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Some Additional New Zealand Cephalopods from Cook Strait

by

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Abstract

The following species of cephalopods are recorded from New Zealand for the first time:—*Vampyroteuthis infernalis* Chun, *Iridioteuthis maoria* n.sp., *Enoploteuthis neozelanica* n.sp., *Gonatus fabricii* (Lichtenstein), *Mastigoteuthis flammea* Chun and *Megalocranchia richardsoni* n.sp. Additional distributional records are given for *Sepioloidea pacifica* (Kirk) and *Eledonella pygmaea* Verrill.

Introduction

Since the writer recorded what was known of the New Zealand cephalopod fauna (Dell, 1952), a good deal of additional material has come to hand. The most spectacular additions to the fauna have resulted from the investigations carried out by the Zoology Department, Victoria University of Wellington. Some of these are recorded in the present paper. Other forms are represented by incomplete or juvenile specimens and consideration of these will be withheld until better specimens are available. The species of *Octopus* and *Robsonella* also require revision, and it is hoped to deal with these forms later. The specimens mentioned, unless otherwise stated, are all preserved in the collections of the Dominion Museum.

Acknowledgments

The writer is indebted to the various members of the Zoology Department research team for their care of the material and to Professor L. R. Richardson for making it available to the writer for study and description.

Family VAMPYROTEUTHIDAE

Genus Vampyroteuthis Chun, 1903

Type Species (monotypy) *Vampyroteuthis infernalis* Chun

Vampyroteuthis infernalis Chun, 1903

1903. *Vampyroteuthis infernalis* Chun, Aus den Tiefen des Weltmeeres, p. 88.
1949. *Vampyroteuthis infernalis* Chun; Pickford, Dana Rep., 32 (external morphology).

Thanks to Dr. Pickford's researches we now know a great deal about the anatomy, growth stages and distribution of this species. Pickford has shown that all the described forms of the Vampyromorpha are in fact stages in the development of one species and that it represents a separate Order of dibranchiate cephalopods.

Vampyroteuthis infernalis has not previously been recorded from New Zealand although the *Galathea* obtained a specimen from the Kermadec Trench. The Zoology Department team at one station obtained two specimens (mantle lengths approximately 55 mm and 35 mm respectively), a very notable addition to New Zealand's bathypelagic fauna.

Locality: VUZ 94, approx. 42° 2′ S, 175° 22′ E, south of Cape Palliser in 4 metre net towed at 500–600 fathoms over c. 1,400 fathoms.

Publication of this paper has been assisted by a grant from the Victoria University Publications Fund.

Family BOLITAENIDAE

Genus ELEDONELLA Verrill, 1884

1884. *Trans. Conn. Acad. Sci.*, vol. 6, p. 144.

Type Species (monotypy) *Eledonella pygmaea* Verrill

Eledonella pygmaea Verrill, 1884

1884. *Eledonella pygmaea* Verrill, Trans. Conn. Acad. Sci., vol. 6, p. 145.
1949. *Eledonella pygmaea* Verrill; Thore, Dana Rep., 33, p. 39.

Thore (1949) recorded this species from New Zealand from a specimen obtained by the *Dana* Expedition and has presented a full account of its distribution, anatomy and general biology as far as this could be deduced from the *Dana* collections. The first specimen available for study in this country was obtained by the Zoology Department, Victoria University of Wellington, at their Station 85.

LOCALITY: VUZ 85, 41° 47′ S, 175° 2′ E, south of Cape Palliser in c. 600 fathoms, over c. 800 fathoms.

Family SEPIADARIIDAE

Genus SEPIOLOIDEA d'Orbigny, 1839

Type Species (original designation) *Sepiola lineolata* Q. & G.

Sepioloidea pacifica (Kirk, 1882)

1882. *Sepiola pacifica* Kirk, Trans. N.Z. Inst. vol. 14, p. 283.
1952. *Sepioloidea pacifica* (Kirk); Dell, Dominion Mus. Bull. 16, p. 82, Plates 33–35, Text-fig. 5.

Since the writer published what was known of the distribution of this species (Dell, 1952) a large quantity of additional material has been accumulated and the distribution can now be more fully recorded. Kirk originally described the species from Wellington Harbour in 1882, but the type is no longer in existence. In 1952 the writer did not have specimens from Wellington Harbour and there was therefore a little doubt that subsequent identifications of this species might not be correct, especially as Kirk had not figured his species and the description was very short. Specimens are now available from Wellington Harbour and to put the species on a firm footing the writer here designates as Neotype, a specimen in the Dominion Museum (Registered Number, M.12954) from Lowry Bay, Wellington Harbour, caught in a small otter trawl at night, J. Moreland, 24/5/1953.

