# A Review of the Tertiary and Recent Neozelanic Pyramidellid Molluscs

## No. 2—The Genus *Chemnitzia*

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Genus CHEMNITZIA d'Orbigny.

1893. D'Orbigny, *Hist. Nat. Iles Canaries*, p. 77.
Type (*fide* Dall and Bartsch): *Melania campanellae* Phil.

THE definition of *Chemnitzia* given by Dall and Bartsch in their Monograph of the West American Pyramidellidae is apt to be misleading. According to these authors both the axial ribs and grooves of *Chemnitzia* end abruptly at the periphery, so that the base is entirely unsculptured. The present investigation has shown, however, that in some instances the axial ribs may be obsoletely continued over the base even when the intercostal spaces have terminated abruptly at the periphery. Within a species some shells may show this feature whilst others lack all trace of basal axials. The only constant feature separating *Chemnitzia* from *Turbonilla* s.str. is, then, the manner of termination of the intercostal spaces, and where these became suddenly obsolete along or near the produced line of suture the shell falls into *Chemnitzia,* even though faint axials may be developed below.

Judging by the description and illustration in the Monograph, *T. centrota* Dall and Bartsch should be removed to *Chemnitzia.* Similarly, *Turbonilla (Chemnitzia) garrettiana* Dall and Bartsch (*Proc. U.S. Nat. Mus.,* vol. 30, p. 339, pl. 21, fig. 5; 1906) is certainly not a *Chemnitzia.* Amongst Neozelanic species *T. powelli* Bucknill and *T. finlayi* Powell are accordingly placed here also.

TIME-RANGES OF CHEMNITZID SPECIES.

| | Bortonian | Tahuian | Waiarekan | Ototaran | Waitakian | Hutchinsonian | Awamoan | Taranakian | Waitotaran | Nukumaruan | Castlecliffian | Recent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Group A—* | | | | | | | | | | | | |
| *kereruensis* .. | | | | | | | | | | — | | |
| *petancana* .. | | | | | | | | | | — | | |
| *aoteana* .. | | | | | | | | | | | | — |
| *pliocenica* .. | | | | | | | | | | | — | |
| *finlayi* .. .. | | | | | | | | | | | | — |
| *owenga* .. .. | | | | | | | | | | | | — |
| *errabunda* .. | | | | | | | | | | | | — |
| *dunedinensis* .. | | | | | | | | | | | | — |
| *kingi* .. .. | | | | | | | | | | — | — | — |
| *raptor* .. .. | | | | | | | | | | — | | |
| *verecunda* .. | | | | | | | | | | | | — |
| *forsteriana* .. | | | | | | | | | | | | — |
| *powelli* .. .. | | | | | | | | | | | | — |
| *jactura* .. .. | | | | | | | | | | — | ... | — |
| *cookiana* .. | | | | | | | | | | | | — |
| *stipes* .. .. | | | | | | | | | | | | — |
| *vegrandis* .. | | | | | | | | | | | | — |
| *zealandica* .. | | | | | | | | | | | — | — |
| *haugrandis* .. | | | | | | | ? | | | | | |
| *vigilia* .. .. | | | | | | | | | | | | — |
| *bucknilli* .. | | | | | | | | | | | | — |
| *waitemata* .. | | | | | | | | | | | | — |
| *barrierensis* .. | | | | | | | | | | | | — |
| *lamyi* .. .. | | | | | | | | | | | | — |
| *kaawa* .. .. | | | | | | | | | — | | | |

? *C. haugrandis* Marwick. Poorly preserved and may have spirals.

TIME-RANGES OF CHEMNITZID SPECIES (continued).

| | Bortonian | Tahuian | Waiarekan | Ototaran | Waitakian | Hutchinsonian | Awamoan | Taranakian | Waitotaran | Nukumaruan | Castlecliffian | Recent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Group B—* | | | | | | | | | | | | |
| *scala* .. .. | | | | | | | | | | | | — |
| *lillingtoniana* | | | | | | | | | | | | — |
| *mitis* .. .. | | | | | | | | | | | | — |
| *rakiura* .. .. | | | | | | | | | | | | — |
| *campbellica* .. | | | | | | | | | | | | — |
| *informis* .. | | | | | | | | | | | | — |
| *brevisutura* .. | | | | | | — | — | | | | | — |
| *acer* .... .. | | | | | | | | | | | | |
| *sycophanta* .. | | | | | | — | | | | | | |
| *granti* .. .. | | | | | | — | | | | | | |

## CHEMNITZIA Group A.*

The species falling into this group are akin to *Turbonilla* s.str. in every respect except that the intercostal spaces terminate abruptly at or near the periphery. The protoconch is heterostrophic and helicoid, usually of about two volutions.

KEY TO SPECIES OF *Chemnitzia* A.

Axials markedly oblique.
  Axials sloping forward, stout; interstices narrrow but not linear; suture deep; whorls slightly tabulated. .. .. *petaneana.*
Axials practically vertical.
  Shell needle-like, very finely sculptured.
    Axials flexuous and hairlike, very dense, 40 on penultimate whorl, summits sharp; interstices irregular but mostly about same width. .. .. .. .. *aoteana.*
    Axials less flexuous, stouter and much flatter, 30 on penultimate whorl; interstices linear. .. .. *pliocenica.*
    Shell distinctly attenuate, but not so needle-like, sculpture fine; axials 26 on penultimate whorl; whorls shouldered; suture oblique. .. .. .. .. *kercruensis.*
  Shell needle-like, not particularly finely sculptured.
    Axials straight, vertical, 22–3 on penultimate whorl; interstices practically linear; shell of moderate size. *kingi.*
    Axials straight, 19 on penultimate whorl; shell .small, very attenuate. .. .. .. .. .. *vigilia.*

* The use of terms "Group A" and "Group B" has been explained in a footnote in paper no. 1 (The Genus *Turbonilla*) of this series (*Trans. Roy. Soc. N.Z.*, vol. 66, pt. 4, p. 407; 1937).

Shell stouter, not notably attenuate.
- Interstices practically linear.
  - Axials more than 35 in number.
    - Shell stout, rather large; axials 40, very low and weak. .. .. .. .. *finlayi.*
  - Axials fewer than 35.
    - Shell rather large.
      - Shell rather stout; axials 22; interstices quite linear; whorls flat. .. .. *errabunda.*
      - Shell not so stout, interstices not quite linear; axials 29; whorls convex. .. *dunedinensis.*
    - Shell small.
      - Axials 19; interstices narrower than ribs; whorls strongly convex. .. .. *raptor.*
      - Axials 14, wide, flat; interstices not quite linear; whorls weakly convex. .. .. *bucknilli.*
      - Axials 30; interstices not quite linear; whorls moderately convex; suture margined below by a narrow concave band. *verecunda.*
- Interstices of appreciable width.
  - Sculpture moderately fine; axials not prominent, about 23 on penultimate whorl.
    - Shell with summit pupoid; spire more convex above than below. .. .. .. *forsteriana.*
    - Shell regularly acicular.
      - Shell fairly large, over 5·0 mm.; interstices channelled, with vertical walls. .. *powelli.*
      - Shell small, less than 5·0 mm.
        - Axials moderately thin, straight throughout length; interstices of greater width; apex blunt; early whorls wide. .. .. .. *jactura.*
        - Axials thin, antecurrent above; width of interstices equal to that of axials; apex sharper; early whorls narrow .. *waitemata.*
  - Sculpture coarse; axials very prominent.
    - Shell with summit pupoid, spire more convex above than below.
      - Shell rather slender. .. .. .. *cookiana.*
      - Shell much shorter, stout. .. .. *stipes.*
    - Spire regularly tapering.
      - Shell short or stoutish.
        - Axials 13, wide, blunt; narrower interstices .. .. .. .. *vegrandis.*
        - Axials 14, thinner, sharply raised, slightly oblique; width of interstices twice that of ribs; grooves incised deeply, very faintly sulcate just below suture. .. .. .. .. *barrierensis.*
      - Shell more slender, axials stout.
        - Shell large; axials 21–3; interstices rather less than axials in width. .. *zealandica.*
        - Shell small; axials about 16; width of interstices much less than that of axials; axials broader, lower, more rounded than those of *zealandica.* .. *owenga.*
    - Sculpture very weak, almost obsolete on some whorls; shell not large. .. .. .. *kaawa.*

NOTE.—*C. haugrandis* Marwick is not included in the above key as the single specimen is so worn that definite characters of axial sculpture could not confidently be drawn. *C. lamyi* (Hedley) has not been examined and is therefore not included in the key.

**Chemnitzia petaneana** n.sp. (Fig. 12.)

Shell rather small, of 6½ post-nuclear whorls (type not quite adult); outlines of spire straight. Early post-embryonic whorls lightly convex, later ones flattish over centre part, constricted to suture below, horizontally shouldered above. Protoconch heterostrophic, of about 2 helicoid turns; nucleus with its lower edge tangent to suture of succeeding whorl. Axial ribs (16 on penultimate whorl) wide, flattish, very oblique and with a tendency to be muricated at summits; interstices deep, half width of axials; ribs and grooves stopped suddenly at periphery of last whorl and sometimes close above suture of spire-whorls. Body-whorl strongly shouldered at suture, then flatly convex down to rounded periphery; base short, convex, rapidly drawn in to columella; aperture somewhat narrowly quadrate; columella vertical, straight, a little reflexed; parieto-columellar angulation present; outer lip straight, descending vertically, turned in strongly at suture.

