

# *Nephrops challenger* Balss, 1914, (Crustacea, Decapoda, Reptantia) from New Zealand and Chatham Island Waters

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## Abstract

THE first three males and one additional egg-bearing female have been taken in 80-300 fathoms since 1951. A list of the 19 species of *Nephrops* known up to 1951 is given and *N. challenger* is compared to both *N. thomsoni* and *N. sibogae*, both close Indo-pacific forms. A prominent colour pattern of bright red, brown and pink on white with blue eggs is described.

Spence Bate (1888) dealing with the macrura collected by H.M.S. Challenger during the years 1873-76, described a new species, *Nephrops thomsoni*, based on a male collected from 100 fathoms between Samboangan and Manila, Philippine Islands, and on two females from 275 fathoms in the Tasman Sea, off Cook Strait, New Zealand. Bate describes only the male in detail, listing the main differences between it and the females, as he considered these differences to be only sexual. He illustrates both sexes in dorsolateral view on Pl. XXV, Figs. 1 and 2 in his report. He figures some appendages and gills from the male on his Pl. XXVI, but no further data for the female.

Balss (1914) having examined females of *N. thomsoni* from Formosa, recognised that two species were involved. The Philippine male being the type of *Nephrops thomsoni*, he proposed the new name *N. challenger* for the females from the Tasman Sea. The type of *N. challenger* is therefore the female illustrated on Bate's (1888) Pl. XXV, Fig. 2, with its description as given there consisting only of the list of differences on page 191 of the latter's report and to date no full account of the female nor any account of the male of *N. challenger* has been published.

De Man (1916) described a closely allied species of *Nephrops*, *N. sibogae*, from 170 fathoms off the Kei Islands, in the Arafura Sea, between Dutch New Guinea and Timor, collected by the Siboga Expedition during 1899-1900. He compared his species with both *N. thomsoni* and *N. challenger*, finding it intermediate, but was handicapped in his comparison by the lack of an adequate description of *N. challenger*.

In 1951, Mr. H. W. Forrest, fishing in 220 fathoms off Manawarakau, Hawke Bay, New Zealand, found the first males of *N. challenger*, two being obtained from the stomach of a groper, *Polyprion oxygeneios* (Bloch & Schn.). These specimens come to the Zoology Department through Dr. A. G. Clark, of Napier.

On January 27, 1954, the "Maimai," trawling in 80-100 fathoms off Tora, between Castlepoint and Cape Palliser, East Coast of the North Island, New

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Zealand, collected a male *N. challengerii* which was preserved by Mr. J. Thompson and came into my hands through Mr. J. H. Sorensen, of the Marine Department. This specimen, which is described below, was in good condition and still retained most of its original colour.

A large egg-bearing female *N. challengerii* was brought up alive in an otter trawl from 300 fathoms off the Chatham Islands on February 3, 1954. This was at Station 41 of the Chatham Islands Expedition, January-February, 1954, and I have to thank Mr. G. A. Knox, of the Zoology Department, Canterbury University College, leader of the Expedition, for allowing me to describe this fine specimen. I was able to examine it when it came to the surface and to record fully its brilliant colour pattern before this was lost on preservation.

The following description of *Nephrops challengerii* is based on the "Maimai" male. An account of the colour pattern and variation is also given using all four specimens available.

Order DECAPODA

Suborder REPTANTIA

Tribe ASTACURA

Family ASTACIDAE

Genus *Nephrops* Leach, 1815.

Carapace more or less laterally compressed, cervical groove distinct, anterolateral angles prominent and sharp. Eyes large. Antennal scale foliaceous. First pair of legs longer and stouter than the other legs, but not heavy and robust, nearly symmetrical. Gills 19-20 plus 7 epipods. (Barnard, 1950.)

Type species for Genus: *Cancer norwegicus* Linn., 1758.

*Nephrops challengerii* Balss, 1914.

1888. *Nephrops thomsoni* Bate (partim). Challenger Macrura: 191, Pl. XXV, Fig. 2.

