# DIAGNOSES OF NEW SPECIES

OF MACRUROUS DECAPOD CRUSTACEA FROM THE ,,SIBOGA-EXPEDITION"

BY

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## IV 1)

This paper contains the diagnoses of 15 new Species and of 8 new Varieties, all belonging to the genera Alpheus Fabr. and Synalpheus Sp. Bate. The Macrura, collected by the "Siboga-Expedition", are at present at Ierseke, but will be transferred to the Zoological Museum of the University of Amsterdam, as soon as they have been worked out.

1. Alpheus malleodigitus (Sp. Bate), var. gracilicarpus, n.

Station 66. Bank between islands of Bahuluwang and Tambolungan, South of Saleyer. Depth 8 to 10 M.

Station 93. Pulu Sanguisiapo, Tawi-Tawi-islands, Sulu archipelago. Depth 12 M.

Station 99. Lat. 6° 7′. 5 N., long. 120° 26′ E. Anchorage off North-Ubian. Depth 16—23 M.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa-Besi and the N.-E. point of Timor. Depth 27—54 M.

<sup>1)</sup> The first Part, containing the diagnoses of 28 new Species and of 1 new Variety, was published in 1905 in the "Tijdschrift der Ned. Dierk. Vereen." (2) T. IX, pp. 587—614, the second Part with 19 new Species and 1 new Variety in 1907 in the "Notes from the Leyden Museum," vol. XXIX, pp. 127—147, the third Part with 11 new Species and 2 new Varieties in 1908 in the same, Vol. XXX, p. 98—112.

This variety differs from the typical species by the carpal joints of the longer 2nd leg presenting a more slender shape and by the carpus of the 3rd (and 4th) legs appearing also a little more slender and longer with regard to the propodite. So e. g. the 4th carpal segment of the longer leg appears 5—5,6-times as long as thick, in the typical species, however, 3,4—3,9-times. Meropodite of 3rd legs 4,3—4,5-times longer than wide, in the typical form 3,7—4-times; carpus 5,6—5,8-times as long as thick in the middle, in the typical species 4,4—5-times; carpus 1,33—1,35-times longer than the propodite, in the typical species 1,25-times.

## 2. Alpheus Arethusa, n. sp.

Station 60. Haingsisi, Samau Island, Timor. Depth 36 M.

A new species of the group "crinitus" s. s., closely allied to A. styliceps Cout. Frontal margin as in this species, but the rostrum much less prominent and, at either side of it, the frontal margin somewhat less oblique; interorbital carina narrow, continued almost to the middle of the carapace and separated by shallow grooves, wider than in A. styliceps, from the orbital hoods. In the male the pleura of the 1th—4th abdominal somites are spiniform, those of the two following acute, posterior margin of 6th somite with acute tooth in the middle and with another also acute, but twice as large, at the outer angles. Telson in the male 3,5, in the female 3,7-times as long as the a little prominent, posterior margin is wide, greatest width in proportion to the posterior margin as 11:6.

Antennal and antennular peduncles as in A. styliceps, but the stylocerite a little shorter and the narrow scale of scaphocerite reaching to the extremity of median antennular article.

Large chela as in A. ovaliceps Cout., small chela as in A. styliceps, but the fingers slightly shorter, the fingers being in proportion to the palm, in the male as 4:3, in the female as 14:11.

Second legs nearly as in A. styliceps. Meropodite of 3rd legs in the male 3,9-times, in the female 4,1-times as long as wide in the middle, with a tolerably strong, acute tooth at the distal

extremity of the posterior margin; carpus stout, in the male 2,7-times, in the female 2,8-times as long as thick, its posterior margin with one or two small spinules in the middle and with an acute tooth at the extremity; propodite 4-times as long as wide, longer than the carpus, the proportion being 1,42 in the male, 1,43 in the female; dactylus one fourth the propodite, with a small, accessory claw on the posterior margin.

Fourth legs nearly as the 3rd, but the meropodite unarmed. Eggs large, few in number.

Length 10 m.m.

## 3. Alpheus Eulimene, n. sp.

Station 154. Lat. 0° 7'. 2 N., long. 130° 25'. 5 E. Depth 83 M.

Closely related to A. Arethusa, but distinguished by the following. At each side of the rostrum, that is as short as in that species, the frontal margin runs transversely outward and, as in A. superciliaris Cout., is separated by a distinct emargination from the rounded orbital hoods. Posterior margin of the pleura of 1st abdominal somite terminating in a spiniform, though obtuse process, curved foreward, pleura of the following rounded, posterior margin of 6th somite with an acute tooth at the outer angles, as in A. Arethusa, but presenting no trace of the median tooth. Telson as in A. Arethusa, but the anterior pair of spinules twice as far distant from the posterior margin as from the anterior, posterior pair almost one and a half as far distant from the posterior margin as from the anterior pair.

Antennal and antennular peduncles as in A. Arethusa, but the scale of the scaphocerite even shorter than in A. styliceps, extending only to the 2nd third part of the median antennular joint.

Larger chela as in A. Arethusa, ovoid, almost 2,5-times as long as high and almost as thick as high, but the fingers shorter, the length of the dactylus being not yet one third the whole length. Small chela as in A. styliceps, the length of the palm being, however, in proportion to the length of the fingers as 10:13; palm one and a half as long as high.

Following legs as in A. Arethusa, but there are no spinules on the posterior border of the carpus of 3rd and 4th legs and the dactyli are simple, without accessory claw.

The only collected specimen, probably a young female, is 8 m.m. long.

## 4. Alpheus parvus, n. sp.

Station 133. Anchorage off Lirung, Salibabu island. Depth 36 M.

A new species of very small size, apparently belonging to the group "crinitus" s. s., Cout., closely related to A. crinitus Dana and A. clypeatus Cout.

Rostrum acute, projecting horizontally foreward to the distal fourth of the visible part of 1st antennular article; anteriorly, as far as the middle of the eyes, the rostral carina is strongly compressed, sharp, posteriorly it is obtuse and continued to the posterior third of the carapace. Frontal margin transverse, orbital hoods rounded, unarmed. Telson as in A. clypeatus, but more strongly narrowing backward, the length of the telson equalling 4,54-times its posterior margin.

