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**A New Swimming Crab from the New Zealand Subantarctic and
a Review of the Genus *Nectocarcinus* A. Milne Edwards**

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Abstract

A large, new *Nectocarcinus* is recorded from 10–22 fathoms off Auckland and Campbell Islands and compared with the closely allied *N. antarcticus* (Jacquinot) here redescribed. The latter occurs throughout the New Zealand—Chatham, Bounty, Auckland and Campbell Islands area from 6–300 fathoms. The presence of two species in the New Zealand Subantarctic is regarded as an example of the development of two allopatric species with a climatic barrier (i.e., Pleistocene glaciation) breaking down later to give partially sympatric ranges. Types of *N. bullatus* Balss from Juan Fernandez are re-examined and additional material is recorded; a lectotype is selected and the species is considered close to the two New Zealand species. Features distinguishing the southern Australian *N. integrifrons* (Latreille) and *N. tuberculosus* A. Milne Edwards at all sizes are discussed and tabulated. *N. spinifrons* Stephenson from western and southern Australia is intermediate in systematic position between the New Zealand—Juan Fernandez species group and the Australian *N. integrifrons/tuberculosus* group. Figures are provided of the two New Zealand species, of *N. bullatus*, and of *N. spinifrons* and a key is given for the six species of *Nectocarcinus*.

INTRODUCTION

A combined Dominion Museum—D.S.I.R. Botany Division field party occupied Cape Expedition Camp 1 at Ranui Cove, Port Ross, Auckland Islands, about 300 miles south of the New Zealand mainland, during late December, 1962, and January, 1963 (see Yaldwyn, 1964). The Dominion Museum's Ichthyologist, Mr J. Moreland, made a series of hauls with a small otter trawl in Port Ross with one of the authors (J.C.Y.) to build up a collection of shallow water fish, decapods and other marine invertebrates. Numbers of large, purplish-red, iridescent, swimming crabs of the genus *Nectocarcinus* were taken in 12 to 15 fathoms on a sand bottom. From their quadrilobate front and general facies, these were at first assumed to be the well-known New Zealand and subantarctic *N. antarcticus* (Jacquinot), originally described from the Auckland Islands.

Later, from a different bottom, a very similar *Nectocarcinus* with a quadrilobate front was taken. These were, however, red and the obviously hirsute carapace con-

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trasted immediately with the naked and iridescent carapace of the first form. The shape of the male abdomen and the male pleopods were very different and there could be no doubt that two distinct species were represented. A later examination of Jacquinet's colour plate of *Nectocarcinus antarcticus* showed clearly that the second, hirsute species was the true *antarcticus*, leaving the iridescent and naked species unnamed. This fine subantarctic swimming crab must now be known as *Nectocarcinus bennetti* Takeda and Miyake, 1969 (see note p. 68).

Drawings of both these species (prepared by D.J.G.G.) are presented with a formal description of each and a discussion of their generic position. New Zealand and subantarctic material of this genus has been examined in detail and the distribution and historical zoogeography of both species is discussed. Type material of *Nectocarcinus bullatus* Balss, from Juan Fernandez and material recently collected by the *Anton Bruun*, was obtained on loan from the Naturhistoriska Museet, Goteborg, Sweden, and the Allan Hancock Foundation, Los Angeles, respectively and additional data on this diminutive species is given here.

While working on the decapod collections made by the National Museum of Victoria during the Port Phillip Survey 1957-63 (Griffin and Yaldwyn, in press), difficulty was experienced in adequately distinguishing juvenile and small-sized adults of the two common southern Australian species of *Nectocarcinus*, *N. integrifrons* (Latreille) and *N. tuberculosus* A. Milne Edwards. Additional features were recognised as being diagnostic in smaller specimens and these are discussed and listed here.

A key to all six species in the genus, the five mentioned above and *N. spinifrons* Stephenson from western and southern Australia, is given as a final contribution to the present review of this temperate Australasian and eastern Pacific portunid genus.

The terminology employed in this paper for the raised aggregations of granules (structures) of the carapace follows that used by Garth and Stephenson (1966: 6-7), while other terms used mainly follow Stephenson and Campbell (1959: 86) and Rathbun (1930: 2-3). The standard measurement used in the "Material examined" sections is the maximum carapace width including the lateral "teeth".

Family PORTUNIDAE

Subfamily CARCININAE Alcock

Carcininae Alcock, 1899: 12. Stephenson and Campbell, 1960: 76, 80.

Portunids with carapace relatively narrow and with four or five anterolateral teeth. Eystalks not elongated. Basal antennal article fixed *or free*, not broader than long, lying in longitudinal axis of carapace. Walking legs long and stout, at least one pair as long as chelipeds; 5th leg either similar to other walking legs *or modified as swimming paddle*, dactyl either lanceolate and distally acute, *or ovate, lamellate and distally mucronate*. (Additional *or modified* sub-familial features in italics.)

Three Indopacific genera are placed in this subfamily: *Carcinus* Leach, *Xaiva* Macleay and *Nectocarcinus* A. Milne Edwards. A key to their separation is given by Stephenson and Campbell (1960: 80, *Portumnus* used for *Xaiva*). The 5th legs are not modified as swimming paddles in *Carcinus* and only weakly modified in the three Australian species of *Nectocarcinus*. In *Xaiva* and in the two New Zealand and one eastern Pacific species of *Nectocarcinus*, they are typical swimming paddles with a broadened propodus and a lamellate dactyl. The dactyl is always distally acute, or at least mucronate, in this subfamily.

Genus NECTOCARCINUS A. Milne Edwards, 1860

Nectocarcinus A. Milne Edwards, 1860: 219-220, 228; 1861: 404. Stephenson and Campbell, 1960: 82.

Carcinines with carapace somewhat wider than long and with regions well defined. Anterolateral borders and front form a regular curve of short radius; front protruding, either entire or subdivided into lobes. Four *more or less subequal* anterolateral teeth. Basal antennal article fixed *or free*, not broader than long. Third maxilliped elongate, ischium hollowed on

