genus Strophomena, *Rafinesque.*

Strophomena ? *sp. ind.*

Pl., Fig. 12.

Obs.—An impression of a very peculiar Strophomenoid shell that is worth figuring to draw attention to it, although of doubtful generic identity. There is evidence of a large sinus, thereby indicating a ventral valve. The sinus is too pronounced for the specimen to be a species of *Orthis*, except such species as *O. biforata*, Schlotheim, of the Middle and Upper Silurian, but it is unlike the latter in outline. So far as mere shape is concerned it approaches *Tropidoleptus*, Hall, or *Enteletes*, Fisher.

Loc.—Zeehan.

---

[1] Davidson, *loc. cit.*, 1883, V., Pt. 2, p. 150, t. 10, f. 3, *a & b.*

[2] Pal. N. York, 1852, II., p. 231, Atlas, t. 33, f. 2 *a-k.*

Genus Strophodonta, *Hall.*

(Pal. New York, 1852, II., p. 63.)

Strophodonta, *sp. ind.*

Pl., Figs. 13–15.

Obs.—Crushed and fragmentary examples of a Strophomenoid shell are numerous in the rock from the Silver King Mine, bearing many delicate, curved, radiating costæ. The chief point of interest is the presence of a crenulated hinge-line, the impressions of numerous transverse denticles. This character indicates the genus *Strophodonta* rather than *Strophomena*. The crenulations extend from one end of the hinge-line to the other, on each side the fissure. The shell was semi-oval, and provided with a large number of fine costæ, simply radiating on the centre of the valves, but gradually curving outwards on the flanks.

Loc.—Zeehan, in a greyish-white schistose rock.

Pelecypoda.

Genus Leptodomus, *M'Coy.*

(Brit. Pal. Foss., 1852, Fascic. 2, p. 277.)

Leptodomus? nuciformis, *sp. nov.*

Pl., Fig. 28.

Obs.—A small shell that it is difficult to refer positively to any genus, but having the general appearance of *Leptodomus*, M'Coy. It has an oblong-oval convex valve, with a straight posterior hinge-line, a rather high umbo, a faint indication of a cincture, and numerous well-marked fine concentric rugæ that unite towards the ventral margin into groups or bundles representing growth stages. The anterior margin is obliquely rounded, whilst the posterior margin is, although generally rounded, somewhat semi-truncate also.

Although no absolute proof exists that this is a true *Leptodomus*, still, from its general resemblance to that genus, I have provisionally placed it therein, with the trivial name *nuciformis*, from its rounded and compact nut-shaped outline. It is quite sufficiently distinct for future recognition.

Loc —Zeehan, in the Despatch Limestone.

Gasteropoda.

Genus Lophospira, *Whitfield.*

(Bull. Am. Mus. Nat. Hist., 1886, I., No. 8, p. 312.)

Pl., Fig. 24.

Obs.—It is with some hesitation that I refer the impression of a fragmentary univalve to this genus, characteristic of the Trenton Limestone of North America, and the Wenlock Limestone of the Island of Gotland. By taking a cast of the impression we see the remains of a turreted shell, with sharply carinated whorls, and generally presenting a bold and somewhat rugged appearance. There are portions of four whorls, each divided almost in the centre by a strong and sharp carina, the surface of each whorl above it being more or less concave, and below nearly straight walled. Our cast corresponds better with Lindström's figure of *L. bicincta*, Hall, sp.[1], than it does with Whitfield's types. Whatever may be the ultimate resting-place of the former, I think the Tasmanian cast will be found congeneric, although sufficient of the body whorl is not preserved to show the second or lower keel. All trace of sculpture has been removed.

There is no more evidence in our specimen than there is in Lindström's figure of the ultimate uncoiling of the whorls described by Whitfield as typical of his genus, and it is just possible therefore that the Gotland shells called *L. bicincta*, Hall, sp., by Lindström, may not be that species.

Loc.—Zeehan, in a white quartzite.