Antennal and antennular stalks as in A. clypeatus, but 2nd antennular article only one fourth longer than the visible part of the 1st, which is but little longer than the 3rd, and the scale of the scaphocerite narrow and reaching to the extremity of antennular peduncle.

Meropodite of smaller chelipede of female 3-times longer than wide, infero-internal margin with a strong, slender, apical tooth, upper margin unarmed. Chela half as long as the carapace, almost 4-times as long as high, fingers hardly shorter than the palm.

Second segment of carpus of 2nd legs 1,28-times longer than the 1st, the 1st one and a half as long as the 5th, 3rd and 4th segments of equal length.

Meropodite of 3rd legs 4,5-times longer than wide in the middle, armed, like that of 4th legs, with a strong, acute, apical tooth; propodite of 3rd legs one fourth longer than the carpus, the posterior border of which terminates in an acute tooth, but that is

for the rest unarmed. Dactylus simple, two fifths of the propodite and half as long as the carpus.

Eggs few in number, ovoid, large, 0,76-0,78 m.m. long. Length of ova-bearing female 11,5 m.m.

## 5. Alpheus Philoctetes, n. sp.

Station 240. Banda. Depth 9-36 M.

A new species closely related to A. Lanceloti Cout. and probably also pertaining to the group "insignis" Cout.: it remained uncertain, because the larger chelipede is wanting in the single specimen collected.

Rostrum acute, projecting straight foreward almost to the extremity of 1st antennular article, interorbital carina rather sharp anteriorly, like the rostrum, but obtuse posteriorly and, gradually widening, extending to the base of the rounded, unarmed, orbital hoods, from which it is separated by narrow grooves. Telson as in A. Lanceloti, its posterior margin armed with a dozen of movable spinules between the inner spines at the outer angles, which spines are as long as in A. Lanceloti.

Second antennular article almost twice as long as thick, one fifth longer than the visible part of 1st, 3rd article a little shorter than the 1st; stylocerite just exceeding 1st article. Carpocerite as long as antennular peduncle, not longer, spine on the basicerite and scaphocerite as in A. Lanceloti.

Meropodite of smaller chelipede 3,5-times longer than wide, upper margin unarmed, infero-internal margin with 4 movable spinules and a rudimentary tooth at the extremity. Small chela as in A. Lanceloti.

Second legs very slender, more slender than those of A. Miersi, 2,2-times longer than the carapace, rostrum included; meropodite 14-times longer than wide; 2nd segment of carpus one and a half as long as the 1st, 4th segment one and a half as long as the 5th, 3rd half as long as 2nd and a little longer than 5th; chela as long as 1st segment, fingers almost one and a half as

long as the palm. Second carpal segment 8-times, 3rd 4-times as long as thick.

Ischium-joint of 3rd and 4th legs with movable spine; meropodite of these legs 5-times longer than wide, their posterior margin with a small, acute tooth at distal extremity and armed moreover with 4, respectively 3 small, movable spinules as in A. Lanceloti; propodite of 3rd legs 6-times longer than wide, 1,25-times longer than the slender, unarmed carpus, which is 4-times as long as thick distally; propodite with 6 pairs of spinules, dactylus two fifths of the propodite, half as long as the carpus, simple.

Length of single, probably young specimen, 14 m.m.

6. Alpheus acutocarinatus, n. sp.

Station 2. Lat. 7° 25' S., long. 113° 16' E. Madura-strait Depth 56 M.

Station 19. Lat. 8° 44'. 5 S., long. 116° 2'. 5 E. Bay of Labuan Tring, west coast of Lombok. Depth 18—27 M.

Station 116. Lat. 0° 58′. 5 N., long. 122° 42′. 5 E. West of Kwandang-bay-entrance. Depth 72 M.

Station 311. Sapeh-bay, East coast of Sumbawa. Depth up to 36 M.

A new species of the group "brevirostris", related to A. macrosceles Alc. and Anders. and to A. Talismani Cout. Carapace half a long as abdomen, integument smooth and polished. Rostrum acute, narrow, reaching to the middle or to the distal third of the visible part of 1st antennular article, continued in a prominent and sharp carina, that extends almost to the posterior third of the carapace and that is separated from the rounded, unarmed, orbital hoods by narrow, deep grooves; immediately behind the orbital hoods the rostral carina bears a small, obtuse tubercle or tooth. Interorbital part of rostral carina concave, concealed, in a lateral view, by the orbital hoods.

Telson half as long as carapace, twice as long as its greatest width, tapering rather strongly and presenting therefore an elongate shape, the posterior margin, that is very prominent and

strongly arcuate, being half as wide as the width at the base.

Second antennular article slender, almost twice as long as the visible part of the 1st and 3 times longer than the 3rd joint. Carpocerite hardly reaching to the extremity of median antennular article; scaphocerite slender, a little shorter than antennular peduncle, terminal spine as in A. macrosceles, hardly exceeding the obtuse extremity of the scale.

Thoracic legs as in A. macrosceles. Meropodite of larger chelipede of the male 6-times longer than wide, without a spine near the far end of upper margin; chela slender, twice as long as the meropodite and 6-times longer than high, palm slightly compressed, upper and lower border entire; fingers slender, their length a little more than one third that of the chela and three fifths of the palm.

Small chela of the male 9-times longer than high, palm a little longer than the fingers that are more slender than those of the large chela and the dactylus of which is *Balaeniceps*-shaped. The slender fingers of the small chela of the female are slightly longer than the palm and simple.

Second segment of carpus of 2nd legs a little longer than 1st, 3rd—5th segments subequal, the 4th usually slightly longer than the two others.

Meropodites of 3rd and 4th legs unarmed, those of 3rd pair 10-times longer than wide; propodite tapering, its length two thirds that of the meropodite, dactylus lanceolate, depressed, its length a little more than one third that of the propodite.

Length of adult male 28 m.m., of ovigerous female 23-25 m.m.

## 7. Alpheus pareuchirus Cout., var. Leucothea n.

Station 2. Lat. 7° 25' S., long. 113° 16' E. Madura-Strait. Depth 56 M.

Station 49a. Lat. 8° 23′. 5 S., long. 119° 4′. 6 E. Sapeh-Strait. Depth 70 M.

