

short, flattened dactyl 2/3 unarmed propodus, and latter 1/3 carpus. Merus a little longer than carpus and about twice ischium. Merus, ischium and basis distinctly stouter than more distal segments. 5th pereopod similar to, but shorter than, 4th.

1st pleopod male and female with small endopod, which is broadly rounded distally; 2nd to 5th pleopods male and female with larger, tapering endopods. Appendix interna absent from all pleopods male and female; male 2nd pleopod with small, but distinct, appendix masculina. Uropod with exopod relatively broad, tapering distally to a simple, acute tip and endopod not as broad and with rounded tip.

Branchial Formula

	Maxillipeds			Pereiopods				
	1st	2nd	3rd	1st	2nd	3rd	4th	5th
Pleurobranchiae	-	-	-	1	1	1	1	1
Arthrobranchiae	-	-	-	-	-	-	-	-
Podobranchiae	-	-	-	-	-	-	-	-
Epipodites	1	r	-	-	-	-	-	-
Exopodites	1	1	1	-	-	-	-	-

r represents a reduced epipod.

The complete branchial formula of *Prionocrangon* does not appear to have been published before.

Colour in Life

The specimens from CIE 6 were brought to the surface alive and examined at once. No chromatophores or pigments were present externally, the entire shrimp being pure white in colour. The large eggs of the ovigerous specimen were bright yellow, while in the other female the ovary showed through the carapace as a yellow mass.

Systematic Position

P. curvicaulis has been described and illustrated in some detail as no complete description of a *Prionocrangon* has yet appeared in the literature. Especially lacking were descriptions of mouthparts and the gill formula. No further species have been listed in the *Zoological Record* since 1920, when de Man gave a key to the 3 described species in the genus. In this key, *P. curvicaulis* does not fit into either of the two main groups used. A third and new group is needed to accommodate this species: "when the carapace is looked at from above, the rostrum appears longer than the transformed eyestalks". Also the following

heading would appear to separate *P. curvicaulis* from the other 3 species: "eyestalks not distally acute, distal tips not visible in dorsal view but meeting below rostrum and curving ventrally between the antennules". In the others, the ocular peduncles are described or illustrated as acute, triangular processes with tips clearly visible on each side of rostrum. In features other than those mentioned above, this new species differs from *P. ommatosteres* Wood-Mason & Alcock, in the relatively shorter telson armed with 3, not 2, pairs of slender spines distally. In this it approaches *P. pectinata* Faxon, as far as can be made out from the illustration. The tail-fan of the third species, *P. dofleini* Balss, has not been described.

Balss (1914) appears to have separated *P. dofleini* from *P. ommatosteres* primarily on the possession of 10-12 middorsal teeth on the carapace rather than 6-8 such teeth. However, Yokoyama (1933) recorded an additional specimen of *P. dofleini* from Japanese waters with 8 middorsal teeth and considered that this species might be synonymous with *P. ommatosteres*. The 9 specimens of *P. curvicaulis* have a range of 7-11 middorsal teeth, while the single specimen of *P. pectinata* recorded in the literature (Faxon, 1896) has 8 such teeth. When it is considered that only 4 specimens of *P. ommatosteres* have been recorded in the literature (Wood-Mason & Alcock, 1891; Alcock & Anderson, 1894; Alcock, 1901; de Man, 1920) it can be seen that little is known of the variation within the species of this rare genus. Further knowledge of the ocular peduncles of the earlier described species may make it necessary to consider these as geographical races of a single wide-ranging species.

Distribution

Prionocrangon curvicaulis has been taken from the Chatham Rise only (from about 43°40'S. to 44°35'S.) between about 220 to 330 fm.

Variation in Carapace Spinulation

The number of middorsal spines on the carapace varied in the 9 specimens examined as follows: 1 specimen had 7 spines, 5 had 8 spines, 2 had 9 spines and 1 (the only male) had 11 spines; one of the 8-spined specimens had one spine almost completely bifid.