The writer has already given measurements for a series of specimens (Dell, 1952, p. 84), the mantle lengths ranging from 15 to 20 mm. These are typical of the usual animals collected in comparatively shallow water. Occasional specimens are very much larger with mantle lengths up to 40 mm. These larger specimens have all come from depths greater than 75 fathoms. Such large specimens are rare, and so far only single individuals have been collected at any station. Larger numbers of specimens up to 30 mm in mantle length have also been collected at such stations. There is not enough material available to prove the point but the indications are that about 3 age groups are represented amongst these specimens, that the majority of individuals die at the end of the first year, and that a very few survive beyond the end of the second year.

It is fairly certain that this species is nocturnal, taking shelter in debris on the sea floor during the day and perhaps even burrowing into soft mud (where it is sometimes quite common) and becoming active at night.

LOCALITIES: Off Tryphena, Great Barrier Island, S. T. *Zuyder Zee*, W. Sampson, 14.5.54; trawled in vicinity of Cape Colville (Auckland Museum); B.S. 155, 39° 27·5′ S, 176° 54′ E, Hawke Bay in 8 fathoms, J. A. F. Garrick, 21.5.52; Lowry Bay, Wellington Harbour, small otter trawl at night, J. Moreland, 24.5.53, and J. C. Yaldwyn, 31.5.53; B.S. 196, North of Trio Islands, Cook Strait, in 39 fathoms, 3.1.57; Pelorus Sound, dipnet, W. H. Dawbin, —.12.51; north-east of Cape Campbell in 60 fathoms, F. Abernethy, —.4.57; Middle Bank, Kaikoura, in 40 fathoms, F. Abernethy, 7.11.56; Menzies Bay, Lyttelton Harbour, G. Knox and E. Percival, 1949; Dunedin wharves, at light at night, R. K. Dell and J. Moreland, 21.1.57; off Long Beach, Otago, in 12 fathoms, m.v. *Alert*, 27.6.54; B.S. 190, 45° 45·4′ S, 171° 5′ E, off east Otago coast in 300 fathoms, m.v. *Alert*, 16.8.55; B.S. 198, 45° 40′ S, 170° 51′ E, NNE of Taiaroa Head in 20 fathoms, m.v. *Alert*, 13.1.57; B.S. 191, 45° 47′ S, 171° 7′ E, off east Otago coast in 250–300 fathoms, m.v. *Alert*, 16.8.55; B.S. 202, 45° 44′ S, 171° 2′ E, off east Otago in 75 fathoms, m.v. *Alert*, 23.1.57; Chatham Island Exped., Station 2, Mernoo Bank in 61 fathoms, 23.1.54; Chatham Island Exped., Station 7, Chatham Rise in 280 fathoms, 24.1.54; Chatham Island Exped., Station 25, Waitangi Wharf, Chatham Islands, on surface at light at night, 29.1.54.

These records now show that *Sepioloidea pacifica* (Kirk) ranges at least from the Hauraki Gulf to the Otago coast and the Chathams in depths from a few fathoms down to 300 fathoms.

Family SEPIOLIDAE

Genus IRIDIOTEUTHIS Naef, 1912

1912. Zool. Anz. bd. 39, p. 247.

Type Species (monotypy) *Stoloteuthis iris* Berry, Hawaii.

Iridioteuthis maoria n.sp. Figs. 3-6.

Animal small. Body short, bell-shaped in dorsal view, widest at anterior extremity, laterally compressed, terminating abruptly. Body approximately as deep as wide in adult specimens, much deeper comparatively in younger animals. Mantle smooth, continuous with integument of head dorsally. Ventral mantle margin extending forward well beyond the eyes and almost entirely covering the funnel, with a well-marked, anterior, median emargination and closely appressed to head which it almost completely covers ventrally but sweeping back laterally to expose the large, prominent eyes.

Fins very large, thin, outline rounded-oblong, base of attachment relatively short, plane of attachment of fins to body approximately median. In adults the anterior extremity of the fin does not reach the level of the eyes, and the posterior extremity does not extend as far as the postrior extremity of the body. In younger specimens the anterior extremity of the fins reaches the level of the eyes and the posterior extends beyond the posterior extremity of the body.

Head broad, short, flattened dorso-ventrally, dominated by the large eye-balls. Eye-balls extremely large, covered to a large extent by the integument, with a small, perfectly circular lid fold.

Funnel only visible after removal of the ventral mantle lobe, large and well developed, base wide, rapidly tapering to tip. In some specimens the tip is swollen, in all it is strongly muscular, aperture relatively small, especially in young examples. Funnel organ very large and swollen, consisting of a pair of divergently placed pads, one on each side of the median line. Locking apparatus consisting of an

elongate, narrow, cartilaginous groove at either side of the base of the funnel and long, thickened, corresponding grooves on the inner wall of the mantle.