Station 86. Anchorage off Dongala, Palos-bay, Celebes. Depth 36 M. Station 96. South-east side of Pearl-bank. Sulu-archipelago. Depth 15 M.

Size much larger than that of the typical species, the male 16,5 m.m. long, the female 18,5 m.m. Stylocerite just exceeding 1st antennular article, scale of scaphocerite extending to the extremity of antennular peduncle. Frontal margin at either side of the rostrum straight, transverse.

Large chela of adult male a little higher, proportion between the whole length and height of palm 2,65. Triangular groove on the inner side of the palm as deep and as well developed as that on the outer side, the lower border of that groove slightly sinuous, not coloured, the groove somewhat hairy; both grooves reach farther downward than in the typical species. In the female and in younger specimens this chela is almost or just 3-times longer than high.

Smaller chela 4-times as long as high, both in the male and in the female. In the male the fingers are a little shorter than the palm, upper border of the palm distinctly notched, both the outer and the inner groove well developed, lower border a little sinuous; dactylus Balaeniceps-shaped. In the female the fingers are slightly longer than the palm, the latter without grooves or notches, dactylus simple.

Second segment of carpus of 2nd legs a little shorter than 1st, the segments presenting a rather not slender form, the 3rd e.g. 1,65—1,85-times as long as thick. Meropodite of 3rd legs 5,4-times longer than wide, distal extremity of lower margin obtuse; propodite 1,35-times as long as the carpus, dactylus almost half as long as the propodite.

8. Alpheus pareuchirus Cout., var. imitatrix n.

Station 153. Lat. 0° 3′. 8 N., long. 130° 24′. 3 E. Depth 141 M. Station 162. Between Loslos and Broken-islands, West-coast of Salawatti. Depth 18 M.

Station 164. Lat. 1° 42′. 5 S., long. 130° 47′. 5. Depth 32 M. Station 305. Mid-channel in Solor-strait of Kampong Menanga. Depth 113 M.

According to Coutière (Alpheidae Maldive and Laccad. Archip.

1905, p. 914), sometimes specimens of A. Audouini occur, in which the dactylus of the small chela of the female presents "la trace très marquée des crêtes sétifères du doigt mobile du mâle." The same fact is observed in the female of a species collected at the above mentioned Stations, a species some specimens of which present the characters of A. pareuchirus Cout., other ones those of the var. Leucothea. This variety is called imitatrix, because the female imitates that of A. strenuus Dana, in which the dactylus of smaller chela is also Balaeniceps-shaped.

## 9. Alpheus Coutierei, n. sp.

Station 96. South-east side of Pearl-bank, Sulu-archipelago. Depth 15 M.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa-Besi and the N. E-point of Timor. Depth 27—54 M.

A new species of the group "Edwardsi".

Rostrum acute, as long as broad at its base, just exceeding 1st antennular article, sharply carinate above and with the narrow, prominent, linear and compressed rostral carina running backward to beyond the posterior third of carapace. Orbital region more prominent than in most other species, orbital hoods rounded, unarmed.

Abdominal pleura of the male terminating inferiorly in a sharp tooth, those of the 2nd somite cordiform; in the female, on the contrary, the 2nd somite is much wider, with slightly concave, lower margin, the infero-posterior angles of the 1st and 2nd pleura are obtuse, those of the 3rd and 4th a little sharp, with their posterior margin rounded and convex, the 5th and the 6th nearly as in the male.

Telson broadly grooved in the middle, 3-times as long as the posterior margin is wide.

Second antennular article almost twice as long as the visible part of 1st, carpocerite hardly longer than antennular peduncle; scaphocerite as long as carpocerite, its outer margin very concave, scale much shorter than the terminal spine and reaching

to the middle of 3rd antennular joint, spine on the basicerite extremely small.

Large chela 2,5-times as long as the palm is high, fingers hardly half as long as the palm and much less high, their height being in proportion to that of the palm as 2:3; notch on the upper border passing into a quadrangular depression on the outer and in a triangular on the inner surface of the palm, the triangular in the male rather indistinct. Lower border with a concave emargination at the base of the immobile finger, this notch appearing triangular on the outer surface, with truncate, posterior margin. Fingers of small chela of female slightly longer than the palm, the chela 4-times longer than high.

The two first segments of carpus of 2nd legs equal or the 1st somewhat longer.

Meropodite of 3rd and 4th legs unarmed, those of 3rd pair 5-times longer than wide, propodite one sixth longer than carpus, dactylus almost half as long as propodite.

Length of male 16 m.m., of adult female with eggs 19,5 m.m.

10. Alpheus Polyxo, n. sp.

Station 240. Banda-anchorage. Depth from 9-45 M.

A new species, probably of the group "Edwardsi."

Rostrum acute, reaching in the male to the extremity of basal antennular article, in the female a little shorter, rostral carina rounded, in the female broader than in the male, extending to the base of the rounded, unarmed, orbital hoods, from which it is separated by tolerably wide, deep grooves. Telson 3,4-times longer than the width of posterior margin, anteriorly twice as wide as the latter, spinules of upper surface inserted midway between the median line and the lateral margins.

Second antennular article 2,5-times longer than thick, one and a half as long as the visible part of the 1st, 3rd joint hardly shorter than that visible part. Stylocerite with the terminal spine just reaching beyond 1st antennular article.

Basicerite with a small inferior spine. Carpocerite just extending

beyond the extremity of antennular peduncle, scaphocerite as long as carpocerite, lateral spine of scaphocerite reaching backward to the middle of 2nd antennular article, scale reaching to the extremity of 3rd.

Smaller chela of the male resembling that of A. euchirus Dana = A. Hippothoë de Man, var? of 1897, dactylus as long as the palm, obtusely carinate above and presenting on the inner (not on the outer) side a crest or ridge, fringed with hairs, as in A. euchirus.

Carpus of 2nd legs stout, 1st segment 2,5-times as long as 2nd, that is one fourth longer than the 5th.