Height (type), 3·2 mm.; width, 1·0 mm. Corresponding dimensions of a paratype: 4·5 mm. (estimated); 1·2 mm.

Locality: Petane, Hawkes Bay (Nukumaruan); Castlecliff, Wanganui (Castlecliffian), one broken specimen.

Type in collection of Dr. H. J. Finlay, Dunedin.

This species is quite distinct in its wide, flat, oblique axial ribs, and flattish, shouldered whorls.

**Chemnitzia aoteana** Powell. (Fig. 9.)

1930. *Turbonilla (Chemnitzia) aoteana* Powell, *Trans. N.Z. Inst.*, vol. 61, p. 545, pl. 87, fig. 15.

This is undoubtedly an exquisite little shell, quite distinct from any other Recent Neozelanic species, though approached by *C. pliocenica* n.sp. from the Pliocene beds at Castlecliff, which possibly is an ancestral form. *Pliocenica,* however, is a less slender shell with coarser and straighter axials. In *C. aoteana* the axials are delicately hair-like and flexuous. Both species carry an embryo large for the size and slenderness of the shell.

Height, 2·8 mm.; width, 0·7 mm. (holotype).

Localities: Great Barrier Island, in 6-10 fathoms (type); Hen and Chickens Islands, in 25 fathoms. Recent.

Type in collection of Mr. A. W. B. Powell, Auckland.

**Chemnitzia pliocenica** n.sp. (Fig. 18.)

Shell very small, elongate-conic, of 5 post-nuclear whorls; outlines of spire straight. Whorls lightly convex, a very little shouldered; suture moderately well marked. Protoconch large and heavy for size of shell; heterostrophic, of 2 helicoid turns; nucleus not immersed, entirely free of succeeding whorl. Axials very numerous (about 30 on penultimate whorl) and fine, vertical, only slightly flexuous, flatly rounded; interstices about half width of riblets, appearing almost linear under hand-lens; grooves and ribs stopped at periphery of last whorl, and on later spire-whorls sometimes

terminating immediately posterior to suture. Body-whorl somewhat long, convex; periphery low, convex; base short, convex, a little concave close in to columella. Aperture subovate; columella thin, vertical, distinctly arcuate; basal lip rounded (not broadly) and drawn down; outer lip thin, vertical, convex.

Height, 2·4 mm.; width, 0·8 mm.

Localities: Te Piki, Cape Runaway (type); Castlecliff, Wanganui (Castlecliffian).

Type in War Memorial Museum, Auckland.

This species is distinguished by its very fine development of axial riblets and narrow interspaces, and by embryonic characters, shape of whorls and flexuous axials. It is strongly reminiscent of *C. aoteana,* but differs in being noticeably less attenuate, in having fewer, blunter and wider axials, and interspaces narrower relative to width of ribs. It cannot be compared with any other species of *Chemnitzia* so far recorded from the Neozelanic region.

This is the "*Chemnitzia* n.sp. aff. *aoteana* Powell" of Powell's list of fossils from Te Piki (*Rec. Auck. Inst. Mus.,* vol. 1, no. 5, pp. 261-274; 1934).

**Chemnitzia kereruensis** n.sp.

This species is allied to *C. formosa* on the one hand and to *C. pliocenica* on the other. It is more attenuate than the former, but has similar axial sculpture; it resembles *pliocenica* in attenuate form, but has sculpture coarser. Apex and top half of spire missing.

Height (estimated), 4·0 mm.; width, 1·0 mm.

Locality: Kereru, Hawkes Bay (Nukumaruan).

Type in writer's collection.

**Chemnitzia finlayi** (Powell). (Fig. 3.)

1926. *Turbonilla finlayi* Powell, *Trans. N.Z. Inst.,* vol. 56, p. 594, pl. 104.

The type has not been seen, but Powell's figure and description along with topotypes sent by the author of the species, have provided adequate material. *Finlayi* and *errabunda* n.sp. (described below) are on a different line from most of the other species of this group, and are characterised by wide, flattish, little-shouldered whorls, stoutish shell and flat axials. *Finlayi* is common in northern New Zealand, and quite a number of shells have been obtained at Takapuna, Auckland. At the time of description Powell identified two shells from Stewart Island as of this species, but these are now recognised as a new, closely related form, *C. errabunda* n.sp., described below.

Height, 5·2 mm.; width, 1·75 mm. (holotype).

Localities: Awanui Bay (type); Great Barrier Island, in 6-10 fathoms; Takapuna, Auckland; Hen and Chickens Islands; Plimmerton, Wellington. Recent.

Type in collection of Mr. A. W. B. Powell, Auckland.

**Chemnitzia errabunda** n.sp. (Fig. 5.)

Shell stout, of moderate size, elongate-conic, of 6½ post-nuclear whorls; outlines of spire a very little convex above, thereafter straight. Whorls very closely shouldered, nearly flat over greater part and then rapidly drawn in to lower suture so that they appear slightly to be overhanging. Protoconch heterostrophic, of 2 helicoid turns; nucleus small, not immersed, its lower edge tangent to succeeding suture. Axial ribs straight, vertical, wide, almost flat, about 22 on penultimate whorl; interstices deep, exceedingly narrow, practically linear; ribs and grooves terminated abruptly at periphery of body-whorl; base unsculptured. Body-whorl flatly convex above, well rounded at periphery; base convex. Aperture elongately oval; columella strongly acuate, the upper portion distinctly oblique; columella-fold well inside aperture; parieto-columellar angulation present; outer lip straight.

Height, 4·3 mm.; width, 1·3 mm. (holotype).

Localities: Takapuna, Auckland (type); Dunedin Harbour; Taieri Beach, Otago; off Otago Heads, in 50-60 fathoms; Stewart Island; Tahunanui, Nelson. Recent.

Type in Auckland Museum (ex writer's collection).

This species is a close relative of *C. finlayi*, but differs at sight in being somewhat more slender and in having many fewer (25 as against 42-46 in *finlayi*) and much wider axial ribs with linear interstices. The specimens from Dunedin Harbour are almost a replica of the type from Takapuna. This and the foregoing species have a quite extended range throughout New Zealand.

A shell from 50-60 fathoms off Otago Heads cannot be satisfactorily dissociated from *C. errabunda*. This extension of the bathymetric range is possibly, however, only apparent, and is probably to be ascribed to the action of tidal currents. Dr. Finlay has informed the writer that the molluscan fauna in about 15 fathoms off the south-eastern portion of Otago and in Foveaux Strait is closely similar to that found in much deeper water (40-70 fathoms) off Otago Heads. In these depths off the Heads one finds abundant evidence of the action of strong currents. The majority of shells are dead, and they are frequently considerably abraded; the bottom is a floor of clean quartz pebble (frequently encrusted with Polyzoa) with very little admixture of argillaceous material, and there is a good deal of broken shell. In 72 fathoms the writer has obtained such very littoral species as *Modiolus neozelanicus* Iredale, *Cellana ornata* Dillwyn, *Micrelenchus tenebrosus* (A. Adams), of course all very considerably abraded specimens. It is believed, then, that the strong tidal current sweeping northwards along the east coast explains the deep-water occurrence in northern Otago of species typically a good deal more littoral. The specimen of *C. errabunda* from this North Otago locality is not a fresh shell, and is evidently a travelled specimen, and its preservation is in marked contrast with that of the associated non-decollated shells of *Turbonilla* living at that locality in deep water as a normal habitat.

**Chemnitzia dunedinensis** n.sp. (Fig. 1.)

Shell of moderate size, elongately conic, of 7½ post-nuclear whorls; outlines of spire faintly convex above, straight below. Whorls shouldered close to suture, lightly convex below that, and then constricted to suture below. Protoconch decollated in type, but heterostrophic and helicoid in a juvenile paratype; nucleus not immersed. Axial ribs very numerous (29 on penultimate whorl), thin, straight, vertical; interstices a little narrower than axials; axial sculpture terminated abruptly at periphery of last whorl; base unsculptured. Body-whorl well rounded; base convex. Aperture widely ovate; columella vertical, arcuate, a little reflexed; parieto-columellar angulation very obtuse, high up; outer lip straight, vertical, turned in and down at suture; basal lip broadly convex.

Height, 4·8 mm.; width, 1·35 mm. (holotype).

Locality: Dunedin Harbour, in 2-3 fathoms. Recent.

Type in collection of Dr. H. J. Finlay.

In shape of whorls this species comes closest to *C. zealandica* Hutton, but is at once distinct in having very numerous, fine axial ribs.

**Chemnitzia kingi** n.sp. (Fig. 10.)

Shell of moderate size, slender, of 9 post-nuclear whorls; outlines of spire straight. Whorls flatly convex, a little shouldered close in to suture, which is distinct. Protoconch large, heterostrophic, helicoid, of 2 volutions; nucleus small, distinctly projecting and almost free of succeeding whorl. Axials numerous (24 on penultimate whorl), straight, practically vertical, broad, low, rounded, usually stopped immediately above suture on spire-whorls; axials and interstices end abruptly at periphery of body-whorl; interstices narrower than ribs. Body-whorl above periphery flatly convex; periphery rounded; base lightly convex, unsculptured. Aperture subovate; columella straight, vertical, a little reflexed; columella-swelling not apparent; basal lip fairly broadly rounded; outer lip straight, descending vertically, turned in at suture.