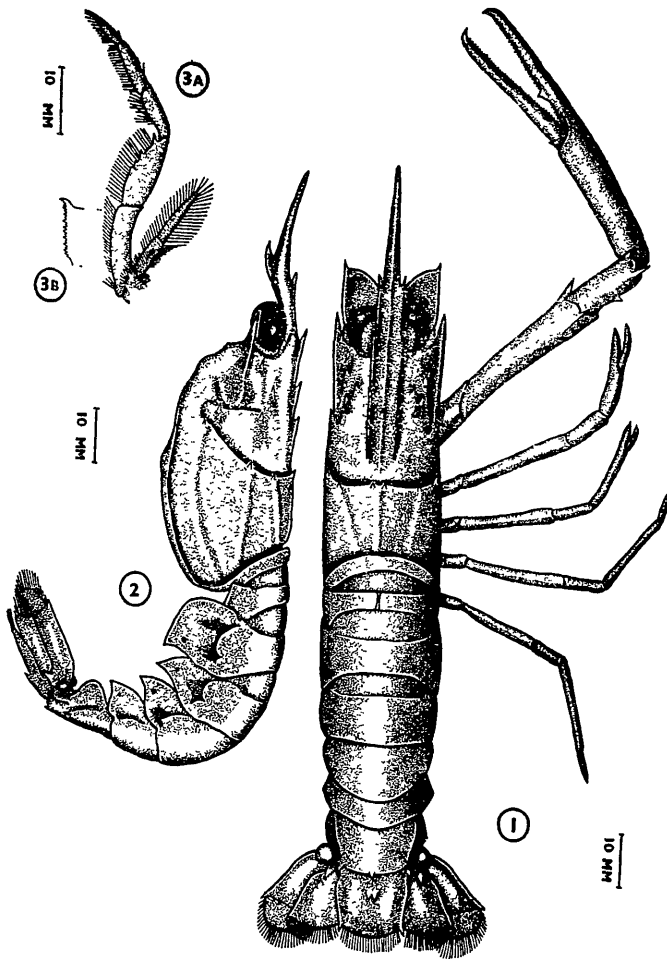
1914. *Nephrops challengerii* Balss. Ostasiatische Decapoden II, Munchen: 84.

1916. *Nephrops challengerii* Balss. De Man, Siboga Exp. XXXIXa2 (Key to Indo-Pacific Species).

1925. *Nephrops challengerii* Balss. Balss, D. Tiefsee Exp. XX: 207.

A rather slender lobster, slightly compressed, with a body length of 15.8 cms. and with long relatively narrow subequal chelae (12.6 cms.). The carapace is smooth and sparsely ornamented. It bears a long narrow acute rostrum whose dentate dorsolateral margins extend on to the carapace as prominent dentate carinae. On the carapace there is a deep cervical groove, weak hepatic grooves each with two hepatic spines; great wing-like antennal spines and three small spines between these and the postrostral carinae. On the brachial region there are seven weak longitudinal carinae, the mid-dorsal one does not bear the spines characteristic of all the other species in the genus. Abdomen relatively smooth and unornamented. The telson is subrectangular. The remaining legs are short and slender; the 2nd and 3rd pairs terminate in small chelae, while the 4th and 5th are simple with slender acute dactyli.

Rostrum slightly shorter than the carapace, depressed over the proximal half which has the dorsolateral margins developed into strong outwardly directed carinae. Thus in this region the rostrum appears deeply furrowed or gutter-like, but in the anterior portion it is essentially subcircular in section, at most



TEXT-FIG. 1.—*Nephrops challengeri*, male, from 80–100 fathoms off Tora, New Zealand, 27/1/54. 1—Dorsal view (antennules and antennae not shown). 2—Lateral view of carapace and abdomen. 3A—Ventral view of the left 3rd maxilliped. B—Lateral view of dentate ridge on the dorsal surface of the ischium of the left 3rd maxilliped. (1 and 2 drawn to same scale.)

