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Burrowing Polychaete Worms from a New Zealand Estuary

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Abstract

A list of polychaete worms from intertidal soft bottom areas in the Heathcote Estuary is given together with a key to species. Two new species are described and two cosmopolitan estuarine species are reported for the first time from New Zealand seas.

INTRODUCTION

THIS paper presents part of the results of an ecological survey of the polychaetes found in the intertidal sand and mudbanks of the Heathcote Estuary near Christchurch, New Zealand. This survey was the subject of an M.Sc. thesis from the Zoology Department, University of Canterbury.

Five transects from high to low water mark were spaced along the southern side of the estuary and stations with a known time of exposure to air at low tide were established on each transect. Five samples were obtained from each station between November, 1960, and December, 1961, at approximately two-month intervals. The list of species found in these collections is set out below. As only a few collections were made on the northern side of the estuary the list cannot be considered a complete one for the entire estuary.

An indication of sediment type and lower salinity limit is given for each species. Water samples were taken from the water's edge at the collecting stations on flooding and ebbing tides and their salinity determined (see Estcourt, 1966: 180, for method). The lowest value found is given as the minimum salinity to which polychaetes at that station may be subjected.

SPECIES LIST

ERRANTIA

Family POLYNOIDAE

*Lepidasthenia accolus* n.sp.

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## Family NEREIDAE

*Perinereis nuntia* (Savigny) *vallata* Grube*Perinereis nuntia* (Savigny) *brevicirris* Grube*Platynereis australis* Schmarda*Nicon aestuariensis* Knox

## Family NEPHTYIDAE

*Aglaophamus macroura* (Schmarda)

## Family GLYCERIDAE

*Glycera americana* Leidy

## Family EUNICIDAE

## Subfamily LUMBRINEREINAE

*Lumbrinereis sphaerocephala* (Schmarda)

## SEDENTARIA

## Family ORBINIIDAE

*Orbinia papillosa* (Ehlers)*Haploscoloplos cylindrifer* (Ehlers)

## Family SPIONIDAE

*Scolecopides benhami* Ehlers*Scolecopides* sp.*Aonides trifidus* n.sp.*Boccardia polybranchia* (Haswell)*Prionospio pinnata* Ehlers

## Family OPHELIIDAE

*Armandia maculata* (Webster)

## Family CAPITELLIDAE

*Capitella capitata* (Fabricius)*Heteromastus filiformis* (Claparède)

## Family ARENICOLIDAE

*Abarenicola affinis affinis* Wells

## Family PECTINARIIDAE

*Pectinaria australis* Ehlers



13	Anterior neuropodia usually with acicular setae, parapodial lamellae fleshy	.....	.....	.....	.....	<i>Scolecoplepides benhami</i>	
	Anterior neuropodia without acicular setae, parapodial lamellae membranous	.....	.....	.....	.....	<i>Scolecoplepides</i> sp.	
14	Gills pinnate, three pairs	.....	.....	.....	.....	<i>Prionospio pinnata</i>	
	Gills simple, erect, twelve to eighteen pairs	.....	.....	.....	.....	<i>Aonides trifidus</i>	
15	Gills all simple, beginning on the fifth segment	.....	.....	.....	.....	<i>Orbinia papillosa</i>	
	Anterior gills simple, posterior gills dichotomously branched	.....	.....	.....	.....	<i>Haploscoloplos cylindrifera</i>	
16	Parapodia with rami widely separated. Gills absent or inconspicuous	.....	.....	.....	.....	.....	17
	Parapodia with rami not widely separated. Gills conspicuous	.....	.....	.....	.....	.....	18
17	Eleven thoracic segments, gills on posterior segments	.....	.....	.....	.....	<i>Heteromastus filiformis</i>	
	Nine thoracic segments, no gills. Dorsal genital setae in mature males	.....	.....	.....	.....	<i>Capitella capitata</i>	
18	Gills arborescent, confined to mid-region of the body	.....	.....	.....	.....	<i>Abarenicola affinis affinis</i>	
	Gills pectinate, two pairs. An anterior row of large golden paleae. Tube conical, open at both ends, composed of sand grains	.....	.....	.....	.....	<i>Pectinaria australis</i>	

## SYSTEMATIC ACCOUNT

## Family POLYNOIDAE

## Genus LEPIDASTHENIA Malmgren, 1867

*Lepidasthenia accolus* n.sp. (Figs. 1-4)

OCURRENCE: One specimen, female, coelom full of eggs, from a burrow of *Abarenicola affinis affinis*, 29.5.61.