Notes on Life History

Ovigerous females, with eggs measuring, after preservation 1.3 to 1.7 × 0.8 to 1.1 mm, were

taken in the months of January and February. The eggs in this genus are large, as has been recorded by Alcock & Anderson (1894), and yolky. Thus the development is probably abbreviated as in *Sclerocrangon*. The smallest ovigerous female observed had a carapace length of 8 mm, but too few specimens are available to draw conclusions as to the size at maturity.

Ecology

It appears fairly certain that *Prionocrangon* is a highly specialised, burrowing, filter-feeder. The blind, white condition, coupled with the stout 4th and 5th pereopods and their spatulate dactyls, appears strong evidence for its burrowing habit, which would also partly account for its great rarity in collections. In *P. curvicaulis* the enormous development of interlocking feathered setae on the antennules, the scaphocerites, the antennal ped-

uncles and especially the 3rd maxillipeds forms a completely closed tube from the exterior direct to the inner mouthparts. If this is a filter-feeding mechanism, the anterior respiratory current would need to be inhalent, the reverse of the condition usually found in decapods. However, Burkenroad (1939, 16) has described in detail the respiratory behaviour of the mud-burrowing penaeid, *Solenocera vioscai*, and in this species the "respiratory water was certainly obtained largely from the opening at the tip of the conduit formed by the apposition of the antennular flagella, since the current entering this opening was very perceptible". From the condition and position of the transformed ocular peduncles in *Prionocrangon curvicaulis* it would appear that they may have some sensory function connected with this inhalent current of water. The bottom, at the 4 stations where *P. curvicaulis* was taken, was fine, grey or green, mud and sand.

DISCUSSION

A checklist of the archibenthal Natantia of the Chatham Rise contains the following six species:

- Lipkius holthuisi* Yaldwyn
- Campylonotus rathbunae* Schmitt
- Notopandalus magnoculus* (Bate)
- Sclerocrangon knoxi* Yaldwyn
- Pontophilus acutirostratus* Yaldwyn
- Prionocrangon curvicaulis* Yaldwyn

These can be divided into two groups. The first group contains what can be regarded as shelf species that extend below 100 fm, e.g., *Notopandalus magnoculus* and *Pontophilus acutirostratus*, which in this case both extend below 300 fm. The remaining four species belong to a second group containing restricted archibenthal forms not known from depths less than 100 fm (in this case less than 150 fm).

By far the most abundant species on the Chatham Rise were *Campylonotus rathbunae* and *N. magnoculus*, the three crangonids being much less common, while only one specimen of *Lipkius holthuisi* was taken during the entire expedition. *C. rathbunae* is the only species recorded from outside New Zealand waters. It has been taken in the Great Australian Bight by the F.I.S. *En-*

deavour at similar depths, and in association with the pandalid, *Plesionika martia* (A. M.-Edw.). Unfortunately little has been published on the natants collected by the *Endeavour* Expedition and thus one cannot compare the archibenthal faunas of the Chatham Rise and the Great Australian Bight in the absence of knowledge on the associated crangonids. Although known only from New Zealand waters as yet, *N. magnoculus* is widespread and abundant, both geographically and bathymetrically. Thus it has been found from off Kaipara in the north to the Chatham Rise in the south, and although it is the commonest species on the Cook Strait trawling grounds, between about 30 to 60 fm, it was also taken in great abundance in the Bay of Plenty at 270 fm. It would appear that *N. magnoculus* may be a northern species and *C. rathbunae* a southern species, overlapping in their ranges between Cook Strait and the Chatham Rise. The evidence for this statement is slim, but the former is neither present in the Portobello and Dominion Museum collections from the "Otago Canyons", nor is it taken on the commercial trawling grounds off North Otago (Portobello Collections), while the latter does not appear in the Dominion Museum archibenthal collections from the Bay of Plenty.

In contrast to these two species, the crangonid, *Pontophilus acutirostratus*, occurs off the North Auckland Peninsula; in the Bay of Plenty; in Cook Strait; on the Chatham Rise and in the "Otago canyons", and has the greatest bathymetrical range of all the species recorded here—about 47 to 400 fm.