slightly depressed and with faintly indicated lateral carinae. The anterior region terminates in an acute point. The proximal half slopes ventrally, while the distal half is directed obliquely upward, so that the acute tip is situated on the level of the dorsal margin of the carapace. Just posterior to the middle of the rostrum, each dorsolateral margin is armed with a small lateral tooth directed anteriorly and obliquely upward. While the proximal half of the dorsal surface is concave above, the distal upturned half appears weakly carinate, the carinae gradually rising from just in front of the lateral teeth. The ventral margin is keeled, armed at the mid-point with an acute anteriorly directed tooth distal to, and a little longer than, the lateral teeth. The distal half of the ventral margin is carinate. The proximal half bears the two ventrolateral rows of ventrally directed setae between the eyes. The dorsolateral carinae of the rostrum are continued on

to the carapace as two parallel ridges, the postrostral ridges, which extend posteriorly almost to the cervical groove. These ridges are armed with 3 pairs of anteriorly directed teeth, the postrostral teeth, as in *N. thomsoni*, not 4 pairs as in *N. sibogae*. The first and largest pair of teeth are directed slightly upwards, as are the two posterior pairs, which are smaller, the 2nd pair being subequal to the lateral teeth of the rostrum, the 3rd pair being still smaller. There is a larger gap between the 1st and 2nd pairs than between the 2nd and 3rd. Just anterior to the 3rd pair there is a small pointed tubercle in the mid-dorsal line of the carapace, from which a low carina runs anteriorly to the rostrum and posteriorly almost to the cervical groove. This feature is also seen in *N. thomsoni* and *N. sibogae*. The two very small low tubercles described by de Man (1916) as occurring one on each side of the low dorsal carina between the bases of the anterior pair of teeth are present in a similar position on *N. challengerii* but are even more inconspicuous and can only be seen in the dried specimen. The depressed antennal tooth is large and acute and extends anteriorly almost as far as the anterior margin of the eye. Viewed dorsally, its outer margin, from near the hepatic groove, is almost parallel to the longitudinal axis and is but faintly curved laterally and anteriorly to the acute point, while the median margin is concave. On a slightly lower level than the antennal spine, there is, immediately behind the hepatic groove, as in the two closely related species, a small acute anteriorly directed hepatic spine, subequal to the 3rd pair of postrostral teeth. The hepatic groove is quite distinct. It is directed dorsally, sloping towards the 3rd pair of postrostral teeth, but continues to only just beyond half way between the hepatic spine and the postrostral ridge. Immediately behind the upper termination of the groove there is another small anteriorly directed spine, subequal to the hepatic spine. As in *N. sibogae* there are no small spines along the posterior margin of the hepatic groove between the two hepatic spines described above. This feature clearly distinguishes *N. challengerii* from *N. thomsoni*, where there are four spines between the two hepatic spines. Between the upper hepatic spine and the orbit there are 3 other small, anteriorly directed spines as in *N. sibogae*, compared with 2 as in *N. thomsoni*. The most anterior one, just behind the orbital margin, is situated at one-third of the distance between the antennal spine and the postrostral ridge, and is directed very slightly dorsally. The next, the smallest, is situated a little further posteriorly on the carapace, at two-thirds the distance between the antennal spine and the postrostral ridge. The third is posteroventral to the preceding spine and larger than the other two, being situated two-thirds of the distance between the first postrostral tooth and the upper hepatic spine. From the lower termination of the hepatic groove there are two small secondary grooves, one of which curves anteroventrally for about half the distance between the lower hepatic spine and the anteroventral margin of the carapace, while the other extends posteriorly as an inverted arc of a circle between the hepatic groove and the lower termination of the cervical groove. The deep and setose cervical groove curves anteroventrally from the dorsal margin of the carapace three-quarters of the distance towards the ventral margin. There is a low ridge along the mid-dorsal line of the cardiac region; at the anterior end of this ridge, rising immediately behind the cervical groove, is a pair of anteriorly directed spines a little smaller than the 3rd pair of postrostral teeth. The remainder of this ridge is quite smooth, lacking the prominent pairs of spines present on both *N. sibogae* and *N. thomsoni*. On each side of the mid-dorsal