DESCRIPTION: Length 6cm, with 142 setigers. Colour in life blue-grey. After preservation in alcohol, tiny flecks of blue-black pigment remain on the prostomium, the elytra and the dorsal surface of the body, and a small black spot at the base of the tentacles and the dorsal cirri, otherwise colourless.

Median antenna, ceratophore elongated, style twice the prostomial length, nearly cylindrical, tapering suddenly to a filiform tip. Lateral antennae a little more than half the length of median antenna. First setiger, ventral cirrus elongated. Antennae, palps, tentacles and cirri similar in shape, proximal part cylindrical or slightly bulbous, tip sharply tapered.

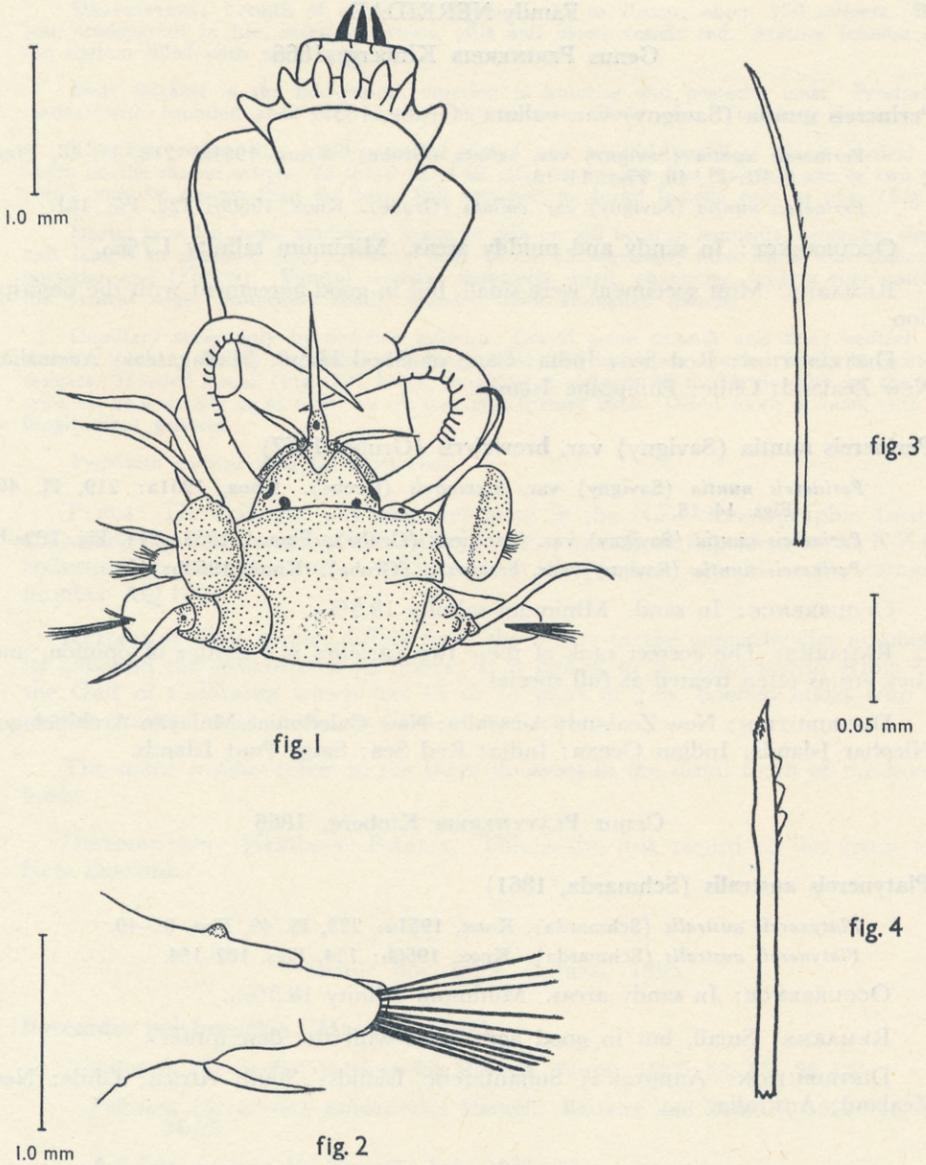
Scattered small papillae on dorsal surface. Crest of flattened conical papillae along the mid-dorsal line.