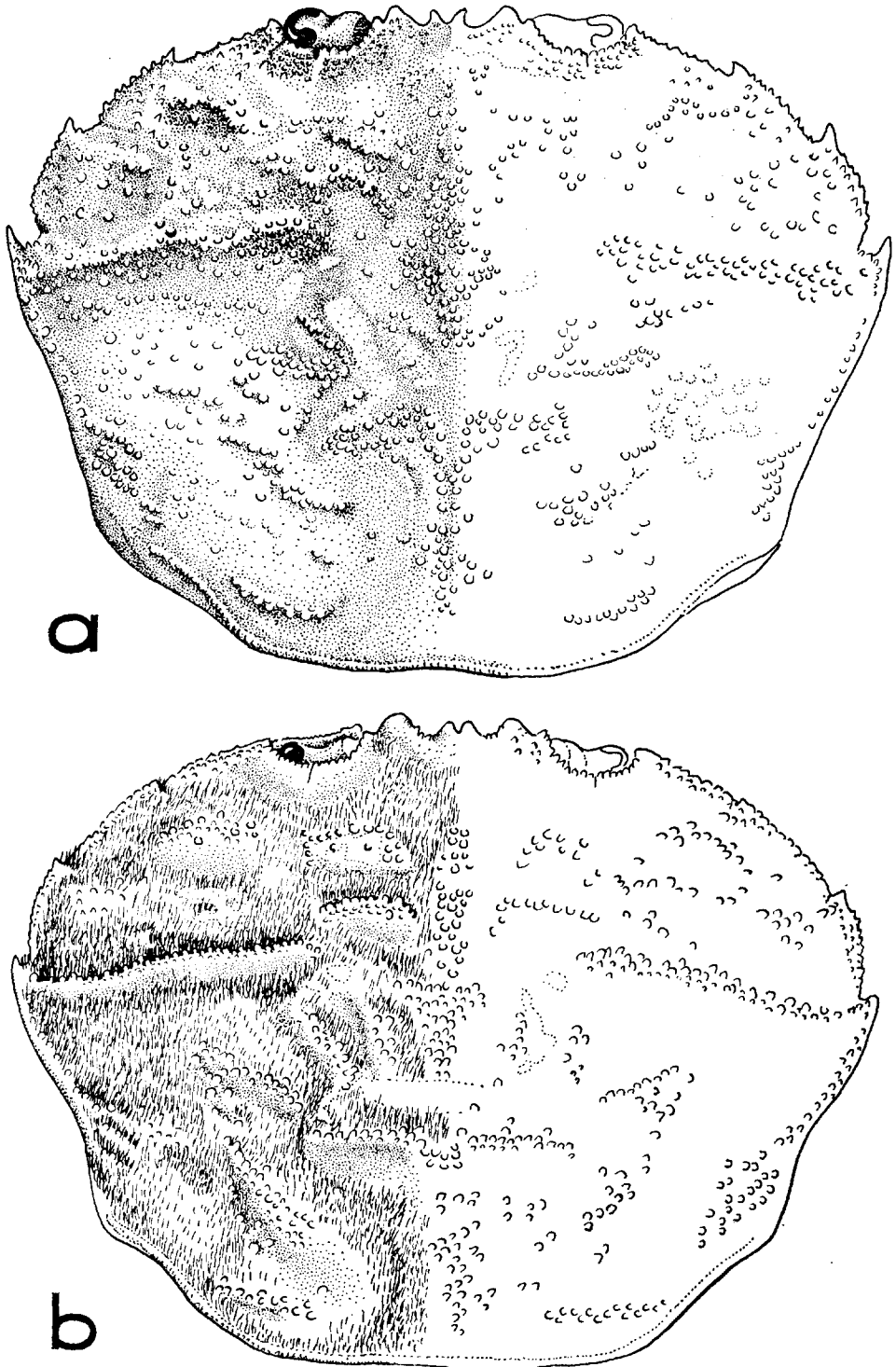


FIG. 1.—Dorsal view of carapace (a) *Nectocarcinus bennetti* (study male) and (b) *N. antarcticus* (study male).

outer surface. Chelipeds relatively short, but robust. Fifth leg *modified for swimming*, but degree of modification varying interspecifically and ranging from slight, with lanceolate dactyl, to complete, with lamellate dactyl. (Additional or modified generic features in italics.)

Type species: A. Milne Edwards originally established this genus to include four species and no type species was designated. No other author has designated a type species for the genus. We now select *Portunus integrifrons* Latreille, 1825, as the type species of *Nectocarcinus*.

The six included species have already been indicated and a key for their separation is provided below. First the two species in the New Zealand area are described and figured, then additional data on the other species are presented.

THE NEW ZEALAND AND SUBANTARCTIC SPECIES *N. bennetti* AND *N. antarcticus*
Nectocarcinus bennetti Takeda and Miyake, 1969. Figs. 1a; 2a, c, d; 3a, b. Pl. 1.

Nectocarcinus "species or form" Dawson, 1963: 313.

Material examined

Study male (72.4mm), Webling Bay, south of Crozier Point, Port Ross, Auckland Islands, trawled 10–15fms, J. Moreland and J. C. Yaldwyn, January, 1963 (Dom. Mus. Z. Cr. 1851).

Twenty ♂♂, 15 ♀♀, 16.5–75.3mm (all in the collections of the Dominion Museum, Wellington, and the Australian Museum, Sydney). Study ♀ (45.3mm), between Rose and Ocean Islands, Port Ross, Auckland Islands, trawled 12–15fms, J. Moreland and J. C. Yaldwyn, January, 1963 (Z. Cr. 1850).

Auckland Islands: Between Rose Island and Ocean Island, trawled 12–15fms, J.M. and J.C.Y., January 1963, 7 ♀♀. Webling Bay, 10–15fms, J.M. and J.C.Y., January 1963, 5 ♂♂. Between Deas Head and Tucker Point, trawled 14–15fms, sand bottom, J.M. and J.C.Y., 18/1/1963, 5 ♂♂. Northwest side of Auckland Islands, 11–18fms, C. de Riek, February, 1966, 5 ♂♂, 5 ♀♀.

Campbell Island: *Galathea* Sta. 595, Perseverance Harbour, 52°33'S, 169°9'E, dredged, 43 metres, mud, sand, shells and stones, 4/1/1952, 2 ♂♂.

Diagnosis

A *Nectocarcinus* species with four frontal lobes, carapace and dorsal surface of chelipeds naked (but granulate) and to a certain extent iridescent, sternum pale, penultimate segment of male abdomen with prominently convex lateral margins and male first pleopod strongly curved laterally.

Description

Carapace hardly wider than long; naked, with rounded granules forming distinct ridges and structures on anterior half but more generally scattered on posterior half; regions distinct. Central gastric and metagastric structures low; cardiac elevation prominent, forming a T-shaped structure with median postcardiac structure. Protogastric structure a low sinuous ridge of granules extending almost from central gastric structure towards 2nd anterolateral tooth; mesogastric structure a low curved granulated ridge near central gastric, widely separated from ill-defined transverse structure near 3rd anterolateral tooth; epibranchial ridge relatively strong and densely granulated, extending from near anterolateral tooth to almost converge with mesogastric structure and then curving sharply posteriorly, with a brief interruption at a discrete, structural white patch, to terminate in a distinct oblique structure lateral to an elongate structural white patch at metagastric level. Mesobranchial region with scattered granules and a poorly defined anterior structure; lateral postcardiac structure low, oblique; metabranchial structure a distinct, narrow, curved and short ridge subparallel with posterior border; posterolateral border granular anteriorly and with three to five short, oblique, granular ridges midway along; posterior part of posterolateral border and posterior border with a strong, beaded ridge forming a sinuous margin to carapace in dorsal view.