Ischiopodite of 3rd and 4th legs with a strong, movable spine. Meropodite of 3rd legs 5,26—5,31-times longer than wide, unarmed; propodite 1,26-times as long as the carpus, almost 6-times longer than wide, with 11 or 12 spinules on the posterior margin; dactylus a little more than one fourth the propodite, with a small, acute, accessory tooth on its posterior margin, at one fourth of its length from the tip. Ova small, numerous, globular, diameter 0,5 m.m.

Length of male 22 m.m., of female 25 m.m.

11. Alpheus bis-incisus de Haan, var. variabilis, n.

Station 71. Makassar. Depth up to 32 M.

Closely allied to A. bis-incisus de Haan, var. malensis Cout. Rostrum 3-times as long as wide at its base, reaching to the distal fourth of visible part of 1st antennular article, sometimes flattened above, sometimes rounded. Outer margin of scaphocerite more concave than in the var. malensis, terminal spine directed inward, stylocerite just reaching beyond 1st antennular article, for the rest both peduncles as in the other variety.

Larger chela of the male closely resembling that of the var. malensis (Coutière, Alpheidae Maldive and Laccad. Archip. 1905, Pl. LXXXVI, Fig. 48a), proportion between the length of the chela and the height of the palm 2,4, proportion between the height of the palm and that of the fingers 1,54, proportion between the length of the chela and that of the fingers 2,6. Ex-

ternal margin of the notch on the lower border of the palm less oblique than on the quoted figure of the var. malensis.

Smaller chela in the male *Balaeniceps*-shaped, in the female not, similar to those of *A. chiragicus* H. M. Edw. Second segment of carpus of 2nd legs half as long as 1st. Meropodite of 3rd legs 5,3-times, propodite 6,5-times longer than wide, dactylus almost half as long as the propodite.

Outer surface of palm of larger chelipede marked with an ochraceous spot on the posterior part of the quadrangular depression.

Length of male 25 m.m., of ova-bearing female 23,5 m.m.

## 12. Alpheus leptochiroides, n. sp.

Station 260. Lat. 5° 36′. 5 S., long. 132° 55′. 2 E. — 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. Depth 90 M.

Closely related to A. leptochirus Cout.

Frontal margin straight near the base of rostrum, in A. leptochirus it appears here excavate. Second article of antennular peduncle very slightly shorter than the visible part of 1st, in A. leptochirus a little longer. Stylocerite broader, ending in a spine that reaches to the 2nd fourth part of median article.

Scaphocerite extending beyond the antennular stalk by the length of 3rd joint, scale just exceeding the extremity of that peduncle.

Meropodite of larger chelipede of the male four, that of the smaller one five times longer than wide in the middle, inferointernal margin with acute tooth near apex. Larger chela similar to that of A. leptochirus, 3-times as long as high, the whole length 3,5-times longer than the fingers, but the lower border not notched, only slightly sinuous as in A. pareuchirus Cout. Fingers of the smaller chela of the male, which is 5,5-times longer than high, just as long as the palm, dactylus Balaenicepsshaped, but appearing a little less broad, when looked at from above.

Second carpal segment of 2nd legs one sixth shorter than first, that is just as long as the two last segments taken together.

Following legs as in A. leptochirus, but dactylus of 3rd legs

measuring one third of the propodite. Length of the single, probably young male that was collected, 12,5 m.m.

13. Synalpheus carinatus de Man, var. binongcensis n.

Station 220. Anchorage off Pasir Pandjang, west coast of Binongka. Depth 278 M.

Rostral carina not notched at the boundary between the gastric and cardiac regions. Supraorbital spines slightly convergent and less distinctly turned upwards than in the typical species. The length of the telson equals just 4-times the width of posterior margin, greatest width 2,6-times as wide as posterior margin (in an adult female of the typical species these numbers are respectively 3,41 and 2,2); spinules of upper surface inserted a little more backward. Carpocerite exceeding the antennular peduncle by half the third article.

Ova 1,2 m.m. long, in the typical species 0,9—1 m.m. One female, long 25 m.m., collected on a Comatula.

14. Synalpheus carinatus de Man, var. ubianensis n.

Station 99. Lat. 6° 7′. 5 N., long. 120° 26′ E. Anchorage off North-Ubian. Depth 16—23 M.

Station 220. Anchorage off Pasir Pandjang, west coast of Binongka. Reef.

Rostral carina not notched, carinae of supraorbital spines indistinct. Telson 4,44—4,8-times longer than the width of posterior margin, proportion between the greatest width and that of posterior margin 2,6—3; anterior pair of spinules of upper surface inserted just in front of the posterior third.

Second, 3rd and 4th segment of carpus of 2nd legs of equal length. Ova very small, 0,4—0,48 m.m. long (in the typical species 0,9—1 m.m.).

Length of ovigerous female 21 m.m.

15. Synalpheus consobrinus, n. sp.

Station 91. Moearas-reef, inner side: east coast of Borneo. Depth up to 54 M.

Station 213. Saleyer-anchorage and surroundings. Reef-exploration.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa Besi and the N. E. point of Timor. Depth 27 — 54 M. Station 305. Mid-channel in Solor-strait off kampong Menanga. Depth 113 M.

A species of the Comatularum group, probably new, closely related to Syn. Stimpsonii de Man. The male from Station 213 is regarded as the type, because the specimens from the Stations 91 and 305 do not fully agree with it. This male presents the following characters. Rostrum hardly longer than wide at its base, reaching to the distal fourth or fifth of the visible part of 1st antennular article; length of supraorbital spines one third that of the rostrum.

Telson 4,5-times longer than the width of posterior margin, greatest width 3,4-times that of posterior margin. Spinules of upper surface small, 0,22 m.m. long and inserted rather far backward (in Syn. Amboinae Zehntner these spinules are larger and situated more foreward). Endopodite of caudal fan one and a half as long as broad, wider than that of Syn. Amboinae.

Visible part of 1st antennular article twice as long as the 2nd, the latter one third longer than the 3rd, stylocerite just reaching beyond 1st joint. Inferior spine of basicerite a little longer than the supraorbital spines, lateral spine of scaphocerite not or hardly curved inward and extending by one third of its length beyond the scale.