Sessile arms short, bound together by a very well developed web, which reaches almost to the free extremity of the dorsal arms, but is entirely lacking between the ventral pair. Arms unequal in length, order 3, 4, 2, 1, the third pair conspicuously the longest and with a prominent membranous keel bordering the outer margin. A similar, much less conspicuous keel is developed on the fourth pair of arms. Suckers on all sessile arms in two rows, alternately placed in each row, closely spaced, the sixth, seventh and eighth suckers on the second pair of arms greatly enlarged. Individual suckers spherical, openings small, pedicels very short, armed with smooth, horny rings. Tentacles long and slender, club hardly differentiated from stalk. Stalk rounded near base, becoming flattened towards club, grooved medianly. Club bearing numerous, minute, crowded suckers.

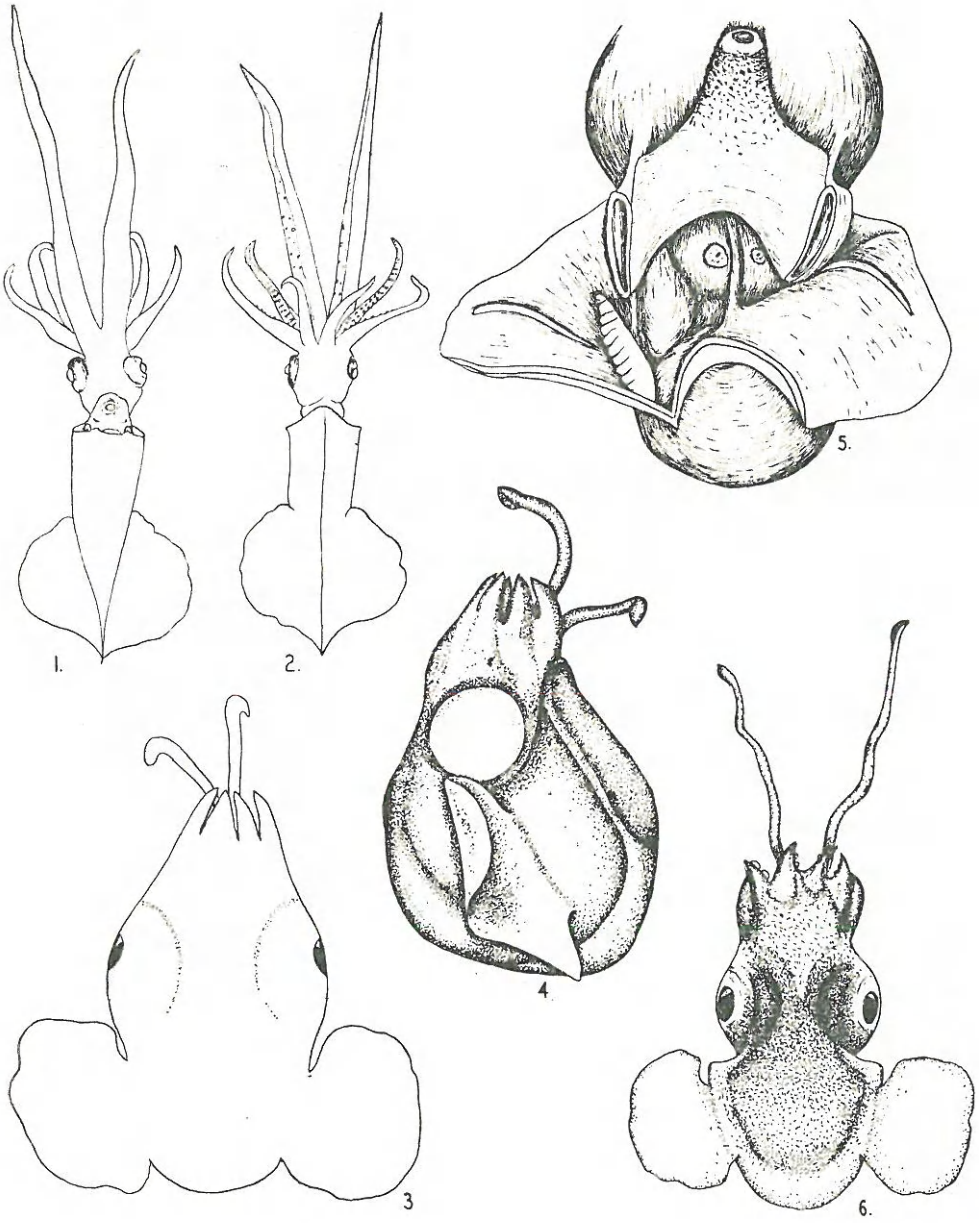
Colour of preserved specimens a dull, brownish cream, suffused on the major part of the dorsal surface of the mantle, over the head and bases of the arms, tip of the funnel and the ventral shield with a dull, purplish black. Central portion of the dorsal surface of the mantle, head and proximal portion of web enveloping arms, set with rather elongate, closely set, irregular chromatophores. Outer surface of stalks of tentacles set with considerably smaller rather sparse chromatophores.

