Art. XXV.—*Description of some New Species of Pliocene Mollusca from the Wanganui District, with Notes on other Described Species.*

By R. Murdoch.

[*Read before the Wellington Philosophical Society, 12th September, 1899.*]

Plate XX.

Ringicula uniplicata, Hutton. Plate XX., fig. 6.

Hutton, Trans. N.Z. Inst., vol. xvii., p. 313; Macleay Memorial Volume, p. 36.

It seemed desirable that this minute species should be figured, and for that purpose I am indebted to Captain Hutton for the loan of type specimen. The following descriptive note may, however, be added: Body-whorl with about eighteen delicate spiral ribs, which are wider than the grooves, the penultimate with about seven minute spirals; the two apical whorls smooth; under an inch objective the whorls are seen to be finely striate with growth-lines; columella with two plaits, the anterior much the stronger, curved and somewhat reflexed; a thick callous rib extends from the insertion of the outer lip some distance down the parietal wall; the outer lip thickened and reflexed, a few inconspicuous denticles thereon; viewed from behind the reflexed lip is seen to project considerably, and appears as a thick, smooth, rounded rib.

Type, Canterbury Museum.

Locality.—Petane.

Actæon minutissima, n. sp. Plate XX., fig. 5.

Shell minute, ovato-elongate, shining, smooth, pellucid; whorls 4, apical whorl rounded, the others very slightly convex, the outward curve from the impressed sutures a little abrupt, giving a slightly turreted aspect; body-whorl nearly twice the length of the spire; a single microscopic thread encircles the body-whorl at the periphery and a little above the sutures on the two succeeding whorls; aperture ovate, slightly oblique; columella with a single posterior fold. Length, 1·96 mm.; breadth, 0·89 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of Wanganui Heads.

This and other minute forms were sifted from sand and blue clay by Mr. T. J. Haines. It differs from other New Zealand species in its minute size and lack of sculpture.

Trophon (Kalydon) huttonii, n. sp. Plate XX., fig. 1.

Shell small, fusiform; whorls 8½, protoconch one and a half whorls, smooth, the others spirally and longitudinally ribbed, the longitudinal ribs rounded, somewhat nodular, eleven on a whorl; the spire whorls with five or six and the body with thirteen or fourteen spiral ribs, the grooves about the same width as the ribs, with the exception of a single wide groove which encircles the spire-whorls a little above the sutures, and the body-whorl close above the aperture; the rib forming the lower margin to this wider space is grooved on its surface; the whorls are finely sculptured with transverse thin laminæ, which cross both grooves and ribs (this is well preserved in some examples, and has almost disappeared in others). Sutures with a marginal rib, indistinct in some examples; aperture broadly ovate, outer lip somewhat expanded and with several small denticles a little within the margin; columella straight and rounded, anterior canal short, curved to the left, posterior canal shallow and indistinct. Length, 16 mm.; breadth, 6·2 mm.

Type, Wanganui Museum.

Locality.—Shakespeare Cliff, Wanganui.

This beautiful little shell seems quite distinct from any New Zealand species. The wide groove encircling each whorl is a characteristic feature by which it may be readily distinguished. The species I venture to name after Captain F. W. Hutton, as a small token of appreciation for his invariable kindly assistance.

Pleurotoma gemmea, n. sp. Plate XX., fig. 9.

Shell small, fusiform; whorls 6½, strongly angled, protoconch one and a half whorls, polished, the others with eighteen to twenty small nodules on the angle (these are slightly produced below the angle, and have somewhat the appearance of very short riblets); whorls obliquely longitudinally striated, and with fine spiral lines; body-whorl biangulate, the anterior angle slight, forming a line with the insertion of the outer lip; there are about twenty-four spirals between the posterior angle and anterior end, about six of which are between the aperture and angle; the posterior of these are close together and cut the nodules into minute grains; the area above the angle concave, with several microscopic spiral lines and a small marginal rib close to the sutures; aperture oval, canal produced, gently curved, outer lip (?) imperfect. Length, 13 mm.; breadth, 5 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of Wanganui Heads.

This shell stands nearest to *P. buchanani,* Hutton, from

which it may be distinguished by the longitudinal and spiral sculpture being much less developed, giving it a more smooth appearance.

Pleurotoma albula, Hutton, var. **subalbula,** n. var. Plate XX., fig. 2.