Upper margin of meropodite of larger chelipede terminating in a small, acute tooth, meropodite 3-times longer than wide; chela 4-times as long as high, fingers a little more than half as long as the palm, dactylus less strongly curved and less high than that of Syn. Stimpsonii, its cutting-edge with a small, acute tooth not far from the tip. First segment of carpus of 2nd legs one sixth longer than the sum of the four following.

Meropodite of 3rd legs 6,2-times longer than wide, with a

tolerably strong, acute tooth at the far end of posterior margin; propodite twice as long as the carpus, 8,4-times longer than wide with 15 small spinules; dactylus one sixth of the propodite, the ventral hook almost as thick as the other and perpendicular to the inferior margin. Length of this male 21 m.m.

In the male long 15 m.m. from Station 91 the larger chela resembles that of Syn. Stimpsonii and the 3rd—5th legs are of a somewhat stouter shape, but the ventral hook of the dactyli is also perpendicular to the inferior margin.

In the young specimen long 11 m.m. from Station 305 the dactyli are as in *Syn. Stimpsonii*, but the scaphocerite is as in the male from Station 213, as also the arrangement of the spinules on the telson.

## 16. Synalpheus odontophorus, n. sp.

Station 65a. Very near Station 65 (Lat. 7° 0' S., long. 120° 34'. 5 E). Depth changed rapidly during haul, diminishing from 400 M. to 120 M.

Station 260. Lat. 5° 36′. 5 S., long. 132° 55′. 2 E. — 2,3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. Depth 90 M.

Station 289. Lat. 9° 0′. 3 S., long. 126° 24′. 5 E. Depth 112 M.

A new species of small size of the Comatularum group. Frontal region as in the other species of this group, rostrum hardly longer than broad at its base, reaching to the middle or to the distal third or fourth part of 2nd antennular article, supraorbital spines short, one fourth of the rostrum. Telson 4—4,5-times longer than the width of posterior margin, greatest width 3-times the width of posterior margin; anterior pair of spinules twice as far distant from the posterior margin as from the base, posterior pair midway between the posterior margin and the anterior pair or somewhat nearer to the latter.

Antennal and antennular peduncles as in Syn. Stimpsonii (Archiv f. Naturg. 53, 1888, Taf. XXII, Fig. 3), but the stylocerite reaches only to the middle of visible part of 1st antennular article and the

terminal spine of the scaphocerite is not curved inward and projects by one fifth of its length beyond the rounded tip of the scale.

Larger chela of female a little longer than the carapace, resembling that of Syn. consobrinus, 3,17-times as long as high, fingers a little less than half the length of the chela, similar to those of Syn. consobrinus, but the distal lobe on the inner (upper) side of the immobile finger, which lobe is rounded in Syn. consobrinus and in the other species of this group, is produced, in Syn. odontophorus, into an acute prominent tooth, directed obliquely upward, and the distal half of the finger is much widened, appearing excavate, when the fingers are looked at from the tips. Fingers of small chela half as long as the palm.

First carpal segment of 2nd legs slender, a little shorter than the four following taken together. Meropodite of 3rd legs 5,5-times longer than wide, with a rather small, apical tooth, apical tooth of 4th legs still smaller, meropodite of 5th legs unarmed; propodite of 3rd legs twice as long as the carpus, almost 7-times longer than wide, with 16 spinules, dactylus as in Syn. Stimpsonii (l. c. Fig. 3c), one fifth of the propodite.

Eggs few in number, ovoid, of large size, 0,7—1 m.m. long. Length of ova bearing female 15 m.m.

# 17. Synalpheus streptodactyloides, n. sp.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa Besi and the N. E. point of Timor. Depth 27—54 M.

A new species of the Neomeris group, closely allied to Syn. streptodactylus Cout.

Rostrum wider than that of Syn. streptodactylus, 2,2 times as long as wide at its base, in Syn. streptodactylus 2,75—3,25, usually 3-times, and extending to the distal sixth of basal joint; different from Syn. streptodactylus, Syn. Neomeris, Syn. Gravieri and other species, the concave, anterior wall of the carapace, below the rostrum, and at either side of it, is not visible at all, and the supraorbital spines that hardly reach beyond the middle of basal

joint, make an acute angle with the rostrum; tips of supraorbital spines glabrous, slightly directed outward.

Antennal and antennular peduncles with spines and appendages nearly as in Syn. streptodactylus, scale of scaphocerite reaching to the middle of 3rd joint, stylocerite reaching to the 2nd fourth or fifth of median joint that measures a little more than two thirds of the basal one.

Telson 2,53-times as long as the width of posterior margin, the latter half the greatest width, and similar to that of Syn. strepto-dactylus; spinules of upper surface 0,07—0,08 m.m. long, much smaller than in Syn. streptodactylus, anterior pair inserted not anterior (as in this species), but posterior to the middle and nearer to the lateral margins.

Carpus of 2nd legs stout, 1st segment 4-times as long as thick, slightly shorter than the sum of the four following.

Proportions of the members of 3rd pair: carpus 1; meropodite 2,44; propodite 2,125. Meropodite 3,68-times longer than wide, with a single spinule, long 0,09 m.m., a little beyond the middle; carpus 2,5-times, propodite 5,66-times longer than wide, with 8 spinules; dactylus almost one fourth of the propodite, of a somewhat stouter shape than the dactylus of Syn. streptodactylus, 2,51-times longer than wide at its base, anterior margin slightly sinuous, for the rest as in Syn. streptodactylus.

Fourth legs nearly as the 3rd, proportions of the members: carpus 1; meropodite 2,15; propodite 2,11.

Length of single female without eggs 11,5 m.m.

18. Synalpheus modestus, n. sp.

Station 240. Banda. Reef-exploration.

A new species of the Neomeris group, closely related to Syn. streptodactylus Cout.

Rostrum spiniform, slender, five times as long as wide at its base, extending to just beyond the middle of 2nd antennular article, lateral spines also spiniform and acuminate, a little shorter than basal article. Antennal region as in Syn. streptodactylus, but

the stylocerite reaches to the distal third part of median article and the carpocerite is 3,35-times longer than wide, in stead of 4,1-times; antennal scale rather broad, reaching to beyond the middle of 3rd antennular article.

Posterior margin of the telson wider with regard to the length than that of Syn. streptodactylus, the length being 2,375-times the width of the posterior margin; spinules of upper surface small, the anterior pair before the middle, but the spinules nearer to the lateral margins than in that species.

