



REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

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AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

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that even in the driest season (November, December, January, and February) rain falls on an average twelve days in each month, the mean fall for the month being 8 inches; whilst in the rainy season (May, June, July, August, and September), rain falls on an average twenty-one days in each month, the mean fall per month being 27 inches. The northwest monsoon appears to commence about November, and lasts until April, but only in January, February, and March do steady north and northwest winds prevail. The southeast monsoon sets in in May, and lasts until the beginning of September; in the other months the winds are variable.

During the stay at Amboina the pinnace was engaged several days in dredging in depths from 15 to 130 fathoms. Among the new species obtained were two Brachyurous Crabs, referred to in the following notes by Mr. Edward J. Miers, of the British Museum, who is preparing a Report on the Brachyura collected by the Expedition:—

The Brachyura.—“The Brachyura collected during the voyage of H.M.S. Challenger are of much interest, not only because many of the new species are remarkable for beauty of form and structure, but also by reason of the additional facts relating to the distribution of several already described, which a study of the collection enables us to record. The groups richest in new genera and species are the *Oxyrhyncha* (*Maiioidea*) and *Oxystomata* (*Leucosiidea*), and to these belong most of the new forms collected at depths exceeding 100 fathoms. The *Cyclometopa* (*Cancroidea*) and *Catometopa* (*Grapsoida*) are for the most part terrestrial, littoral, or shallow-water species, but exceptions occur, notably in the genus (or rather sub-genus) *Pilumnoplax*, and among the swimming crabs (Portunidæ). No Brachyurous Crab was brought up in any of the deep-water dredgings at depths exceeding 1000 fathoms; at this depth a small female Crab, nearly allied to or identical with *Ethusa microphthalma*, Smith, was dredged at the Azores (Station 73); and but very few were dredged at depths exceeding 400 fathoms, but between 100 and 400 fathoms occurred nearly all the most interesting new forms in the collection. Sir Wyville Thomson's statement is therefore correct as regards the Challenger Crustacea ‘that the Brachyurous Decapoda appear to be confined almost entirely to comparatively shallow water.’¹

“In the following brief account of the Brachyura, I have referred, as a general rule, to the more interesting new species in the order in which they were collected. As regards the pelagic species, I need only say that the Gulf Weed Crab, *Nautilograpsus minutus*, occurred not only in the north and northwest Atlantic, and at the Bermudas, West

¹ Voyage of the Challenger, The Atlantic, vol. ii. p. 349. Cf. Rev. A. M. Norman, President's Address in *Trans. Nat. Hist. Soc. North. and Durham*, vol. viii. (pt. 1) p. 42 (1883). But Prof. S. I. Smith, in a note on the Crustacea of the “Albatross” Dredgings in 1883, mentions the occurrence of a new genus of Brachyura allied to *Ethusa* in the N.W. Atlantic, in 1496 to 1735 fathoms (*Amer. Journ. Sci. and Arts*, vol. xxviii. p. 53, 1884; reprinted in *Ann. and Mag. Nat. Hist.*, ser. 5, vol. xiv. p. 179, 1884). Since these notes have been in type I have received, in a consignment taken from among the Anomura by Mr. Henderson, some remarkable forms (probably Dorippidæ) dredged at depths varying from 310 to 800 fathoms, and one species dredged at Station 237 in 1875 fathoms.

Indies, Canaries, and Azores, but also at the Kermadec Islands, South Pacific, off Volcano Island in the North Pacific, and on the coast of Japan. *Neptunus sayi*, A. M.-E., was taken on weed only in the western North Atlantic and south of Nova Scotia (Station 49). *Plagusia immaculata*, Lamarck, and *Varuna litterata*, Fabr., occurred in abundance on floating driftwood north of New Guinea, on the 22nd February 1875; but the two latter are not strictly pelagic species.¹

“*Atlantic Region*.—Little need be said respecting the Brachyura taken in the Atlantic. The species collected at the Bermudas, Azores, and Cape Verde Islands are somewhat numerous, but are for the most part littoral and shallow-water forms. No Brachyurous Crustacean occurred at any of the deep-water stations in the North Atlantic except the carapace of a small swimming crab allied to *Bathynectes*, which was dredged off the Bermudas in 435 fathoms (Station 33), and *Heterocrypta maltzani*, Miers, in 450 fathoms, off Fayal (Station 75). Of a dozen littoral or shallow-water species collected at the Cape Verde Islands, several are common West Indian forms. At St. Paul's Rocks, besides the common and very widely distributed *Grapsus maculatus* (Catesby), the only crab taken was a new species of *Stenorhynchus* (*Stenorhynchus spinifer*), distinguished from all its congeners by the strongly developed supra-ocular and post-ocular spines (depth, 10 to 80 fathoms).