When the Chatham Rise faunal assemblage is compared from a generic point of view with archibenthal faunas from other geographical areas, it is found to be unique, at least in the southern hemisphere. Archibenthal Natantia belong with few exceptions to three families, Hippolytidae, Pandalidae and Crangonidae. Species of Hippolytidae may not occur in certain areas, but pandalids and crangonids are invariably present. The unusual feature of the Chatham Rise fauna is the presence of *Sclerocrangon* and *Prionocrangon* associated in the same area. *Sclerocrangon*, as a sublittoral and shelf genus, is restricted to arctic and northern temperate waters but extends into the archibenthal off these shelves, off South Africa and on the Chatham Rise. It has not, however, been recorded from the archibenthal or abyssal zones of the equatorial regions. *Prionocrangon*, on the other hand, is apparently restricted to the archibenthal and occurs in the equatorial regions, off subtropical Japan and on the Chatham Rise. Nowhere else are species of these two genera directly associated. The nearest approach is off the Pacific coast of southern, or subtropical, Japan. Here in the famous Sagami Bay, the crangonid genera *Crangon*, *Paracrangon* and *Prionocrangon* occur in the archibenthal, while

Sclerocrangon, *Pontophilus* and *Pontocaris* (syn. *Aegeon*) occur on the shelf (*vide* de Man, 1920; Yokoya, 1933), there being no evidence of direct association.

In the absence of information on the Australian archibenthal, the only southern hemisphere fauna with which the Chatham Rise can be compared is that off the southern coasts of South Africa. Here, *vide* Barnard (1950), pandalids of the genera *Plesionika*, *Heterocarpus*, *Chlorotocus* and *Pandalina*, and crangonids of the genera *Sclerocrangon*, *Pontophilus* and *Pontocaris*, are found. When one takes into account that *Plesionika* occurs in the archibenthal of Cook Strait (unpublished); *Chlorotocus** occurs on the New Zealand shelf down to at least 100 fm; *Pandalina* can be taken as the South African equivalent of the monotypic *Notopandalus*, and the same species of *Pontocaris*† occurs on the shelf and in the archibenthal of the Bay of Plenty, *Heterocarpus* remains the only South African genus not found in the New Zealand area. There is nothing in the South African fauna, however, to compare with the Chatham Rise bresilioid, *Lipkius*, or palaemonoid, *Campylonotus*, nor is there anything in New Zealand to compare with the South African archibenthal hippolytids, *Merhippolyte* and *Leontocaris*.

Northern hemisphere archibenthal faunas, while similar in general facies to that of the Chatham Rise, are usually characterised by the dominance of the genus *Pandalus* and great speciation in *Pontophilus* and *Crangon*.

SUMMARY

The Chatham Islands 1954 Expedition took six species of natant Decapoda from 10 stations between 125 and 330 fm on the Chatham Rise. A new genus and species of bresilioid prawn, *Lipkius holthuisi*, is here described and recorded from Cook Strait as well as the Chatham Rise. The definition of the family Rhynchocinetidae is amended to include the more recent family Eugonatonotidae and the genus *Lipkius*. A key to the three genera in this amended family is also given.

Campylonotus rathbunae Schmitt, originally taken by the F.I.S. *Endeavour* in the Great Aus-

tralian Bight, is now recorded from New Zealand waters, having been taken in Cook Strait and in the "Otago Canyons" as well as on the Chatham Rise. *C. rathbunae* is shown to be a protandrous hermaphrodite and thus the Campylonotidae become, with the Hippolytidae and Pandalidae, the

* *Chlorotocus novae-zealandiae* (Borradaile) in litt. as *Thalassocaris*.

† *Pontocaris lacazei* (Gourret) in litt. as *Aegeon cataphractus*.

third natant family in which this phenomenon is known to occur. The types of the three other species of the genus *Campylonotus* have been examined in the British Museum (N.H.) and a new key to the genus has been prepared.