Front quadrilobate, slightly upturned, medial lobes smaller, narrower, more acute, closer to each other than to submedials; submedial lobes with concave, minutely tuberculate inner and convex, smooth, outer margins, slightly over-reaching medial lobes. Internal orbital angle subacute, not extending anteriorly as far as frontal lobes but on a level with external orbital angle (1st anterolateral tooth). Orbit shallow, broad, as wide as distance between tips of submedial frontal lobes; dorsal edge of orbit with rounded tubercles, two supraorbital fissures

present, medial fissure the stronger, at about midpoint of orbit, forming distinct but narrow notch in margin, lateral fissure in outer quarter of orbit, subparallel to adjacent margin of carapace; ventral edge of orbit concave, bearing rounded tubercles, interrupted laterally by distinct suborbital notch immediately below external orbital angle, incomplete medially, antenna having complete access to orbit.

Anterolateral margin with four subequally spaced teeth, 1st subacute, others acute, 3rd and 4th stronger and standing out more distinctly from margin than others; margin between teeth edged with granules and one or two granules in concave portions of margin anterior and medial to the outstanding 3rd and 4th teeth.

Eyestalk short, narrowed slightly near terminal subspherical cornea.

Basal antennal article narrow, nearly twice as long as wide, smooth, with two minute, distal spinules ventrally, not fused to orbit but free to move to limited extent in vertical plane, and not excluding flagellum from orbit.

Third maxillipeds meeting in midline, with coarse fringe of short hairs medially; ischium narrow, about twice as long as wide, with a longitudinal narrow groove bordered medially by a narrow, naked, low ridge extending almost full length of segment; merus with rounded anterolateral angle, anterior margin straight, with bluntly produced anteromedial angle.

Chelipeds subequal in length and size, right chela armed with strong, rounded lobe-like teeth on fingers, left chela with more numerous, smaller, more acute teeth on fingers; with some fringes of long hairs and scattered patches of short tomentum. Merus (or arm) relatively short and distally expanded, with a short acute spine on dorsal surface about $\frac{1}{4}$ length of segment from distal border. Carpus (or wrist) broad, with a small blunt spine distolaterally, a long, stout, acute medial spine extending to $\frac{1}{2}$ dorsal length of palm when hand is folded back against wrist, and a small spine on medial border of medial spine. Hand with tuberculated ridges and scattered tubercles but no carinae, length three times greatest width, dactyl (or free finger) subequal in length with palm. Inner surface of palm tuberculate but without distinct ridges; dorsal surface of palm flattened and marked off from inner and outer surfaces by a prominent tuberculated angular ridge along each side, inner ridge terminating in a short spine, some tubercles forming an irregular longitudinal band along slightly raised midline of surface, remainder of surface smooth; outer surface of palm with two irregular longitudinal bands of tubercles, upper band the narrower, with raised tubercles, lower band with tubercles elevated and more scattered distally; ventral surface of palm with numerous tubercles arranged in closely-spaced, irregular, transverse aggregations. Fixed finger with five very distinct, raised, rounded and tuberculated longitudinal ridges extending full length of finger and merging distally in the curved, terminal tooth of cutting edge—one ridge along outer surface, two closely spaced along ventral surface and two along inner surface; teeth on cutting edge irregularly sized and spaced, fixed finger of right chela with about 10 teeth irregularly graded in size, second the largest, first and fourth smaller, fixed finger of left chela with about 14 teeth irregularly associated in groups of three proximally. Dactyl with five distinct ridges similar to those of fixed finger—one along outer surface, one dorsolateral, one dorsal ridge of irregularly sized spines, larger proximally and two ridges along inner surface; teeth on cutting edge irregularly sized and spaced, dactyl of right chela with about 10 teeth irregularly graded in size, the largest being the proximally curved, blunt and boss-like proximal tooth, distal teeth smaller, dactyl of left chela with about 16 teeth more or less in groups of three proximally.

Walking legs flattened and unspined. Second, third and four pereopods elongate, subequal in length, slightly over-reaching chelipeds in length and similar in form. Second pereopods (first walking legs) with merus subequal in length to carpus and propodus combined and with low transverse tuberculate ridges dorsally; propodus equal to about twice midlateral length of carpus and subequal to elongate, slender, acute dactyl; carpus, propodus and dactyl with longitudinal grooves and associated smooth rounded ridges, carpus with a groove on each side of a dorsal ridge, propodus and dactyl with a pair of closely spaced dorsal ridges, two ridges along anterior surface (one partly hidden by anterodorsal fringe of hairs on propodus) and two along posterior surface; fringes of long hairs associated with ridges and grooves on anterior surface only of distal three segments: one fringe along carpus, three along propodus and two along dactyl. Fifth pereopod reaching articulation of propodus and dactyl of fourth pereopod, strongly modified as a swimming paddle and with low, longitudinal, naked and pigmented ridges on merus and following segments contrasting strongly with pale tomentum of appendage surface; merus and propodus subequal in length, carpus about $\frac{2}{3}$ merus; merus with two low longitudinal ridges along flattened dorsal (structurally posterior) surface, carpus with one longitudinal ridge along posterior surface; propodus expanded and lamellate, as wide as long, with four low ridges along posterior surface: one along each margin, one along midline and one between midline ridge and that along dorsal margin; dactyl oval, lamellate and distally mucronate, one and a half times length of merus and twice as long as broad, with three low ridges along posterior surface: one along each margin and one along midline; similar, matching, low ridges along anterior (structurally ventral) surfaces of merus, carpus, propodus and dactyl. Fringes of elongate hairs along both edges of segments of fifth pereopod except on proximal $\frac{1}{4}$ of ventral edge of merus and ventral edge of ischium.

Male abdomen with ultimate segment triangular, a little broader than long, with bluntly rounded apex; penultimate segment with strongly convex lateral margins, length a little more than half greatest width; segments one to five with a distinct transverse ridge across middle of segment, ridges on second and third segments edged proximally with a dense fringe of hairs, penultimate segment with incomplete transverse ridge in midline only; third segment with a rather distinct, low, rounded boss on each side of midline distal to transverse ridge. Surface of abdomen, sternum and ventral surface of body and appendages in general covered with a very short, fine, pale tomentum.

First pleopod of male stout proximally, bent outwards almost at a right angle $\frac{1}{3}$ length from tip, strongly curved laterally, distally tapering, blunt; distal section twisted spirally so that the shallow groove runs across abdominal surface proximally and curves across lateral surface to become sternal on bent distal portion; a broad band of closely spaced spinules extending along lateral surface proximally, passing across sternal surface with twist of distal section to extend along mediolateral surface and to surround terminal part of abdominal surface.