ridge, the branchial region is traversed by three low obscure carinae, the submedian, the lateral and the lateroventral. These are extremely faint, being merely slight angles in the integument, but each carina terminates immediately posterior to the cervical groove in a small anteriorly directed spine and begins near the deep groove which divides the cardiac and branchial regions from the broad flattened band that borders the posterior margin of the carapace. This band continues, but is not as broad, around the posteroventral and ventral margins, narrowing to vanish at the anteroventral angle. The very indistinct submedian carina begins about one quarter of the distance between the dorsal and ventral margins, and is straight, but slopes slightly ventrally to terminate in a small spine immediately posterior to the cervical groove. The lateral carina, slightly more distinct, is straight but slopes dorsally to terminate in a small spine about one-third of the distance between the dorsal and ventral margins of the carapace. The lateroventral carina, the most prominent, curves concavely from near the posteroventral angle of the carapace to terminate at a very small spine at the base of the cervical groove. This carina has slightly closer and coarser granulation than the surrounding parts of the carapace, which, though it appears almost smooth to the naked eye, is minutely granulated, especially on the branchial region.

The general shape of the terga and pleura of the abdomen closely resembles that described for *N. thomsoni*. The 2nd to 5th terga appear smooth and shining to the naked eye, there being no transverse groove on each side of the terga as in *N. thomsoni*, nor transverse row of shallow pits as in *N. sibogae*. The terga and pleura are, however, minutely pitted. The pleura of these somites are delineated from the terga by a low concave ridge, and have a central irregular sunken area. The delineating ridges of the 4th and 5th somites each bear a very small posteriorly directed spine near their posterior margins. As in both the other species the 6th somite of *N. challenger* bears a small posteriorly directed spine in the mid-dorsal line of its posterior margin. The lateral ridge of this somite, which separates the tergum from the pleuron, appears finely serrated on its anterior half and ends in a small posteriorly directed spine nearer the posterior than the anterior margin. The posterodorsal margins of the pleura of this somite are each produced laterally into a posteriorly directed spine which overlaps the telson. This is square in shape with its posterior margin slightly convex and together with the uropods, is identical with that figured and described by Bate for *N. thomsoni*.

The flagella of the antennule are subequal to each other and to the carapace, the outer, however, appears more robust than the inner.

The flagella of the antenna and the peduncle together are just under five and one-half times as long as the carapace. The peduncle is a little less than two-thirds the length of the rostrum and bears a small sharp spine at the distal extremity of the curved lateral margin of the basipodite and another at the distal extremity of the median margin of the ischiopodite. The scaphocerite extending anteriorly as far as the distal end of the peduncle, is two-thirds as wide as long, and its lateral margin terminates in a small sharp spine, while its anterior margin curves gently and continuously into the median margin.

The mouth parts agree closely with those described for *N. thomsoni*, and except for the 3rd maxillipeds no further description of them will be given.

The 3rd maxillipeds extend anteriorly beyond the distal margins of the antennal peduncles. The ventral surface of the ischium broadens slightly distally, its lateral margin is distinctly concave, while the convex median margin is faintly serrated along its entire length but does not bear a small distal spine as in *N. sibogae*. The dorsal surface of this element is produced into a long transverse ridge armed with a single row of about 20 acute teeth. These teeth alternate in size, smaller teeth appearing between the larger ones, and there is a general increase in size distally with the row terminating in a single larger tooth. The merus is nearly as long as the ischium, and its median margin is armed with four acute spines of differing length, the distal spine being the largest. The carpus, with width a little less than half its length, does not bear an acute tooth at the termination of its ventral margin, as in *N. sibogae*. The propodus and dactylus are somewhat compressed, the former just over, and the latter just under, twice as long as broad.