Holotype (M.11179) and three paratypes in Dominion Museum, Wellington.

LOCALITIES: Washed ashore on Paraparaumu Beach, Wellington, D. F. Watson, 9.8.54 (Holotype); trawled in Bay of Plenty, c. 130 fathoms, 1956. Presented K. Fraser; VUZ 17, 41° 31′ S, 174° 58′ E, Palliser Bay, Cook Strait, in 150–200 fathoms, 13.5.55.

This species is closely allied to the type species of the genus, *Iridioteuthis iris* Berry, described from off the Hawaiian Islands in 153–142 fathoms. There is little doubt that Berry's specimen was immature and the immature specimens of *maoria* n.sp. agree with Berry's descriptions of *iris* fairly closely. However, there are a number of differences, even between those immature specimens which appear to be valid differentiating characters, so that the two forms certainly represent different species. In *Iridioteuthis iris* it is the third pair of arms which develops greatly enlarged suckers, in *I. maoria* it is the second pair. This feature can be clearly seen in the two largest of the four New Zealand specimens available. Whether this feature represents hectocotylisation still remains to be determined. In addition the head and tentacles are longer in relation to mantle length in *I. maoria* than they are in *I. iris*. In the four examples seen, the head and tentacles are all bent ventrally in relation to the plane of the mantle and fins and if this feature is constant and real it will serve as an additional means of differentiation. During growth it would appear that the fins do not increase in size proportionately with growth of the mantle and the lateral compression of the mantle also becomes less marked.

This is only the second known species of the genus, but in view of the wide geographic distance between the two areas from which the genus is now known, it seems certain that additional representatives will come to light in the Pacific when the faunas of the intermediate depths are better known.



FIGS. 1, 2.—*Mastigoteuthis flammea* Chun. VUZ 86. 3, 4.—*Iridioteuthis maoria* n.sp., Holotype. 5.—*Iridioteuthis maoria* n.sp., mantle cavity. 6.—*Iridioteuthis maoria* n.sp., half grown specimen.

Measurements of *Iridioteuthis maoria* n.sp.

	Holotype mm	Bay of Plenty mm	Bay of Plenty mm	Cook Strait mm
Dorsal mantle length	17	11	12	13
Ventral mantle length	21	15	16	17
Length to base of dorsal arms	38	21	22	28
Extreme length of fin	16	12.5	13	13
Length of fin at base of attachment	8	8	7	9
Width of single fin	12	9	8	9
Width across fin	36	27	27	29
Diameter of body	19	9	10	14
Depth of body	18	14	14	14
Length of head	21	10	10	15
Width across eyes	16.5	11	11	11.5
Median length of dorsal shield	17	11	11.5	14
Length of funnel (median)	10	—	—	—
R.1	11	—	—	9
R.2	12.5	—	—	10
R.3	14	—	—	11
R.4	12	—	—	8
Length of right tentacle	44	—	—	22

The measurements for the lengths of the sessile arms has not been given for two of the specimens as they are too tightly bunched for measurements to be taken accurately.

Family ENOPLOTEUTHIDAE

Genus ENOPLOTEUTHIS d'Orbigny, 1839

1839. Hist. Nat. gen. Ceph. acet., p. 337.
1840. Pal. Franc. (Cret) Ceph. p. 30.

Type Species: (subsequent designation, Pfeffer, 1900) *Loligo leptura* Leach,

Atlantic.

Enoploteuthis neozelanica n.sp. Figs. 11–13.

Animal small, mantle narrowly conical; widest anteriorly, thence tapering regularly to a rather blunt posterior point. Anterior edge of mantle drawn out into a wide angular extension dorsally, broadly emarginate ventrally between two obtuse points marking the position of the funnel locking apparatus. Fins very large in proportion, triangular, the width across both fins only slightly less than the dorsal mantle length, outer angles sharply rounded, anterior margins lobed, posterior extremity fusing with the integument of the mantle very gradually some distance in front of the posterior extremity of the body.

Head squarish in cross section, a little longer than wide, somewhat excavated ventrally, a single rather delicate lamella on either side in the nuchal area. Eyes of moderate size, the lid opening with a well-developed anterior sinus.

Funnel large, broad, bluntly swollen at the apex. Mantle locking apparatus consisting of a simple, broad and shallow cartilaginous pit on either side of the base of the funnel and a corresponding simple ridge on the mantle.