Colour

Carapace and dorsal surface of chelipeds mainly purplish-red with areas of pink iridescence and some regularly patterned paler areas especially on the posterior half of the carapace. Walking legs and ventral surface of body and appendages pale off-white to dirty cream in colour. Fingers of chela not distinctly pigmented. Main areas of iridescence in large specimens are across the front of the carapace from the frontal margin, the orbits and the anterolateral margins as far posteriorly as the protogastric ridges; along each anterolateral margin in an irregular broad band to the level of the fourth tooth; along the anterior side of each epi-branchial ridge in a narrow band, and over the entire dorsal surface of the wrist, palm and free finger of each cheliped. Small specimens show less iridescence, have more tomentum on the carapace and have the various structures and ridges of the carapace marked out in dark red.

Measurements

Measurements of the male and female study specimens are given in Table I following the description of *N. antarcticus*.

Remarks

The differences between *N. bennetti* and *N. antarcticus* are discussed following the description of the latter species.

Distribution

Auckland and Campbell Islands, 10–22fms. (Mr E. W. Dawson informs us that there is additional material in the N.Z. Oceanographic Institute collections from a depth of 108fms off the Auckland Ids.). Chatham Rise, east of Banks Peninsula, 140m (Takeda and Miyake, 1969).

Nectocarcinus antarcticus (Jacquinot, 1853) Figs. 1b; 2b, e; 3c, d. Pl. 2.

Portunus antarcticus Jacquinot, in Jacquinot and Lucas, 1853: 51, pl. 5, figs. 1–5.

Nectocarcinus antarcticus; A. Milne Edwards, 1860: 220; 1861: 407. Miers, 1874: 2, pl. 1, fig. 2 (*Portunus antarcticus* in caption); 1876: 30. Hutton, 1879: 340. Filhol, 1886: 383. Hodgson, 1902: 229. Wilson, 1907: 65. Chilton, 1909: 608; 1911: 291. Thomson, 1913: 237. Rathbun, 1918: 3. Thomson and Anderton, 1921: 98, 2 figs. (of zoea). Stephensen, 1927: 293. Chilton and Bennett, 1929: 754. Young, 1929: 151. Powell, 1937: 375, 377, 387. Richardson, 1949: 31, fig. 1. Ralph and Yaldwyn, 1956: 74, fig. 42 (5th leg only). ?Yaldwyn, 1958: 125. Dell, 1960: 5. Stephenson, 1962: 315. Dell, 1963a: 44, fig.; 1963b: 253. Bennett, 1964: 65, fig. 130. ?Inoue, Arai and Abe, 1968: 135, 137.

Localities previously recorded

(Some specimens of *N. bennetti* may be included here as well as *N. antarcticus*.)

NEW ZEALAND: New Zealand (Miers, 1876). 10 miles NW of Cape Maria van Diemen; off Little Barrier Id., 35fms; Colville Channel; The Watchman, Hauraki Gulf (Chilton and Bennett). Waitemata Harb., Auckland; Northcote, Waitemata Harb.; Motuihi Channel, Waitemata Harb.; between Kaipara and New Plymouth (Bennett). Off Stokes Pt., Northcote, 8fms; $\frac{3}{4}$ mile N of Rangitoto beacon, 8fms; of NE coast of Motutapu Id., 9 fms; $\frac{1}{2}$ mile NW of Tiri Tiri wharf, off Whangaparoa Peninsula, 7fms, all Auckland area bottom community dredgings (Powell). Castlecliff; Wellington; Cloudy Bay, Cook Strait, 19fms (Chilton and Bennett). Between Foxton and Wanganui, 50fms (Griffin and Yaldwyn, 1965). Wellington Harb., 3–10fms (Bennett). Cook Strait; E coast of South Island (Filhol). C.I.E. Stas. 1 and 2, Mernoo Bank, Chatham Rise, 60–100fms (Dell, 1960). Lyttelton Harb.; Sumner, Banks Peninsula (Bennett). *Nora Niven* Sta. 30, 18 miles ENE of Oamaru, 35fms; Sta. 26, 19 $\frac{1}{2}$