Elytra minute; second and third pairs half the size of the first pair (Fig. 1); posterior pairs becoming successively smaller, not clearly demarcated from the elytophores (Fig. 2). (Inflation of the anterior elytra is possibly an artifact due to anaesthetisation in dilute magnesium chloride solution.) Elytra on setigers 1, 3, 4, 6, 8, thence on alternate setigers to the posterior end. Elytra without papillae or fringe, uniformly pigmented except for a darker area over the attachment scar.

Notopodia reduced to a small lobe without visible aciculum. Neuropodia elongated, anterior lobe slightly longer than posterior; aciculum not projecting beyond lobes. Dorsal cirri as long as setae (Fig. 1), ventral cirri short (Fig. 2). Nephridial papillae conical, projecting from base of parapodia (Fig. 2).

Setae in single rows; all unidentate. Setae of the anterior segments fine with small spines (Fig. 3); gradually changing to heavier setae with a few strong spines (Fig. 4) on the posterior two-thirds of the body. The two setae dorsal to the aciculum are stronger and more darkly pigmented than those ventral to it.

Pygidium flattened, circular, anus ventral. No anal cirri.



FIGS. 1-4.—*Lepidasthenia accolus* n.sp. Fig. 1: Anterior end. Fig. 2: A middle parapodium. Fig. 3: Anterior seta. Fig. 4: Posterior seta.

**TYPE:** The holotype has been deposited in the New Zealand Oceanographic Institute collection, registered number 31.

**REMARKS:** Most species of *Lepidasthenia* have bidentate ventral setae. *L. accolus* with unidentate ventral setae is distinguished from the other unidentate species by the details of the setae and the extreme reduction of the elytra. The name *accolus* (one who dwells nearby) refers to its commensal habit.

## Family NEREIDAE

## Genus PERINEREIS Kinberg, 1866

**Perinereis nuntia** (Savigny) var. **vallata** (Grube, 1857)

*Perinereis nuntia* (Savigny) var. *vallata* (Grube). Knox, 1951a: 218, Pl. 45, Figs. 9–10; Pl. 46, Figs. 11–13.

*Perinereis nuntia* (Savigny) var. *vallata* (Grube). Knox, 1960b: 122, Fig. 181.

**OCCURRENCE:** In sandy and muddy areas. Minimum salinity 1.7‰.

**REMARKS:** Most specimens were small, but in good agreement with the description.

**DISTRIBUTION:** Red Sea; India; Cape of Good Hope; Madagascar; Australia; New Zealand; Chile; Philippine Islands.

**Perinereis nuntia** (Savigny) var. **brevicirris** (Grube, 1867)

*Perinereis nuntia* (Savigny) var. *brevicirris* (Grube). Knox, 1951a: 219, Pl. 46, Figs. 14–18.

*Perinereis nuntia* (Savigny) var. *brevicirris* (Grube). Fauvel, 1953: 214, Fig. 109a-b.

*Perinereis nuntia* (Savigny) var. *brevicirris* (Grube). Knox, 1960b: 124.

**OCCURRENCE:** In sand. Minimum salinity 18.5‰.

**REMARKS:** The correct rank of these two varieties is a matter of opinion, and they are as often treated as full species.

**DISTRIBUTION:** New Zealand; Australia; New Caledonia; Malayan Archipelago; Nicobar Islands; Indian Ocean; India; Red Sea; Saint Paul Islands.

## Genus PLATYNEREIS Kinberg, 1866

**Platynereis australis** (Schmarda, 1861)

*Platynereis australis* (Schmarda). Knox, 1951a: 223, Pl. 49, Figs. 34–40.

*Platynereis australis* (Schmarda). Knox, 1960b: 124, Figs. 182–184.

**OCCURRENCE:** In sandy areas. Minimum salinity 18.5‰.

**REMARKS:** Small, but in good agreement with the description.

**DISTRIBUTION:** Antarctica; Subantarctic Islands; South Africa; Chile; New Zealand; Australia.

## Genus NICON Kinberg, 1866

**Nicon aestuariensis** Knox, 1951

*Nicon aestuariensis* Knox, 1951a: 225, Pl. 50, Figs. 41–46.