The chelipeds or 1st pereopods are large and prominent for the animal, but unlike other members of this genus are narrow and not swollen at the palms. They bear neither carinae nor rows of tubercles on their surfaces. The 1st leg on the left side is missing in the male described here, but in the other specimens the 1st legs are subequal. The right leg in this male is a little longer than the carapace and abdomen together. The ischium appears quite smooth both dorsally and ventrally but is, however, granulated on its median margin. The merus is compressed and flattened dorsally. It is armed with an acute, strong, terminal spine on the median margin and with a somewhat larger terminal spine on the dorsal surface. The lateral margin is produced as a blunt extension against the carpus. Both margins are granular, these granules being a little larger than those present on the dorsal surface; however the ventral surface is only weakly granulated. The cylindrical carpus, about half the length of the merus, is granulated all over. It bears three acute terminal spines, one at the extremity of the median margin, another on the margin of the dorsal surface, and a third, somewhat smaller, from the central convex extremity of the ventral surface. There is a fourth acute, distally directed spine at the centre of the lateral margin of the merus. No trace of the dorsal tubercle present on *N. sibogae* can be seen. The propodus three and one-half times as long as the carpus, does not widen appreciably at the articulation with the dactylus. The straight median margin is distinctly granulate, while the lateral margin is weakly convex and granulate, the remainder of the surface being only pitted. The dactylus or free finger, is a little more than half the length of the propodus and bears at the proximal end of its median or outer margin a small, anteriorly directed spine. Both fingers, somewhat flattened and gradually tapering distally, close tightly together, their obliquely and inwardly pointed acute tips crossing one another. The fixed finger is armed on the median margin with a large, subacute, dorso-ventrally compressed tooth, one-third of the distance between the distal end of the palm and the tip, and along almost its entire length to near the extremity with two rows of very much smaller teeth, alternating with still smaller ones. Similar small teeth of differing sizes occur in a single row along the whole inner margin of the free finger, a few of the proximal ones being slightly larger than the rest. The single row of the free finger interlocks between the two rows of the fixed finger. Neither *N. challengeri* nor *N. sibogae* have a spine on the median margin of the palm, though one is present in *N. thomsoni*.

The 2nd to 5th pairs of legs are as described for the genus, the 2nd and 3rd pairs being chelate. The 2nd pair reaches anteriorly as far as the middle of the carpus of the 1st, the 3rd as far as the merocarpal articulation of the 1st, the 4th a little further and the 5th to just beyond the middle of the merus of the 1st.

The branchial formula of *Nephrops challenger* is as follows:—

	Maxillipeds.			Pereiopods.				
	1st	2nd	3rd	1st	2nd	3rd	4th	5th
Pleuobranchiae	—	—	—	—	1	1	1	1
Arthrobranchiae	—	—	2	2	2	2	2	—
Podobranchiae	—	—	1	1	1	1	1	—
Mastigobranchiae (epipodites)	1	1	1	1	1	1	1	—

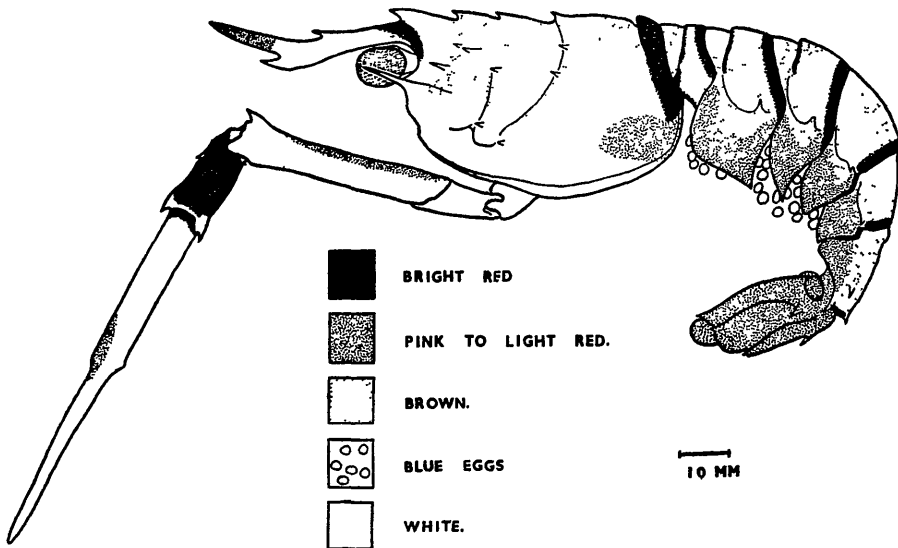
This is the same as that given for *N. thomsoni* by Bate (1888) and for *N. norwegicus* by Bouvier (in Barnard, 1950). Alcock (1894) records a podobranch on the 2nd maxilliped of *N. andamanicus* and Holthuis (1945) states that this podobranch can be present or absent in *N. norwegicus*.