Shell small, fusiform; body longer than the spire; whorls 8, protoconch two whorls, smooth and polished, the third usually irregular growth-lines only; the two succeeding whorls with two spiral ribs, the anterior somewhat the stronger, and one or two spiral threads; on the next, or antepenultimate, a sutural thread gradually strengthens, forming a third rib, which on the penultimate equals in size the posterior rib; in addition to these, there are two or three spiral threads between the subcentral and posterior rib, and a like number between the latter and suture; on the body-whorl are three spiral ribs in front of the aperture, usually less distinct as they approach the outer lip, and with one or two threads in the interspaces; anterior to this are ten or eleven small spirals, somewhat irregular in size; above the sinus are seven or eight threads, two of which are slightly stronger, and in some examples form small ribs; the whorls transversely striate with growth-lines, oblique on the sinus area; aperture narrow, slightly contracted below; columella straight, somewhat callused, canal short and slightly curved, outer lip thin, sinus shallow. Length, 12 mm.; breadth, 5 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of Wanganui Heads.

Compared with a typical example of *albula*, this shell differs in the most prominent rib not being central on the spire-whorls, but nearer to the anterior ends, the area above the sinus wider, the columella stronger, canal less produced, and by the shell in general having a stouter aspect. This and the preceding species should probably be referred to section *Surcula*.

Clathurella sinclairii, Smith. Plate XX., fig. 7.

Smith, Ann. and Mag. Nat. Hist., 1884, vol. xiv., p. 320; Tryon, Man. Conch. (1), vol. vi., p. 283, pl. xxxiv., fig. 91.

To determine this species from other nearly allied fossil forms is not always an easy matter. The example chosen for illustration is recent, and a brief description of it may not be out of place.

Shell whitish, with a narrow brown band near the posterior end of whorls, and a wider band towards the anterior end of body-whorl (some examples without colour-bands); whorls 6–6½, apical whorl smooth, the others trans-

versely ribbed, ribs slightly oblique, seventeen to nineteen on the body-whorl, becoming obsolete as they approach the anterior end, fine growth-lines on and between the ribs; the anterior end of body-whorl with ten or a dozen minute spiral striæ, and three or four on the sinus area; sutures impressed; aperture ovate-elongated, somewhat narrow and oblique; columella straight, anterior canal short, lightly curved, outer lip thin, sinus shallow. Length, 10 mm.; breadth, 4 mm.

Differs from *C. abnormis*, Hutton, in the greater number of longitudinal ribs and the whorls not angled; from other New Zealand fossil species in the spiral sculpture being limited to the anterior end of body-whorl and the few delicate lines on and above the sinus area.*

Clathurella corrugata, n. sp. Plate XX., fig. 8.

Shell small, fusiform; the body much longer than the spire; whorls 5½, protoconch one and a half whorls, polished and with spiral lines, the others with strong longitudinal ribs, ten or eleven on a whorl; these are crossed by fine spiral ribs, of which there are six or seven on the spire-whorls, the three anterior strongest, with one or two threads in the interspaces; on the body-whorl are about thirteen principal spirals, with here and there a delicate thread or two in the interspaces; at the posterior end are five or six minute irregular threads; the first three ribs above the aperture are the strongest; sutures well marked; aperture somewhat narrow, columella straight, anterior canal short and straight, outer lip thin, slightly angled above, sinus well marked. Length, 7 mm.; breadth, 3 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of Wanganui Heads.

The example described and figured is, perhaps, not quite adult; other specimens have a length of 9·5 mm.; unfortunately, they are more or less broken, the sculpture rubbed and somewhat indistinct. From *C. abnormis*, Hutton, it may at once be distinguished by the spiral sculpture on posterior end of body-whorl; from *C. dictyota*, Hutton, in the longitudinal ribs being much stronger and the cancellated sculpture less marked. I have not seen the latter species.

Clathurella hamiltoni, Hutton.

Hutton, Trans. N.Z. Inst., vol. xvii., p. 316, pl. xviii., fig. 7; Macleay Memorial Volume, p. 52, pl. vii., fig. 35.

The examples of this species occurring in the Wanganui and Okehu formations differ from the typical forms in their smaller size—they vary in length from 6·5 mm. to 9 mm.;

* For further reference to this species, see Suter, "Revision of the New Zealand *Pleurotomidæ*," Trans. N.Z. Inst., vol. xxxi., pp. 73, 74.

also unworn specimens have fine spiral lines on the embryonic whorls. Captain Hutton informs me the typical examples from Petane have the embryonic whorls smooth, but are slightly rubbed, and the spiral sculpture probably erased.