Arms rather thick-set, moderately long. The order of length is 4, 2 = 3, 1; the ventral pair distinctly the longest, and the dorsal pair distinctly the shortest, the second and third pairs subequal in length, although the third pair is markedly stouter. First pair of arms with a poorly developed carination; second pair of sessile arms with a weak carination developed over the distal third; third pair of

arms with a well developed membranous keel extending over the distal two-thirds of the arm; fourth pair of arms with the mantle integument extending as a very narrow fold along the outer ventral angles. All arms bare in proximal area but becoming armed with two rows of alternately placed, moderately sized hooks which continue almost to the distal extremities. Extreme tips of arms with several rows of close-packed minute suckers. About 11 pairs of hooks on the first pair of sessile arms, 8 on the second, 10 on the third and 15 on the fourth pair. Hook-bearing faces of all arms bordered by well developed trabeculate swimming membranes.

The right hand fourth sessile arm hectocotylized, the structure of this arm being exactly as described and figured for *galaxias* by Berry (1918, p. 213, Pl. 60, Fig. 5).

Right tentacle missing, left tentacle stout, considerably longer than the dorsal mantle length, stalks somewhat flattened producing a rather rectangular cross-section. Club (Fig. 13) narrowing from carpus, outer face with a short but prominent carinate membrane situated just distal to the carpal fixing apparatus. Club gradually tapering from the carpus. Fixing apparatus compact, occupying a well defined oval section on the inner face of the carpus, consisting of 5 small suckers and 4 small pads.

Club armed with two rows of alternately placed hooks, those on the ventral edge much larger than the dorsal series, four hooks in each series, the two proximal hooks in the ventral series the largest, the second and third subequal and the largest in the dorsal series. A minute sucker associated with the base of each hook in the dorsal series. Distal extremity of club with about 9 rows of minute, close-packed suckers, four suckers in a row across the club. A small comparatively wide membrane borders the dorsal, distal half of the club.

Buccal membrane eight-pointed, the points supported by colourless raised stiffening rods, membrane very dark in colour, prominent.

Photophores very numerous arranged as follows:—

Mantle: A very few, sparsely scattered photophores on the anterior dorsal surface of the mantle and a few in the mid dorsal line between the fins. No photophores on the fins. On the ventral surface of the mantle photophores of two sizes are closely, more or less equally spaced, but do not form any discernible pattern. One kind are large, spherical and deep-seated, the others much smaller, more frequent and dot-like, confined to the surface of the integument.

Funnel: Three irregular rows of the larger photophores on each side of the mid-line leaving a wide band bare of photophores down the centre. Other larger photophores are scattered rather irregularly on the lateral surfaces of the funnel. The smaller dot-like photophores are also present.

Head and Arms: Only the larger type of photophores occur. On the dorsal surface of the head there are a few irregularly disposed photophores, with more on the arms. Ventrally there is one row of closely spaced photophores right down the inner ventral face of the fourth pair of arms, continuing down the head for its full extent as two parallel rows of photophores. A less regular row of more scattered photophores extends down the outer ventral face of the fourth pair of arms to continue down the head, at first parallel to the inner rows but diverging posteriorly to end rather irregularly near the postero-lateral ventral angle of the head. A rather irregular, sparser row of photophores runs down the middle of the third pair of sessile arms to continue on to the lateral surface of the head. A ring of close spaced photophores around the whole border of the eyelid, close-spaced and more numerous ventrally. Four rather larger photophores are situated on the ventral

periphery of the eyeball. A large, elongate photophore on the tip of each ventral arm.

Holotype (M.10378) in Dominion Museum.

LOCALITY: Off Kahu Rocks, east coast of Wellington, taken from a commercial fish trawl which had been working in 50 fathoms. F. Abernethy, October, 1956.

There are three other described species of *Enoploteuthis*, *E. leptura* Leach from the Atlantic, *E. chuni* Ishikawa from Japan and *E. galaxias* Berry from eastern Australia. The new species has the form of the young specimen figured by Chun (1910, Taf. 11, figs. 5, 6) of *leptura* Leach. It differs from this stage of *leptura* in having a subsidiary row of hooks on the tentacle clubs, a proportionately much smaller area of small suckers distally on the tentacle club and an irregular arrangement of photophores on the ventral surface of the mantle. The arrangement of the photophores and the details of the tentacle clubs also distinguish it from *chuni* and *galaxias*. From *galaxias* it differs in having fewer hooks on the tentacle club and fewer photophores on the ventral surface of the eyeball.

From the shape and general proportions it appears that *E. neozelanica* n.sp. is only half grown. Even at this stage the differences cited above render the species distinctive and the proportionate differences between body and fins have not been stressed as they may well change with development.