A new genus, *Notopandalus*, has been described for the endemic New Zealand species *Pandalus magnoculus* Bate, here recorded for the first time since 1888. *N. magnoculus* is a widespread shelf and archibenthal species, and, unlike many species of the closely allied northern hemisphere genus *Pandalus*, is not a protandrous hermaphrodite.

Sclerocrangon knoxi and *S. richardsoni* are described from the archibenthal of the Chatham Rise and Cook Strait respectively. *Sclerocrangon* was formerly regarded as a characteristic northern hemisphere genus with one isolated and anomalous species recorded from off South Africa.

A widespread shelf and archibenthal *Pontophilus*, *P. acutirostratus*, is described and dis-

tinguished from the close New Zealand *P. pilosoides* Stephensen, an exclusively shelf species, hitherto only recorded from the Subantarctic Islands of New Zealand.

A new species of the blind and rare genus *Prionocrangon*, *P. curvicaulis*, is described, and evidence is put forward to show that *Prionocrangon* is a highly specialised, burrowing, filter-feeder, with an abbreviated development.

The Chatham Rise archibenthal fauna is discussed and shown to be unique in that a species of the arctic and temperate genus *Sclerocrangon* is associated with a species of *Prionocrangon*, formerly regarded as an equatorial genus. The archibenthal fauna of South African waters is closely comparable with that of New Zealand in that the families Pandalidae and Crangonidae are represented by much the same genera.

Throughout the systematic section details of rostral variation, colour pattern and distribution have been given for all species where possible.

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REFERENCES

ALCOCK, A. 1901: "A descriptive Catalogue of the Indian Deep-Sea Crustacea Decapoda Macrura and Anomala, in the Indian Museum. Being a Revised Account of the Deep-sea species collected by the Royal Indian Marine Survey Ship *Investigator*." Indian Museum, Calcutta, 286 pp., 3 pls.

—; ANDERSON, A. R. 1894; Natural History Notes form H.M. Indian Marine Survey Steamer *Investigator*, Commander C. F. Oldham, R.N., commanding. Series II, No. 14. An Account of a Recent Collection of Deep Sea Crustacea from the Bay of Bengal and Laccadive Sea. *J. Asiatic Soc. Bengal*. 63 (11): 141-85 pl. 9.