**OCCURRENCE:** Abundant (more than 1,000 per m<sup>2</sup>) in stiff grey mud in the upper reaches of the estuary. Very tolerant of lowered salinities, extending upriver to places where saltwater penetrates only on spring tides. Also collected during this survey from Saltwater Creek (North Canterbury) and Havelock Harbour.

**DESCRIPTION:** Typical. Not mentioned in Knox's description is the presence of a gland in each ligule of the notopodium of posterior parapodia. This is white and conspicuous in live animals, sometimes brown in preserved material.

REMARKS: *N. aestuariensis* appears to be well adapted to the estuarine environment, and its known distribution suggests that it may occur in many South Island estuaries. It has not been found in the North Island. An account of its breeding biology based on work done during this survey has already appeared (Estcourt, 1966).

DISTRIBUTION: Heathcote Estuary; Saltwater Creek, North Canterbury; Have-lock Harbour, Pelorus Sound; and Bluff Harbour.

Family NEPHTYIDAE

Genus AGLAOPHAMUS Kinberg, 1866

**Aglaophamus macroura** (Schmarda, 1861)

*Aglaophamus macroura* (Schmarda). Hartman, 1950: 118.

*Aglaophamus macroura* (Schmarda). Knox, 1960b: 115.

OCCURRENCE: In fine sand. Minimum salinity 3.7‰.

DESCRIPTION: Typical.

DISTRIBUTION: New Zealand; South America.

Family GLYCERIDAE Grube

Genus GLYCERA Savigny, 1818

**Glycera americana** Leidy, 1855

*Glycera americana* Leidy. Knox, 1960a: 221, Figs. 1-3.

OCCURRENCE: In sand and muddy sand. Minimum salinity 3.7‰.

REMARKS: The largest specimen taken was 27cm long, but most were less than half this.

DISTRIBUTION: East coast of America from New England to Brazil; west coast of America from Canada to Peru; New Zealand; South Australia.

Family EUNICIDAE Grube

Subfamily LUMBRINEREINAE Grube

Genus LUMBRINEREIS Blainville

**Lumbrinereis sphaerocephala** (Schmarda, 1861)

*Lumbrinereis sphaerocephala* (Schmarda). Knox, 1960b: 130.

OCCURRENCE: Only one specimen was obtained during the survey. It came from a sandy area, minimum salinity 25‰.

DESCRIPTION: Typical.

DISTRIBUTION: New Zealand; New Caledonia; Australia; Gambia Islands.

Family ORBINIIDAE Hartman

Genus ORBINIA Quatrefages, 1865

**Orbinia papillosa (Ehlers, 1907)**

*Aricia papillosa* Ehlers, 1907: 16, Figs. 7-14.

*Orbinia papillosa* (Ehlers). Hartman, 1957: 250.

**OCCURRENCE:** In sandy areas only. Minimum salinity 16.9‰. Also collected during this survey from the sandy beach at Duvauchelle Bay, Akaroa Harbour.

**DESCRIPTION:** Colour in life, orange with red gills. Gametes white, abdominal region therefore pale in mature individuals. Average length when mature 9cm with about 250 setigers. Twenty-six or 27 thoracic setigers and two or three transitional to the abdominal region. Immature specimens have fewer thoracic setigers; the smallest seen had only 11. Ventral fringe present on segments 21 to 33 with a variation of up to three segments in the position and number of segments involved.

Thoracic neuropodia with three complete and one half row of uncini. Furcate setae present in thoracic and abdominal notopodia, two or three in a ramus and only half the length of the capillary setae; the two arms of the fork are joined by a striated, pouched, transparent membrane.

Pygidium circular with a pair of filamentous cirri, dorsolaterally inserted. Anus terminal.

**REMARKS:** This description applies to the specimens from the Heathcote Estuary and from Duvauchelle Bay. The specimens from Auckland Harbour described by Ehlers had 33 thoracic setigers and two transitional; ventral fringe on segments 25 to 37; and five rows of uncini in thoracic neuropodia. Ehlers did not mention furcate setae. They are difficult to find even when their presence is expected, and he perhaps overlooked them.