Height, 5·1 mm.; width, 1·1 mm. (holotype).

Localities: off Takapuna, Auckland, in 4-6 fathoms (type); Oneroa Beach, Waiheke Island; Great Barrier Island, in 6-10 fathoms; Castlecliff, Wanganui (Castlecliffian); Nukumaru (Nukumaruan); Te Piki,* Cape Runaway (Castlecliffian).

Type in Auckland Museum (ex writer's collection).

*C. raptor* n.sp. (described below) is also a small shell with numerous axials, but the whorls are strongly convex and the interstices not linear like those of the present species. *C. verecunda* n.sp. (also described below) likewise has many axials, but can readily be distinguished by reason of its being a smaller and more slender shell marked below sutures by a narrow spiral concavity. The shells from Great Barrier Island have their summits slightly pupoid, but otherwise agree with the description of *kingi* given above.

* This is the "*Chemnitzia*" of Powell's list of Pliocene fossils from Cape Runaway (*Rec. Auck. Inst. Mus.*, vol. 1, no. 5, pp. 261–274; 1934).

***Kingi*** is more plentiful in dredgings taken off the Beacon, Rangitoto Island, than anywhere else in the vicinity of Auckland. It is named in honour of Dr. L. C. King, of Natal University College, South Africa.

**Chemnitzia raptor** n.sp. (Fig. 8.)

Shell small, stout, of 6½ post-nuclear whorls; outlines of spire straight. Whorls well rounded and cut in deeply to suture, which is very distinct. Protoconch heterostrophic, of 2 convex volutions coiled in a low helicoid spiral; nucleus not immersed. Axial ribs (19 on penultimate whorl) stout, straight, somewhat oblique; interaxial furrows of less width than ribs, excavated. Axials and grooves terminated abruptly at periphery of last whorl, and on spire-whorls sometimes not quite reaching suture. Aperture roundly quadrate, but outer lip broken back; columella a little excavated, vertical, lightly swollen above; basal lip broadly rounded; outer lip broken. Body-whorl, periphery and base convex. Base unsculptured.

Height, 3·2 mm.; width, 1·0 mm. (holotype).

Locality: Cape Kidnappers, Hawkes Bay (Pliocene).

Type in Auckland Museum (ex writer's collection).

This species is distinctive in its very convex whorls, strongly impressed suture, and small not greatly elevated shell.

var. **hamiltoni** nov.

Three shells amongst the material from Cape Kidnappers bear a very much finer development of axial sculpture, there being about 30 axial ribs on the penultimate whorl. In all other respects they are identical with the species and so are here regarded as a varietal form only.

**Chemnitzia verecunda** n.sp. (Fig. 6.)

Shell small, semi-transparent, shining, elongate-conic, of 6½ post-nuclear whorls; outlines of spire straight. Whorls convex, suture margined below by a narrow concave band. Protoconch heterostrophic, of 2 helicoid volutions; nucleus only a little immersed or else its lower edge tangent to succeeding suture. Axial ribs numerous and fine (about 30 on penultimate whorl), straight, vertical, narrowly rounded; interspaces of less width than ribs; ribs and grooves terminated suddenly at periphery of last whorl; base unsculptured. Body-whorl very evenly convex from suture to base; periphery rather low. Aperture broadly ovate; columella arcuate, about vertical; parieto-columellar angulation distinct; outer lip turned in close to suture, thin, straight; basal lip broadly rounded.

Height, 2·8 mm.; width, 0·8 mm. (holotype).

Localities: off Takapuna, Auckland, in 3-4 fathoms, and in shell-sand (type); Great Barrier Island, in 6-10 fathoms.

Type in Auckland Museum (ex writer's collection).

The broadly ovate aperture, low periphery and subsutural concavity serve to distinguish this species.

**Chemnitzia forsteriana** n.sp. (Fig. 16.)

Shell of moderate size, attenuated, of 7½ post-embryonic whorls; outlines of spire pupoid above, straight below. Whorls flat, shouldered above close into suture, and constricted below. Protoconch heterostrophic, of 2 helicoid turns; nucleus sometimes a little immersed or its lower edge tangent to succeeding suture. Axial ribs (25 on penultimate whorl) moderately fine, rounded, and not prominent on last whorl; interstices excavated, subequal in width to ribs; ribs and grooves stopped abruptly at periphery of body-whorl. Body-whorl shouldered at suture, thereafter almost flat; periphery convex; base convex, unsculptured. Aperture ovate; columella arcuate, a little reflexed; basal lip moderately widely rounded; outer lip turned in to suture, faintly sinuous; parieto-columellar angle very obtuse.

Height, 4·3 mm.; width, 1·0 mm. (holotype).

Localities: off Otago Heads, in 72 fathoms (type); off Oamaru, in 50 fathoms. Recent.

Type in collection of Dr. H. J. Finlay, Dunedin.

This species evidently has close affinity with *C. cookiana* n.sp., but differs at sight in having flatter and more regularly built whorls, finer and less prominent axial sculpture, and larger, more convex protoconch. The general aspect of these two species is strikingly reminiscent of that of *T. paramoea* Dall and Bartsch from Panama, which they resemble in outlines of spire, shape of whorls and features of suture and aperture.

**Chemnitzia bucknilli** n.sp. (Figs. 14, 34.)

Shell small, elongate-conic, of 6½ post-nuclear whorls, outlines of spire straight. Whorls lightly convex; suture distinct. Protoconch heterostrophic, of about 2 helicoid volutions; nucleus small, overhanging first adult whorl, not immersed. Axial ribs low, very wide, almost flat, about 14 on penultimate whorl; intercostal spaces shallow and almost linear; grooves and ribs abruptly terminating above periphery on all but topmost whorls of spire. Body-whorl fairly high, well rounded over periphery, excavated towards columella. Aperture ovate, angled behind, narrowly rounded in front; columella set vertically, strongly arcuate, a little reflexed; parieto-columellar junction very obtuse; basal lip narrowly rounded; outer lip straight, descending vertically.

Height, 3·9 mm.; width, 1·1 mm. (holotype).

Localities: Mt. Maunganui, Tauranga (type); (?) off Waiheke Island, Hauraki Gulf, in 4 fathoms (1 juvenile shell). Recent.

Type in Auckland Museum (ex writer's collection).

The wide, low, flat axials separated by quite linear interstices make this species very distinctive. Named in honour of the late Dr. C. E. R. Bucknill, of Tauranga.

**Chemnitzia powelli** (Bucknill). (Figs. 22, 37.)

1924. *Turbonilla powelli* Bucknill, *Proc. Mal. Soc.*, vol. 16, pt. 3, p. 122.

This apparently is a northern species, and no records are known south of Tauranga. It is a smaller species than *C. zealandica* Hutton, more tapering, with more evenly though not strongly convex whorls, practically no shoulder, and the ribs finer and more convexly rounded. The protoconch is more massive and the early post-nuclear whorls narrower in contrast with those of *C. zealandica.* Dr. Bucknill's figure makes the ribs too narrow relative to grooves, for examination of the holotype shows the ribs and grooves about equal in width. Further, Bucknill's statement that the ribs are continued down the base is hardly correct. Near the aperture there are a few very weak prolongations of the axials, but further out on the base there is little trace of them. Bucknill's comparison of his species with *C. zealandica* is inaccurate. Comparison of the two holotypes shows that the ribs are not " much more robust " in *powelli,* as Bucknill states, and actually the reverse is the case; and the interstices cannot be described as " deeper." The ribbing on the base is quoted as being of particular note in distinguishing the two species, but specimens of *zealandica* from Dunedin Harbour sometimes show a similar obsoletely ribbed base; in fact, faint indications of such are to be found on the type specimen of *C. zealandica* itself. As has been pointed out elsewhere, the presence of obsolete ribs on the base is not a constant specific character.

Height, 5·2 mm.; width, 1·2 mm. (holotoype).

Localities: Tauranga (type); Auckland Harbour. Recent.

Type in War Memorial Museum, Auckland.

**Chemnitzia jactura** n.sp. (Fig. 7.)

Shell small, elongate-conic, of 6¾ post-nuclear turns; outlines of spire straight. Whorls lightly convex, sometimes flattish over centre part, closely tabulated below suture. Protoconch large, heterostrophic, of about 2 helicoid turns; nucleus about one-third immersed. Axial ribs thin, distant, straight, vertical, about 20 on penultimate whorl; interstices with sides sloping, about equal in width to ribs or a little wider; ribs and grooves terminated abruptly a little below periphery of last whorl, and sometimes not quite reaching suture on whorls of spire; base unsculptured. Body-whorl flatly convex above periphery; periphery and base convex. Aperture ovate; columella straight, long, vertical, a little reflexed below; parieto-columellar angulation distinct; outer lip broken back in type but evidently straight and vertical; basal lip widely rounded and drawn down.

