BENTHIC POLYCHÆTA FROM DEPTHS EXCEEDING 6000 METERS

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INTRODUCTION

The material of Polychætes from depths greater than 6000 m obtained by the Galathea-Expedition 1950-52 comprises 21 species, of which 15 were determined to species and 3 only to genus. The remaining 3 are so fragmentary, that they could only be determined to family.

The following species were found:

- 1. Macellicephala abyssicola FAUVEL
- 2. Macellicephala hadalis n. sp.
- 3. Ancistrosyllis constricta Southern
- 4. Nereis profundi n. sp.
- 5. Nepthys elamellata ELIASON
- 6. Ninöe fusca MOORE
- 7. Tharyx multifilis MOORE
- 8. *Ilyphagus bythincola* CHAMBERLIN
- 9. Travisia profundi CHAMBERLIN
- 10. Kesun abyssorum MONRO
- 11. Ammotrypane galatheae n. sp.
- 12. Maldanella harai (IZUKA)
- 13. (?) Petaloproctus cirratus MONRO
- 14. (?) Owenia lobopygidiata USCHAKOV
- 15. Terebellides eurystethus CHAMBERLIN

Three of these species are new to science, they are known only from depths greater than 6000 m, and probably represent a special hadal fauna.

Previously we had finds of eleven species of Polychætes from depths greater than 6000 m. Two of these are from the Swedish Deep-Sea Expedition 1947-48 (ELIASON 1951). At St. 370 of this expedition, at depths from 7625 to 7900 m, a fragment of a *Macellicephala*, and some empty tubes, probably of a Terebellid, were found. From the Soviet Expeditions to the Kurile-Kamtchatka Trench seven species are at present described from depths greater than 6000 m (USCHAKOV 1955b). Five of these are new to science. The species are: *Macellicephala mi*- rabilis 7210-7230 m (6 spec.), Macellicephala zenkevitchi 8100 m (1 spec.), Macellicephaloides grandicirra 8100-9950 m (43 spec.), Macellicephaloides verrucosa 7210-7230 m (3 spec.), Macellicephaloides vitiazi 7210-8430 m (2 spec.), Vitiazia dogieli 8100 m (1 spec.) and Amphicteis mederi 8100 m (20 spec.). Besides a Lumbriconereis sp. and a Potamilla sp. were found at 8100 m (USCHAKOV 1952).

The 21 species from the Galathea-Expedition were collected at the following 14 stations:

Philippine Trench

- St. 418. 10°13'N 126°43'E 10190 m Macellicephala hadalis?
- St. 419. 10°19'N 126°39'E 10160-10210 m Macellicephala hadalis?

Sunda Trench

- St. 462. 10°02'S 107°52'E 6740 m Ilyphagus bythincola, Kesun abyssorum.
- St. 465. 10°20'S 109°55'E 6930-7000 m Ampharetidæ II.
- St. 466. 10°21'S 110°12'E 7130-7160 m *Macellicephala abyssicola*.

Banda Trench

- St. 494. 5°36'S 131°01'E 7280 m (?) Petaloproctus cirratus, Jasmineira sp.
- St. 495. 5°26'S 130°58'E 7250-7290 m Macellicephala abyssicola, Macellicephala hadalis, Nereis profundi, Travisia profundi, Ammotrypane galatheæ, (?) Petaloproctus cirratus.
- St. 497. 5°18'S 131°18'E 6490-6650 m Travisia profundi, (?) Owenia lobopygidiata.
- St. 499. 5°21'S 131°17'E 6580 m Ancistrosyllis constricta, Tharyx multifilis, Travisia profundi, (?) Owenia lobopygidiata.

Kermadec Trench

- St. 649. 35°16'S 178°40'E 8210-8300 m Macellicephala hadalis, Kesun abyssorum, Notomastus sp., Myriochele sp., Jasmineira sp.
- St. 650. 32°20'S 176°54'W 6620 m Macellicephala abyssicola, Nepthys elamellata, Ninoë fusca, Myriochele sp., Maldanella harai, Jasmineira sp., Serpulidæ.
- St. 651. 32°10'S 177°14'W 6960-7000 m Macellicephala abyssicola, Macellicephala hadalis, Nephthys elamellata, Ninoë fusca, Kesun abyssorum.
- St. 653. 39°09'S 176°35'W 6140-6160 m Nephthys elamellata, Myriochele sp.
- St. 658. 35°51'S 173°31'W 6660-6720 m Macellicephala abyssicola, Macellicephala hadalis, Nephthys elamellata, Ninoë fusca, Maldanella harai, Ampharetidæ I, Terebellides eurystethus.

Further information about the stations is given in the main station list.

We have now traces of Polychætes from the greatest depths of the oceans, thus from the Philippine Trench at 10210 m some fragments of a Polychæte, which probably is a *Macellicephala hadalis* (see the descriptions). From 8210-8300 m in the Kermadec Trench (St. 649) we have 5 species, some of the specimens in so fine conditon that two species could be determined. These two species *Macellicephala hadalis* and *Kesun abyssorum* and *Macellicephaloides grandicirra* from the Kurile-Kamtchatka Trench are thus the deepest known finds.

All figurs were made by Mr. Poul H. Winther, scientific drawer, and the English manuscript was corrected by Mrs. Agnete Volsøe.

I wish to express my most cordial thanks to Dr. A. F. Bruun, the leader of the Galathea-Expedition, for letting me join the expedition and for having placed this interesting material at my disposal.

Description of the Material FAM. APHRODITIDAE SUBFAM. POLYNOINAE

Macellicephala abyssicola FAUVEL 1913 (FAUVEL 1914 pl. I fig. 9, pl. III figs. 4-5, 18-20)

Macellicephala abyssiocla FAUVEL 1913 p. 7. Macellicephala abyssicola FAUVEL 1914 p. 41. Macellicephala abyssicola FAUVEL 1923 p.44fig.15d-g. Macellicephala abyssicola ELIASON 1951 p. 132.

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Material:

Sunda Trench: St. 466, 7130-7160 m, 2 spec., 2 fragm.

Banda Trench: St. 495, 7250-7290 m, 1 probose. Kermadec Trench: St. 650, 6620 m, 12 spec., 12 fragm., largest: 38×18 mm. St. 651, 6960-7000 m, 16 spec., 4 fragm., 1 probose., largest: 43×20 mm. St. 658, 6660-6720 m, 1 spec., 2 probose.

Body short, flattened, broad. 17 setigerous segments. Prostomium bilobed with frontal filiform peaks. No eyes. Median tentacle with a large cylindrical ceratophore, inserted between the prostomial lobes. No facial tubercle. The palps are very long and smooth. Two pairs of tentacular cirri with basal setæ. 8 pairs of elytra on segments 2, 4, 5, 7, 9, 11, 13, 15, but all the present specimens have lost the elytra. Parapodia elongate, with a long dorsal cirrus, inserted at a long distance from the base. No dorsal tubercle on segments without elytra. The dorsal ramus small, subulate, with serrated setæ. Ventral ramus longer, shaped like a narrow cone, contains long transparent setæ, flat, spatulate, with serration along the edge. Short subulate ventral cirrus, inserted at a long distance from the base. 2 large anal cirri. Proboscis long and violet as the body.