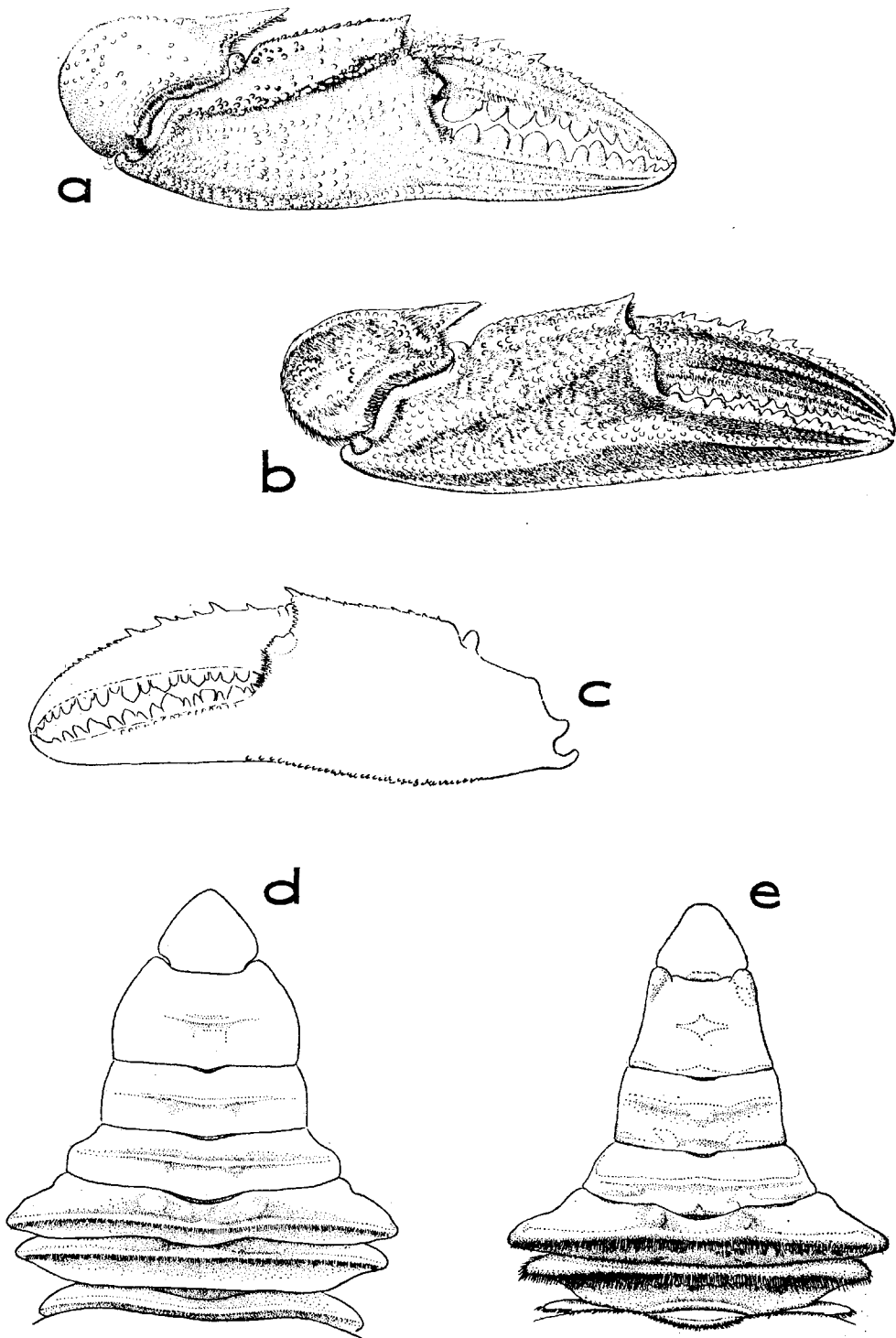


FIG. 2.—Chelae and abdomens of *Nectocarcinus bennetti* (study male) (a, c, d) and *N. antarcticus* (study male) (b, e). a, b, right chela, outer aspect; c, left chela, outer aspect.

miles S of Oamaru, 40–43fms; Sta. 23, 4 miles SE of Mocraki, 13–24fms (Chilton, 1911). Otago Harb. (Thomson; Thomson and Anderton; Bennett). St Kilda, Dunedin; off Portobello Marine Station, Otago Harb.; Warrington, Otago; E of Papanui Inlet, Otago, 40fms; off Otago, 23–40fms; off Otago, from Red Cod stomachs, 20fms; E of Taiaroa Head, Otago, 30–50fms (Bennett). Off E Otago, 120fms (Dell, 1963b). *Nora Niven* Sta. 12, Molyneux Bay, 6 miles NW of Nuggets, Otago, 20–46fms; Sta. 5, 50 miles E off Wreck Reef, Foveaux Strait, 65, 67 and 183fms; Sta. 2, 10 miles NE of Port Adventure, Stewart Id., 54–55fms (Chilton, 1911). Stewart Id. (Chilton and Bennett; Bennett). E coast of Stewart Id. (Filhol). Dusky Sound, over 40fms (Bennett). Off Snares Ids., approx. 80fms (Inoue, Arai and Abe).

CHATHAM ISLANDS: Chatham Ids. (Chilton, 1911; Bennett). Chatham Ids., from Blue Cod stomachs (Young). C.I.E. Stas. 14, 15, 20, 24, 28, 30, 38, Chatham Ids. shelf, 15–70fms (Dell, 1960).

AUCKLAND ISLANDS: Auckland Ids. (Jacquinot; Milne Edwards, 1861; Miers, 1876; Bennett). Aucklands Ids., 10fms (Hodgson). Auckland Ids., from *Notothenia microlepidota* stomachs (Hutton). Auckland Ids., food of Hooker's Sealion (Wilson). Port Ross, 9–10fms; Coleridge Bay, Carnley Harb. (Stephensen). Off Auckland Ids., approx. 98fms (Inoue, Arai and Abe).

CAMPBELL ISLAND: Perseverance Harb., 20fms (Stephensen).

Material examined

Forty ♂♂, 27 ♀♀ (6 ovigerous), 10.5–87.0mm (smallest ovig. ♀ 10.5mm) and other unmeasured and unsexed specimens. Study ♂ (72.7mm), study ♀ (70.9mm), between Deas Head and Tucker Point, Port Ross, Auckland Islands, trawled 14–15fms, J. Moreland and J. C. Yaldwyn, January 1963 (Z. Cr. 1849). Other material as follows:

NEW ZEALAND: New Zealand, E. W. Bennett, 1931, 1 ♂ (Australian Mus. P.9957). Colville Channel, 26fms, N.Z. Marine Dept., 14/11/1962, 1 ♂, 2 ♀♀ (ovig.) (Dom. Mus.). Twelve miles N of Whale Island, Bay of Plenty, 58–68fms, N.Z. Marine Dept., 8/12/1962, 1 ♂ (Dom. Mus.). Eleven miles S of East Cape, 100fms, N.Z. Marine Dept., 5/4/1963, 1 ♂ (Dom. Mus.). Sixteen miles SE of East Cape, 70fms, N.Z. Marine Dept., 5/4/1963, 1 ♀ (ovig.) (Dom. Mus.). Three miles NE of Hick's Bay, 100–120fms, N.Z. Marine Dept., 4/4/1963, 3 ♂♂ (Dom. Mus.). Between Foxton and Wanganui, 50fms, M.V. *Admiral*, J. C. Yaldwyn, 14/6/1956, 1 ♀ (ovig.) (Dom. Mus.). Dom. Mus. Bottom Sta. 173, Kapiti Channel, 33fms, M.V. *Alert*, August 1951, 1 ♂ (Dom. Mus.). Off Days Bay, Wellington Harbour, R. A. Falla, 5/10/1953, 3 ♂♂ (Dom. Mus.). Off Days Bay, Wellington Harbour, 9fms, R. K. Dell and J. Moreland, 19/1/1953, 1 ♂ (Dom. Mus.). D.M.B. Sta. 163, Cook Strait, 40°52.6'S, 174°49.5'E, 75fms, M.V. *Alert*, 30/8/1951, 1 ♂, 1 ♀ (Dom. Mus.). Ships Cove, Queen Charlotte Sound, taken at surface at night, attracted by light, R. K. Dell, 30/8/1951, 3 small specimens (Dom. Mus.). Tasman Bay, 40°20'S, 172°41'E, 45–55fms, N.Z. Marine Dept., 8/8/1963, 1 ♂, 1 ♀ (ovig.) (Dom. Mus.). Lyttelton Harbour, dredged, G. M. Thomson, 1910 (Otago Mus.). Off Oamaru, J. Graham, 2 ♂♂ (Dom. Mus.). D.M.B. Sta. 189, off East Otago, 120fms, M.V. *Alert*, 14/8/1955, 1 ♂, 1 ♀ (Dom. Mus.). D.M.B. Sta. 191, off East Otago Coast, 250–300fms, M.V. *Alert*, 16/8/1955, 1 ♂ (Dom. Mus.). D.M.B. Sta. 202, off Taiaroa Head, Otago, 75fms, M.V. *Alert*, 23/1/1957, 1 ♂ (Dom. Mus.). D.M.B. Sta. 189, off East Otago, 120fms, M.V. *Alert*, 14/8/1955, numerous small specimens (Dom. Mus.). Off Otago, dredged 40fms, D. H. Graham, 1931 (Otago Mus.). Foveaux Strait Oyster beds, September 1961, 1 ♂ (Dom. Mus.). Five miles W of Otorokua Point, north of Jackson's Bay, 20fms, N.Z. Marine Dept., 24/1/1964 (specimen examined R.K.D.).