Odostomia (Pyramis) obsoleta, n. sp. Plate XX., fig. 4.

Shell minute, ovato-elongated; whorls 5, slightly convex, the two apical smooth, the first polished, the third whorl with four and the fourth with five delicate spiral grooves, leaving a narrow smooth space at the anterior end of each whorl; body-whorl nearly twice the length of spire, with eight spiral grooves, six in front of the aperture, anteriorly without sculpture, finely longitudinally striate with growth-lines; sutures lightly impressed; aperture ovate, slightly oblique, columella gently curved, the plait indistinct, situate somewhat within the aperture; a narrow deeply impressed area in the umbilical region. Length, 2·5 mm.; breadth, 1·21 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of the Wanganui Heads.

Of this minute species there is but a single example; it is nearly allied to *O. fasciata*, Hutton, but differs in the arrangement of the spiral sculpture.

Lacuna (?) exilis, n. sp. Plate XX., fig. 3.

Shell minute, subovate, fragile, narrowly umbilicate; whorls 5, smooth, somewhat polished, the spire-whorls rounded, the penultimate more than equals the first three in length, the body-whorl large, inflated, equals four-fifths of total length of shell, the whorls lightly transversely striated with growth-lines; sutures impressed; aperture broadly ovate, slightly oblique, outer lip thin, columella gently curved, the inner lip projecting outwards as a narrow rim, leaving, as it were, a deeply channelled suture extending from the umbilicus to the posterior end of aperture; the umbilicus small and deep, with a broad shallow groove proceeding from it to the anterior end of columella. Length, 2·5 mm.; breadth, 1·6 mm.

Type, Wanganui Museum.

Locality.—Blue-clay cliffs, west of Wanganui Heads.

It is with much hesitation I refer this minute shell to *Lacuna*, a genus known only from the Northern Pacific and Atlantic. Apart from the projecting rim-like inner lip, it is not unlike this genus, and may be included provisionally. There is but a single example, and further material may assist to determine the true position.*

* Since the above was written and read the species has been submitted to Mr. H. Suter, of Christchurch, who, with Professor Boehm, of Freiburg, regards it as a form of *Lacuna*.

Mactra scalpellum, Deshayes. Plate XX., fig. 10.

Deshayes, Proc. Zool. Soc., 1854; Reeve, Conch. Icon., fig. 106; Man. N.Z. Moll., p. 138.

I offer a figure of this somewhat rare shell. Some half-dozen examples were found in the sandy blue clays occurring in the coastal cliff north-west of the Wanganui Heads. The shell is triangular, oblong, compressed, equilateral, shining, extremities rounded, slightly attenuated, finely concentrically striated; umbones small, closely approximated; right valve with two narrow lateral teeth on each side of the cartilage-pit, and one on each side in the left valve; pallial sinus deep, rounded at the apex. The specimen figured has a length of 21 mm., and a breadth of 12·5 mm.

EXPLANATION OF PLATE XX.

Fig. 1. *Trophon huttonii*, n. sp.; × 2.
Fig. 2. *Pleurotoma albula*, Hutton, var. *subalbula*, n. var.; × 3.
Fig. 3. *Lacuna (?) exilis*, n. sp.; × 10.
Fig. 4. *Odostomia (Pyramis) obsoleta*, n. sp.; × 10.
Fig. 5. *Actæon minutissima*, n. sp.; × 10
Fig. 6. *Ringicula uniplicata*, Hutton; × 22.
Fig. 7. *Clathurella sinclairii*, Smith.
Fig. 8. *Clathurella corrugata*, n. sp.
Fig. 9. *Pleurotoma gemmea*, n. sp.
Fig. 10. *Mactra scalpellum*, Deshayes.

The latter four figures were drawn with the aid of a camera lucida.

ART. XXVI.—*On the Nelson Boulder Bank.*

By W. F. WORLEY.

[*Read before the Nelson Philosophical Society, 13th November, 1899.*]

Plate XXI.

ABOUT six years ago I had the honour of reading before this Society a paper on the geology of this district. In the discussion which followed the reading of that paper I was asked for an expression of opinion upon the formation of the Boulder Bank. In reply to that question I stated that in all probability the Boulder Bank had been formed by the upheaval of a boulder stratum. Mr. Leslie Reynolds has evidently heard of this theory, for in his report on the proposed harbour improvements he says he can see nothing to support the theory that a reef underlies the bank.

One's own experience of the difficulties of understanding