Measurements of the large chela: fingers 1; total length 4; height 1,5. Anterior margin of the palm, near the articulation of the finger, with an acute, spiniform tooth.

Relative dimensions of the small chela: fingers 1; total length 3,1; height 1,1. Meropodites of both chelipedes with a spiniform tooth at the end of the upper margin.

First carpal article of 2nd legs as long as the chela, but one fifth shorter than the sum of the four following. Relative dimensions of 3rd pair: meropodite 2,61; carpus 1; propodite 2,72. Meropodite 4-times, propodite 7,3-times longer than wide, meropodite with four spinules on the distal half, propodite with nine. Dactylus  $^{1}/_{4}$  of the propodite, of a less slender form than in Syn. streptodactylus, the dactylus being 2,5-times longer than wide, in stead of 3-times; ventral hook also stouter.

# 19. Synalpheus Iphinoë, n. sp.

Station 49a. Lat. 8° 23′. 5 S., long. 119° 4′. 6 E. Sapeh-strait. Depth 70 M.

Station 51. Madura-bay and other localities in the southern part of Molo-strait. Depth from 54-90 M.

Station 240. Banda-anchorage. Depth from 9-36 M.

Station 279. Rumah-kuda-bay, Roma-island. Depth 36 M.

A new species of the Neomeris group, closely related to Syn. Gravieri Cout.

Rostrum narrow, reaching to the distal third or to the extremity of 1st antennular article, supraorbital spines conical, acuminate,

a little shorter than the rostrum, slightly diverging outward, rarely projecting straight foreward; the three spines, not setose, are distinctly curved upward at their tips. Visible part of 1st antennular article twice or almost twice as long as the 2nd, when measured on the upper side, 3rd a little shorter than 2nd; stylocerite just reaching beyond the 1st article. Spines on the basicerite as in Syn. Gravieri, carpocerite a little longer than antennular peduncle, scaphocerite as in Syn. Gravieri, but the terminal spine extending, beyond the antennular stalk, to or almost to the tip of carpocerite.

Telson shorter than in Syn. Gravieri, its length being 2,44-2,75 times the width of posterior margin, the latter as in Syn. Gravieri, but the outer angles acute; anterior pair of spinules inserted just in front of the middle, posterior pair one and a half, sometimes even more than twice as far distant from the posterior margin as from the anterior pair.

Thoracic legs nearly as in Syn. Gravieri, meropodites of 3rd and 4th legs 4-times longer than wide, those of 3rd with four or five small spinules along the middle, those of 4th legs with two or three; dactyli as in Syn. Gravieri, but the ventral hook that is 3-times as long as the dorsal one and more than 3-times as thick, perpendicular to the lower border, the dactyli closely resembling Fig. 3a, Pl. LXX of Coutière's paper on the Alpheidae of the Mald. and Laccad. Archip. 1905.

Eggs rather large, 0,75 m.m. long.

Length of male 12 m.m., of ova-bearing female 12,5 m.m.

20. Synalpheus jedanensis, n. sp.

Station 273. Anchorage off Pulu Jedan, East coast of Aruislands (Pearl-banks). Depth 13 M.

A new species of the *Neomeris* group, related to *Syn. Gravieri* Cout. and *Syn. Iphinoë*, n. sp., but differing by the stouter shape of the small chela and of the following legs.

Frontal spines and both peduncles with appendages as in Syn. Gravieri (Coutière, Alpheidae Maldive & Laccad. Archip. 1905, Pl. LXX, Fig. 2), but the carpocerite shorter, hardly longer than

the antennular peduncle; tips of frontal spines setose and slightly curved upward, visible part of 1st antennular article a little more than one and a half, sometimes even almost twice as long as median article.

Telson shorter than that of Syn. Gravieri, proportion between its length and the width of posterior margin 2,54-2,57, anteriorly twice as wide as the posterior margin, the outer angles of which are spiniform, though very short; median part of posterior margin prominent; anterior pair of spinules situated just in front of the middle.

Larger chela as in Syn. Iphinoë. Smaller chela also as in this species, as regards the length of the fingers, but of a much stouter shape, the chela being only 2,61—2,73-times, the palm 1,5—1,57-times longer than high.

First carpal segment of 2nd legs 3,8-4,8-times as long as thick, slightly shorter or hardly longer than the sum of the following. As regards the proportion between the length of mero-, carpo-, and propodite of 3rd and 4th legs, this species agrees with Syn. Gravieri, also their form is the same: so e.g. mero-podite of 3rd legs 3,43-3,7-times longer than wide with five spinules, those of 4th legs 3,4-3,66-times and with three or four spinules. Dactyli nearly as in Syn. Gravieri.

Eggs large, few in number, in one female long 1,1—1,2 m.m., in another 1,5 m.m.

Length of adult specimens 15 m.m.

# 21. Synalpheus miscellaneus, n. sp.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa Besi and the N. E. point of Timor. Depth 27—54 M.

A new species of the Neomeris group, presenting miscellaneous characters both of Syn. Neomeris de M. and Syn. jedanensis, n. sp.

Rostrum 2,5-times as long as broad, reaching a little beyond the middle of basal joint, lateral spines a little shorter, convex above, with the tips slightly curved inward. Antennal and antennular peduncles with spines and appendages as in Syn. Neomeris

de M., but the stylocerite just as long as 1st antennular article, and the carpocerite, which is 3,7-times longer than wide, a little shorter.

Telson 2,35-times longer than the width of posterior margin, proportion between the greatest width and that of posterior margin 1,77; spinules of upper surface situated just as far backward and the two rows as close together as in Syn. Neomeris, the distance between the anterior pair and the posterior margin being just one third the length of the telson.

Meropodite of larger chelipede 2,3-times longer than wide, upper margin obtuse at extremity, lower angle of carpus with a long, spiniform tooth, chela as in Syn. Neomeris. Smaller chela resembling that of Syn. jedanensis, proportion total length: height = 2,7:1; proportion total length: length of the fingers = 2,336:1.