Measurements (mm.)

	1	2	3	4
	"Maimai"	Hawke Bay	Hawke Bay	Chatham Specimen
	♂	♂	♂	♀
Rostrum	37	31	—	43
Carapace length	42	36	47	49
Carapace depth	27	22	31	33
Carapace width	24	19	27	28
Abdomen:	79	67	83	89
Total length:	158	134	—	181
Peduncle of antennule	19	17	21	22
Outer flagellum of antennule	43+	45+	50	53
Inner flagellum of antennule	45+	—	58+	66
Peduncle of antenna	23	20	25	26
Flagellum of antennae	202	—	212	206
Scaphocerite length	12	11	14	14
Scaphocerite width	8	7	10	10
3rd maxilliped	39	36	48	49
1st pair legs	126	121	168	153
1st pair propodite	65	63	89	80
1st pair dactylopodite	35	35	45	43

The length of the rostrum is taken from the tip to the posterior margin of the orbit along the dorsal mid-line; that of the carapace, from the posterior margin of the orbit to the posterior margin of the carapace, along the dorsal mid-line. The depth of the carapace is taken just posterior to the cervical groove, while the width is taken through the branchial region. The measurement of the abdomen includes the telson and is not exact because of the difficulty of extending

preserved specimens. The total length is taken from the tip of the rostrum to the posterior margin of the telson. For the 1st pair of legs, the right member has been used except in the case of specimen 2, where, because of damage, the left member was used.



TEXT-FIG. 2.—*Nephrops challengerii*, female, from 300 fathoms off the Chatham Islands, 3/2/54. Carapace, abdomen and left cheliped to show colour pattern.

#### *Sexual Differences.*

The female, from the Chatham Islands Expedition, is similar in all respects to the male described above, except, of course in the position of the genital apertures and the structure of the first two pairs of pleopods. No other sexual differences have been described for species of the genus *Nephrops*. The genital apertures are large and conspicuous in the female and are situated on the posterior portion of the coxopodites of the 3rd pair of legs, while in the male, where they are equally large and conspicuous, they are situated on raised tubercles on the posterior portion of the coxopodites of the 5th pair of legs. In the male the 1st pleopods are each modified into the standard type of reptant copulatory appendage, uniramous with styliform spoon-shaped terminal element. The 2nd pair of pleopods each bear a prominent expanded appendix masculina with a row of stiff setae along its median margin. The 1st pleopods of the female are much reduced and uniramous, while the 2nd pair are unmodified and similar to the succeeding pairs. The female was carrying about 250 eggs on its pleopods; these are subspherical with a diameter of 2.5 to 2.8 mm. (after preservation). They showed no sign of structure within, so were newly laid, indicating that the species breeds in the January and February period.

#### *Colour Pattern.*

The brilliant colour pattern of the Chatham Islands Expedition female was recorded before the specimen was preserved (Text-fig 2). My thanks are due to Dr. E. J. Batham, Director of the Portobello Marine Biological Station, who supplied me with the following Munsell notations for the major colours present.