Height, 3·2 mm.; width, 0·9 mm. (holotype).

Localities: off Oamaru, in 50 fathoms; Te Piki, Cape Runaway (Castlecliffian).

Type in collection of Dr. H. J. Finlay, Dunedin.

This species has many fewer and sharper axials than *C. kingi,* and much wider interstices, but it has the same fairly large protoconch. It is close to *C. waitemata* n.sp. described below, but differs

in possessing stouter axial ribs, narrower interstices and blunt apex with heavier early post-embryonic whorls. In the present species the interstices are of less width than the ribs, whereas *C. waitemata* has them about equal in width to axials.

The record from Te Piki is that of "*Chemnitzia* n.sp." in Powell's list (*Rec. Auck. Inst. Mus.*, vol. 1, no. 5, p. 264; 1934).

**Chemnitzia waitemata** n.sp. (Fig. 19.)

Shell small, semi-transparent, elongate-conic, of 6½ post-nuclear whorls; outlines of spire straight. Whorls fairly strongly shouldered to suture, thereafter moderately convex, cut in rather to suture below. Protoconch heterostrophe, of 2 helicoid volutions; nucleus small, central, its lower edge tangent to suture below. Axial sculpture of thin ribs (about 20 on penultimate whorl) separated by interstices about equal to their width; posteriorly on the shoulder of the whorls the ribs are antecurrent to suture; intercostal spaces and ribs terminate abruptly at periphery of whorls. Body-whorl fairly high, shouldered above, lightly convex below that, well rounded over periphery, lightly convex on base. Aperture rather broadly ovate, angled behind, moderately wide in front; columella thin, set vertically, arcuate; parieto-columellar junction scarcely defined; basal lip broadly rounded; outer lip lightly convex, antecurrent to suture in conformity with trend of axials on shoulder.

Height, 2·6 mm.; width, 0·9 mm. (holotype).

Localities: Takapuna Beach, Auckland (type); common in dredgings at many points around Waitemata Harbour; Great Barrier Island, in 6-10 fathoms. Recent.

Type in Auckland Museum (ex writer's collection).

This species seems confined to the immediate Auckland coastal area, and is as plentiful at this locality as *C. zealandica* is at Dunedin Harbour. Some comparisons are given in the remarks under the preceding species.

**Chemnitzia cookiana** n.sp. (Fig. 15.)

Shell small, moderately slender, of 8 post-embryonic whorls; outlines of spire more convex above than below. Whorls fairly distinctly shouldered high up and close in to suture, constricted rapidly below; shape of whorls rather variable, some well rounded and others flatly convex, so that some appear more overhanging than others, and the shell has an ungainly habit. Protoconch small, heterostrophe, of 2½ helicoid volutions; degree of immersion of nucleus variable; nucleus sometimes entirely free, at others tangent to suture below or else a little immersed. The axial sculpture is distinctive in that the ribs on whorls of upper two-thirds of spire (about 15 per whorl here) are stout, prominent and rounded; those on last two whorls or so (about 20 on penultimate whorl) are finer, more numerous and sinuous; interspaces sub-equal in width to axials; ribs and grooves terminated abruptly at periphery of body-whorl. Body-whorl strongly shouldered above, then flatly convex; sub-angled at periphery, which

is low; base short, convex, unsculptured. Aperture broadly oval; columella vertical, a little arched; parieto-columellar angulation present; basal lip broadly rounded; outer lip very lightly convex and faintly antecurrent to suture.

Height, 3·3 mm.; width, 1·0 mm. (holotype).

Localities: Takapuna Beach, Auckland (type); Oneroa Beach, Waiheke Island. Recent.

Type in Auckland Museum (ex writer's collection).

For comparisons refer to remarks under *C. forsteriana* n.sp.

**Chemnitzia stipes** n.sp. (Figs. 24, 41.)

Shell quite small, stumpy in habit, of 5½ post nuclear whorls; outlines of spire convex. Whorls well shouldered above, almost flat over centre and strongly constricted to suture below; suture very well marked. Protoconch not much projecting, heterostrophe, of 2 helicoid volutions; nucleus about one-third immersed. Axial ribs heavy, wide, rounded, vertical; 15 ribs on penultimate whorl; width of interstices about half that of axials; ribs and grooves stopped abruptly at periphery of last whorl, and above sutures of whorls of spire; base unsculptured. Body-whorl shouldered above, flatly convex over middle; periphery and base well rounded. Aperture sub-pyriform, channelled behind; columella vertical, faintly arcuate, a little reflexed; parieto-columellar angulation wide, rounded; no columella-fold seen; basal lip sharply rounded anteriorly, the curvature broadening laterally; outer lip sinuous (antecurrent to suture, convex below).

Height, 2·5 mm.; width, 0·9 mm. (holotype).

Locality: Big King Island, in 100 fathoms.

Type in collection of Dr. H. J. Finlay, Dunedin.

This species approaches *C. forsteriana* and *C. cookiana* in the outline of spire and shape of whorls, but its smaller size and very stumpy habit provide a ready means of separation.

**Chemnitzia vegrandis** n.sp. (Fig. 21.)

Shell small, very stout, of heavy build, milk-white to semi-transparent, of 6 post-nuclear whorls rapidly increasing in size; outlines of spire straight. Shape of whorls strongly reminiscent of those of *C. zealandica;* whorls strongly shouldered above, convex over centre and then constricted to suture below. Protoconch small considering heaviness of build of shell, heterostrophe, of 2 helicoid turns; nucleus very slightly immersed. Axial ribs very prominent, thick, heavy, rounded, vertical, 13 on penultimate whorl; interstices less in width than ribs; grooves and ribs terminated abruptly at periphery of last whorl; base unsculptured. Body-whorl well rounded from shoulder over periphery and on to base. Aperture rhomboidal to quadrate; columella vertical, straight above, gradually becoming arcuate towards basal lip, which is broadly rounded; outer lip vertical, straight; parieto-columellar angulation marked; no columella-fold apparent.

Height, 3·5 mm.; width, 1·3 mm. (holotype).

Locality: Dunedin Harbour, in 3 fathoms. Recent.

Type in collection of Dr. H. J. Finlay, Dunedin.

This shell is extremely close to *C. zealandica* in build, shape of whorls and nature of sculpture, but is much less attenuated (greater angle of spire) and has fewer axials. It is characterised by shorter whorls and ribs.

**Chemnitzia zealandica** Hutton. (Figs. 2, 17.)

1873. *Chemnitzia zealandica* Hutton, *Cat. Mar. Moll.*, p. 22.
1878. *Chemnitzia zealandica* Hutton, *J. de Conch.*, p. 24.
1880. *Chemnitzia zealandica* Hutton, *Man. N.Z. Moll.*, p. 72.
1884. *Turbonilla neozelanica* Hutton, *P.L.S.N.S.W.*, vol. 9, p. 934.
1893. *Turbonilla neozelanica* Hutton=*C. zealandica* Hutton (Hutton), *Plioc. Moll. N.Z.*, p. 56.
1913. *Turbonilla zealandica* Hutton (Suter), *Man. N.Z. Moll.*, p. 332.

Through the courtesy of the Director of the Dominion Museum, Wellington, the writer has been enabled to examine Hutton's type specimens, consisting of three shells all gummed on one tablet. Since no type-designation was made either by Hutton or by Suter, the writer here selects and figures one of them as type. The shell figured by Suter in the Manual is probably a representation of a shell from his own collection, and seems too attenuate for *zealandica*. Suter in the Manual gives dimensions of "the type," but does not indicate which shell he had in mind. But the measurements he gives, though incorrect (for he records the diameter as 2·5 mm. whereas it is actually only 1·5 mm.), and those stated by Hutton enable the type to be fixed with some confidence. The largest of the three specimens on Hutton's type-tablet is the shell here designated as holotype. Of the remaining two shells one is definitely not even congeneric, for it differs in embryonic characters, and is dealt with elsewhere in this paper. The other shell is doubtfully distinct, and for the present is left under Hutton's name.

Hutton's description is very incomplete, and his figure is far from satisfactory. As already stated, Suter's figure in the Manual is of a shell too slender for this species, and it shows linear intercostal spaces; further, his description does not seem to be that of the shell indicated by the dimensions he gives, so that a description of the shell here selected as type is given below:—Shell of moderate size and strong build, elongate-conic, of 8½ post-nuclear whorls; outlines of spire straight. Whorls prominently shouldered, lightly convex over centre part, constricted to suture below, which is distinct. Protoconch small, heterostrophe, of 2 helicoid turns; nucleus about one-third immersed. Axial ribs (about 17 on penultimate whorl) flatly rounded, straight, vertical; intercostal spaces deep, about half the width of axials; ribs and grooves terminated abruptly at periphery of last whorl; base unsculptured. Body-whorl and periphery evenly convex throughout; base short, convex. Aperture sub-quadrate; columella thick, vertical, straight; parieto-columellar junction distinctly angled; basal lip broadly rounded; outer lip thick, turned in strongly to suture, vertical, straight.

Height, 5·75 mm.; width, 1·5 mm.

Localities: Stewart Island (type); Taieri Beach; Otago Harbour; Castlecliff, Wanganui (Castlecliffian).

Type in Dominion Museum, Wellington.