- BALSS, H. 1914: Ostasiatische Decapoden II. Die Natantia und Reptantia. In DOPLEIN, F., Beiträge zur Naturgeschichte Ostasiens. *Abh. Bayer, Akad. Wiss. Suppl.* 2 (10): 1-101, 50 figs., 1 pl.
- BARNARD, K. H. 1950: Descriptive Catalogue of South African Decapod Crustacea. *Ann. S. Afri. Mus.* 38: 1-837, 154 figs.
- BATE, C. S. 1888: Report on the Crustacea Macrura Collected by H.M.S. *Challenger* during the Years 1873-1876. *Rep. Voy. Challenger, Zool.* 24: 1-942, 150 pls.
- BERKELEY, ALFREDA A. 1929: Sex reversal in *Pandalus danae*. *Amer. Nat.* 63: 571-3.
- 1930: The post-embryonic development of the common pandalids of British Columbia. *Contr. Canad. Biol. Fish.* n.s. 6 (6): 79-214, 30 figs.
- BURKENROAD, M. D. 1939: Further Observations on Penaeidae of the Northern Gulf of Mexico. *Bull. Bingham Ocean. Coll* 6 (6): 1-62, 36 figs.
- DAKIN, W. J.; COLEFAX, A. N. 1940: The Plankton of the Australian Coastal Waters off New South Wales. Part I. *Publ. Univ. Sydney Dep. Zool.* 1: 1-215, 4 pls.
- DELL, R. K. 1956: The Archibenthal Mollusca of New Zealand. *Dom. Mus. Bull.* 18: 1-235, 280 figs.
- DOHRN, P. F. R.; HOLTHUIS, L. B. 1950: *Lysmata nilita*, a new species of prawn (Crustacea Decapoda) from the Western Mediterranean. *Pubbl. Staz. Zool. Napoli* 22 (3) 339-47, 2 pls.
- FAXON, W. 1896: Reports on the Results of Dredging, under the Supervision of Alexander Agassiz, in the Gulf of Mexico and the Caribbean Sea, and on the East Coast of the United States, 1877 to 1880, by the U.S. Coast Survey Steamer *Blake*, Lieut.-Commander C. D. Sigsbee, U.S.N. and Commander J. R. Bartlett, U.S.N. Commanding. 37. Supplementary Notes on the Crustacea. *Bull. Mus. Comp. Zool. Harvard* 30: 153-66, 2 pls.
- FLEMING, C. A.; REED, J. J. 1951: Mernoo Bank, East of Canterbury, New Zealand. *N.Z. J. Sci. Tech. B* 32 (6): 18-30, 6 figs.
- HOLTHUIS, L. B. 1952: Reports of the Lund University Chile Expedition 1948-49. 5. The Crustacea Decapoda Macrura of Chile. *Lunds Univ. Arssk.* 2, 47 (10): 1-109, 19 figs.
- 1955: The Recent Genera of the Caridean and Stenopodidean Shrimps (Class Crustacea, Order Decapoda, Supersection Natantia) with Keys for their Determination. *Zool. Verhand.* 26: 1-157, 105 figs.
- KEMP, S. 1910: The Decapoda Natantia of the Coasts of Ireland. *Fisheries Ireland Sci. Invest.* 1908 1: 1-190, 23 pls.
- 1916: Notes on Crustacea Decapoda in the Indian Museum. VI. Indian Crangonidae. *Rec. Ind. Mus.* 12: 355-84, pl. 8.
- KNOX, G. A. 1957: General Account of the Chatham Islands 1954 Expedition. *N.Z. Dep. sci. indus. Res. Bull.* 122. 37 pp., 14 figs.
- LEBOUR, MARIE V. 1954: The position of *Pontophilus echinulatus* (M. Sars) in the Crangonidae. *J. Mar. Biol. Ass. U.K.* 33 (3): 587-8.
- DE MAN, J. G. 1920: The Decapoda of the Siboga Expedition. Part IV. Families Pasiphaeidae, Stylo-dactylidae, Hoplophoridae, Nematocarcinidae, Thalas-socaridae, Pandalidae, Psalidopodidae, Gnathophyl-lidae, Processidae, Glyphocrangonidae and Crangon-idae. *Siboga Exped.* 39a3: 1-318, 25 pls.
- MURRAY, J. 1895: A Summary of the Scientific Results, First Part. *Rep. Voy. Challenger.* 796 pp.
- ORTMANN, A. E. 1895: A Study of the Systematic and Geographic Distribution of the Decapod Family Crangonidae Bate. *Proc. Acad. Nat. Sci. Philad.* 1895: 173-97.
- RASMUSSEN, B. 1953. On the Geographical Variation in Growth and Sexual Development of the Deep Sea Prawn (*Pandalus borealis* Kr.). *Rep. Norw. Fish. Mar. Invest.* 10 (3): 1-160, 42 figs.
- RATHBUN, MARY J. 1902. Descriptions of New Decapod Crustaceans from the West Coast of North America. *Proc. U.S. Nat. Mus.* 24: 885-905.
- 1904: Decapod Crustaceans of the Northwest Coast of North America. *Harriman Alaska Exped.* 10: 1-190, 10 pls.
- REED, J. J. 1952: Sediments from the Chatham Rise. Part I: Petrology. *N.Z. J. Sci. Tech. B* 34 (3): 173-84, 10 figs.
- SARS, G. O. 1885. Crustacea I. *The Norwegian North-Atlantic Exped. 1876-1878* Zool. 280 pp., 21 pls.
- SCHMITT, W. L. 1926. Report on the Crustacea Macrura (Families Peneidae, Campylonotidae and Pandalidae) Obtained by the F.I.S. *Endeavour* in Australian Seas. *Biol. Res. Endeavour* 5 (6): 311-81, pls. 57-68.
- SOLLAUD, M. E. 1910: Sur l'identité des genres *An-chistiella* A. Milne-Edwards et *Campylonotus* Bate. *Bull. Mus. Nat. Hist. Nat.* 1910 (7): 377-83.
- 1913: Nouvelles observations sur les Crevettes du genre *Campylonotus* Bate (= *Anchistiella* A. M.-E.) type d'une nouvelle Famille de Caridea: les Campylonotidae. *Bull. Mus. Nat. Hist. Nat.* 1913 (4): 184-90.
- *SPITSCHAKOFF, T. 1912: *Lysmata seticaudata* Risso, als Beispiel eines echten Hermaphroditismus bei den Decapoden. *Z. wiss. Zool.* 100: 190-209.
- STEPHENSEN, K. 1913: Report on the Malacostraca Collected by the "Tjalfe"-Expedition, under the direction of cand. mag. Ad. S. Jensen, especially at W. Greenland. *Viden. Medd.* 64: 57-134, 36 figs.