If there was not such complete agreement in all other details the differences between the Auckland and Banks Peninsula specimens would suggest two species. Possibly there is a north-south cline in the number of thoracic setigers. I have a few specimens from the Wellington area which is geographically intermediate, but not enough to see if they have an intermediate number of thoracic setigers.

**DISTRIBUTION:** Auckland Harbour; Heathcote Estuary; Duvauchelle Bay, Akaroa Harbour.

Genus HAPLOSCOLOPLOS Monro, 1933

**Haploscoloplos cylindrifer (Ehlers, 1904)**

*Scoloplos cylindrifer* Ehlers, 1904: 45, Pl. 6, Figs. 16-19.

*Haploscoloplos cylindrifer* (Ehlers). Hartman, 1957: 270.

**DESCRIPTION:** Length 11cm with 210 segments in an average specimen. Gills first present on segments 18-22, approximately the first 25 pairs simple, the rest dichotomously branched with up to seven terminations. Mature individuals have gonopores on about 30 anterior abdominal segments. Live animals range in colour from orange to dark olive green. The gills on posterior segments have an intense copper-green colour which persists in formalin fixed specimens.

**REMARKS:** This species can be easily recognised by its gills and pigmentation. Both it and *O. papillosa* when disturbed show the behaviour characteristic of the family, rolling into a tight coil with the head and gills inside.

**DISTRIBUTION:** Southern shores and islands of New Zealand and Australia in littoral zones.

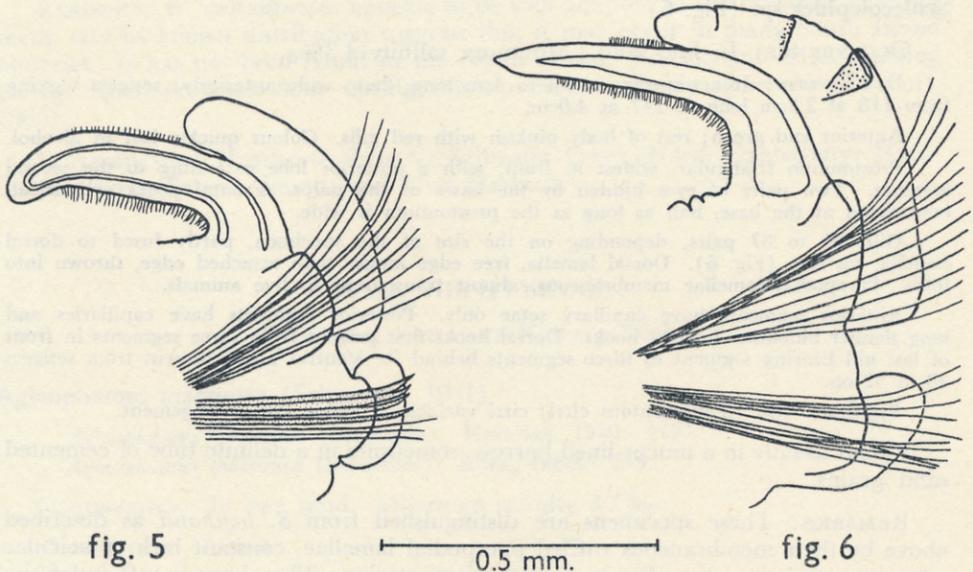


FIG. 5.—*Scolecolepides benhami*, thoracic parapodium in anterior view. FIG. 6.—*Scolecolepides* sp., thoracic parapodium in anterior view.

Family SPIONIDAE Grube

Genus SCOLECOLEPIDES Ehlers, 1907

***Scolecolepides benhami* Ehlers, 1907 (Fig. 5)**

*Scolecolepides benhami* Ehlers, 1907: 14, Figs. 4–6.

**OCCURRENCE:** Found in greatest numbers (up to 5,000 per m<sup>2</sup>) in muddy areas. It extends up the Avon River, which flows into the northern corner of the Heathcote Estuary, as far as Kerr's Reach which is two miles upstream of the recorded limit of saltwater penetration. It was also collected during this survey from Saltwater Creek (North Canterbury), Havelock Harbour and the mouth of the Rakaia River.

**DESCRIPTION:** Most specimens from the estuary were about 4cm long; width across the parapodial lobes in the anterior region, 1.5mm. Setae: Capillaries only in anterior notopodia, in neuropodia of setigers 1–8; capillaries and acicular setae (Fig. 5) in neuropodia of setigers 9–30; bidentate hooded hooks and capillaries in both rami of posterior segments beginning about the last gill-bearing segment dorsally, and at segment 64 ventrally.