Suter states that this species ranges throughout New Zealand from shallow water down to 50 fathoms, and records it from Snares and Bounty Islands. The present work shows this range to be incorrect, for *zealandica* is essentially a Forsterian species, and the extended range stated by Suter is no doubt to be ascribed to confusion of several species. No shells at all approaching Hutton's species have been recorded during the present survey from deep water, and the bathymetric range allowed by Suter must also be considered due to confusion of deep-water with littoral forms. *Zealandica* is strictly a littoral species, and the shells from 2 to 3 fathoms in Dunedin Harbour are an exceedingly close match of the type.

subsp. **axivarians** n.subsp.

Certain shells from localities bordering both sides of Cook Strait do not present features sufficiently divergent to warrant separate specific status. They all have the small protoconch of the species, but their axial sculpture is not so heavy and the intercostal spaces are narrower relative to width of axials.

Localities: Lyall Bay, Wellington; Plimmerton; Tahunanui, Nelson.

**Chemnitzia owenga** n.sp.

Shell small, moderately elevated, of 7½ post-nuclear whorls; outlines of spire straight. Whorls distinctly convex, evenly rounded; suture distinct. Protoconch small, coiled in a helicoid spiral of 2 volutions, lateral nucleus small, not quite central, no part of it immersed in succeeding whorl. Axial ribs (about 16 on penultimate whorl) broad, not high, rounded, straight, vertical; interstices distinctly narrower than axials, abruptly terminated at periphery; base unsculptured. Body-whorl convex; base lightly convex; aperture pyriform; outer lip broken.

Height, 3·5 m.m.; width 1·0 mm. (holotype).

Locality: off Owenga, Chatham Islands, in 10 fathoms.

Type in Auckland Museum.

This is the "*Chemnitzia* n.sp." of Powell's list of the Chatham Islands mollusca (*Rec. Auck. Inst. Mus.*, vol. 1, no. 4, p. 186; 1933).

**Chemnitzia barrierensis** n.sp. (Figs. 11, 29.)

Shell small, thick, elongate-conic, of 7 post-nuclear whorls; outlines of spire straight. Whorls shaped much as in *C. zealandica*, shouldered above, faintly convex over centre, cut in to suture below; suture distinct. Protoconch heterostrophic, of about 2 helicoid volutions; nucleus projecting, its lower edge about tangent to suture of first adult whorl. Axial ribs (about 14 on penultimate whorl) prominent, rather thin and laterally pinched up, straight, oblique

to left on later whorls, slightly nodulated at summits on edge of shoulder; interstices deep, about twice width of ribs; ribs and grooves stopped abruptly above suture on last few whorls; a very faint sulcus present in intercostal spaces immediately below shoulder. Body-whorl shouldered at top, convex over periphery; base lightly convex; aperture broken, but apparently sub-quadrate; columella thick, vertical, straight; parieto-columellar angulation present, obtuse; basal and outer lips broken.

Height, 3·2 mm.; width, 0·9 mm. (holotype).

Localities: off western coast of Great Barrier Island, in 6 to 10 fathoms (type); Pilot Bay, Tauranga; Crusoe Island, in 12 fathoms. Recent.

Type in Auckland Museum.

Of all the northern species of *Chemnitzia* this is the only one that at all resembles *zealandica* and this it does only in general build of shell. It is a smaller species, with wider interstices, thinner and fewer axials (which are slightly oblique), a faint sulcus around top of whorls (not found in the southern shell), and a columella-swelling.

**Chemnitzia lamyi** (Hedley). (Fig. 13.)

1916. *Turbonilla lamyi* Hedley, *Austr. Ant. Exp.*, Ser. C., vol. 4, pt. 1, p. 62, pl. 9, fig. 100.

The writer has not seen the type, nor any shell belonging to this species. Hedley's description is certainly rather meagre, and the single shell on which he founded his species has the apex decollated. He states that it belongs to the subgenus *Chemnitzia,* as defined by Dall and Bartsch, and compares it with *T. smithi* Strebel from Lemaire Straits. The abrupt stoppage of the interspaces above the periphery signifies that it belongs to a Chemnitzid genus, but the absence of the embryo renders it impossible to be definite as to its exact location. Judging by Hedley's figure the axial ribs on lower whorls appear to run in rather arcuate fashion, and this is reminiscent of the new genus *Striarcana,* to be discussed in a later part of the revision. The main feature of *Striarcana* is the development of excessively fine, dense microscopic spiral lirae, and it is quite possible that these are present and have been overlooked, for it requires especially careful observation to detect their presence. In the meantime, however, one has no choice but to leave the species in *Chemnitzia.*

The figure is a reproduction of Hedley's illustration.

**Chemnitzia haugrandis** Marwick. (Figs. 20, 23.)

1931. *Turbonilla (Chemnitzia) haugrandis* Marwick, *N.Z. Geol. Surv. Pal. Bull.*, no. 13, p. 108, fig. 208.

The type is the only specimen. The axial sculpture is sufficiently well shown to justify location in *Chemnitzia,* but the surface is corroded to such an extent that it is possible that spiral ornamentation may have been obliterated. The protoconch is remarkably projecting and not so flatly helicoid as in other species of *Chemnitzia.* This is the earliest *Chemnitzia* (if such it be) recorded from New Zealand, and so far the only form dating earlier than the Pliocene, and this also leads one to suspect its location in *Chemnitzia.*

Height, 4·5 mm.; width, 1·1 mm.

Locality: mudstone, Island Creek, Gisborne District, Tutamoe Series (Awamoan).

Type in collection of N.Z. Geological Survey, Wellington.

**Chemnitzia vigilia** n.sp. (Fig. 4.)

Shell small, needle-like, of 6½ post-nuclear whorls; outlines of spire straight. Whorls closely shouldered above, very flatly convex over centre, constricted rapidly to anterior suture. Protoconch large for size of shell, heterostrophe, of about 2½ helicoid volutions; nucleus projecting, its lower edge tangent to suture of first adult whorl. Axial ribs (about 19 on penultimate whorl) low, thin, rounded, vertical, straight; interspaces sub-equal in width to ribs; ribs and grooves stopped abruptly just above periphery of whorls. Body-whorl narrow, shouldered above, flatly convex above periphery; periphery and base convex, the base lightly so. Aperture pear-shaped, angled behind, widely rounded in front; columella thin, vertical, arcuate; parieto-columellar junction not distinct; basal lip broadly rounded; outer lip straight, vertical.

Height, 3·1 mm.; width 0·8 mm. (holotype).

Localities: off western coast of Great Barrier Island, in 6-10 fathoms; Hen and Chickens Islands, in 6-10 fathoms. Recent.

Type in Auckland Museum.

In size, needle-like form, whorl-shape and heaviness of embryo this species resembles *C. aoteana,* but the much coarser and fewer axials readily distinguish it from *aoteana.*

**Chemnitzia kaawa** n.sp.

At first sight strongly reminiscent of *T. comitas,* described in Part 1 of this series, but close inspection shows that the sculpture is Chemnitzid and not that of *Turbonilla.* Shell small, attenuate, outline of spire straight; adult whorls 7¼ in number. Whorls flat, cut in close to suture above and below; suture only moderately distinct, narrowly channelled. Axial ribs very weak on most whorls; some of the whorls have the axials fairly regularly developed, whilst on others they are practically obsolete; axials and grooves often die out high up on whorl, but here and there close inspection shows the grooves to end abruptly in Chemnitzid fashion just posterior to the suture. Embryo large, heavy, bulbous, coiled in a fairly pronounced helicoid spiral, the lateral nucleus small and clear of first adult suture. Body-whorl flat above, periphery sub-angled, base lightly convex; aperture pear-shaped, moderately broadly rounded in front; columella thin, oblique to left; outer lip faintly sinuous.

Height, 3·9 mm.; width, 1·0 mm.

Locality: Kaawa Creek beds (Waitotaran).

Type in collection of Auckland University College.

The weak development of axials and flat whorls distinguish this from all other Neozelanic *Chemnitzia.* This is the " *Chemnitzia* n.sp. A " of the Kaawa Creek Pyramidellids listed by the writer in a recent paper entitled The Waitotaran Faunule at Kaawa Creek (*Trans. Roy. Soc. N.Z.,* vol. 66, p. 112; 1936).

**"Chemnitzia"** n.sp

This is the "*Chemnitzia* n.sp. B" in the list of Kaawa Creek Pyramidellids given by the writer (*Trans. Roy. Soc. N.Z.*, vol. 66, p. 112; 1936). It is represented by two fragments neither of which has the embryonic whorls preserved. It is a small species with deeply incised intercostal spaces and strongly sub-angled periphery.

Specimens in collection of Auckland Museum (ex writer's collection).

CHEMNITZIA Group B.

Shells of this group possess an embryo of one heterostrophic and planispiral volution, the nucleus of which is lateral and usually large, but never projects after the fashion of the closely coiled nucleus of helicoid type. The depth of immersion of the embryo in the first sculptured whorl varies among the different species, as also does the degree of obliquity of the axis of embryonic coiling. In all other characters this group agrees with *Chemnitzia* Group A as herein defined.