CHATHAM ISLANDS: Specimens reported on by Dell, 1960, and re-examined for the purpose of this report. Hanson Bay, off Cape Young, South of the Sisters Islands, Petre Bay and south of Little Mangere Id., 15–70fms, C.I.E. Stas. 14, 15, 20, 24, 28, 30 and 38, 3 ♂♂, 1 ♀ (Dom. Mus.) and additional specimens (Canterbury Mus.).

BOUNTY ISLANDS: Off Bounty Islands, *Magga Dan* Expedition, M. M. Darby, dredged in 40fms, 12/12/1968, 1 ♀ (Cant. Mus.).

AUCKLAND ISLANDS: Musgrave Peninsula, R. W. Oliver, 5/1/1944, Cape Expedition, 1 ♀ (Dom. Mus.). Between Deas Head and Tucker Point, trawled 14–15fms, sponge bottom, J. C. Yaldwyn and J. Moreland, 18/1/1963, 15 ♂♂, 16 ♀♀ (1 ovig.) (Dom. Mus.). Camp Cove, Carnley Harbour, speared in six feet of water, E. Mitchell, 8/5/1943, Cape Expedition, several large specimens (Dom. Mus.). Emergency Bay, Carnley Harbour, 6fms, Cape Expedition, several specimens (Dom. Mus.). Togua Bay, 10fms, W. H. Dawbin, 6/10/1943, Cape Expedition, several small specimens (Dom. Mus.).

LOCALITY UNCERTAIN: ?Subantarctic, Mawson's Australian Antarctic Expedition, 1 ♂, 1 ♀ (fragments) (det. Mary J. Rathbun) (Aust. Mus. P.4063).

Diagnosis

A *Nectocarcinus* species with four frontal lobes, carapace and dorsal surface of chelipeds clothed in dark-coloured tomentum (and granulate), sternum dark col-

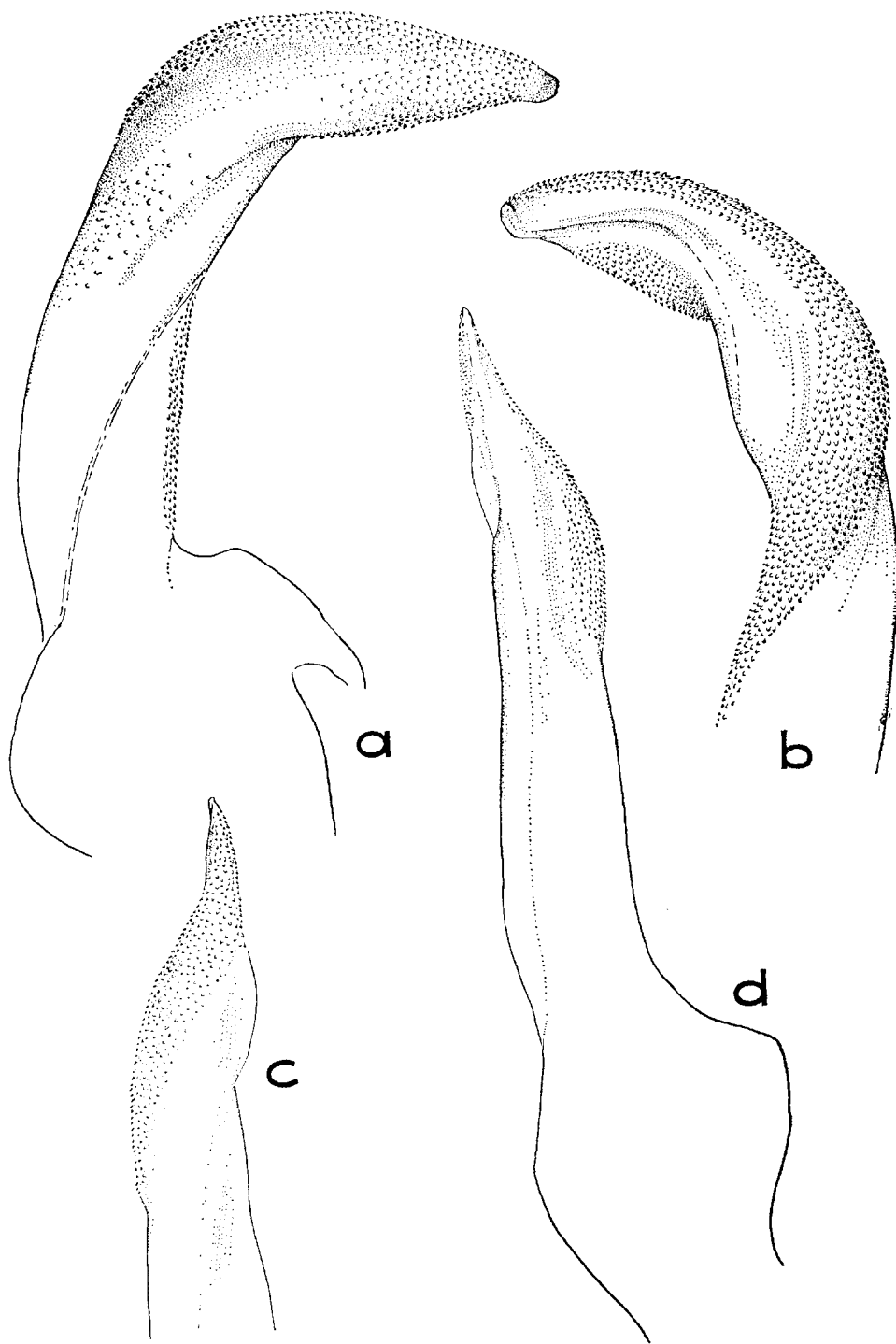


FIG. 3.—Male left first pleopods of *Nectocarcinus bennetti* (study male) (a, b) and *N. antarcticus* (study male) (c, d). a, d, whole pleopod, abdominal aspect; b, c, tip, sternal aspect.

oured, penultimate segment of male abdomen with weakly concave lateral margins and male first pleopod straight.

Description

This description is mainly based on the study male, carapace width 72.7mm, from Port Ross, Auckland Islands, with additional information from the associated study female (both Z. Cr. 1849).