Specimens from the Avon River at Pages Road and from Saltwater Creek with a length of 4cm but 3mm wide had acicular setae in only four segments. Occasional incomplete large specimens, up to 4mm wide, from the estuary had no acicular setae but only slightly thicker capillaries in the appropriate segments. It appears that the acicular setae are lost as the worms grow.

Live specimens have a distinctive colour pattern, the anterior 8 to 10 segments and their gills being dark green and the rest of the body pink with red gills. The gills form a regular chevron pattern over the back.

**REMARKS:** Dominant, with *Nicon aestuariensis*, in areas where the salinity conditions cannot be tolerated by other animals.

**DISTRIBUTION:** Moeraki; Saltwater Creek; Havelock Harbour; Rakaia River mouth (coll. H. J. Cranfield).

**Scolecoplepides sp. (Fig. 6)**

**OCCURRENCE:** In fine sand. Minimum salinity 4.3‰.

**DESCRIPTION:** Intact specimens up to 4cm long, 2mm wide anteriorly; setigers varying from 118 at 2.5cm long to 147 at 4.0cm.

Anterior end green; rest of body pinkish with red gills. Colour quickly lost in alcohol.

Prostomium triangular, widest in front, with a posterior lobe extending to the second segment. Two pairs of eyes hidden by the bases of the palps. Frontal peaks cylindrical, constricted at the base, half as long as the prostomium is wide.

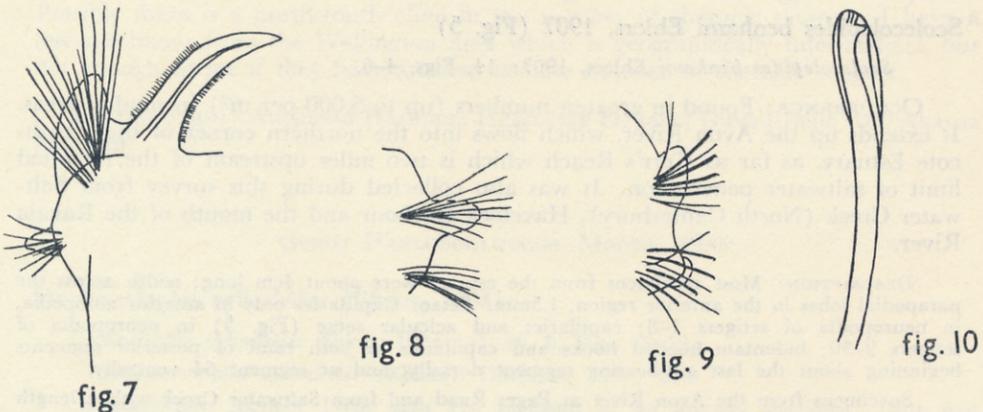
Gills 69 to 87 pairs, depending on the size of the specimen, partly fused to dorsal lamella, tip free (Fig. 6). Dorsal lamella, free edge longer than attached edge, thrown into folds. Parapodial lamellae membranous, almost transparent in live animals.

Anterior segments have capillary setae only. Posterior segments have capillaries and long slender bidentate hooded hooks. Dorsal hooks first present from three segments in front of last gill bearing segment to three segments behind it. Ventral hooks present from setigers 48 to 52 on.

Pygidium with 10 filamentous cirri; cirri variable in shape and arrangement.

Found usually in a mucus-lined burrow, sometimes in a definite tube of cemented sand grains.

**REMARKS:** These specimens are distinguished from *S. benhami* as described above by their membranous ruffled parapodial lamellae, constant lack of acicular setae in anterior neuropodia, and paler pigmentation. They have a soft indefinite outline which contrasts with the sharply defined and very regular arrangement of the fleshy parapodial lamellae and gills of *S. benhami*. In other characters they fall within the range of variation found in *S. benhami*. They may belong to a new species but I do not feel justified in describing them as such without more information on their biology for comparison with that of *S. benhami*.