The notation corresponding to the name used in the description below is as follows:

Bright red	R 4/10
Brown	R — YR 5/5
Light red	R 5/8
Blue	B — PB 4/6

The anterior half of the rostrum is pink, while the remainder is white with a streak of bright red extending from just anterior to the 1st pair of postrostral teeth, around the base of the rostrum, and along the posterior margin of the orbit. The carapace has two broad saddles of brown across the dorsal, and extending part of the way down the lateral, surfaces. The anterior saddle extends dorsally from the 2nd pair of postrostral teeth to a point just anterior to the cervical groove, and laterally down to the posterior part of the base of the antennal tooth, with a small extension along part of the hepatic groove. The posterior saddle extends dorsally from the cervical groove to the deep groove separating the cardiac region from the broad flat posterior band of the carapace. This saddle extends laterally down the posterior margin of the cervical groove to fade out about midway between the two most ventral spines. There is a conspicuous band of bright red along the broad posterior band of the carapace extending a little on to the adjacent posterior edge of the branchial region and ceasing just dorsally to the rounded posteroventral angle. A small patch of pink on the posteroventral part of the branchial region is the only other colour on the carapace, the remainder being glossy white. In all the abdominal somites, the terga are brown while the pleura are pink, though there is a lot of intermingling of the two colours laterally. Each abdominal somite has a band of bright red along the posterior margin of the tergum, which extends more or less on to the posterior margin of the pleuron. The raised anterior margin of each of the terga of the 1st to 3rd somites, also bears a narrow band of bright red, extending in the 1st on to the anterior projection of the somite, which overlaps the posterior margin of the carapace. The telson and uropods are a uniform light red.

The eye is a clear bright yellow brown. In the 1st pair of legs the basis and ischium are white, the merus is white with a large patch of pink on the dorsal surface, and the carpus is bright red except for a small area around the terminal spines, this brightly coloured element being very conspicuous in the live animal. The palm and both fingers are white, except for a small patch of pink on the dorsal surface of the palm near the articulation of the free finger. The other legs are white with irregular longitudinal streaks of pink. The eggs stood out against this background of brown, white and red as a bright milky blue. As far as could be seen, the colour pattern of the "Maimai" male was identical with that of the female described above. Because this male specimen had been in formalin for several weeks before examination the colours had lost intensity, and the remainder of the animal had turned a general yellow brown.

References to colour in this genus are: Balss (1925) when he refers to *N. andamanicus* as being pinkish or reddish, with eggs sky-blue; Santucci (1932) who states that *N. norwegicus* is red with carpus of 1st pair of legs bright red; Boone (1938) when she describes the general colour of the body of *N. norwegicus* as pale flesh with deeper tones marking the pattern, light brown pubescence and eyes shining black, and Poulsen (1946) who describes the eggs of *N. norwegicus*

as greenish to greenish black when newly laid but becoming reddish later. Alcock (1894) gives a more detailed account of the colouring of *N. andamanicus*, when alive, as follows: "dorsum yellowish-pink; venter pink in the female, white in the male; chelipeds banded pink and yellow in the female, pink and white in the male. The eggs in an advanced stage of development are dark blue."

#### Variation.

No noticeable variation in the distribution of spines or shape of rostrum, grooves or carinae was seen in the four specimens available.

#### Affinities.

De Man (1916) lists the species of the genus *Nephrops* known up to that date, however, several species have been described since, so a complete list of all species of the genus will be given up till 1951, based on de Man and the "Zoological Record".

#### *Nephrops* Leach, 1815.

*norwegicus* (Linn., 1758). Iceland; West Coast of Europe; Mediterranean

*japonicus* Tapp.-Can., 1873. Japan.

*thomsoni* Sp. Bate, 1888. Philippine Islands; Formosa.

*andamanicus* W.-Mason, 1892. Andaman Sea; Bali Sea; South Africa

*reedi* Carter, 1898. Eocene, London clay, England.