* Not seen.

- 1927: Papers from Dr Th. Mortensen's Pacific Expedition 1914-16. XL. Crustacea from the Auckland and Campbell Islands. *Viden. Medd.* 83: 289-390, 33 figs.
- THOMPSON, D. W. 1901: A Catalogue of Crustacea and of Pycnogonida contained in the Museum of University College, Dundee. Dundee, 56 pp.
- WOOD-MASON, J.; ALCOCK, A. 1891: Natural History Notes from H.M. Indian Marine Survey Steamer *Investigator*, Commander R. F. Hoskyn, R.N., Commanding. Series II, No. 1. On the Results of Deep-sea Dredging during the Season 1890-91. *Ann. Mag. Nat. Hist. Ser.* 6, 8: 353-62.
- YALDWYN, J. C. 1957a: Studies on *Palaemon affinis* M.-Edw. 1837. (Crustacea, Decapoda, Natantia). Part II. Variation in the Form of the Rostrum. *Trans. roy. Soc. N.Z.* 84 (4): 883-95, 5 figs.
- 1957b: A Review of Deep-Water Biological Investigation in the New Zealand Area. *N.Z. Sci. Rev.* 15 (5-6): 41-5.
- 1957c: Deep-Water Crustacea of the Genus *Sergestes* (Decapoda, Natantia) from Cook Strait, New Zealand. *Victoria Univ., Wellington. Zool. Publ.* 22: 1-27, 19 figs.
- YOKOYA, Y. 1933: On the Distribution of Decapod Crustaceans inhabiting the Continental Shelf around Japan, chiefly based upon the Material collected by S.S. *Sōyō-Maru*, during the years 1923-1930. *J. Coll. Agri. Tokyo Imper. Univ.* 12 (1): 1-226, 71 figs.

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Memoir No.

1. 1955: Bibliography of New Zealand Oceanography 1949–1953 by N.Z. Oceanographic Committee (published as *N.Z.D.S.I.R. Geophys. Mem.*, 4).
2. 1957: General account of the Chatham Islands 1954 Expedition by G. A. Knox (published as *N.Z.D.S.I.R. Bull.* 122).
3. 1959: Contributions to Marine Microbiology. Compiled by T. M. Skerman.
4. 1960: Biological Results of the Chatham Islands 1954 Expedition, Part I—Decapoda Brachyura by R. K. Dell, Cumacea by N. S. Jones, Decapoda Natantia by J. C. Yaldwyn.
5. 1960: Biological Results of the Chatham Islands 1954 Expedition, Part II—Archibenthal and Littoral Echinoderms by H. Barraclough Fell.
6. 1960: Biological Results of the Chatham Islands 1954 Expedition, Part III—Polychaeta Errantia by G. A. Knox.
7. 1960: Biological Results of the Chatham Islands 1954 Expedition, Part IV—Mollusca by R. K. Dell; Sipunculoidea by S. J. Edmonds.
8. 1960: Hydrology of New Zealand Coastal Waters 1955, by D. M. Garner.