Although FAUVEL indicates 18 setigerous segments it must be the same species since all other characters are quite similar.

Distribution: Bay of Biscay 4380 m, Canary Islands 4255-4872 m, Kermadec Trench 6620-7000 m, Sunda Trench 7130-7160 m, Banda Trench 7250-7290 m.

Macellicephala hadalis n. sp. (Figs. 1-3)

Material:

? Philippine Trench: St. 418, 10190 m, 1 fragm. of the anterior part of the intestine, purplish coloured. St. 419, 10160-10210 m, 1 probosc., abnormal with 3 teeth.

Banda Trench: St. 495, 7250-7290 m, 2 fragm. with prost. and probose.

Kermadec Trench: St. 649, 8210-8300 m, 41 fragm., some with a prost., and 32 probosc., one of these abnormal with 3 teeth. St. 651, 6960-7000 m, 8 fragm., some faintly purplish coloured, and 2 probosc. St. 658, 6660-6720 m, 33 spec., the largest: 62×25 mm. (Type-locality, type preserved in the Zoological Museum of the University, Copenhagen).



Fig. 1. Macellicephala hadalis n. sp. Anterior part.

Body broad and flat. 21 setigerous segments. The prostomium is deeply incised in front with two very long cone-shaped lobes, ending in a globe with a short filiform process. No eyes. A median tentacle separates the two lobes. The palps are smooth and taper from base to apex. Two pairs of tentacular cirri with basal setæ. The tentacular and dorsal cirri are also smooth and long, tapering. Ventral cirri small and filiform. Dorsal cirri inserted at a great distance from the base of the parapodium. The parapodia are elongate, the dorsal ramus small, but the ventral ramus long and cone-shaped, like the parapodia in M. abyssicola. 9 pairs of elytrophores on segments 2, 4, 5, 9, 11, 15, 17. No elytra are left in the present specimens. The dorsal ramus bears a comparatively small number of iridescent, stout setæ. They are fragile because of the large size of the internal cavity, lightly serrated on one side only and end in a blunt point. The ventral setæ are longer and extremely slender, transparent and more distinctly serrated on one side. The colour faintly purplish in some specimens, but most of them are pale, owing to the preservation.

This species must be very close to McIntosh's



Fig. 2. Macellicephala hadalis n. sp.

species M. mirabilis from New Zealand (MCINTOSH 1885 p. 121), which certainly is identical with M. violacea (Levinsen). M. mirabilis is also a deep-sea species with a very wide distribution. M. hadalis differs from M. mirabilis in the number of segments, which in M. mirabilis is 18, longer and more cone-shaped prostomial lobes, tentacular cirri with setæ, not indicated in M. mirabilis, and more strongly serrated setæ. Possibly M. hadalis occurs only in the deepest deep-sea.



Fig. 3. a. Proboscis of *Macellicephala hadalis* n. sp. b. Proboscis from the Philippine Trench.

From the Philippine Trench we have a proboscis with three teeth (fig. 3b). One of the teeth is triangular, but the two other teeth and the shape of the proboscis are just like those of *M. hadalis* (fig. 3a). Among several proboscises from the Kermadec Trench St. 649 I found one similar to the proboscis from the Philippine Trench. Uschakov (1955b) describes a new genus Macellicephaloides upon specimens from the Kurile-Kamtchatka Trench. The characters of this genus are: only three teeth, or four with two of the teeth sitting close together, and two long lateral cirri on the proboscis as in the family Alciopida. The present two proboscises have no lateral cirri, probably they have fallen off. The material is too poor to draw any conclusions, but I hope later investigations will clear up the problem.

Distribution: Kermadec Trench 6660-8300 m, ?Philippine Trench 10160-10210 m, Banda Trench 7250-7290 m.

FAM. HESIONIDAE

Ancistrosyllis constricta SOUTHERN 1921 (SOUTHERN 1921 pl. XIX fig. 1)

Ancistrosyllis constricta Southern 1921 p. 573. Ancistrosyllis constricta FAUVEL 1932 p. 64.

Material:

Banda Trench: St. 499, 6580 m, 1 spec., 11 mm, 60 setigerous segments.

Body anteriorly round, posteriorly flat. Greatest width at the anterior end, a distinct neck at short distance from the prostomium. Prostomium with





Fig. 4. *Nereis profundi* n. sp. a. Anterior part, dorsal view. b. Anterior part from the side. c. Posterior part, ventral view.

two flattened palps, fused in the median line. Each palp has a small terminal joint. Three tentacles, the median longest. No eyes. Two pairs of short tentacular cirri. Dorsal cirri of the first setigerous segment very long and tapering, at least three times as long as the ventral ones. Second setigerous segment with short dorsal cirri, no ventral cirri. An enclosed dorsal slender aciculum and posteriorly a stout sickle-shaped seta. In the anterior segments short ventral setæ among long ones, in the posterior segments only long setæ. The short setæ with coarse teeth, the long setæ are faintly serrated. Minute papillæ on the base of the dorsal cirrus.

Very close to *A. robusta* EHLERS from Great Fish Bay, SW-Africa.

Distribution: Chilka Lake, Vizagapatam (shallow water), Banda Trench 6580 m.

FAM. NEREIDAE

Nereis profundi n. sp. (Fig. 4-6)

Material:

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Banda Trench: St. 495, 7250-7290 m, 9 spec., including one complete, 7 fragments. Size of complete spec.: 69×8 mm. (Type, preserved in the Zoological Museum of the University, Copenhagen).

Body stout, tapering posteriorly. 64 setigerous segments in the only complete specimen. Prostomium short and very broad with two long biannulated tentacles. Palps long, large with long eggshaped distal joints. *No eyes of any kind; they seem to be quite blind*. Peristomium twice as large as the following segments. 4 pairs of tentacular cirri, the pos-

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Fig. 5. Parapodium from the middle part of *Nereis profundi* n. sp. Front view.

terior ones reaching the 6th setigerous segment. The proboscis was withdrawn in all the specimens. A dissection showed two strong, dark-brown jaws with 5 teeth below the main fang. Numerous strong conical paragnaths were found in the proboscis, some of them separated from their original place, but most of them arranged in the following way: group I=6, II=14, III=25, IV=27, V=2, VI, VII, VIII=asingle row of few paragnaths. These figures are perhaps not quite correct, as they were constructed on the seven specimens dissected. In none of these specimens were all the paragnaths situated in their original place, several were found flowing freely in the cavity of the proboscis. Two first pairs of setigerous segments uniramous, the following biramous with two lobes in the dorsal ramus and two fillets and one lobe in the ventral ramus (fig. 5). In the ventral ramus the posterior fillet is very short, rounded. No differences between the anterior and posterior feet. Dorsal cirri longer than the foot, ventral ones somewhat shorter. Dorsal setæ homogomph spinigerous, upper ventral setæ homogomph spinigerous and heterogomph falcigerous, lower ventral setæ heterogomph spinigerous and falcigerous. In the posterior feet dorsal homogomph falcigerous setæ are found (fig. 6). The terminal piece of these setæ is smooth. Acicula black. The last setigerous segment is rudimentary with two long cirri on each foot, following



Fig. 6. Dorsal homogomph falcigerous seta.

this a (dorsal) cirri on each side and two small anal cirri (fig. 4c).