Genus Murchisonia, *D'Archiac* and *De Verneuil.*

(Bull. Soc. Géol. France, 1841, XII., p. 154.)

Pl., Fig. 23.

Obs.—This genus is represented by the elongated cast of a turreted-pyramidal shell, slowly increasing in size. There are five whorls (as preserved), almost straight sided, and swollen near the sutures, caused by a slight projection of the wide and apparently flat band, which on the upper whorls is situated at that point, but on the body whorl forms its periphery.

[1] *Pleurotomaria*, Sil. Gastropoda and Pteropoda of Gotland, 1884, p. 104, t. 8, f. 15-25.

Although only a fragment, this is a well marked shell. It belongs to that group of Murchisoniæ to some extent represented by *M. cingulata*, His., but differs in possessing straight-walled whorls and a more rapidly attenuating spire. The sculpture is unpreserved.

Loc.—Zeehan, in a white quartzite.

Genus Eunema, *Salter.*

(Canadian Organic Remains, 1859, Dec., I., p. 24.)

Eunema Montgomerii, *sp. nov.*

Pl., Fig. 21 & 22.

Sp. char.—Shell conical, turreted, of four non-oblique whorls, and a nucleus, encircled by prominent sharp carinæ, the first three whorls each bearing two, one immediately around the suture, the other near the middle; below this the sides of each whorl are straight-walled; body whorl with four keels, the three upper as already described, whilst the fourth is much more anterior in position—practically quite anterior—and somewhat oblique; the sides of each whorl between the first and second carinæ are concave, whilst the second carina is always the more prominent; the sutures are flat or very slightly concave; surface ornamented with microscopic thread-like lines of growth, varying slightly in direction between the encircling carinæ. Height of the largest specimen three-quarters of an inch.

Obs.—A very well marked shell, allied to *E. strigillatum*, Salter,[1] of the Trenton Epoch of North America, but broader in relation to its height, and differently directed carinæ. It affords me much pleasure to associate with this the name of Mr. A. Montgomery, Government Geologist of Tasmania. Johnston's *Trochonema Etheridgei*[2] is perhaps an allied, although distinct shell.

Loc.—Zeehan, in the Despatch Limestone.

Genus Raphistoma, *Hall.*

(Pal. N. York, 1847, I., p. 28.)

Raphistoma? *sp. ind.*

Pl., Figs. 25 and 26.

Obs.—In the white sandstone from Zeehan several very poor casts of a low-crowned shell occur, difficult of determination, but having the appearance of this genus, and in

[1] Canadian Organic Remains, Dec., I., 1859, p. 29, t. 6, f. 4.
[2] Syst. Acc. Geol. Tas., 1888, t. 5, f. 13 and 14.

some respects resembling the form I have lately described as *R. Brownii*,[1] but lower in the spire, and therefore probably distinct. It is very desirable that additional examples of this fossil should be obtained, with the view of determining its systematic position with greater accuracy.

Loc.—Zeehan, in a white quartzite.

Pteropoda.

Genus Tentaculites, *Schlotheim.*

(Petrefactenkunde, 1820, p. 377.)

Tentaculites, *sp. ind.*

Pl., Fig. 27.

Obs.—This elegant genus is represented by a very large number of external impressions. Casts taken from the latter display a remarkably elongate and delicate form, extending to a fine needle-point, but without any trace of the bulbiform embryonic shell. The characteristic annulations are about one-fourth or one-fifth millimetre apart, or four to five in number in the space of one millimetre. The interannular spaces are delicately transversely striated as usual in the genus. The annulations were very sharp, and apparently came to a fine edge.

Specific identification from the condition of the specimens is impossible, but it is a smaller form than that figured[2] by myself from the Siluro-Devonian rocks of the neighbourhood of Wellington, N. S. Wales.

Loc.—Heazlewood and Zeehan, in a blue-grey schistose rock.

5.—AGE.