Two divisions, based on the protoconch, can be recognised, (1) species with the summit of the embryo more or less evenly convex and the protoconch usually fairly obliquely tilted, and (2) species with the summit of the embryo sub-angled, the protoconch as a whole being more upright and exsert. To the former belong the following species: *scala* n.sp., *mitis* n.sp., *rakiura* n.sp., *campbellica* (Odhner), *informis* n.sp., *lillingtoniana* n.sp. The species of division (2) are *brevisutura* n.sp., *acer* n.sp., *sycophanta* n.sp., *granti* n.sp.

Key to Species of CHEMNITZIA B.

Protoconch convex over summit.
- Whorls strongly shouldered.
  - Axials muricated at summits. .. .. .. *scala.*
- Whorls not strongly shouldered.
  - Shell attenuate.
    - Axials vertical, weak; whorls flatly convex; interstices almost linear. .. .. .. .. *lillingtoniana.*
    - Axials distinct; whorls convex; interstices half as wide as ribs. .. .. .. .. .. *mitis.*
    - Axials stouter; whorls convex, a little shouldered; shell wider. .. .. .. .. .. *rakiura.*
  - Shell stouter, not markedly attenuate.
    - Ribs fairly stout; shell large; whorls fairly strongly convex, faintly tabulated above; suture not bordered below. .. .. .. .. .. *campbellica.*
    - Ribs fairly stout, vertical; shell small; whorls flatly convex; suture flatly bordered below. .. *informis.*

Protoconch sub-angled at summit.
- Whorls evenly convex and moderately to well rounded.
  - Axials narrow, 16 on penultimate whorl; interstices wider than axials; spire-whorls narrow; embryo flattened dorso-laterally. .. .. .. .. *brevisutura.*
  - Axials heavier; interstices sub-equal in width to axials on spire-whorls, but 2–3 times width on last whorl; embryo flattened laterally. .. .. .. .. *acer.*
- Whorls flatly convex.
  - Axials sinuous and oblique; interstices narrower than ribs. .. .. .. .. .. .. *sycophanta.*
  - Axials oblique, distant; interstices twice width of axials, which are coarse for size of shell. .. .. .. *granti.*

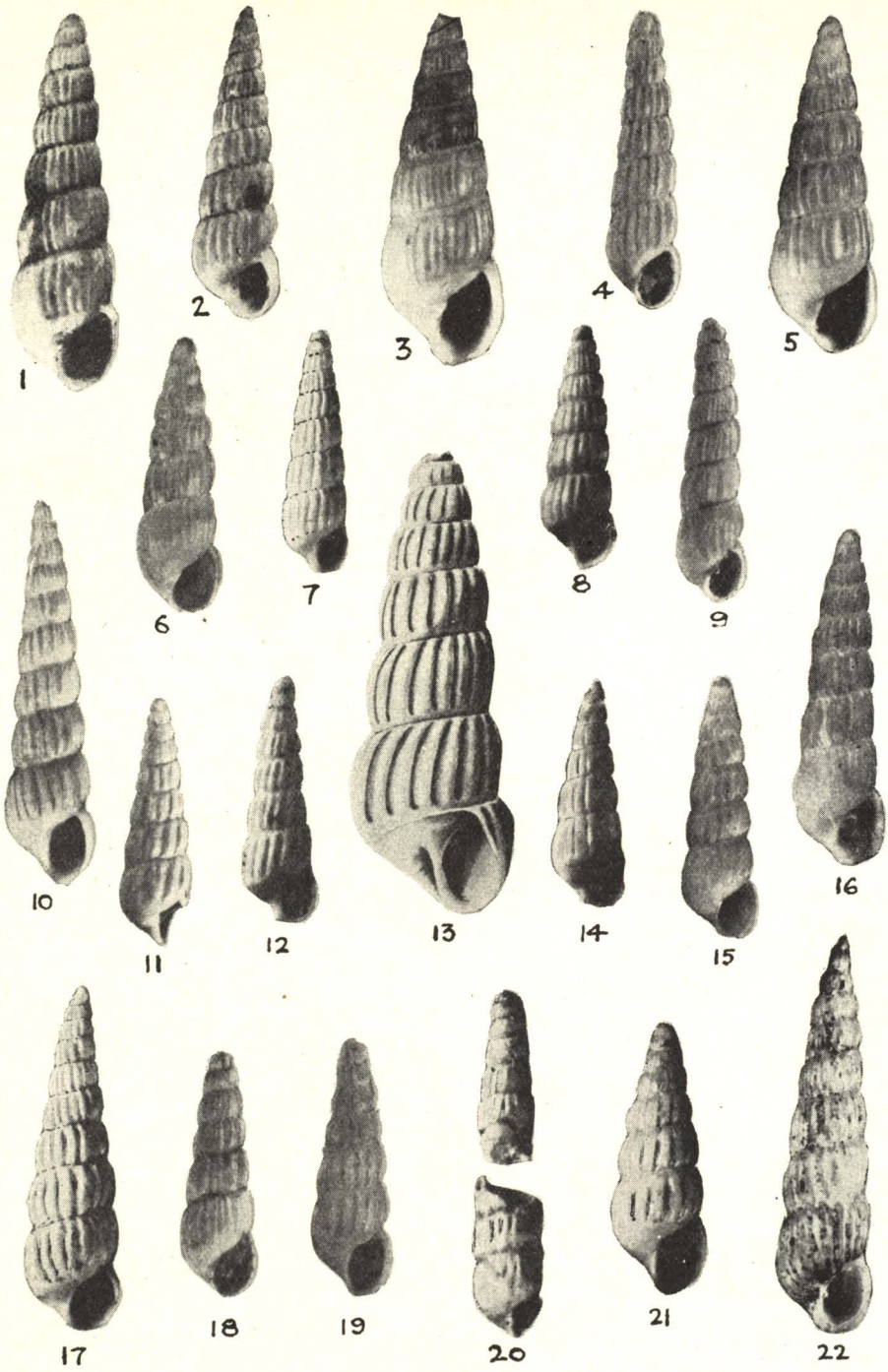


FIG. 1.—*Chemnitzia dunedinensis* n.sp.; holotype. × 10. FIG. 2.—*Chemnitzia zealandica* Hutton; holotype. × 10. FIG. 3.—*Chemnitzia finlayi* Powell; topotype. × 10. FIG. 4.—*Chemnitzia vigilia* n.sp.; holotype. × 13. FIG. 5.—*Chemnitzia errabunda* n.sp.; holotype. × 10. FIG. 6.—*Chemnitzia verecunda* n.sp.; holotype. × 13. FIG. 7.—*Chemnitzia jactura* n.sp.; holotype. × 10. FIG. 8.—*Chemnitzia raptor* n.sp.; holotype. × 10. FIG. 9.—*Chemnitzia aoteana* Powell; holotype. × 13. FIG. 10.—*Chemnitzia kingi* n.sp.; holotype. × 10. FIG. 11.—*Chemnitzia barrierensis* n.sp.; holotype. × 10. FIG. 12.—*Chemnitzia petaneana* n.sp.; holotype. × 10. FIG. 13.—*Chemnitzia lamyi* Hedley; holotype. FIG. 14.—*Chemnitzia bucknilli* n.sp.; holotype. × 10. FIG. 15.—*Chemnitzia cookiana* n.sp.; holotype. × 10. FIG. 16.—*Chemnitzia forsteriana* n.sp.; holotype. × 10. FIG. 17.—*Chemnitzia zealandica* Hutton; Dunedin Harbour. × 10. FIG. 18.—*Chemnitzia pliocenica* n.sp.; holotype. × 13. FIG. 19.—*Chemnitzia waitemata* n.sp.; holotype. × 13. FIG. 20.—*Chemnitzia haugrandis* Marwick; holotype. × 10. FIG. 21.—*Chemnitzia vegrandis* n.sp.; holotype. × 10. FIG. 22.—*Chemnitzia powelli* Bucknill; holotype. × 10.

