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NOTES ON MOLLUSCA FROM THE ALPINE ZONE OF
MOUNT KOSCIUSKO.

By C. HEDLEY, F.L.S.

(Conchologist to the Australian Museum).

[Plate XXIII.]

The Alpine fauna and flora have elsewhere yielded such interesting results that it is with pleasurable anticipations a student turns to the consideration of this chapter in Australian Biology. The restricted development of high land here holds out, however, no promise of a rich harvest. In Australia the alpine zone is almost limited to the plateau of Mount Kosciusko, an elevation so insignificant (7,256 ft.) that on other continents it would rather be termed a hill than a mountain.

Two observers have contributed, especially to our knowledge of the physical features of this district. In January, 1885, Dr. R. von Lendenfeld made a brief reconnaissance and under the titles of "Meteorology of Mount Kosciusko" and "The Glacial Period in Australia" communicated some of his experiences of it to the Linnean Society of New South Wales. A more detailed account of his travels appeared as a Parliamentary Paper, Sydney, 1885, and in Petermann's Mittheilungen, 1887.

Later, several visits, the first under the auspices of this Institution, were paid by Mr. Richard Helms. In a "Report of a Collecting Trip to Mount Kosciusko,"* in an essay "On the recently observed evidences of an extensive Glacier Action at Mount Kosciusko Plateau," † and in a paper now being published by the Royal Geographical Society of Australasia, N.S.W. Branch, he has recorded observations on the geology and natural history of the district. Considerable zoological collections were formed by Mr. Helms, which have not yet been exhaustively investigated.

"An isopod of a very old and greatly generalised type," ‡ he procured at the 5,700 level, was described by Dr. C. Chilton§ as *Phreatoicus australis*; a species since collected at the 4000 ft. level on Mount Wellington in Tasmania and which completes a genus of two other species from South New Zealand. This distribution supporting that of *Geonemertes australiensis*, Dendy,||

* Rec. Austr. Mus. i., pp. 11-16.

† Proc. Linn. Soc. N.S.W. (2) viii., pp. 349-364.

‡ Thomson, Trans. Linn. Soc., Zool. (2) vi., p. 301.

§ Rec. Austr. Mus. i., pp. 149-171.

|| Proc. Linn. Soc. N.S.W. (2) x., p. 372.

and Tasmanian types of Orthoptera and Coleoptera* suggests that the alpine fauna of Mt. Kosciusko is primarily or specifically Tasmanian and secondarily or generically Antarctic. This generalisation accords perfectly with the mollusca I am about to discuss. The Tasmanian colony left stranded on the Kosciusko heights demands a former cold period to explain their existence there as clearly as does a moraine left by a vanished glacier. Had not geologists furnished evidence of an Australian Glacier Epoch, then biologists would have had to invent on their own account a theory of such.

As the molluscan collection has not reached me whole, these observations make no pretence to exhaust the subject, the interest attending which justifies the publication of data, however fragmentary. On the return of Mr. Helms from his first trip to Mt. Kosciusko, a single species of his molluscan captures was at once entrusted to me, though not then engaged in the Museum service, for description. This was an unfigured species, then only recorded as Tasmanian, which I identified,† with some hesitation from insufficient data as *Cystopelta petterdi*, Tate. These doubts were dispelled‡ afterwards by an examination of living specimens in their type locality. Since then, this species has been traced in Victoria to Ballarat (Musson), and Loch, (Frost); in New South Wales to the Kurrajong Hills (Musson), Mount Wilson (J. C. Cox), and Blackheath (Quaife).

On resuming the examination of the Kosciusko mollusca five years afterwards two new species first claimed my attention.

EDODONTA NIVEA, *n. sp.*

(Plate XXIII., Figs. 5, 6, and 7).