In the literature I have found only one eyeless species of *Nereis*, *Nereis typhla* MONRO from the Discovery Investigations off South Georgia (MONRO 1930). This species is closely related to *N.eugeniae*. In *N. profundi* the arrangement of the paragnaths is quite different from the arrangement in these species, and, moreover, I cannot find any described species with a similar number of paragnaths arranged in the same way.

It must be a new species unrelated to any known species with normal eyes. Future investigations of the more shallow waters in the area may show relatives.

The specimens were found in a Pandanus fruit in the small tunnels of a boring lamellibranch.

Distribution: Banda Trench 7250-7290 m.

FAM. NEPHTHYDIDAE

Nephthys elamellata ELIASON 1951 (Fig. 7, ELIASON 1951 fig. 2)

Nephthys elamellata ELIASON 1951 p. 133.

Material:

Kermadec Trench: St. 650, 6620 m, 1 spec., 30 set. segm., 32×7 mm, post.segm. lost. St. 651, 6960-7000 m, 2 spec. and 2 fragm., 1.45×4 mm, 2.32×5 mm-33 set. segm., post. segm. lost. St. 653, 6140-6160 m, 2 spec. and 2 fragm., 1.42×4 mm, 2. 11 set. segm. post. segm. lost. St. 658, 6660-6720 m, 5 spec. and 2 fragm., 1.46×5 mm, 2.34×4 mm, 3.44×5 mm, 4.15×5 mm-13 set. segm., post. segm. lost, 5.10×4 mm-16 set. segm., post. segm. lost.

54 setigerous segments. Prostomium trapezoid, the anterior edge broadest, with four short tentacles. No eyes. The proboscis has 14 rows of papillæ. The first segment with a short ventral cirrus, similar to the tentacles, and a very small dorsal cirrus. On the following segments the dorsal cirri are short, rounded, on the caudal side of the branchiæ. The ventral cirri longer than the dorsal, pyriform. In the present specimens the first branchia appears on the 13th to 16th setigerous segments, in Eliason's specimens the first traces of branchiæ are visible on the 13th or the 11th setigerous segment. The anterior branchiæ are very small, posteriorly they attain their full size and are generally coiled inward. The chætal lobes are long and pointed. The anterior lamellæ are rudimentary, the posterior very small. The acicula ends



Fig. 7. Nephthys elamellata ELIASON. Anterior part.

in a long curved point. Setæ long and yellow, of the usual Nephthys-shape, no lyriform setæ.

Although these specimens were found many miles away from the first finds, I feel sure that it must be the same species. The feet of the present specimens are quite like ELIASON's figures.

Distribution: Azores 4255-4267 m, Canary Islands 4540-4600 m, Kermadec Trench 6140-7000 m.

FAM. EUNICIDAE SUBFAM. LUMBRICONEREINAE

Ninoë fusca Moore 1911 (Fig. 8, Moore 1911 figs. 110-118)

Ninoë fusca MOORE 1911 p. 285

Material:

Kermadec Trench: St. 650, 6620 m, 1 spec. and 4 fragm., 10×3 mm-11 set. segm., post. segm. lost. St. 651, 6960-7000 m, 1 spec. and 2 fragm., 26×4 mm-31 set. segm., post segm. lost. St. 658, 6660-6720 m, 16 spec. and 15 fragm., largest: 72×5 mm-71 set. segm., post. segm. lost.

Prostomium an equilateral triangle with rounded apex. The dorsal part of the prostomium with two long grooves from the apex to the nuchal fold. The prostomium is attached to the peristomium by a pair of folds, separated medially by a deep nuchal



Fig. 8. Ninoë fusca MOORE. Anterior part.

pit, covered by a nuchal fold of the peristomium. When this is drawn back, the posterior face of the pit is seen to bear a vertical groove lodging a small and apparently retractile papilla. First segment without setæ. The parapodia are uniramous. The anterior very small, after the 15th segment larger. They are short, thick and subcylindrical. The postsetal lip is produced into a small, erect finger-shaped cirrus. 3-4 acicula, black and stout. Setæ disposed in a supra-acicular and a sub-acicular fascicle. All are dark brown at the base, colourless distally. Anteriorly only long bilimbate, capillary setæ occur. The supra-acicular are longer than the sub-acicular. On the posterior parapodia they become shorter. About the 70th segment the hooks appear. They are stout, ending in a small head with small teeth. Mandibles white with dark lines, maxillæ dark brown. Maxillæ II each with only two large teeth. Maxillæ III each with one tooth. Maxillæ IV, large, triangular, each with a single stout tooth. Colour brown.

Distrubution: Santa Catalina Islands (Southern California) 4063 m, Kermadec Trench 6620-7000 m.

FAM. CIRRATULIDAE

Tharyx multifilis MOORE 1909 (MOORE 1909 plate IX fig. 43)

Tharyx multifilis MOORE 1909 p. 267 Tharyx multifilis MOORE 1923 p. 187 Tharyx multifilis FAUVEL 1932 p. 179 Tharyx multifilis WESENBERG-LUND 1949 p. 332 Tharyx multifilis BERKELEY 1952 p. 34

Material:

Banda Trench: St. 499, 6580 m, 3 spec., 20 mm, female with eggs, post. segm. lost, 11 mm, post. segm. lost, 10 mm, post. segm. lost. 1 fragm., 10 mm.

Prostomium a short cone, no eyes. Peristomium apodous and about twice as wide and long as the prostomium, with two partial furrows. Tentacles and branch on the first setigerous segment, in the present specimens only the base of the tentacles left, but they appear to be stouter than the branchiæ. The branchiæ arise in contact with the dorsal side of the notopodium. In the present specimens, which all have lost their posterior segments, the branchiæ occur on every segment. Setæ simple, colourless, smooth, slender capillaries, situated in small notopodial and neuropodial tubercles. The notopodial setæ are longer than the neuropodial, otherwise they are all alike.

This species must be very close to *Th. gracilis* MOORE and *Th. marioni* (SAINT-JOSEPH), as there are only very small differences between them.