Measurements of *Enoploteuthis neozelanica*

Dorsal mantle length	37 mm
Ventral mantle length	33 mm
Length to base of dorsal arms	50 mm
Extreme length of fins	28 mm
Width of single fin	15 mm
Width across fins	34 mm
Diameter of body	14 mm
Length of head	12 mm
Width across eyes	10 mm
Length of funnel (median)	8 mm
R.1	17 mm
R.2	24 mm
R.3	23 mm
R.4	29 mm
Length of left tentacle	45 mm
Length of left tentacle club	8 mm

Family GONATIDAE

Genus GONATUS Gray, 1849

1849. Cat. Moll. Coll. Brit. Mus., pt. 1, p. 67.

Type Species (monotypy): *Onychoteuthis ? amoena* Moller (= *Sepia loligo* Fabricius)

Gonatus fabricii (Lichtenstein, 1818)

1818. *Onychoteuthis fabricii* Lichtenstein, Isis, 1818, p. 3.
1886. *Gonatus fabricii* Hoyle, Challenger Rep., 16, p. 41.
1929. *Gonatus fabricii* Sasaki, Journ. Coll. Agric. Hokkaido Imp. Univ., 20 (Supplement), p. 266.

A single specimen in excellent condition from VUZ 94 agrees with descriptions of this species in all particulars. This is the first record from New Zealand waters.

LOCALITY: VUZ 94, approx. 42° 2′ S, 175° 22′ E, in 500–600 fathoms over c. 1,400 fathoms.

Family CHIROTEUTHIDAE

Genus MASTIGOTEUTHIS Verrill, 1881

1881. Bull. Mus. Comp. Zool., vol. 8, p. 100.

Type Species (monotypy): *Mastigoteuthis agassizii* Verrill.

Mastigoteuthis flammea Chun, 1908. Figs. 1, 2.

1908. *Mastigoteuthis flammea* Chun, Wissensch. Ergebnisse Deutschen Tiefsee-Exped., Bd. 18, Th. 1, p. 229.

Three specimens from the Cook Strait area match Chun's figures and description of *Mastigoteuthis flammea* in most details. They are considerably larger than either of Chun's specimens, the larger of which had a dorsal mantle length of 35 mm. The specimens taken by the *Valdivia* came from the Guinea Current and the northern limit of the Benguela Current in 3,500 and 2,000 metres respectively. The Cook Strait specimens were caught in nets fished from 825 to 1,100 metres (450 to 600 fathoms). Chun's figure (1910, Pl. 33, Fig. 4) shows the tentacular stumps as rather long. In the three New Zealand specimens the stumps of the tentacles are represented only as rounded bosses sunk in the pits from which the tentacles usually emerge. It would appear that the New Zealand form normally loses the tentacles, if they are ever actually functional. Obviously the function of these degenerate tentacles has been largely taken over by the fourth pair of sessile arms which are greatly elongated. The rings from the suckers on the arms have longer, sharper hooks than those described by Chun for *flammea*, but this could possibly be a development correlated with increased size. The disposition of chromatophores and photophores is very much as figured for *flammea* by Chun. The preserved specimens when first seen by the writer were almost as brightly coloured as Chun's coloured plate of *flammea* but they have faded in the preservative.

Allan (1945, p. 335) recorded a small specimen (mantle length 13 mm) from off the east coast of Tasmania, tentatively under the name of *grimaldi* Joubin. Two species, *M. cordiformis* Chun and *M. latipinna* (Sasaki) have been recorded from Japanese waters and Berry has described *M. famelica* from Hawaii. This is the first record of the genus from New Zealand.

LOCALITIES: VUZ 86, 41° 47′ S, 175° 2′ E, south of Cape Palliser in c. 600 fathoms over c. 800 fathoms (figured specimen); VUZ 105, 41° 47′ S, 175° 1′ 30″ E, off Palliser Bay in 450–500 fathoms over c. 925 fathoms; VUZ 108, 41° 52′ 30″ S, 175° 6′ E, off Palliser Bay in c. 600 fathoms over c. 1,050 fathoms.

Measurements of *Mastigoteuthis flammea* Chun

	VUZ 105 mm	VUZ 86 mm	VUZ 108 mm
Total length	119	121	132
Dorsal mantle length	45	44	48
Ventral mantle length	42	42	46
Length of fins	28	28	28
Width across fins	30	30	31
Diameter of mantle at anterior margin	10.5	10	9.5
Length of head	10.5	12	10
Width across eyes	10.5	13	9.5
Arms R.1	17	18	17
R.2	26	32	33
R.3	27	32	22
R.4	65	79	82
Length of funnel	4	6	5
Diameter of right eye	—	6.5	4.5

Family CRANCHIIDAE

Genus MEGALOCRANCHIA Pfeffer, 1884

1884. Abhandl. Naturwissen Vereins Hamburg, vol. 8, p. 24.

Type Species (monotypy): *Megalocranchia maxima* Pfeffer.

Megalocranchia richardsoni, n.sp. Figs. 7-10.