Carapace hardly wider than long; completely clothed in short, fine, dark tomentum, but with rounded granules forming distinct ridges and structures projecting through tomentum; regions distinct. Central gastric and metagastric structures low; cardiac elevation prominent, forming a T-shaped structure with median postcardiac structure, with granules concentrated along anterior edge of cardiac structure and bunched in posterior part of postcardiac. Proto-gastric structure a low sinuous ridge of granules extending from near central gastric structure but widely separated from transverse ridge near second anterolateral tooth; mesogastric structure low, curved, widely separated from ill-defined structure near third anterolateral tooth; epibranchial ridge relatively strong with large granules concentrated anteriorly, extending from near fourth anterolateral to converge slightly with mesogastric, then curving sharply posteriorly, with a brief interruption at a discrete, structural white patch, to terminate in a distinct oblique structure lateral to elongate white patch at metagastric level. Mesobranchial region with some granules forming an irregular structure; lateral postcardiac structure granulated and elevated; metabranchial region with a distinct, narrow, straight and short ridge inclined at angle to posterior border; posterolateral border granular anteriorly and with three ill-defined, short, oblique, granular ridges midway along; posterior part of posterolateral border and posterior border, with a distinct, finely beaded ridge forming a sinuous margin to carapace in dorsal view.

Front quadrilobate, in plane of carapace; medial lobes smaller, narrower, blunt and closer to each other than to submedials; submedial lobes with concave, strongly tuberculate inner margins and smooth, convex outer margins, rounded distally and slightly over-reaching medial lobes. Internal orbital angle subacute, not extending anteriorly as far as frontal lobes but somewhat in advance of level of external orbital angles. Orbit shallow, broad, as wide as distance between tips of submedial frontal lobes; dorsal edge of orbit with rounded tubercles, one supraorbital fissure at about midpoint of orbit forming narrow slit in margin rather than a notch, second fissure in outer quarter of orbit, a narrow slit in margin only; ventral edge of orbit concave, bearing rounded tubercles, and interrupted laterally by distinct suborbital notch immediately below external orbital angle, incomplete medially, antenna having complete access to orbit.

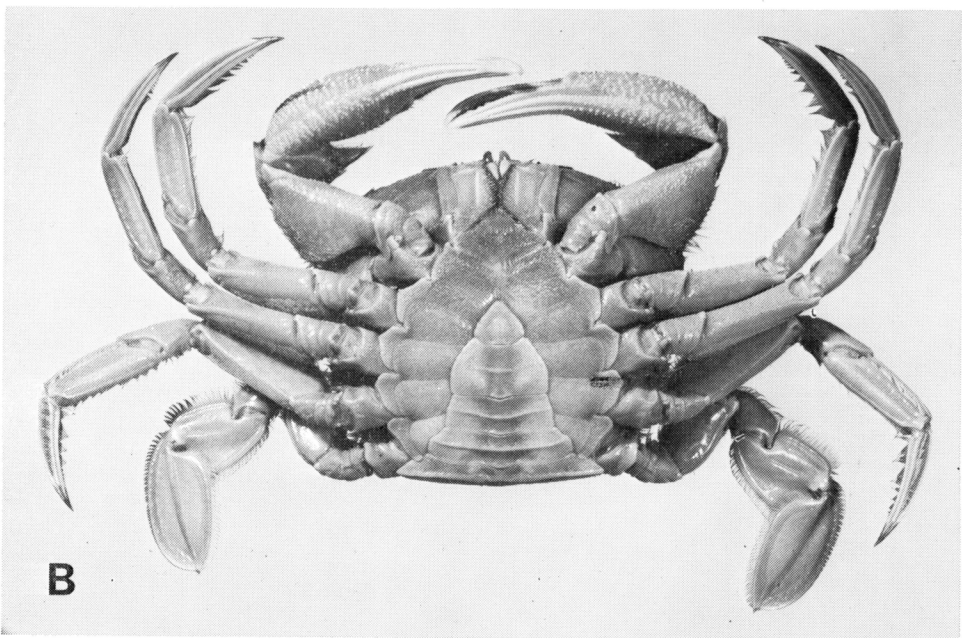
Anterolateral margin with four subequally spaced teeth, first blunt, others acute; first and second not standing out from anterolateral margin but third and fourth stronger and standing out distinctly from margin; margin between teeth edged with small granules.

Eye, basal antennal article and third maxilliped as in *N. bennetti* but distal edge of basal antennal article minutely granulate ventrally.

Chelipeds subequal in length and size, both right and left chelae with similar teeth on fingers. Merus relatively short and distally expanded, with a short and subacute spine on dorsal surface somewhat less than $\frac{1}{2}$ of segment length from distal border. Carpus broad, with strong blunt, sometimes apically bifid, distolateral spine, a stout, acute spine medially, extending to $\frac{1}{3}$ dorsal length of palm when hand is folded back against wrist, and a small spine on medial border of medial spine; dorsal surface of wrist with several short tuberculated ridges and some scattered tubercles. Hand with strong tuberculated ridges and many scattered tubercles, length three times greatest width, dactyl and palm subequal in length. Inner surface of palm tuberculate but without distinct ridges; dorsal surface of palm marked off from inner surface by a tuberculated angular ridge terminating distally in a short spine, and from outer surface by a broad, rounded, tuberculated ridge, midline of dorsal surface raised into an incomplete tuberculated ridge; outer and ventral surfaces of palm each with a rounded, tuberculated ridge extending on to base of fixed finger. Fixed finger with five very distinct, raised, rounded and tuberculated longitudinal ridges merging distally in straight tip of cutting edge—one along outer surface, two closely spaced along ventral surface and two along inner surface; about 15 teeth or more on cutting edge somewhat irregularly sized and spaced, and irregularly associated in groups of three. Dactyl with five distinct ridges similar to those of fixed finger—one along outer surface, one dorsolateral, one dorsal ridge of irregularly sized spines, larger proximally, and two ridges along inner surface; about 15 teeth or more on cutting edge irregularly sized and spaced. Both hands with prominent longitudinal bands of dark-coloured tomentum between the pale tuberculated ridges on fingers and on palm distally—outer surface with two such bands on dactyl, one irregular broad band on palm medially extending on to fixed finger and one distinct band on palm ventrolaterally extending on to fixed finger.