Distribution: San Diego, Point Pinos 1-590 m (both California), Madras, Vancouver Islands 70 m, Banda Trench 6580 m, Iranian Gulf and Gulf of Oman 8-110 m.

FAM. CLORAEMIDAE

Ilyphagus bythincola CHAMBERLIN 1919 (Fig. 9, CHAMBERLIN 1919 plate 69 figs. 4-9)

Ilyphagus bythincola CHAMBERLIN 1919 p. 402

Material:

Sunda Trench: St. 462, 6740 m, 1 spec., 10×2 mm.

The surface of the body is densely clothed with hair-like filaments, more or less uniformly arranged, and completely cloaking the body. The setæ of the most anterior somites not specially elongate and not forming a head-cage. The prostomium with two short, stout palps. No tentacles visible. Parapodia biramous, but setigerous papillæ absent. The number of segments is small, not exceeding forty. The setæ are simple, strongly cross-striate, annulated. The dorsal setæ are finer than the ventral ones, with the annuli longer. The ventral setæ coarser, straw-coloured and narrow continously distally, being drawn out in a long, fine, straight tip. The annuli are short and strongly marked. No hairs at the tip, as in *I. hirsutus* MONRO.



Fig. 9. Ilyphagus bythincola CHAMBERLIN.

In 1937 MONRO suggests that *I. bythincola, I. pluto* from Peru, *I. ascendens* from Galapagos and his own I. hirsutus from Arabian Sea are the same species, as the differences between them are very small. This new intermediate find seems to show that he is right. *Ilyphagus bythincola* is a true abyssal species.

Distribution: W. Mexico (14°46'N 91°40'W) 3436 m, Sunda Trench 6740 m.

FAM. OPHELIIDAE

Travisia profundi CHAMBERLIN 1919 (CHAMBERLIN 1919 plate 67 figs. 1-4)

Travisia profundi CHAMBERLIN 1919 p. 387 *Travisia profundi* USCHAKOV 1955 a p. 322

Material:

Banda Trench: St. 495, 7250-7290 m, 1 spec., 28×5 mm. St. 497, 6490-6650 m, 3 spec., 34×5 - 20×5 mm. St. 499, 6580 m, 1 spec., 32×6 mm.

Body pointed at both ends, broadest anteriorly. Prostomium small, round and smooth. First setigerous segment biannular. All annuli are covered with a transverse row of low, rounded papillæ. The mouth continues as a groove anteriorly. Second setigerous segment biannular too. Third to fourteenth setigerous segments triannulate, 15th is incompletely triannulate, 16th and 17th biannular, and the remaining segments are entire, or uniannular. The branchiæ do not appear until on the third setigerous segment and occur on each one to and including the sixteenth segment. The branchiæ are short anterior, longer posteriorly, but the most caudal ones are also short. Each branchia is subfiliform, gradually narrowing distally, conically acuminate at the tip. They are strongly transversely wrinkled. The setæ occur from the second to the caudal segment. They are pale, capillary, the notopodial longer than the ventral ones. Pygidium short, conicocylindrical, by longitudinal sulci divided into ten lobes.

The present specimens have 27 setigerous segments and the branchiæ occur to and including the sixteenth, while Chamberlin indicates 26 setigerous segments and branchiæ to the fourteenth. Since the annulation and the shape of the branchiæ agree so well with CHAMBERLIN'S description, I see no use of erecting a new species on account of the number of segments. Moreover, another new record of this species from the Atlantic at 975 m shows 26 setigerous segments and branchiæ to the fourteenth. Apart from the differences in number of setigerous segments and branchiæ the specimens are quite similar.

Distribution: Off Peru (5°42'S 83°W) 4064 m, off Angola 975 m, Banda Trench 6490-7290 m., Bering Sea 4000 m.

> Kesun abyssorum Monro 1930 (Fig. 10, Monro 1930 fig. 69 a-c)

Kesun abyssorum MONRO 1930 p. 167 Kesun abyssorum Augener 1932 p. 44 Kesun abyssorum MONRO 1939 p. 133

Material:

Sunda Trench: St. 462, 6740 m, 1 spec., 8×1 mm. Kermadec Trench: St. 649, 8210-8300 m, 5 spec. and 1 fragm., largest: 14×3 mm. St. 651, 6960-7000 m, 6 spec., $21 \times 3 \cdot 15 \times 3$ mm, one has lost the post. 7 segm.

24-25 setigerous segments. A short triangular, smooth prostomium and a triannulate buccal segment. The surface of the body is granular, and each annulus is marked by a row of vesicular papillæ. No branchiæ. In the anterior part of the body the setæ are situated in two small papillæ and above and below are two large papillæ. From the 12th setigerous segment all the papillæ of the middle ring increase in size, so for the last 10 segments the bundles of setæ lie in a deep groove. The terminal segments are uniannulate. The anal cylinder with longitudinal furrows.

This form is very closely allied to *Kesun fusus* CHAMBERLIN, may possibly be the same species,



Fig. 10. Kesun abyssorum Monro.

since it only differs in the number of segments. The small specimen from the station south of Java has only 20-21 setigerous segments. This is also the case with a specimen of the same species taken by the »Galathea« off Angola, at 1470 m. As this specimen is also very small, measures only 4 mm, they are surely not outgrown, and this may be the reason for the fewer segments.

Distribution: Antarctic 300-1266 m, off Angola 1470 m, Sunda Trench 6740 m, Kermadec Trench 6960-8300 m.

Ammotrypane galatheae n. sp. (Fig. 11)

Material:

Banda Trench: St. 495, 7250-7290 m, 6 spec., one has lost the posterior 10 segments, $22-29 \times 1$ mm. (One of them is the type, preserved in the Zoological Museum of the University, Copenhagen).

30 setigerous segments. The prostomium is long, ending in a globular palpode. No eyes visible. Two big extensile nuchal organs with dark pigmental spots. Parapodia small with two tufts of long capillary setæ and a long cirriform branchia. Branchiæ on all setigerous segments except the first one. The distance between the parapodia is longer in the



Fig. 11. Ammotrypane galatheae n. sp. a. Posterior part, ventral view. b. Anterior part, dorsal view.

middle part of the body than in the anterior and posterior part. The segments 13-14 to 20 with a lateral dark line, possibly the segmental organs. No anal tube. The anus is situated ventrally without any appendages.

A.trigintae HARTMAN 1953 from the coast off Uruguay has 30 setigerous segments, but the number of branchiæ and the structures of the anal process are different.

Distribution: Banda Trench 7250-7290 m.

FAM. CAPITELLIDAE

Notomastus sp. (Fig. 12)

Material:

Kermadec Trench: St. 649, 8210-8300 m, 5 spec. and 2 fragm.