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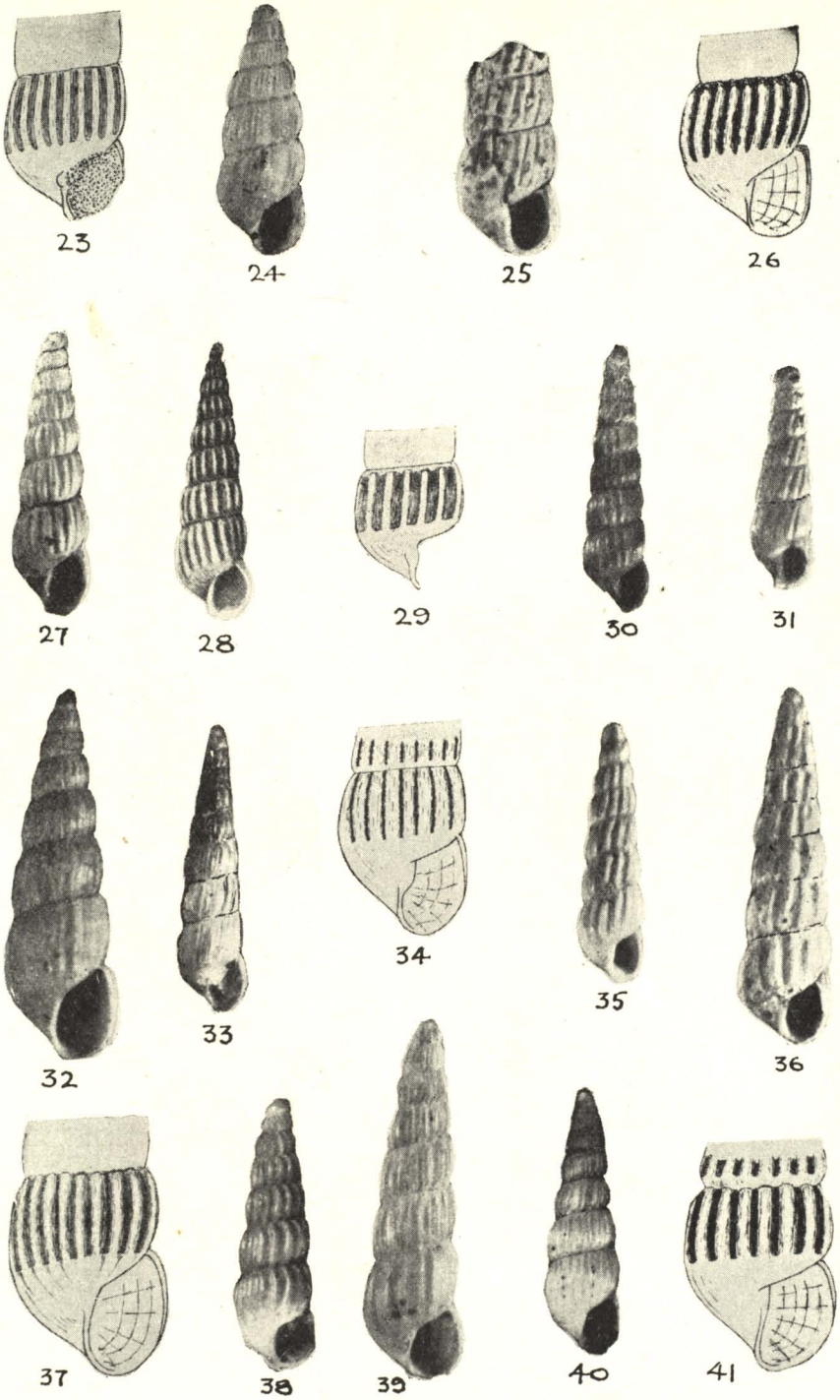


FIG. 23.—*Chemnitzia haugrandis* Marwick; holotype. FIG. 24.—*Chemnitzia stipes* n.sp.; holotype. × 13. FIG. 25.—*Chemnitzia sycophanta* n.sp.; paratype. × 13. FIG. 26.—*Chemnitzia scala* n.sp.; holotype. FIG. 27.—*Chemnitzia rakiura* n.sp.; holotype. × 10. FIG. 28.—*Chemnitzia campbellica* Odhner; holotype. × 5. FIG. 29.—*Chemnitzia barrierensis* n.sp.; holotype. FIG. 30.—*Chemnitzia mitis* n.sp.; holotype. × 10. FIG. 31.—*Chemnitzia sycophanta* n.sp.; holotype. × 13. FIG. 32.—*Chemnitzia campbellica* Odhner; Auckland Islands. × 10. FIG. 33.—*Chemnitzia acer* n.sp.; holotype. × 10. FIG. 34.—*Chemnitzia bucknilli* n.sp.; holotype. FIG. 35.—*Chemnitzia brevisutura* n.sp.; holotype. × 13. FIG. 36.—*Chemnitzia granti* n.sp.; holotype. × 13. FIG. 37.—*Chemnitzia powelli* Bucknill; holotype. FIG. 38.—*Chemnitzia scala* n.sp.; holotype. × 10. FIG. 39.—*Chemnitzia lillingtoniana* n.sp.; holotype. × 13. FIG. 40.—*Chemnitzia informis* n.sp.; holotype. × 10. FIG. 41.—*Chemnitzia stipes* n.sp.; holotype.

*Division 1.—Protoconch convex over summit, usually fairly oblique.*

**Chemnitzia scala** n.sp. (Figs. 26. 38.)

Shell small, elongate-conic, rather robust, of 6½ post-nuclear whorls; outlines of spire very lightly convex. Whorls strongly shouldered and muricated above, then flatly convex and constricted below. Suture very well marked, oblique. Protoconch of 1 volution coiled loosely in a plane spiral; nucleus almost completely immersed. Axials (17 on penultimate whorl) rounded, well elevated, sinuous, oblique; interspaces sub-equal in width to ribs; axials and grooves terminated abruptly at periphery of last whorl. Body-whorl flatly convex, periphery sub-angled; base short, convex, unsculptured except for the presence of growth-striae. Aperture quadrate; columella vertical, slightly reflexed, straight above, arcuate below; basal lip wide, broadly rounded; outer lip straight, descending vertically, folded in at shoulder to suture.

Height, 3·5 mm.; width, 1·0 mm.

Locality: off Oamaru, in 50 fathoms. Recent.

Type (unique) in collection of Dr. H. J. Finlay, Dunedin.

The strongly shouldered whorls, muricated summits of axial ribs and quadrate aperture serve to make this species distinctive.

**Chemnitzia lillingtoniana** n.sp. (Fig. 39.)

Shell small, tapering, semi-transparent, shining, of 6¾ post-nuclear whorls; outlines of spire straight. Whorls flatly convex; suture impressed, a little oblique. Protoconch of 1 heterostrophe volution, very loosely coiled in a plane spiral; nucleus almost completely immersed in succeeding whorl. Axials (about 18 on penultimate whorl) broad, low, vertical, usually extending across entire whorl, but sometimes stopped close above suture; interspaces narrower than axials and often almost linear, ending abruptly at periphery of body-whorl. Body-whorl flatly convex above, periphery well rounded, base lightly convex and unsculptured. Aperture ovate, erect; columella arcuate, vertical, its junction with parietal wall not angulate but broadly rounded; outer lip straight; basal lip moderately broadly rounded, but sub-angled at junction with columella.

Height, 3·7 mm.; width, 1·0 mm. (holotype).

Localities: east of Cape Saunders, Otago Peninsula, in 72 fathoms (type); Snares Islands, in 50 fathoms. Recent.

Type in Auckland Museum (ex writer's collection).

This is of similar shape to *C. acer* n.sp. (described below), but *acer* has a higher and more pointed tip to protoconch, and curved, oblique axial ribs.

**Chemnitzia mitis** n.sp. (Fig. 30.)

Shell small, tapering, of 7¾ post-nuclear whorls; outlines of spire straight. Whorls well rounded, closely shouldered around suture, which is strongly impressed and oblique. Protoconch of 1 heterostrophe volution, very loosely coiled in a plane spiral; nucleus almost completely immersed. Axial ribs (about 18 on penultimate

whorl) rounded, straight, vertical; interspaces sub-equal in width to the ribs; axials and grooves not reaching suture below, and stopping abruptly at periphery of last whorl. Body-whorl convex; periphery rounded; base convex and unsculptured. Aperture ovate; columella thick, vertical, a little curved; outer lip broken back, thick, apparently straight.

Height, 3·5 mm.; width, 0·85 mm.

Localities: Hen and Chickens Islands, in 25 fathoms (type); Owenga,* Chatham Islands, in 10 fathoms. Recent.

Type in collection of Dr. H. J. Finlay, Dunedin.

This species approaches *C. lillingtoniana* somewhat, but *lillingtoniana* has fewer and less convex whorls, suture much less impressed and the ratio, whorl-height : whorl-width, greater than that for *C. mitis.*

**Chemnitzia rakiura** n.sp. (Fig. 27.)

Shell small, moderately attenuated, of 6½ post-nuclear whorls; outlines of spire straight. Whorls convex, a little shouldered; suture distinct. Protoconch large, well tilted, of 1 heterostrophic volution, loosely coiled in a plane spiral; nucleus almost completely immersed. Axial ribs (about 18 on penultimate whorl) straight, vertical, rounded; width of interspaces about equal to that of axials; ribs and grooves abruptly stopped at periphery of last whorl, and just above suture on the two preceding whorls. Body-whorl and periphery convex; base nearly flat, unsculptured. Aperture probably ovate (broken); columella stout, vertical, reflexed a little, practically straight; basal lip moderately widely rounded; outer lip broken away but apparently straight; callus over parietal wall.

Height, 3 6 mm.; width, 1·0 mm. (holotype).

Localities: Stewart Island; off Oamaru, in 50 fathoms. Recent.

Type in Dominion Museum, Wellington.

This shell was one of the three on the type-tablet of *Chemnitzia zealandica* Hutton, but its nuclear characters at once separate it generically. It differs from *C. mitis* in being considerably stouter and in having more distant axials separated by wide interspaces, and fewer whorls. From *C. lillingtoniana* it is to be distinguished by stronger axials with wide interspaces, and much more strongly convex whorls. *C. campbellica* (Odhner) is a larger, stouter shell with strongly convex whorls.

**Chemnitzia campbellica** (Odhner). (Figs. 28, 32.)

1924. *Turbonilla campbellica* Odhner, *Vidensk. Medd. Dansk. Natur. Foren.*, 77, 33; pl. 1, fig. 23.