FIGS. 7-10.—*Aonides trifidus* n.sp. Fig. 7: Anterior parapodium, anterior view. Fig. 8: Post-branchial parapodium, anterior view. Fig. 9: Posterior parapodium, anterior view. Figs. 7-9: Magnification  $\times 60$ . Fig. 10: Hooded hook, three-quarter view,  $\times 600$ .

Genus AONIDES Claparede, 1864

***Aonides trifidus* n.sp. (Figs. 7-10)**

**OCCURRENCE:** The most abundant polychaete (estimated maximum density 5,000 per  $m^2$ ) in the seaward part of the estuary. In sand and mud. Minimum salinity 4.3‰.

DESCRIPTION: Length of preserved specimens 15 to 20mm; about 150 setigers. Body-wall transparent in life, intestine brown, gills and blood vessels red. Mature females have the coelom filled with pink eggs.

Body thickest in the mid-region, tapering to anterior and posterior ends. Prostomium conical with rounded apex and an occipital tentacle. Four eyes. Two long palps.

The first setiger has small rounded dorsal and ventral lamellae. Erect conical gills begin on the second setiger, 12 to 18 pairs all alike except the first and last one or two pairs which may be shorter than the rest. Gill attached to dorsal lamella only at base (Fig. 7).

Dorsal lamellae large, similar in shape to gills on gill bearing segments, becoming smaller and lateral in position (Fig. 8) over next 13 to 15 segments, then small and conical to posterior end (Fig. 9). Ventral lamellae anteriorly small, triangular, with a tiny notch in the ventral edge; posteriorly small, rounded, with elongated glands.

Capillary setae only in anterior setigers. Dorsal setae smooth and fine; ventral ones shorter, thicker, slightly flattened. Capillary setae and bidentate hooded hooks in posterior setigers. Hooded hooks (Fig. 10) begin ventrally at setigers 30 to 34, dorsally on the same segment as ventrally or as many as six segments further back. Distal tooth of hook with two longitudinal grooves.

Pygidium conical with six short cirri.

TYPES: The holotype has been deposited in the N.Z. Oceanographic Institute collection, registered number 30. Paratype series have been deposited in the N.Z.O.I. collection, registered number P 25, and in the Canterbury Museum, catalogue number AQ 100.

REMARKS: This species differs from the others in the genus by the number of its gills and the structure of its hooks. It is closest to *A. californiensis* Rioja from the Gulf of California which has 13 or 14 pairs of gills, hooded hooks with two similar pointed teeth, and two pairs of anal cirri.

The name *trifidus* refers to the three divisions in the distal tooth of the hooded hooks.

DISTRIBUTION: Heathcote Estuary. This is the first record of the genus from New Zealand.

#### Genus BOCCARDIA Carazzi, 1895

##### **Boccardia polybranchia** (Haswell, 1885)

*Polydora* (*Boccardia*) *polybranchia* Haswell. Fauvel, 1927: 58, Fig. 20 a-i.

*Polydora* (*Boccardia*) *polybranchia* Haswell. Berkeley and Berkeley, 1952: 16, Figs. 24-25.

*Polydora polybranchia* Haswell. Fyfe, 1952: 23.

OCCURRENCE: In sand and sandy mud. Minimum salinity 0.4‰.

DESCRIPTION: Estuary specimens measured up to 4cm long with 123 setigers. This is rather larger than has been recorded from other localities. They differ from the description in having notosetae on the first setiger and acicular setae and capillaries on the segments of the last quarter of the body.

REMARKS: In most recent systematic publications *Boccardia* is given full generic rank but some authors still treat it as a subgenus of *Polydora*. The two differ in the arrangement of the gills. *Boccardia* spp. have gills on the segments in front of the modified fifth segment, while *Polydora* (*sensu stricto*) spp. do not.

DISTRIBUTION: Cosmopolitan.

## Genus PRIONOSPIO Malmgren, 1867

**Prionospio pinnata** Ehlers, 1901

*Prionospio pinnata* Ehlers. Fyfe, 1952: 23.

*Prionospio pinnata* Ehlers. Fauvel, 1953: 323, Fig. 174e.

OCCURRENCE: In sandy areas. Minimum salinity 4.3‰.

DESCRIPTION: Typical. The species is easily recognised by the long pinnate gills.

DISTRIBUTION: Previously recorded in New Zealand from Tauranga. Pacific, Indian and Atlantic Oceans.