Thorax of eleven setigerous segments, with only dorsal and ventral capillary setæ. Thorax faintly tessalated, segments biannular. Prostomium large,



Fig. 12. Notomastus sp. Posterior part damaged.

with a globular tip. Peristomium achætous. Proboscis covered with numerous papillæ. The abdomens of the present specimens are so damaged, that they cannot be determined to species.

FAM. MALDANIDAE SUBFAM. EUCLYMENINAE

Maldanella harai (IZUKA) 1902 (FAUVEL 1927 fig. 64 i-n)

Clymene harai IZUKA 1902 p. 111, pl. III figs. 9-12. *Axiothea campanulata* MOORE 1903 p. 485, pl. XXVII fig. 99.

Maldanella harai FAUVEL 1914 p. 260, pl. XXIII fig. 1.

Maldanella harai FAUVEL 1927 p. 186.

Maldanella harai FAUVEL 1932 p. 203.

Maldanella harai MESNIL ET FAUVEL 1939 p. 10.

Maldanella harai Stöp-Bowitz 1948 p. 67.

Maldanella harai USCHAKOV 1950 p. 212.

Maldanella harai USCHAKOV 1955a p. 342.

Material:

Kermadec Trench: St. 650, 6620 m, 1 spec., 7 anterior set. segm., 15×4 mm. St. 658, 6660-6720 m, 48 spec., 3-7 anterior set. segm., 8 fragm. with anal-segm. and 88 fragm. from the middle region, 7 tubes.

Body cylindrical. 2 anteanal segments without setæ. Cephalic plate with a smooth rim faintly notched. Keel and nuchal groove extending on about half the length of the plate. The posterior part of the plate with faintly transversal lines. Prostomium short, round, no eyes. Anterior border of the first 7 setigerous segments with a large rim. Two kinds of dorsal setæ: stout, winged, and slender smooth capillaries. On the first segment only dorsal setæ, uncini on the following, on the second 15 uncini, on the 8th 26. They have one stout tooth and 3 small ones above. Anal funnel elongate, fringed with small equal, triangular cirri. As no specimen is complete the number of segments cannot be counted. According to other finds the number of setigerous segments should be 19.

Furthermore 10 specimens of this species was taken by the »Galathea« off West-Africa at 2690 m.

Distribution: Atlantic Ocean 2690-4700 m, Java 330-1158 m, Bay of Bengal 1154-1462 m, Lakkadive Sea 2110 m, Japan 100-146 m, Kermadec Trench 6620-6720 m, Sea of Okhotsk 220-591 m.

SUBFAM. NICOMACHINAE

? Petaloproctus cirratus Monro 1937 (Monro 1937 fig. 26)

Petaloproctus cirratus MONRO 1937 p. 311. *Petaloproctus cirratus* MESNIL ET FAUVEL 1939 p. 10.

Material:

Banda Trench: St. 494, 7280 m, 1 spec., set. segm. 2-5, 22×2 mm. St. 495, 7250-7290 m, 3 spec., 11 set. segm., 26×2 mm, 9 set. segm., 25×2 mm, set. segm. 2-6, 18×2 mm.

Prostomium and peristomium very short, together shorter than the first setigerous segment. The cephalic plate is oblique, rounded in front and with a prominent long keel. Two divergent nuchal organs and several transversal folds. The anterior 7 setigerous segments with a white thick collar in front of the setæ. Dorsal setæ of three kinds: 1, smooth bilimbate capillary setæ, 2, narrowly bordered setæ with barbed tips, 3, long barbed setæ. 4-7 straight ventral hooks with obtuse tips at the first three setigerous segments. The uncini in the following segments with one big tooth and three smaller ones above. Beside the small teeth a number of small denticles. Long subrostral barbules.

As no anal plate is present in the material the specimens cannot be determined with certainty, but the anterior part and the setæ is very similar to the description and figures of *P. cirratus* MONRO. Moreover, this species was found in the same area by the Siboga and at great depths in the Indian Ocean.

Distribution: South Arabian Coast 1046 m, Indonesia 36-472 m, Banda Trench 7250-7290 m.

FAM. OWENIIDAE

Myriochele sp.

Material:

Kermadec Trench: St. 649, 8210-8300 m, 30 fragm., 38 tubes. St. 650, 6620 m, 6 tubes. St. 653, 6140-6160 m, 1 fragm. and 1 tube.

Only fragments from the middle part of the body present. Dorsal setæ capillary, with small spines. Ventral parapodia with numerous uncini in several rows. The uncini with a long shaft and two small teeth. Tubes like the tubes of *Myriochele heeri* MALMGREN.



Fig. 13. Owenia lobopygidiata USCHAKOV. Posterior part.

? Owenia lobopygidiata USCHAKOV 1950 (Fig. 13)

Owenia lobopygidiata USCHAKOV 1950, p. 214, fig. 31. Owenia lobopygidiata USCHAKOV 1955a. p. 347, fig. 128 E-J.

Material:

Banda Trench: St. 497, 6490-6650 m, many fragments and tubes. St. 499, 6580 m, 1 spec., 29 post segm., 5 fragm.

Dark brown, with white parapodia. Dorsal setæ long, capillary, changing colour from red to green and blue. Ventral parapodia like other Oweniidæspecies with numerous, long-shafted uncini with two small teeth, very similar to those of Myriochele heeri Malmgren. 9 short, finger-shaped papillæ in one row round the anus. Tubus with thick sandy walls, dark brown, diameter: 2-4 mm.

USCHAKOV (1950) describes a new Owenia-species which is distinguished from *Owenia fusiformis* DELLE CHIAJE by having no eyes. This species has fingershaped papillæ round the anus and I think it must be the same species as that from the Galathea-Expedition, although the anterior part of this is absent. Distribution: Banda Trench 6490-6650 m, Sea

of Okhotsk 110-1366 m.

FAM. AMPHARETIDAE

Gen. et sp.?

Material:

Kermadec Trench: St. 658, 6660-6720 m, 1 spec., $13 \times 1^{1/2}$ mm, 1 fragm. and 1 tube.

14 thoracic setigerous segments. Uncinigerous pinnules commencing on the 3th setigerous segment. First two feet with a very small tuft of setæ. Palæ absent. Gills absent, but there seems to be three or four pairs in two crowded groups, separated in the middle. 13 abdominal uncinigerous segments. Two anal cirri. Capillary setæ faintly winged, uncini with two rows of teeth, 4-5 teeth in each row.

The anterior part of the only complete specimen is so damaged that a closer determination is impossible.

Gen. et sp.?

Material:

Sunda Trench: St. 465, 6930-7000 m, 1 fragm. with 11 set. segm.

Only eleven setigerous segments from the thoracic region present. Capillary setæ faintly winged, uncini with one row of 6 long teeth.

FAM. TEREBELLIDAE SUBFAM. CANEPHORINAE

Terebellides eurystethus CHAMBERLIN 1919 (CHAMBERLIN 1919 plate 80 figs. 7-15)

Terebellides eurystethus CHAMBERLIN 1919 p. 438.