Second legs as in Syn. Neomeris. The proportions of the members of the 3rd legs are: meropodite 2,72; carpus 1; propodite 2,1; those of 4th legs: meropodite 2,32; carpus 1; propodite 2.1. These legs much resemble those of Syn. Neomeris, especially the dactyli are quite the same (vide: Zoolog. Jahrb. (Spengel), X, 1898, Pl. 35, Fig. 61e), but the meropodites bear only one single small spinule.

Length of the only specimen collected, a male, 16,5 m.m.

# 22. Synalpheus Iocasta, n. sp.

Station 71. Makassar and surroundings. Depth up to 32 M. Station 116. Lat. 0° 58′. 5 N., long. 122° 42′. 5 E. West of Kwandang-bay-entrance. Depth 72 M.

Station 144. Anchorage north of Salomakiëe-(Damar) island. Depth 45 M.

Station 164. Lat. 1° 42′. 5 S., long. 130° 47′. 5 E. Depth 32 M. Station 204. Lat. 4° 20′ S., long. 122° 58′ E. Between islands of Wowoni and Buton; northern entrance of Buton-strait. Depth from 75 – 94 M.

Station 240. Banda-anchorage. Depth from 9-36 M.

Station 273. Anchorage off Pulu Jedan, East coast of Aruislands. (Pearl-banks). Depth 13 M.

Station 274. Lat. 5° 28′. 2 S., long. 134° 53′. 9 E. Depth 57 M. Station 282. Lat. 8° 25′. 2 S., Long. 127° 18′. 4 E. Anchorage between Nusa Besi and the N.-E. point of Timor. Depth 27—54 M. Station 285. Lat. 8° 39′. 1 S., long. 127° 4′. 4 E. Anchorage South coast of Timor. Depth 34 M.

Station 305. Mid-channel in Solor-strait off Kampong Menanga. Depth 113 M.

Station 310. Lat. 8° 30′ S., long. 119° 7′. 5 E. Depth 73 M. A new species of the *Neomeris* group, closely related to *Syn*.

Pococki Cout., from which it differs by the three posterior legs.

In Syn. Pococki the propodite of 3rd legs that are much less setose than those of this new species, is 6,7-times longer than wide and distinctly arcuate; the concave, posterior margin bears, besides those at the distal extremity, only two or three short spinules, long 0,1 m.m., separated from one another by long smooth interspaces; the dactylus,  $^{1}/_{4}$  of the propodite, has a rather stout form, the proportion between its length and width (near the articulation) being 2,46 and the ventral or principal hook measures  $^{1}/_{8}$  the whole length of the dactylus; the 2 spinules on the meropodite are 0,1-0,12 m.m. long. Eggs few in number, 1,3-1,4 m.m. long, length of ova-bearing female 12,5 m.m.

In Syn. Iocasta, however, the propodite of 3rd legs, that are much more setose, is nearly straight, 5—6,75-times longer than wide and the posterior margin is armed, besides with those at the distal extremity, with seven to ten spinules that are 0,1-0,18 m.m., rarely 0,08 m.m. long and separated from one another by short interspaces; the dactylus,  $^{1}/_{3}$  or a little more than  $^{1}/_{3}$ , rarely  $^{2}/_{5}$  of the propodite, has a more slender shape, being 3-3,5-times, rarely 2,77-times longer than wide near the articulation and the ventral hook is shorter, measuring  $^{1}/_{14}-^{1}/_{17}$  the whole length of the dactylus. Meropodite with 1 or 2 spinules, long 0,07-0,1 m.m.

In the other characters, which, in Syn. Iocasta, are subject to a great variability, both species much agree with one another. Length of ova-bearing female 8,5—12,5 m.m.

Eggs in most specimens 0,6—1 m.m. long, in specimens from Station 310 attaining, however, a length of 1,5—1,7 m.m. and here few in number.

23. Synalpheus nilandensis Cout., var. bandaensis n.

Station 49a. Lat. 8° 23′. 5 S., long. 119° 4′. 6 E. Sapeh-strait. Depth 70 M.

Station 240. Banda. Depth from 9-36 M.

Differs from the typical species by the different shape of the dactyli of the three posterior legs.

Rostrum, supraorbital spines, antennal and antennular peduncles as in the typical species, but the terminal spine of the scaphocerite, though longer than the antennular peduncle, does not yet reach to the tip of the carpocerite. Larger chela resembling that of Syn. Neomeris, but the fingers are shorter, measuring one third of the palm. Upper border of the palm of smaller chela more regularly curved than in the typical form.

As regards the relative length of mero-, carpo-, and propodite of 3rd legs, this variety agrees with the typical species, but the dactylus has a less stout shape, being 2,5—3-times as long, from the base to the extremity of the dorsal hook, as wide near the articulation; the principal hook is directed obliquely foreward, making no right angle with the anterior margin and the dorsal hook is longer, measuring two thirds of the principal hook.

Fourth legs similar to the 3rd, but the propodite hardly shorter than the meropodite; in the specimen from Station 49a the propodite is even slightly longer than the meropodite.

Eggs not very numerous, large, ovoid, 0,8 m.m. long. Length of ova-bearing female 14 m.m.

24. Synalpheus fossor Paulson, var. propinqua n.

Station 96. South-east side of Pearl-bank. Sulu-archipelago.

Depth 15 M.

Station 164. Lat. 1° 42′. 5 S., long. 130° 47′. 5 E. Depth 32 M.

Station 273. Anchorage off Pulu Jedan, East coast of Aruislands. (Pearl-banks). Depth 13 M.

Station 282. Lat. 8° 25′. 2 S., long. 127° 18′. 4 E. Anchorage between Nusa Besi and the N. E. point of Timor. Depth 27—54 M. Station 315. Anchorage East of Sailus Besar, Paternosterislands. Depth up to 36 M.

Professor Coutière of Paris kindly enabled me to examine the two specimens from Reef Naifaro, Maldives, that were referred by him (in: Alpheidae Mald. and Laccad. Archip. 1905, p. 872, Pl. VII, fig. 6) to Syn. fossor Paulson, a semi-adult male long 12 m.m., and an adult female long 19 m.m.