Animal large for the group, body narrowly conical, but constricted anteriorly. Mantle thin, smooth, membranous, constricted considerably just behind the anterior margin, then rapidly swelling to attain its maximum diameter, tapering at first gradually and then suddenly to a fine attenuate point at the posterior extremity. Fins large, elongate, thin and fragile, somewhat damaged at the posterior extremity in all specimens but apparently continuous about the posterior extremity of the body, extending from one-half to one-third the mantle length, inserted along their whole length into dorsal mantle wall, towards the posterior half of their attachment closely appressed to the lanceola of the pen. Anterior margin of mantle attached to the head and funnel in three areas. The mantle is attached to the head by a comparatively narrow band in the mid-dorsal line and to the funnel towards each lateral wing. A faint darkened line indicates the mid-dorsal line over most of the mantle, bifurcating posteriorly to outline the lanceola and joining a similar faint, dark line which indicates the line of attachment of fin and mantle on each side.

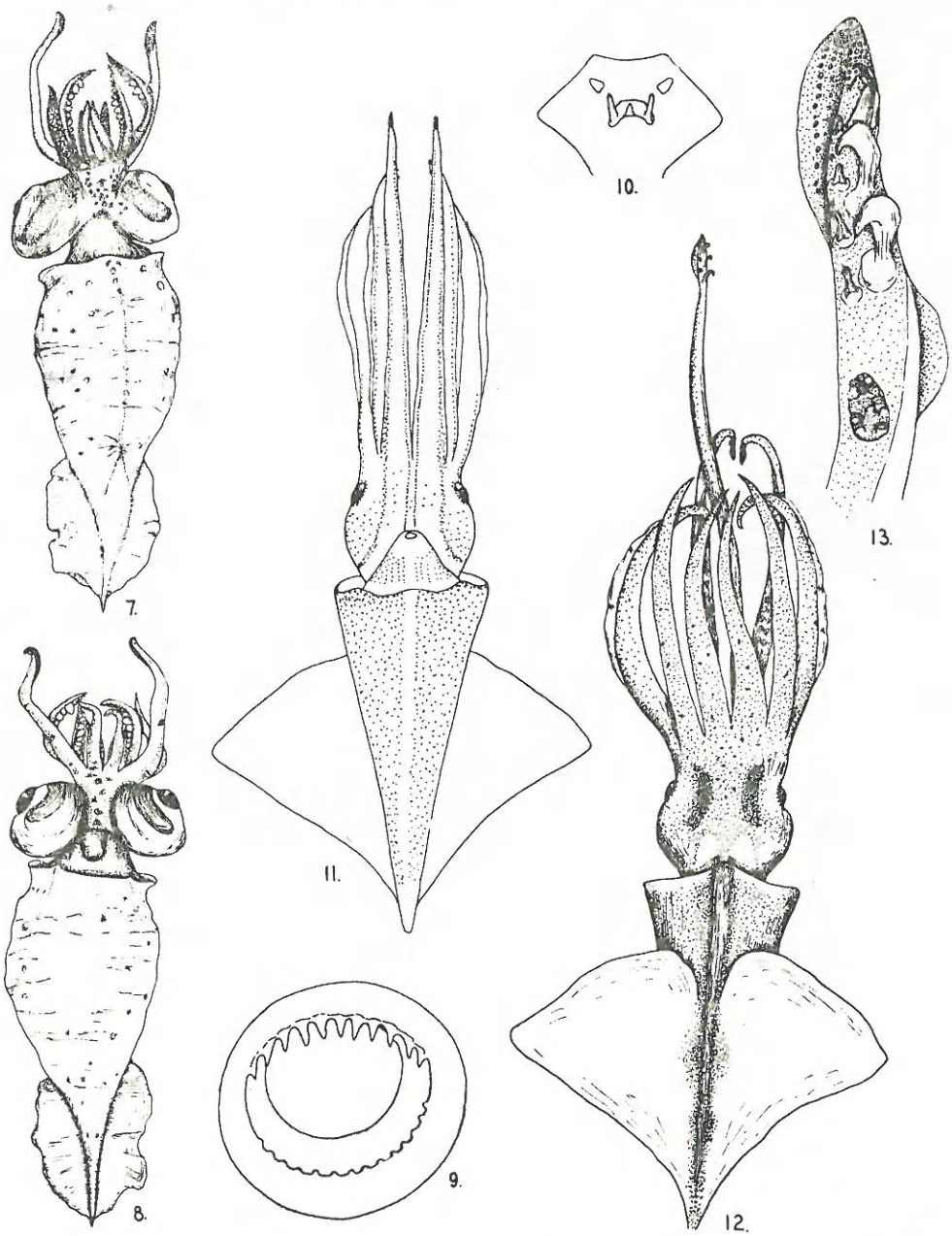
Head short and narrow without the eyes. Width of head including eyes considerably greater than the mantle width. Eyes very large and prominent, non-pedunculate but attached to the sides of head, almost circular in lateral view and projecting obliquely downwards. A large semi-circular photogenic organ occupies the ventral surface of the eyeball.