Material:

Kermadec Trench: St. 658, 6660-6720 m, 1 spec., thorax with a few abdominal segm., 14×2 mm.

Thorax with 18 setigerous segments. The prostomium is a prominent lobe which widens anteriorly like the end of a trumpet, the anterior end being broad and flat, with the edge wavy or folded. The branchia has nearly the general form and proportions as in T. stroemi. The first notopodia are short and rounded, the others are longer. The pinnulæ of the abdomen are prominent. The capillary setæ begin on the third segment, they are coarser than in T. stroemi, and the wing of one side is much wider. On the sixth setigerous segment the usual unidental, acicular ventral setæ. The thoracic uncini on the following 12 segments. They have the long, distally somewhat curved stalk, the fang is scarcely curved, its distal upper edge is convex, its lower one straight. Four or five slender teeth above the fang. The projecting caudal region of the crown is higher and less widely rounded than is usual in T. stroemi. The abdominal uncini have the usual short broad base.

The crown of smaller teeth usually bends about the base of the large tooth in a series of six or seven teeth.

This species must be very close to *Terebellides* stroemi, maybe they are conspecific. I hope that later investigations on a larger material will clear up the problem.

Distributions: S. of Panama (6°21'N 80°49' W) 1410 m, off Peru (11°55'S 81°20'W) 4750 m, Kermadec Trench 6660-6720 m.

FAM. SABELLIDAE SUBFAM. FABRICINAE

Jasmineira sp.

Material:

Banda Trench: St. 494, 7280 m, 2 spec., one with branchiæ and 4 set. segm., $4 \times 1/_2$ mm, one without branchiæ and 7 set. segm., $3 \times 1/_2$ mm, 1 abdominal fragm. with 15 set. segm., $5 \times 1/_2$ mm, 2 small fragm. and 3 branchial-crowns, some small tube-fragments.

Kermadec Trench: St. 649, 8210-8300 m, 2 fragm. of one specimen. St. 650, 6620 m, 2 fragm. of one specimen, 2 fragm. of branchiæ, some tubes of fine clay.

The branchial-filaments are free, without an interbranchial membrane. Collar high and dorsally extending backwards as two separate folds. First setigerous segments with dorsal capillary setæ only. The following thoracic segments with two kinds of setæ, some dorsal narrowly lanceolate and some spatulate. Thoracic uncini with a long shaft, one big tooth and many small above. Abdominal capillary setæ very slender, uncini avicular.

The setæ are very similar to the setæ of *Jasmineira* elegans SAINT-JOSEPH from the Atlantic, which, according to MESNIL ET FAUVEL 1939 p. 29, is possibly identic with *J.ecaudata* MOORE 1923 from California and Indonesia.

The present material is in a too poor condition to make a closer determination, but the setæ of the fragments from the Kermadec and Banda Trench are alike.

FAM. SERPULIDAE

Gen. et sp.?

Material:

Kermadec Trench: St. 650, 6620 m, 1 fragm. of the post. segm., 2 mm long, 5 tubes, largest: 14×1 mm.

Only very few and very small setæ present. Some of them hair-shaped and some are faintly winged with serrated edge. Tubes calcareous of the usual shape, not coiled.

Zoogeographical Summary

Since this paper only forms part of a study of the deep-sea Polychætes, obtained during the cruise of H. M. S. »Galathea« 1950-52, I think it premature to draw further conclusions about the zoogeography. In a later publication dealing with all the Polychætes taken by »Galathea« at depths from 400 to 6000 m I hope that it will be possible to say more about the distribution of Polychætes in the deep-sea.

Although only fifteen determinable species of Polychætes have been dealt with in the present paper some conclusions could nevertheless be drawn now about the Polychæte-fauna at great depths.

Ten of the species seem to be really abyssal, they have until now only been taken at depths at which the temperature is below 4° C (see table 1). Among these are two, *Macellicephala abyssicola* and *Kesun abyssorum*, distributed in all three oceans, they are cosmopolitan species. Of *Nephthys elamellata* and *Travisia profundi* we have records from the Atlantic and the Pacific and of *Ilyphagus bythincola* from the Pacific and the Indian Ocean. I am sure that further investigations will show that these species too have a wide distibution in all three oceans. Maybe this will also be the case with *Ninoë fusca* and *Terebellides eurystethus*, which at the present are only known from the Pacific area.

The remaining three abyssal species, Macellicephala hadalis, Nereis profundi, and Ammotrypane galatheae, are all new to science. M. hadalis was found in three trenches, but the other two species were taken in the Banda Trench. Is it possible that these three species are representatives of a special trenchfauna? The latest publication by USCHAKOV on the Aphroditidæ from the Kurile-Kamtchatka Trench (USCHAKOV 1955b) is in agreement with this theory. Of five species taken at depths greater than 6000 m four are new to science, they are only taken below 6000 m, and only in this trench. The remaining *Macellicephala mirabilis* is a cosmopolitan, eurybathic and eurythermic species.

Five of the fifteen species found in the trenches are eurybathic and eurythermal. These species are Maldanella harai, Ancistrosyllis constricta, Tharyx multifilis, Petaloproctus cirratus, and Owenia lobopvgidiata. Maldanella harai is a thrue cosmopolitan species, distributed all over the world from 36 m in the tropics with high temperatures down to 6720 m in the Kermadec Trench with very low temperatures (1°.3 C). Tharys multifilis is found in shallow water at the western coast of N. America and down to 6580 m in the Banda Trench. It is only known from the Pacific and the Indian Ocean, but a very closely connected species, Th. marioni (SAINT-JOSEF), occurs in the Atlantic. This is also the case with Ancistrosyllis constricta, which is found at high temperatures at the eastern coast of India and down to 6580 m in the Banda Trench. A. constricta has a nearly related form in the Atlantic, A. robusta Ehlers. It is interesting to read in Southerns description from Chilka Lake (Southern 1921, p. 571) that Ancistrosyllis constricta of all the Polychætes in the lake was the species, »which can endure the greatest range of conditions.«

To summarize, it seems to me at present that the deep-sea Polychæte-fauna consists of three elements:

1. Eurybathic and eurythermic species, many of them, maybe all, cosmopolitan.

2. Eurybathic and stenothermic species with a world-wide distribution, living at temperatures below c. 4° C.

3. Stenobathic and stenothermic species, a special hadal fauna.

No. of records - 0 \sim \sim \sim WESENBERG-LUND 1949:332 MOORE 1909:267, 1923:187 WESENBERG-LUND 1950:9 USCHAKOV 1950:156 McINTOSH 1885:121 SOUTHERN 1921:573 DITLEVSEN 1937:15 McINTOSH 1904:59 AUGENER 1932:102 Author ELIASON 1951:132 BERKELEY 1952:34 ELIASON 1951:133 FAUVEL 1932:179 Monro 1936:100 LEVINSEN 1887:4 WIREN 1907:287 FAUVEL 1932:64 MOORE 1911:285 FAUVEL 1914:41 FAUVEL 1914:39 Other records N. of New Zealand S. of the Canaries Sea of Okhotsk W. of Canaries South Georgia Bay of Bengal Off Vancouver NE of Iceland W. of Azores-Off California Bay of Biscay Off California W. of Greenl. Iranian Gulf Locality E. of Greenl. Off Madras S. of Africa Off Azores Kara Sea Ind. Pac. Pac. Atl. Pac. Pac. Ind. Pac. Atl. Atl. nsəəO I I I 1 1 1 I i 1 Bottom C°, qm9, °C 18-24 2.8 2.4 $\div 0.5$; ?--6 1.7 2.4 \$ \$ c. c. Depth in m 699-1090 4255-4872 4255-4600 1-590 ? 8-110 155-178 200-300 4380 733 1366 Shallow 900 13 70 1095 1260 4060 90 water Kurile-Kamtch. Trench N. of Puerto Rico Kermadec Trench Philippine Trench Kermadec Trench Kermadec Trench Kermadec Trench Locality Banda Trench Banda Trench Sunda Trench Banda Trench Banda Trench Banda Trench Records beyond 6000 m Pac. Ind. Atl. Pac. .3-1.6 Pac. Pac. -1 1 I 1 I ļ Ocean 1 1 1.2 - 1.31.5 1.3 2.6 3.6 3.6 O°.qmoT 3.6 3.5 1.3 3.5 ŝ \$ **~**.. <u>~</u>. ~ ~ ¢. Bottom 0160-10210 6140-7000 6660-8300 7130-7160 7250-7290 7250-7290 7630-7900 8100-9950 7250-7290 6620-7000 6620-7000 7210-7320 7210-7230 7210-8430 Depth in m 6580 8100 8100 6580 8100 Macellicephala zenkevitchi Uschakov Macellicephaloides grandicirra Usch. Lumbriconereis sp. (Uschakov 1952) Macellicephaloides verrucosa Usch. Macellicephala mirabilis McIntosh Ancistrosyllis constricta Southern Macellicephala abyssicola Fauvel Macellicephala sp. (Eliason 1951) Macellicephaloides vitiazi Usch. ł Macellicephala hadalis n.sp. Nephthys elamellata Eliason Vitiazia dogieli Uschakov Tharyx multifilis Moore 1 Species Nereis profundi n.sp. 1 I Ninoë fusca Moore 1 Phyllodocidæ Aphroditidæ Cirratulidæ Nephtydidæ Hesionidæ Eunicidæ Nereidæ 1