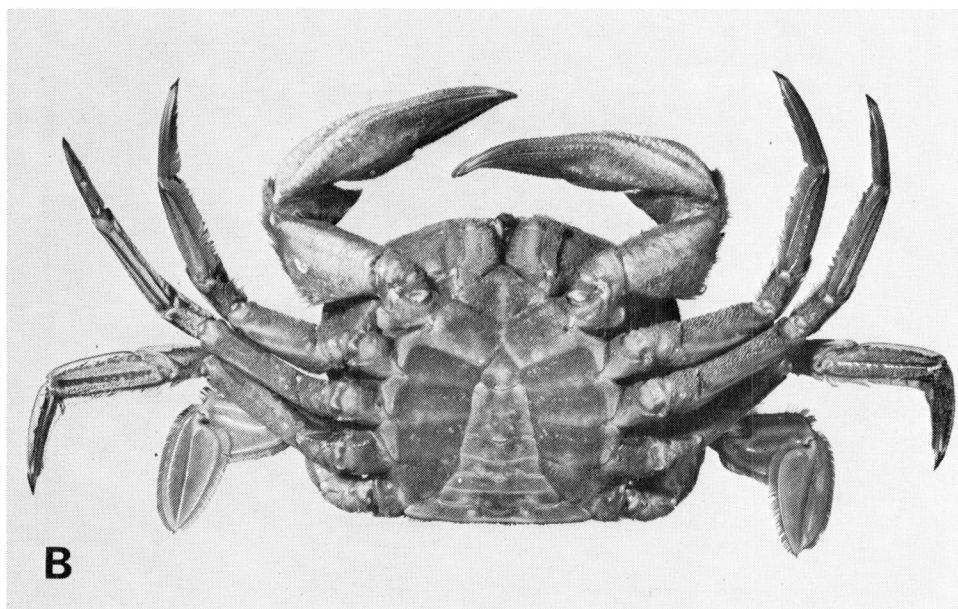
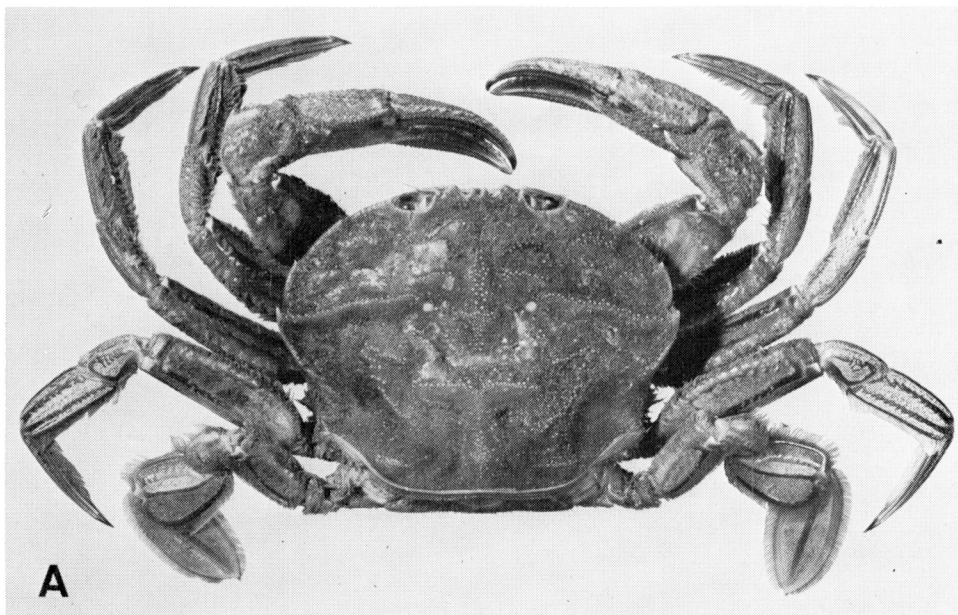
Walking legs (second to fifth pereopods) as described for *N. bennetti*.

Male abdomen with ultimate segment triangular, a little broader than long, with apex somewhat truncated and rounded, penultimate segment with weakly concave lateral margins,



Nectocarcinus bennetti (study male). A, dorsal view; B, ventral view.

Photos: Charles Turner, Australian Museum.



Nectocarcinus antarcticus (study male). A, dorsal view; B, ventral view.

Photos: Charles Turner, Australian Museum.



A, *Nectocarcinus bullatus* (δ , 24.6mm, off Juan Fernandez, Anton Bruun), dorsal view. B, *Nectocarcinus spinifrons* (Aust. Mus. E.4511), dorsal view.

Photos: Anthony Healy.

length subequal to distal width; segment 1 largely obscured by proximal expansion of segment 2; segments 2 to 5 each with a distinct transverse ridge across middle of segment, ridges on 2nd and 3rd segments edged proximally with a very dense fringe of long hairs; penultimate segment with trace of transverse ridge centrally only; 3rd segment with a rather indistinct, low rounded boss on each side of midline distal to transverse ridge. Surface of abdomen, sternum and ventral surface of body and appendages in general covered with short, fine, dark-coloured tomentum.

First pleopod of male stout and straight, subdistally slightly swollen, tip elongate, acute; groove extending along sternal surface proximally, curving around medial surface at level of swollen subdistal portion to become abdominal distally; a patch of small, closely spaced spinules present on lateral and sternal surfaces of swollen subdistal section, passing on to sternal and medial aspects of tip.

Colour

Carapace and dorsal surface of chelipeds and walking legs mottled with dark red over a background of pinkish red. No trace of iridescence, but with some small white marks on various ridges and spines. Ventral surface of body and legs pale with some regularly placed bands of red across sternum and coxa of each leg. These bands and the general dark-coloured tomentum of the body surface give the sternum a general dark appearance in contrast to the pale appearance of the *N. bennetti* sternum. Fingers of chelae dark red on the longitudinal ridges especially on the inner surface.

TABLE I.—Dimensions (in mm) of *Nectocarcinus bennetti* and *N. antarcticus*.

Dimension	<i>N. bennetti</i>		<i>N. antarcticus</i>	
	study male	study female	study male	study female
Carapace length	55.7	36.4	55.2	53.5
Carapace width	72.4	45.3	72.7	70.9
Cheliped length	85.1	50.3	89.6	77.5
Chela length	43.7	24.9	44.4	38.9
Chela height	19.2	10.7	18.7	15.0
Ambulatory leg 2 length	100.4	59.8	98.4	92.7

Remarks

The most obvious differences between the two subantarctic species of *Nectocarcinus* are the colour (including iridescence), hairiness, and shape of the abdomen and first pleopod in males. Although the position and relative size of the structures on the carapace is the same in both species there are marked differences in the position of the larger tubercles making up the structures. In *N. stephensoni* the granules are somewhat uniformly distributed over each structure, the protogastric structure is almost continuous with that near the second anterolateral tooth, the granules making up the cardiac and medial postcardiac structures merge into one another and the posterolateral structure is curved and subparallel with the posterior border. In *N. antarcticus*, on the other hand, the protogastric structure, like the mesogastric in both species, is widely separated from that near the anterolateral tooth, the granules on the structures are typically larger and more concentrated near the anterior part (particularly noticeable on the protogastric, mesogastric, epibranchial and cardiac ridges) with smoother, naked areas behind them, the granules on the cardiac and medial postcardiac structures are distinctly separated by a smooth area and the posterolateral structure is straight and set at a slight angle to the posterior border. There are differences between the two species in the shape and tuberculation of the frontal lobes, although these are slight and variable, in the relative prominence of the outer dorsal ridge of the palm of the chelae, in the shape of the teeth on the fingers of the chelae, although in *N. bennetti* those on the right chela are not always larger than those on the left and the arrangement of the teeth is variable, and in the relative length of the medial spine of the cheliped carpus. Finally, the anterolateral teeth of the carapace stand out much more in *N. bennetti* so that the whole of the margin of the anterior part of the carapace does not appear to be as smoothly rounded as in *N. antarcticus*.