The species detailed in the foregoing pages present both a Lower and an Upper Silurian facies, but with a preponderating tendency towards the latter. I think it not impossible that they represent a series of beds homotaxially equivalent to the lower portion of the Upper Silurian.

---

[1] S. Australian Parl. Papers, 1891, No. 158, p. 9, Pl., f. 1-3.

[2] Journ. R. Soc. N. S. Wales, 1880, XIV., p. 253, pl., f. 10.

DESCRIPTION OF THE FIGURES.

Fig. 1. *Pleurodictyum?* sp. ind.—The impression of portions of ten corallites. The walls have entirely disappeared, leaving traces of the mural pores as small connecting shafts between the corallites. Zeehan.

2. *Asaphus*, sp. ind.—Small pygidium consisting of the test seen from the inside. Zeehan.

3. *Illænus Johnstoni*, Eth. fil. The cephalon or cephalic shield, with well marked axial grooves. Zeehan.

4. *Hausmannia meridianus*, Eth. fil. and Mitchell.—Pygidium showing the largely increased number of segments: cast from an impression. Heazlewood.

5. *Hausmannia*, sp. ind.—A smaller pygidium, probably of a distinct species, with the axis tuberculate. Zeehan.

6. *Hausmannia meridianus*, Eth. fil. and Mitchell.—The right coalesced pleuræ showing the wide limb. Zeehan.

7. *Cromus Murchisoni*, De Koninck.—The glabella and portion of the fixed cheeks—× 2. Heazlewood.

8. The same.—Pygidium, with the apex wanting—× 2. Heazlewood.

9. *Amphion? brevispinus*, Eth. fil.—Small pygidium, decorticated at the apex, but showing traces of the pleural spines—× 2. Zeehan.

10. *Cornulites tasmanicus*, Eth. fil.—Internal cast of the tube. Heazlewood.

11. The same.—A smaller tube in the same condition. Heazlewood.

12. *Strophomena.*—Impression of a ventral valve? Zeehan.

13. *Strophodonta*, sp. ind.—Imperfect cast. Zeehan.

14. The same.—Hinge-line of Fig. 15 to show denticulations—× 3. Zeehan.

15. The same.—Partially preserved cast. Zeehan.

Fig. 16. *Rhynchonella cuneata*, Dalman.—Impression of the ventral (?) valve. Zeehan.

17. *Rhynchonella capax*, Conrad.—Cast taken from the impression of two valves in juxta-position—× 2. Heazlewood.

18. The same.—A ventral valve—× 2. Heazlewood.

19. *Rhynchonella borealis*, Schlotheim?—Cast of the ventral valve taken from an impression—× $1\frac{1}{2}$. Zeehan.

20. The same.—Zeehan.

21. *Eunema Montgomerii*, Eth. fil.—Showing general characters. Zeehan.

22. The same.—A smaller example. Zeehan.

23. *Murchisonia*, sp. ind.—Cast taken from an impression. Zeehan.

24. *Lophospira?* sp. ind.—Cast taken from an impression. Zeehan.

25. *Raphistoma?* sp. ind.—Internal cast, apical view. Zeehan.

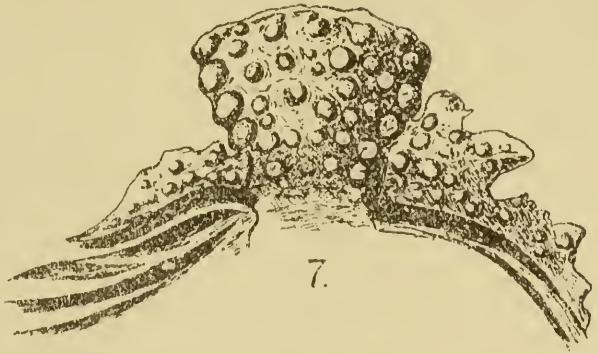
26. The same.—Side view showing the keeled whorls. Zeehan.