Odhner's species comes from Perseverance Harbour, Campbell Island, but no shells from that locality have been studied during the present revision. A large number of specimens (collection of Dr.

* This is "*Chemnitzia* n.sp." of Powell's list of Chatham Islands Pyramidellids (*Rec. Auck. Inst. Mus.*, vol. 1, no. 4, p. 204; 1933).

Finlay) from Auckland Islands are undoubtedly referable to this species. As Odhner's description errs on the side of brevity, a description of one of the Auckland Island specimens is given below:—

Shell of moderate size, semi-transparent, shining, of 6½ post-nuclear whorls fairly rapidly increasing in width; outlines of spire straight. Whorls convex, closely shouldered above; suture distinct, oblique. Protoconch heterostrophe, of 1 loosely coiled planispiral volution; nucleus almost completely immersed. Axial ribs (19 or 20 on penultimate whorl) straight, vertical, rounded; interspaces sub-equal in width to ribs, evanescent suddenly at periphery of last whorl. Body-whorl convex; periphery evenly rounded; base lightly convex. Aperture ovate; columella set vertically, arcuate; parieto-columellar junction broadly rounded, not angled; columella with a light swelling above and inside aperture; basal lip rather widely rounded; outer lip straight.

Height, 4·8 mm.; width, 1·4 mm.

Locality: Faith Harbour, Auckland Islands. Recent.

*Campbellica* most resembles *rakiura,* which, however, is smaller and more tapering, with whorls more shouldered and axials higher and narrower. This species seems not to be confined to the fauna of the Subantarctic Islands, and appears to range more widely over the Neozelanic region than any other Turbonillid studied in the present survey. From 72 fathoms off Otago Heads there is an immature shell of 5 whorls, entirely inseparable from Odhner's species, while it also occurs at Chatham Islands.

Fig. 28 is a reproduction of Odhner's illustration.

**Chemnitzia informis** n.sp. (Fig. 40.)

Shell small, semi-transparent, shining, of 7½ post-nuclear whorls; outlines of spire straight. Whorls flatly convex and shouldered; suture well impressed. Protoconch planispiral, of 1 heterostrophic volution; nucleus one-half immersed. Sculpture of rounded, vertical axial ribs (about 17 on penultimate whorl); width of interaxial furrows a little less than that of ribs; ribs and grooves stopped abruptly at periphery of last whorl. Body-whorl convex; base unsculptured. Aperture sub-pyriform; columella straight, slightly oblique and with a low swelling above; parieto-columellar junction obtusely angled; basal lip rather narrowly rounded; outer lip straight, vertical, bent in above to suture.

Height, 3·0 mm.; width, 1·0 mm. (holotype).

Locality: Takapuna Beach, Auckland. Recent.

Type in writer's collection.

This species is much stouter than *C. lillingtoniana;* it is smaller and has less convex whorls than *campbellica;* it has not the wide early post-nuclear whorls and distinct shoulder of *rakiura,* which is characterised by narrowed axial ribs and more swollen, less erect embryo.

*Division 2.—Protoconch sub-angled at summit, considerably exsert and but little tilted.*

**Chemnitzia brevisutura** n.sp. (Fig. 35.)

Shell very small, tall, slender, of 6¼ post-nuclear whorls; outlines of spire straight. Whorls all regularly and evenly convex, not shouldered; suture not deeply cut in. Protoconch prominent, smooth, flattened obliquely near summit, and bluntly angled at sides. Sculpture of fine, oblique, rounded axial ribs (16 on penultimate whorl), extending from suture to suture, straight on most whorls, but a little sinuous on last one; interspaces slightly wider than ribs and stopping suddenly in little pitted depressions at periphery. Body-whorl with its periphery sub-angled; base lightly convex above but concave towards pillar, unsculptured. Aperture narrowly ovate; columella set vertically, faintly arcuate; columella-fold represented by a low swelling above; outer lip a little broken back. straight and a little oblique.

Height, 2·8 mm.; width, 0·6 mm. (holotype).

Localities: Blue Cliffs, South Canterbury, blue sandy clays above limestone (Hutchinsonian), type; Awamoa Creek, Oamaru (Awamoan); Clifden, Southland, bands 6A and 6B (Hutchinsonian).

Type in Auckland Museum (ex writer's collection).

The shell from Awamoa is not identical with the type, and differs in having the apex not quite so well angled on top, and in having slightly more and slightly finer axial ribs. As the single specimen is not adult it is in the meantime regarded as conspecific with the Blue Cliffs shell, though additional material may justify separation.

**Chemnitzia acer** n.sp. (Fig. 33.)

Shell small, attenuated, semi-transparent, shining, of 8 post-nuclear whorls; outlines of spire straight. Whorls convex, no shoulder on upper whorls, but a distinct flattening below suture of last few whorls; suture moderately distinct. Protoconch high, of 1 planispiral heterostrophic volution; nucleus two-thirds immersed. Axial ribs (19 on penultimate whorl) narrow, rounded, decidedly oblique, especially on later whorls; interstices sub-equal in width to axials, except on last whorl where they are 2-3 times width of ribs; ribs and grooves stopped abruptly at periphery of body-whorl. Body-whorl flatly convex; periphery broadly sub-angled; base very lightly convex, short. Aperture sub-pyriform; columella thin, arcuate; outer lip thin, sharp, straight.

Height, 3·8 mm.; width, 1·0 mm. (holotype).

Localities: off Otago Heads, in 40-50 fathoms (type); off Oamaru, in 50 fathoms. Recent.

Type in writer's collection.

The more sharply pointed, laterally flattened embryo distinguishes this species from its associates in Division 2, which differ in having a dorso-lateral flattening of embryo. *Brevisutura* is more slender and has thinner axials and whorls a little more convex.

**Chemnitzia sycophanta** n.sp. (Figs. 25, 31.)

Shell small, elongate-conic, of 5½ post-embryonic volutions (but not quite adult); outlines of spire straight. Whorls very flatly convex; suture only moderately distinct, not much cut in. Protoconch sub-angled at summit, considerably exsert, heterostrophic and planispiral; nucleus about one-half immersed. Axials (about 12 on penultimate whorl of type; 18 on penultimate whorl of a fragmentary adult paratype) sinuous, oblique, extending across entire whorl, except on paratype, where they stop just above suture on penultimate whorl; interstices much narrower than ribs, almost linear; both ribs and interstices terminate abruptly at periphery of last whorl, the latter pitted at lower extremities, while some of the ribs are faintly indicated on base sweeping towards umbilical region. Body-whorl flatly convex above, sub-angled at periphery; base convex, rather rapidly drawn in to axis of shell. Aperture sub-quadrate; columella oblique to left, straight, lightly swollen above; parieto-columellar junction obtusely sub-angled; basal lip broadly rounded; outer lip broken back, possibly slightly sinuous.

Height, 2·2 mm.; width, 0·65 mm. (holotype).

Locality: new roadcutting about half a mile behind racecourse, Clifden, Southland, the equivalent of horizon 7C on the beds along the Waiau River at Clifden.

Type in Auckland Museum (ex writer's collection).

*Brevisutura* has more convex whorls with coarser, more prominent and sinuous axial ribs. *Acer* is characterised by sharper summit to embryo, which is laterally compressed, has oblique, not sinuous, axials, and whorls not so flatly convex. *C. granti* n.sp. (described below) is separable by reason of its straight, heavy, distant, axial ribs and distinctly cut-in sutures.

**Chemnitzia granti** n.sp. (Fig. 36.)

Shell small, elongate-conic, of 8 post-nuclear whorls; outlines of spire straight. Whorls flatly convex; suture distinct and well cut in. Protoconch of the Division 2 type, sharpened somewhat at summit; heterostrophic and planispiral, of about 1¼ loosely coiled volutions; nucleus about one-half immersed. Axials (13 on penultimate whorl) prominent, coarse, straight, vertical, extending from suture to suture on all whorls; interstices about twice width of axials; both ribs and interstices stopped abruptly at periphery of last whorl, the latter pitted at lower extremities. Body-whorl short, convex over entire height, but base only lightly so. Aperture sub-quadrate; columella straight, about vertical, no swelling apparent; parieto-columellar junction rounded to sub-angled; basal lip broadly rounded; outer lip very lightly convex.

Height, 3·75 mm.; width, 1·0 mm. (holotype).

Localities: Clifden, Southland, band 6A (type); Blue Cliffs, South Canterbury, sandy clays above limestone (Hutchinsonian).

Type in Auckland Museum (ex writer's collection).

This form is stouter than the other species of Division 2.

Named in honour of Mr. J. Grant, honorary conchologist, Wanganui Museum.

**Chemnitzia** n.sp.

This record is based on a single immature shell decorticated over much of its surface, so that the species is barely worthy of a name until better specimens are available. It is a slender shell with very convex whorls, sutures well waisted, and broadly ovate aperture. The protoconch is of 1 volution, and is large, pointed and markedly protruding, its nucleus not central. The axial ribs and intercostal spaces end abruptly above sutures.

Height, 1·8 mm.; width, 0·5 mm.

Locality: Big King Island, in 100 fathoms. Recent.

Specimen in collection of Dr. H. J. Finlay, Dunedin.