Funnel comparatively large, thin walled, broad at base, almost completely filling the area of head between the eyes. Funnel organ (Fig. 10) well-developed, consisting of a large median dorsal organ with a smaller sub-triangular pad-like lateral organ on each side. Dorsal organ rather crescent-shaped with three rather pointed projections, one from each lateral wing and one from the posterior median margin.

Arms well-developed, short, the longest approximately two-fifths the mantle length, distinctly unequal, order of length more usually 3, 2, 4, 1, but occasionally 3, 4, 2, 1, the second and fourth pairs subequal. No umbrella. Sessile arms bordered by a delicate, narrow, lateral membrane on each side. Arms with a double row of stalked suckers, the largest on the second and third pairs situated about the distal fourth. Sucker rings smooth.

Tentacles moderately stout, comparatively long, between a half and four-fifths the mantle length, expanded at tips to form clubs which are bounded by a thin lateral membrane on each side. A small median membrane extends along the distal third of the outer face of each club. Club set with rows of long stalked suckers, four suckers of comparable size in each row, the largest suckers in the middle of the club, diminishing in diameter distally and proximally, about 11 rows on body of club and about 12 rows of very small suckers on the distal extremity of club. Stalk of tentacles set on inner faces with pairs of close-spaced suckers, the pairs arranged in a zigzag fashion. Suckers of main portion of club set with horny rings (Fig. 9) which bear some eleven narrowly pointed teeth on the superior circumferance, teeth reduced to small rounded bosses on inferior margin.

Living animal almost transparent except for brownish-black chromatophores. Preserved specimens a dirty white with reddish-brown chromatophores. Chromato-



FIGS. 7, 8.—*Megalocranchia richardsoni* n.sp., Holotype. 9.—*Megalocranchia richardsoni* n.sp., ring from sucker on tentacle club. 10.—*Megalocranchia richardsoni* n.sp., funnel organ. 11.—*Enoploteuthis neozelanica* n.sp., diagrammatic view to show disposition of photophores. 12.—*Enoploteuthis neozelanica* n.sp., Holotype. 13—*Enoploteuthis neozelanica*, n.sp., left tentacle club.

phores small and close on integument of anterior portion of head and outer surface of arms, large and irregularly shaped on dorsal and ventral surfaces of head and rather oval-shaped and large on mantle. Little discernible pattern in arrangement of chromatophores on mantle but a general bilateral symmetry. A narrow line of small chromatophores down the mid-dorsal line, overlying the gladius.

Holotype (M.12940) and three paratypes in Dominion Museum, Wellington.

LOCALITIES: B.S. 204, 37° 29′ S, 177° 17′ E, White Island Trench, c. 250 fathoms over c. 600 fathoms, m.v. *Alert*, 25.2.57 (Holotype); VUZ 57, 42° 1′ 30″ S, 174° 50′ E, south of Cape Palliser in c. 300 fathoms over 1,200–1,300 fathoms (paratype); VUZ 85, 41° 47′ S, 175° 2′ E, south of Cape Palliser in c. 600 fathoms over c. 800 fathoms (paratype); VUZ 110, Cook Strait, "Middle ground", fish stomachs from about 70 fathoms, coll. R. Greco (paratype).

This species seems a typical *Megalocranchia* related to *M. maxima* Pfeffer but distinguished from it by the relatively enormous development of the eyes. This feature, in fact, separates it from all other described species of the genus. This is the second species of *Megalocranchia* to be recorded from Cook Strait. The writer has already reported and figured *M. pardus* Berry (Dell, 1952, p. 135). Although the specimen of *M. pardus* from Cook Strait is smaller than the new species it is not much smaller than the smallest specimen of *richardsoni* and there is no possibility that it represents a juvenile stage. From *pardus* it differs in the different mantle shape, wider body and immense eyes. From *M. abyssicola* (Goodrich) it differs in the size of the eyes and the shape of the mantle. The eyes are easily damaged and the specimens collected have often had one or both missing or torn off in the trawl.

Measurements of *Megalocranchia richardsoni*

	Type	VUZ 57	VUZ 85	VUZ 110
	mm	mm	mm	mm
Total length	94	152	178	260
Dorsal mantle length	57	86	104	130
Ventral mantle length	56	82	102	—
Length of fins	25	32	54	51
Width across fins	19	25	34	—
Diameter of mantle at anterior margin	22	—	—	—
Major diameter of mantle	25	—	34	—
Length of head	14	16	15	36
Width of head disregarding eyes	5	16	22	26
Width across eyes	29	—	—	—
Longitudinal diameter of right eye	12	19	—	28
Horizontal diameter of right eye	13	17	—	—
Sessile arms R.1	15	23	27	37
R.2	18.5	25	33	50
R.3	23	35	39	62
R.4	17	27	28	39
Length of right tentacle	33	53	49	123
Length of tentacle club	9	11	13	20
Length of funnel	—	—	—	24

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