## Family OPHELIIDAE

## Genus ARMANDIA Filippi, 1861

**Armandia maculata** (Webster, 1884)

*Armandia maculata* (Webster). Augener, 1923: 75; 1926: 169.

OCCURRENCE: In sandy areas. Minimum salinity 18.5‰.

DESCRIPTION: The specimens from the Heathcote Estuary agree completely with Augener's description. Length up to 17mm with 29 setigers. Ligulate lateral gills on setigers 2 to 26. Eleven pairs of conspicuous red lateral eyes on setigers 7 to 17. Twelve short anal cirri, a median ventral cirrus as long as the last six setigers.

DISTRIBUTION: New Zealand; Auckland and Campbell Islands; tropical and subtropical Atlantic Ocean.

## Family CAPITELLIDAE

## Genus CAPITELLA Blainville, 1828

**Capitella capitata** (Fabricius, 1780)

*Capitella capitata* (Fabricius). Fauvel, 1927: 154, Fig. 55 a-h.

*Capitella capitata* (Fabricius). Hartman, 1947: 404, Pl. 43, Figs. 1-2.

OCCURRENCE: In polluted muddy sand below low water neap tide level. Minimum salinity 0.4‰.

DESCRIPTION: Length up to 20mm, with about 50 setigers. Colour in life pale pink. Three teeth in a straight row above the fang of the hooded hooks of abdominal segments as figured by Hartman. Mature males have three to five pairs of genital setae on segment 8 and a single larger pair on segment 9. These are not visible in contracted specimens.

REMARKS: This cosmopolitan species has not previously been recorded in New Zealand. It occurs characteristically in estuaries and areas polluted by organic wastes.

DISTRIBUTION: Cosmopolitan.

## Genus HETEROMASTUS Eisig, 1887

**Heteromastus filiformis** (Claparède, 1864)

*Heteromastus filiformis* (Claparède). Fauvel, 1927: 150, Fig. 53.

*Heteromastus filiformis* (Claparède). Hartman, 1947: 426, Pl. 52, Figs. 1-4.

OCCURRENCE: In sandy areas. Minimum salinity 4.3‰.

DESCRIPTION: Typical. The species can be recognised in the field by its extreme length and thinness (10cm by 1mm) and intense dark red colour.

REMARKS: This is the first record of this species from New Zealand. Like *Capitella capitata* it is found in estuaries in widely separated parts of the world.

DISTRIBUTION: Cosmopolitan.

#### Family ARENICOLIDAE

Genus ABARENICOLA Wells, 1959

#### **Abarenicola affinis affinis** Wells, 1963

*Arenicola assimilis* var. *affinis* Ashworth. Fyfe, 1952: 27.

*Abarenicola assimilis* (Ehlers). Wells, 1959: 311, Pl. 2, Fig. 6.

*Abarenicola affinis affinis* Wells, 1963: 142, Pl. 2, Pl. 5.

OCCURRENCE: Found only in fine sand. Minimum salinity 4.3‰.

DESCRIPTION: Typical.

REMARKS: The Southern Hemisphere Arenicolidae have recently been revised by Wells (1959, 1963) who gives detailed synonymies and distributions of New Zealand species in his 1963 paper.

DISTRIBUTION: New Zealand.

#### Family PECTINARIIDAE

Genus PECTINARIA Lamarck

#### **Pectinaria australis** Ehlers, 1904

*Pectinaria (Lagis) australis* Ehlers, 1904: 56, Pl. 8, Figs. 1-12.

*Pectinaria australis* Ehlers. Hartman, 1941: 325.

*Pectinaria australis* Ehlers. Fyfe, 1952: 29.

OCCURRENCE: In sand up to half-tide level. Minimum salinity 4.3‰.

DESCRIPTION: The specimens agree with the description apart from some variation in the numbers of paleae and scaphal setae. Ehler's specimens from Lyttelton Harbour had 10 pairs of paleae and four pairs of setae at the base of the scaphe, while Heathcote Estuary specimens had 9 to 13 pairs of paleae and 3 to 5 pairs of scaphal setae.

DISTRIBUTION: New Zealand. Tauranga, Auckland Harbour, Albatross Point, Lyttelton (Fyfe, 1952). Heathcote Estuary and Saltwater Creek, North Canterbury (this survey), Petone Beach (Wear, 1966: 141).

#### ACKNOWLEDGMENTS

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