*rubellus* Moreira, 1903. Coast of Brazil; Atlantic South America.

*arafurensis* de Man, 1905. Kei Islands.

*challengeri* Balss, 1914. New Zealand waters.

*sibogae* de Man, 1916. Off Kei Islands

*sagamiensis* Parisi, 1917. Japan.

*costatus* Rathbun, 1918. Pleistocene, Panama Canal Zone.

*sp.* Rathbun, 1918. Pleistocene, Panama Canal Zone.

*maoensis* Rathbun, 1920. Miocene, Dominican Republic.

*aequus* Rathbun, 1920. Miocene, Dominican Republic

*intermedius* Balss, 1921. Japan.

*binghami* Boone, 1927. Off British Honduras.

*shastensis* Rathbun, 1929. Cretaceous, California.

*americanus* Rathbun, 1935. Cretaceous, Texas.

*norwegicus meridionalis* Zar.-Cenarro, 1935. Spain.

Of the 19 species described, the fossil forms *N. reedi*, *N. costatus*, *N. sp.* Rathbun, *N. maoensis*, *N. aequus*, *N. americanus* and presumably *N. shastensis* can be separated out. These have all been described from fragments of fingers or palms only and are not well known. All have large heavy fingers with prominent tubercles or carinae and sometimes bear spines.

*N. norwegicus* with its synonym *N.n. meridionalis* (see Holthuis, 1945) differs from all the other recent species in the following features; it has only five longitudinal carinae on the carapace posterior to the cervical groove, the dorso-lateral margins of the rostrum are not continued on to the carapace as postrostral carinae, the antennal spine is small and the scaphocerite is narrow and lanceolate. All other recent species have seven longitudinal carinae on the carapace posterior to the cervical groove, the dorsolateral margins of the rostrum continued on to the carapace as postrostral carinae, large prominent antennal spines and the scaphocerite broad and often circular in shape.

The Atlantic *N. rubellus* and *N. binghami*, from off Brazil and Honduras respectively, superficially resemble one another and can be distinguished from the Indopacific forms by the heavily spined chelipeds and the large number of spines on the carapace between the hepatic groove and the orbit.

The Indopacific species can be divided into three main groups (de Man, 1916). The first group has the carapace smooth or finely granulate, the terga of the 2nd to 5th abdominal somites conspicuously sculptured and prominent spinulose ridges on the chelae of the 1st pair of legs. To this group belongs *N. japonicus*, *N. andamanicus*, *N. sagamiensis* and *N. intermedius*, these last two being possibly synonymous. The second group also has the carapace smooth or finely granulate, but the terga of the 2nd to 5th abdominal somites appear almost smooth to the naked eye and there are no prominent ridges on the chelae of the first pair of legs. In this second group are the species *N. thomsoni*, *N. challengeri* and *N. sibogae*. The third group has the carapace distinctly spinulose and the abdominal somites conspicuously sculptured. This group contains the single species *N. arafurensis*.

The three closely allied species *N. thomsoni*, *N. sibogae* and *N. challengeri* can be distinguished readily by the fact that the two former have a dorsal longitudinal spinulose ridge on the cardiac region, while the latter has not. *N. thomsoni* has also a single, deep, transverse groove, broadly interrupted in the middle, on the terga of the 2nd to 5th abdominal somites, while *N. sibogae* has only an inconspicuous transverse row of shallow pits on these somites.

From the above it can be seen that there is in the New Zealand region a clearly distinguishable member of the widely distributed genus *Nephrops*. It is apparently closely related to two species, one of which occurs in East Indonesian waters and the other in Philippine waters. Our *Nephrops* has been found in 80 to 300 fathoms, in the Tasman Sea, off Cook Strait; off Manawarakau, Hawke Bay; off Tora, between Castlepoint and Cape Palliser, and off the Chatham Islands. It is probably widely distributed around our coasts in water of that depth, its striking colour and unmistakable form making it an easily recognisable species in our marine fauna.

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\* Not seen.