In these specimens that I propose to consider as the typical form of Syn. fossor, the meropodite of 3rd legs is, in the male, 2,875-times, in the female 3-times longer than wide, the propodite, armed with five spinules besides those at the distal extremity, in the male 4,6-times, in the female 4,43-times longer than wide. In both specimens the meropodite of 4th legs is 3-times longer than wide, the propodite in the male with four, in the female with five spinules, in the former 4,55-times, in the female 4,2-times longer than wide.

The var. propingua now differs by the propodite of 3rd legs bearing eight or nine, that of 4th legs six or seven spinules and also by the more slender shape of these members. The meropodite of 3rd legs is namely 3,38—3,61, that of 4th legs 3,55—3,81 times longer than wide, while these numbers are for the propodite of 3rd legs 4,9—5,25, and for that of the 4th 5—5,1.

Smaller chela usually more slender than in the typical form. Ova long 1—1,1 m.m.

Length of ova-bearing females 17-20 m.m.

25. Synalpheus paraneomeris, Cout., var. halmaherensis, n.

Station 152. Wunoh-bay, N. W. Coast of Waigeu-island.

Rostrum as in the typical form, but almost as long as 1st antennular article, lateral spines as in the var. prolatus Cout., but with the inner margins concave and a little shorter than the

rostrum. Antennular peduncle with the 2nd article somewhat wider distally than long, one fourth shorter than the visible part of the 1st, 3rd article one fourth longer than 2nd, stylocerite reaching to the distal fifth part of 2nd joint. Carpocerite 3-times longer than wide, surpassing the antennule by two thirds the distal article, lateral spine of basicerite a little shorter than stylocerite, scale as long as the antennule, as wide as in the var. prolatus Cout. (Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXI, Fig. 7), terminal spine a little shorter than carpocerite.

Telson in the adult female 3-times longer than the width of posterior margin, for the rest as in the typical form.

Meropodite of smaller chelipede of the male  $2^{1}/_{3}$  times longer than wide, with a small, acute tooth at the apex of upper margin, chela 2,85-times longer than high, for the rest typical.

Following legs as in the typical species, but the meropodite of 3rd pair 3,8-times, of 4th, 3,7-times longer than wide and in either pair the propodite 6-times as long as wide with six respectively five spinules, dactylus as in the typical form, but the dorsal hook distinctly longer and a little more than half as thick as the other.

Ova small, 0,6 m.m. long. Length of ova-bearing female 16 m.m.

26. Synalpheus paraneomeris Cout., var. praedabunda, n.

Station 34. Anchorage off Labuan Pandan, Lombok. Depth 18 M. Station 37. Sailus Ketjil, Paternoster-islands. Depth 27 M. and less.

Station 129. Anchorage off Kawio- and Kamboling-islands, Karkarolong-group. Reef.

Station 250. Anchorage off Kilsuin, West-coast of Kur-island. Reef-exploration.

Rostrum acute and lateral spines as in the typical species (Coutière, Alpheidae Mald. and Laccad. Archip. 1905, Pl. LXXI, Fig. 7'), but the acute tips of the lateral spines are turned inward. Carpocerite 3,54-times longer than wide, antennal region for the rest as in the typical species (l. c. Fig. 7').

Telson 2,35—2,5-times longer than the width of posterior margin, not yet twice as wide anteriorly as the width of the latter; spinules of upper surface a little farther remote from the lateral margins than in the typical species and than in the var. halmaherensis, the anterior pair usually a little before the middle.

Chelipedes as in the typical species, but the upper margin of meropodite with a very small, apical tooth. First segment of carpus of 2nd legs slightly shorter than the sum of the following.

Meropodites of 3rd and 4th pair of a stouter form than in the typical species, those of 3rd pair 3,56—3,58-times longer than wide; the relative proportions of 3rd pair are: carpus 1; merodite 1,94—2; propodite 1,63—1,64. Dactylus as in the typical species, but the dorsal hook distinctly longer than the other.

Relative proportions of 4th pair: carpus 1; meropodite 1,8—1,85; propodite 1,7—1,71.

Length of ova-bearing female 14 m.m., ova 0,8-0,82 m.m. long.

27. Synalpheus ancistrorhynchus, n. sp.1)

Station 273. Anchorage off Pulu Jedan, East coast of Aruislands. (Pearl-banks). Depth 13 M.

A new species of the Paulsoni group, related to Syn. acanthitelsonis Cout.

Rostrum short, reaching to the middle of 1st antennular article, rostral carina obtuse, fading away a little behind the corneae; lateral spines a little shorter, their tips acute and, like that of the rostrum, curved upward like barbed hooks. Median antennular article measuring three fourths the visible part of the 1st and a little longer than the 3rd; stylocerite reaching to the 2nd third part of median article. Carpocerite 4,3-times longer than wide, surpassing the antennular peduncle as far as in Syn. acanthitelsonis; lower spine of basicerite as long or slightly longer than stylocerite, upper spine small, turned outward. Terminal spine of scaphocerite shorter than carpocerite, but longer than the antennular peduncle; scale reaching to the extremity of median article.

<sup>1)</sup> άγκιστρον, barbed hook.

Telson as in Syn. acanthitelsonis, but the posterior margin less wide, proportion between the length of telson and the width of posterior margin 2,42; posterior angles spiniform, longer than the median part of the margin, but shorter than the adjacent spinules.

Meropodite of larger chelipede with a spiniform tooth at the apex of upper margin, that of the small chelipede truncate at apex. Large chela with an obtuse, conical tubercle at the anterior margin of the palm. Relative dimensions of smaller chela: fingers 1; total length 2,54; height 0,81.

Following legs much stouter than those of Syn. acanthitelsonis. Relative proportions of 3rd pair: meropodite 2,8; carpus 1; propodite 2. Meropodite 3,43-times longer than wide, armed with three feeble, movable spinules on the distal third of posterior margin; propodite 4,65-times longer than wide, dactylus  $^{1}/_{6}$  of the propodite, resembling that of Syn. acanthitelsonis, but the dorsal hook is twice as long and one and a half as broad at base as the ventral. Length 11 m.m.



Man, J. G. de. 1909. "Diagnoses of new species of macrurous decapod Crustacea from the "Siboga Expedition"." *Tijdschrift der Nederlandsche Dierkundige Vereeniging* 11, 99–125.

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