Shell, white, thin, small, shining, flattened, involute, and perforate. Whorls, three, closely coiled, the earlier enrolled within the latter and almost concealed by them. Spire, a shallow crater, one third of the shell's major diameter, from the floor of which the whorls centrifugally ascend. Umbilicus, narrow, one eighth of the shell's major diameter, a hollow screw showing the revolutions of two whorls. Sculpture, last whorl perpendicularly crossed by 115 sharp costæ diminishing in size and approaching one another at the suture and umbilicus; on the vertex and base the interstices, from three to five times the breadth of the intervening costæ, are crossed by minute spiral raised hair lines forming meshes which are in turn crossed by three or four most minute longitudinal threads; in the peripheral zone the spiral

* *Op. cit.*, iv., p. 398.

† *Proc. Linn. Soc. N.S.W.*, (2) v., pp. 44-46, pl. i.

‡ *Op. cit.*, vi., p. 24.

lines are evanescent. The penultimate whorl has 61 costæ. The first whorl is spirally grooved. Aperture oblique, lunate ovate, lip deeply incurved at the suture, rising above the vertex, arched above and below, not thickened and scarcely reflected at the columella. Inner lip overlaid by an opaque granular callus burying in its advance the costæ in its path.

Diameters, major $3\frac{1}{4}$, minor $2\frac{3}{4}$, height $1\frac{1}{2}$ m.m.

Loc.—Wilson's Valley, at an altitude of 4,500 ft., Mt. Kosciusko, N.S.W. (Helms).

Type—Australian Museum, C. 67.

This species nearly approaches *E. antialba*, Beddome, from Tasmania, from which its narrow umbilicus and shallow spire readily distinguish it. Other species compared by their respective authors to *E. antialba* are *E. subantialba*, Suter, from New Zealand, and *E. emula*, Tate, from Central Australia; besides other differences both are much smaller than that now introduced.

FLAMMULINA EXCELSIOR, n. sp.

(Plate XXIII., Figs. 2, 3, and 4).

Shell large for the group (subgenus *Flammulina*), turbinate, spire rather elevated, thin, translucent, surface dull, barely perforate, whorls three, rapidly increasing, last flattened above, rounded at the periphery and ventricose on the base. Suture impressed, coloured on a pale ground by angular brown flames of irregular pattern, usually most distinct at the suture and fading away both at the periphery and on the penultimate whorl, frequently directed downwards and forwards they cross the growth lines diagonally and breaking up about the periphery produce a mottled pattern. Sculpture, close irregular growth lines commence as coarse wrinkles at the suture and fade into the smooth base, faint spiral scratches are seen under the microscope to cross these; the earliest whorl exhibits regularly spaced costæ crossed by fine spiral striae. Aperture oblique, ovate, lip sharp, the somewhat twisted columella is folded over a minute perforation; a thin granulated callus is spread over the inner lip and curves around the umbilical region. Diameters, major 9, minor 8, height 6 m.m.

Loc.—Pretty Point, at an altitude of 5,700 ft., Mt. Kosciusko, N.S.W. (Helms).

Type.—Australian Museum, C. 71.

This very fragile shell of a group hitherto unrecorded from Australia seems in shape to be nearest allied to *F. cornea*, Hutton, from Auckland, New Zealand, from which its size, colour, and perforation distinguish it. In a bottle with *Cystopelta*, but without locality more precise than "Victoria," Prof. W. Baldwin Spencer

has sent me examples of this species in spirits. The foot, white dotted with black, showed a tail gland and papilla, parapodial grooves and oblique furrows.

Other species brought by Mr. Helms, from Mt. Kosciusko, were:

ENDODONTA TASMANIÆ, *Cox.*

Ref.—Cox, Mon. Austr. L. Shells, p. 22, pl. xiii., fig. 4 (3 figs.); Petterd, Mon. L. Shells Tasmania, p. 31, etc.

Loc.—Pretty Point, at an altitude of 5,700 ft., Mt. Kosciusko. This is the first record of the species occurring outside Tasmania.

ENDODONTA PARVISSIMA, *Cox.*

Ref.—Cox, in Legrand, Collections Mon. Tasm. L. Shells, species 39, Pl. ii., fig. 1 (3 figs.); Petterd, Mon. L. Shells Tasmania, p. 22.

Loc.—Pretty Point, at an altitude of 5,700 ft., Mt. Kosciusko. Like the preceding not hitherto known beyond Bass Straits. Doubtfully identified from insufficient material.