List of Polychaetes from depths greater than 6000 m

< # 10		. .	G 1 m 1					C 4040 400	
6740	1.5	Ind.	Sunda Trench	3436	1.8	Pac.	Off W. Mexico	CHAMBERLIN 1919:402	1
64907290	3.5-3.6	Pac.	Banda Trench	4064	1.9	Pac.	Off Peru	CHAMBERLIN 1919:387	1
				4000	?		Bering Sea	Uschakov 1955 а:322	1
				975	4.2	Atl.	Off Angola	KIRKEGAARD (unpubl.)	1
6960-8300	1.3-1.6		Kermadec Trench	1080	$\div 1.3$		Antarctic	Monro 1930:167	1
6740	1.5	Ind.	Sunda Trench	750	?	-	-	AUGENER 1932:44	1
				300-1266	?	Ind.	filmat	Monro 1939:133	2
				1470	3.8	Atl.	Off Angola	Kirkegaard (unpubl.)	1
7250-7290	3.6	Pac.	Banda Trench						
8210-8300	1.6		Kermadec Trench						
66206720	1.3		Kermadec Trench	146	c.15	Pac.	South of Japan	Izuka 1902:111	1
				100-119	?			Moore 1903:485	1
				4380	2.8	Atl.	Bay of Biscay	Fauvel 1914:260	1
				1154-2110	?-2.2	Ind.	Bay of Bengal	- 1932:203	2
				330-1158	c.9-?	Pac.	Indonesia	Mesnil et Fauvrl 1939:10	2
				4700	2.1	Atl.	Bay of Biscay	STØP-BOWITZ 1948:67	1
				220-591	?	Pac.	Sea of Okhotsk	USCHAKOV 1950:212	3
				2690	2.6	Atl.	Off Angola	KIRKEGAARD (unpubl.)	1
72507290	3.6	Pac.	Banda Trench	1046	c.9	Ind.	South Arabia	Monro 1937:311	1
				36-472	?-c.9	Pac.	N. of Celebes	Mesnil et Fauvel 1939:10	2
								n	
6140-8300	1.2-1.6	Pac.	Kermadec Trench						
64906650	3.5	-	Banda Trench	110-1366	?	Pac.	Sea of Okhotsk	Uschakov 1950:214	1
8100	2	Pag	Kurile-Kamtch Tranch	88 1266	9	Dag	See of Okhatek	LISCHAROV 1950-221	1
6100	12	r ac. Doc	Kurne-Kanten, Henen	00-1300	1	гас.	Sea of Oknotsk	USCHAKUV 1930:221	1
6930 7000	1.5	rac. Ind	Sunda Trench						
000/-000	1.3	ma.	Sunua TICHCII						
66606720	1.3	Pac.	Kermadec Trench	1410	3.3	Pac.	S. of Panama	CHAMBERLIN 1919:438	1
				4750	1.7	Average 1	Off Peru	- 1919:438	1
66208300	1.3-1.6	Pac.	Kermadec Trench						
7280	3.6	-	Banda Trench						
8100	?	-	Kurile-Kamtch. Trench						
	6740 6490-7290 6960-8300 6740 7250-7290 8210-8300 6620-6720 6140-8300 6490-6650 8100 6660-6720 6660-6720 6660-6720 6660-6720	6740 1.5 6490-7290 3.5-3.6 6960-8300 1.3-1.6 6740 1.3-1.6 7250-7290 3.6 8210-8300 1.6 6620-6720 1.3 7250-7290 3.6 8210-8300 1.6 6620-6720 1.3 6140-8300 1.2-1.6 6490-6650 3.5 8100 ? 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3 6660-6720 1.3	6740 1.5 Ind. 6490-7290 3.5-3.6 Pac. 6960-8300 1.3-1.6 - 7250-7290 3.6 Pac. 8210-8300 1.6 - 6620-6720 1.3 - 7250-7290 3.6 Pac. 6620-6720 1.3 - 7250-7290 3.6 Pac. 6620-6720 1.3 Pac. 8100 ? Pac. 6660-6720 1.3 Pac. 8100 ? Pac. 6660-6720 1.3 Pac. 6660-6720 1.3 Pac. 6660-6720 1.3 Pac. 8100 ? Pac. 6660-6720 1.3 Pac. 6660-6720 1.3 Pac. 6660-6720 1.3 Pac. 6660-6720 1.3 Pac. 7280 3.6 - 8100 ? -	6740 1.5 Ind. Sunda Trench 6490-7290 3.5-3.6 Pac. Banda Trench 6960-8300 1.3-1.6 - Kermadec Trench 6740 1.5 Ind. Sunda Trench 7250-7290 3.6 Pac. Banda Trench 8210-8300 1.6 - Kermadec Trench 6620-6720 1.3 - Kermadec Trench 6620-6720 3.6 Pac. Banda Trench 7250-7290 3.6 Pac. Banda Trench 6140-8300 1.2-1.6 Pac. Kermadec Trench 6140-8300 1.2-1.5 Pac. Kermadec Trench 8100 ? Pac. Kurile-Kamtch. Trench 6660-6720 1.3 Pac. Kurile-Kamtch. Trench 6660-6720 1.3 Pac. Kermadec Trench 8100 ? Pac. Kermadec Trench <	6740 1.5 Ind. Sunda Trench 3436 6490-7290 3.5-3.6 Pac. Banda Trench 4064 4000 975 6960-8300 1.3-1.6 - Kermadec Trench 1080 750 300-1266 6740 1.5 Ind. Sunda Trench 1080 750 300-1266 7250-7290 3.6 Pac. Banda Trench 146 100-119 4380 8210-8300 1.6 - Kermadec Trench 146 100-119 4380 7250-7290 3.6 Pac. Kermadec Trench 146 100-119 4380 7250-7290 3.6 Pac. Kermadec Trench 146 104 330-1158 4700 7250-7290 3.6 Pac. Kermadec Trench 146 36-472 6140-8300 1.2-1.6 Pac. Kermadec Trench 88-1366 6660-6720 1.3 Pac. Kurile-Kamtch. Trench 88-1366 6660-6720 1.3 Pac. Kermadec Trench 1410 4750 6660-6720 1.3 Pac. Kermadec Trench 1410 4750 6660-6720 1.3 Pac. Kermadec Trench 88-1366 6660-6720 1.3	6740 1.5 Ind. Sunda Trench 3436 1.8 6490-7290 3.5-3.6 Pac. Banda Trench 4064 1.9 6960-8300 1.3-1.6 - Kermadec Trench 1080 ÷1.3 6740 1.5 Ind. Sunda Trench 1080 ÷1.3 6740 1.5 Ind. Sunda Trench 1080 ÷1.3 7250-7290 3.6 Pac. Banda Trench 146 c.15 8210-8300 1.6 - Kermadec Trench 146 c.15 6620-6720 1.3 - Kermadec Trench 146 c.15 6620-6720 1.3 - Kermadec Trench 146 c.15 100-119 ? 4380 2.8 1154-2110 ?-2.2 30-158 c.9-? 4700 2.1 20-591 ? 7250-7290 3.6 Pac. Kermadec Trench 1046 c.9 6140-8300 1.2-1.6 Pac. Kermadec Trench 10-1366 ? 6490-6650 3.5 - Banda Trench<	6740 1.5 Ind. Sunda Trench 3436 1.8 Pac. 6490-7290 3.5-3.6 Pac. Banda Trench 4064 1.9 Pac. 6960-8300 1.3-1.6 - Kermadec Trench 1080 1.3 - 6740 1.5 Ind. Sunda Trench 1080 1.3 - 750 ? - - 750 ? - 7250-7290 3.6 Pac. Banda Trench 146 c.15 Pac. 8210-8300 1.6 - Kermadec Trench 146 c.15 Pac. 6620-6720 1.3 - Kermadec Trench 146 c.15 Pac. 7250-7290 3.6 Pac. Banda Trench 1154-2110 ?-2.2 Ind. 7250-7290 3.6 Pac. Banda Trench 100-119 ? Pac. 6140-8300 1.2-1.6 Pac. Kermadec Trench 1046 c.9 Pac. 6490-6500 3.5 - Banda Trench 110-1366 ? Pac.	6740 1.5 Ind. Sunda Trench 3436 1.8 Pac. Off W. Mexico 6490-7290 3.5-3.6 Pac. Banda Trench 4064 1.9 Pac. Off Peru 6900-8300 1.3-1.6 - Kermadec Trench 1080 *1.3 - Antarctic 6740 1.5 Ind. Sunda Trench 1080 *1.3 - Antarctic 7250-7290 3.6 Pac. Banda Trench 1470 3.8 Atl. Off Angola 7250-7290 3.6 Pac. Banda Trench 146 c.15 Pac. South of Japan 100-119 ? - - - - - - 6620-6720 1.3 - Kermadec Trench 146 c.15 Pac. South of Japan 100-119 ? - - - - - - - - - - - - - - - - - - - - - - - - - - <td< td=""><td>6740 1.5 Ind. Sunda Trench 3436 1.8 Pac. Off W. Mexico Симменли 1919:402 6490-7290 3.5-3.6 Pac. Banda Trench 4064 1.9 Pac. Off Peru Off Peru Chanmentum 1919:387 6960-8300 1.3-1.6 - Kermadee Trench 75 4.2 Atl. Off Angola Chanmentum 1919:387 6760 1.5 I.6 - Kermadee Trench 750 7 - - - - Morko 1930:167 7250-7290 3.6 Pac. Banda Trench 3.8 Adl. Off Angola KirkEGAARD (unpubL) 7250-7290 3.6 Pac. Banda Trench 146 c.15 Pac. South of Japan Izuka 1902:111 Moore 1939:133 7250-7290 1.6 - Kermadee Trench 146 c.15 Pac. South of Japan Izuka 1902:111 Moore 1939:103 Strot-Novr 1941:260 - 14309 2.20-591 7 Pac. Atl. Bay of Biscay <td< td=""></td<></td></td<>	6740 1.5 Ind. Sunda Trench 3436 1.8 Pac. Off W. Mexico Симменли 1919:402 6490-7290 3.5-3.6 Pac. Banda Trench 4064 1.9 Pac. Off Peru Off Peru Chanmentum 1919:387 6960-8300 1.3-1.6 - Kermadee Trench 75 4.2 Atl. Off Angola Chanmentum 1919:387 6760 1.5 I.6 - Kermadee Trench 750 7 - - - - Morko 1930:167 7250-7290 3.6 Pac. Banda Trench 3.8 Adl. Off Angola KirkEGAARD (unpubL) 7250-7290 3.6 Pac. Banda Trench 146 c.15 Pac. South of Japan Izuka 1902:111 Moore 1939:133 7250-7290 1.6 - Kermadee Trench 146 c.15 Pac. South of Japan Izuka 1902:111 Moore 1939:103 Strot-Novr 1941:260 - 14309 2.20-591 7 Pac. Atl. Bay of Biscay <td< td=""></td<>

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