27. *Tentaculites*, sp. ind.—Cast taken from an impression—× 6 (about). Heazlewood.

28. *Leptodomus? nuciformis*, Eth. fil.—Left valve—× 3. Zeehan.

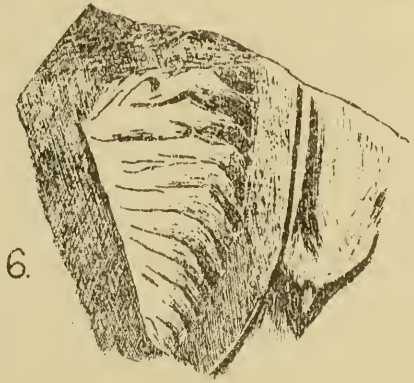
19.

20.

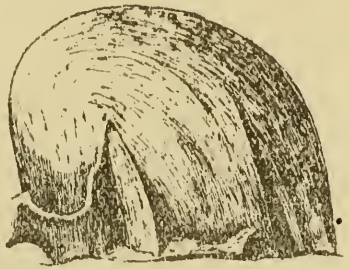


7.

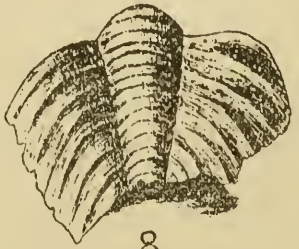
27.



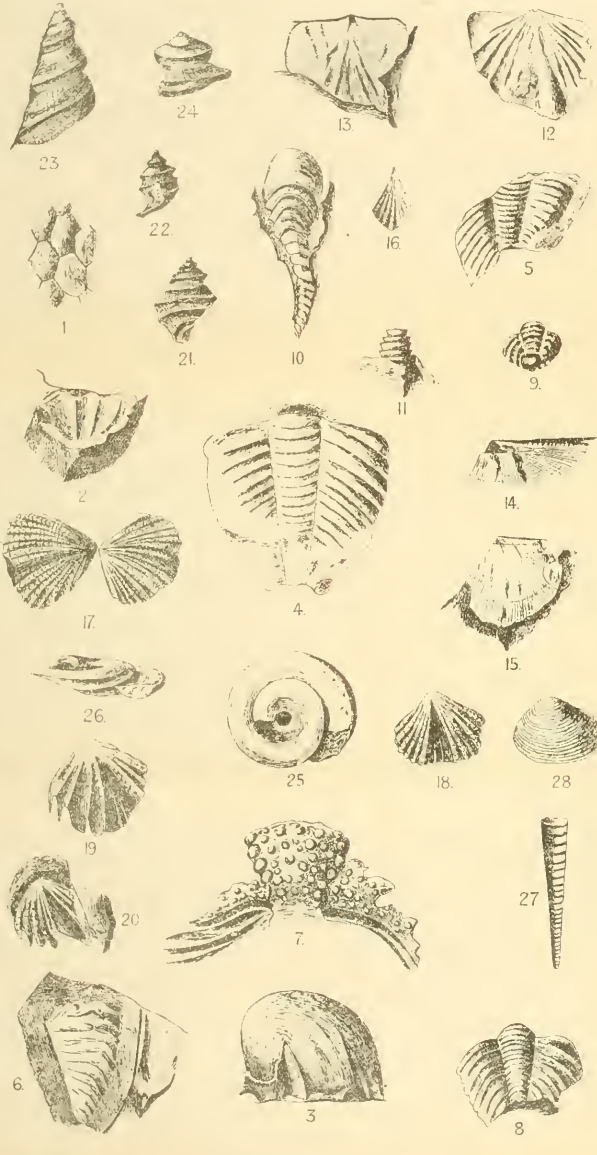
6.



3.



8.


23.
24.
13.
12.
22.
16.
5.
1.
21.
10.
11.
9.
2.
14.
4.
17.
15.
26.
25.
18.
28.
19.
27.
20.
7.
6.
3.
8.