ENDODONTA TAMARENSIS, *Petterd.*

Ref.—Petterd, Journ. Conch. ii., p. 213; iii., p. 175 (as *H. rosacca*), Mon. Tasm. L. Shells, p. 30; Tate, Proc. Roy. Soc. S.A., iv., p. 75; Billingham, Victorian Naturalist, 1893, p. 62; Hedley, Proc. Linn. Soc. N.S.W., (2) ix., p. 43.

Loc.—Wilson's Valley, at an altitude of 4,500 ft., Mt. Kosciusko. From Launceston, Tasmania (Petterd), it has been traced to Burrumbeet (Tate), Mount Franklin (Billingham), Victoria; and Blackheath, N.S.W. (Quaife). In the last locality it was associated with *Helicarion verreauxi* and *Cystopelta petterdi*, both fellow emigrants from Tasmania.

ENDODONTA ALBANENSIS, *Cox.*

Ref.—Hedley, Proc. Linn. Soc. N.S.W., (2) vii., p. 163, pl. ii., f. 5-8; Proc. Malacol. Soc. i., p. 260.

Loc.—Pretty Point, at an altitude of 5,700 ft., Mt. Kosciusko. Specimens collected by Mr. C. T. Musson at Tamworth, N.S.W., and presented to the Museum represent the most northern point known to be attained by this species.

ENDODONTA FUNEREA, *Cox.*

Ref.—Cox, Mon. Austr. L. Shells, p. 16, pl. iii., f. 1.

Loc.—Moonbar (3,500 ft.) and Wilson's Valley (4,500 ft.), Mt. Kosciusko. Ranges from S. Queensland to Victoria.

ENDODONTA PARADOXA, *Cox.*

Ref.—Cox, Mon. Austr. L. Shells, p. 21, pl. xi., f. 13 (as *H. morti*), etc.

Loc.—Moonbar (3,500 ft.), Mt. Kosciusko. The form here recorded is larger and more globose than typical examples.

CHLORITIS BREVIPILA, *Pfeiffer.*

Ref.—Pilsbry, Man. Conch., (2) vi., p. 265, pl. lviii., f. 29-30.

Loc.—Moonbar, Mt. Kosciusko, N.S.W.

Mr. Helms also reports a *Panda*, from Mt. Kosciusko, probably *P. atomata*, Gray, which has not come into my hands.

RHENEA SPLENDIDULA, *Pfeiffer.*

Ref.—Pfeiffer, Conchylien Cabinet, (2nd ed.), Band I., Abth. 12, pt. 2. p. 109, pl. lxxxv., f. 1-3.

Loc.—Mt. Kosciusko. East coast of Australia generally.

DESCRIPTION OF *PUGNUS*, A NEW GENUS OF
RINGICULIDÆ, FROM SYDNEY HARBOUR.

By C. HEDLEY, F.L.S.

(Conchologist to the Australian Museum).

[Plate XXIII., Fig. 1.]

Among several microscopic shells taken by Mr. A. U. Henn on stones at low water in Little Manly Cove, near Sydney, one attracted our special attention. The finder gratified the writer by placing the novelty in his hands for study, and on learning the result thereof has generously presented to the Australian Museum the most perfect of the three specimens obtained, which constitutes the subject of the present communication.

The long narrow aperture was contrasted in turn with every involute shell figured in Pilsbry's Monograph of the Order* without matching it. Then it occurred to me that those features of the thickened lip, etc., in which the new form departed from the plan of *Cylichna*, *Tornatina*, and so on, were all characteristic of *Ringicula*, whose very different outline had not at first invited attention. Critical comparison enforced the conviction that a telescoped Ringiculoid had now presented itself; for which a

* Manual Conch., (1) xv., pls. 18 - 60.

EXPLANATION OF PLATE XXIII.

Fig. 1. *Pugnus parvus*, Hedley.

Figs. 2, 3, 4. Various aspects of *Flammulina excelsior*, Hedley.

„ 5, 6, 7. Various aspects of *Endodonta nivea*, Hedley.

[All magnified, and to various scales, drawn from types by the Author.]