“At Ascension Island, which H.M.S. Challenger visited on the homeward voyage, occurred the Land Crab (*Gecarcinus lagostoma*) referred to by Mr. Moseley² as swarming everywhere on the island; the common *Grapsus maculatus* (Catesby) and *Pseudozius mellissi*, Miers, received with the fishes of H.M.S. Challenger and described in 1881.³

“The Brachyura collected at Fernando Noronha (7 to 20 fathoms) are few in number, and for the most part belong to genera common at the West Indian Islands and on the South American coasts; they include species of *Pericera*, *Macrocaloma*, *Mithraculus*, and *Mithrax*. There is also in the collection a small Crab, apparently referable to the rare Floridan *Apocremnus septemspinus*, A. M.-E. The localities on the Brazilian coast at which Brachyura were collected are Barra Grande (Station 122) in 30 to 350 fathoms, and Bahia in shallow water; I may particularly mention the occurrence at the former locality of the remarkable *Neptunus* (*Hellenus*) *spinicarpus* (Stimpson), characterised by the extraordinary development of the carpal spine of the chelipedes, and also a very interesting variety (*oculiferus*) of the West Indian deep-water *Bathyplox typhlus*, A. M.-E., in which the ocular *cornæ*, although small, are distinctly developed. Milne-Edwards' types, it is to be noted, were dredged in deeper water.

“At the Tristan da Cunha group (Nightingale Island), in 100 fathoms, occurred a new

¹ Cf. H. N. Moseley, Notes by a Naturalist on the Challenger, p. 434, London, 1879.

² Loc. cit., p. 561.

³ Ann. and Mag. Nat. Hist., ser. 5, vol. viii. p. 432, 1881.

species of Grapsoid Crustacean (*Pseudorhombila* [*Pilumnoplax*] *normani*), which was taken also on the Agulhas Bank (Station 142) in 150 fathoms, and which has a bilobated front, three antero-lateral marginal teeth (the first obtuse), and the chelipedes granulated, the granules most numerous on the smaller chela.

"The species collected in the South African seas show affinities both with the Atlantic and Oriental Crustacea. At the Cape of Good Hope several Brachyura were collected at Simon's Bay and Sea Point near Cape Town; among them are specimens of the West Indian *Pericera cornuta*, M.-E., and *Calappa flammea* (Herbst). *Mursia cristimana*, Desmarest (with which I believe the Oriental *Cryptosoma orientis*, Adams and White, to be identical), occurred both at these localities and in 150 fathoms, on the Agulhas Bank (Station 142), where also were taken *Lispognathus thomsoni* (Norman), common in the deep waters of the North Atlantic and Mediterranean, to which is also doubtfully referred a mutilated male trawled off Sydney in 410 fathoms (Station 164B), a new Grapsoid Crustacean (*Brachygrapsus kingsleyi*) distinguished from the New Zealand *Brachygrapsus lævis*, Kingsley, by the bilobated front, and specimens of *Ebalia tuberculosa* (A. M.-E.), which was also taken frequently on the South Australian coast and in the New Zealand seas.

"*Antarctic Region.*—The only crab occurring in the Southern Ocean between the Cape and Australia is the *Halicarcinus planatus*, Fabr., common everywhere on the coasts and islands of the Southern Ocean, which was taken at Marion Island (50 to 75 fathoms), off Prince Edward Island (85 to 150 fathoms), and at Kerguelen Island, New Zealand, and the Falklands (Station 316), and which besides *Eurypodius latreillei*, Guér.-Ménév., and *Peltarion spinulosum*, White, common in Magellan Strait and at the Falklands, is the only Brachyurous species taken by the Expedition in the Antarctic or Austral circumpolar region.¹

"*Oriental or Indo-Pacific Region.*—The Brachyura taken in Bass Strait and on the coasts of Victoria and New South Wales are numerous, and for the most part included in Mr. Haswell's recently-published Catalogue of the Australian Crustacea; among them, however, are several species apparently new to science. At Port Philip (Station 161, 33 fathoms) occurred the European *Portunus corrugatus* (Pennant), and at Port Jackson (3 to 8 fathoms) specimens of a species of *Pachygrapsus*, which I think cannot be distinguished from the West Indian *Pachygrapsus transversus*, Gibbes. *Pachygrapsus transversus* occurred also at the Bermudas and St. Vincent, and may itself prove to be identical with the Mediterranean *Pachygrapsus maurus*, Lucas.

"The only Station on these coasts where any Brachyura (beside the *Lispognathus thomsoni* already referred to) occurred at a greater depth than 100 fathoms is Station

¹ Dr. R. v. Willemoes Suhm (*Zeitschr. f. wiss. Zool.*, Bd. xxiv. p. xvi, 1874) remarks "dass in here Crustaceen den Ufern der antarctischen Inseln fast ganz fehlen."

163A, off Twofold Bay, in 150 fathoms, where two or three species were dredged; among them a new species of the Cancroid genus *Medæus* (*Medæus haswelli*) allied to *Medæus elegans*, A. M.-E., from New Caledonia, but distinguished by the different areolation of the carapace, and the absence of the numerous small spines and tubercles which in *Medæus elegans* exist between the antero-lateral marginal teeth of the carapace.

“At Tongatabu (Station 172), in 18 to 240 fathoms, several new and interesting forms were collected, notably in 240 fathoms a new species (*Randallia granulata*) of the rare Leucosoid genus *Randallia*, Stimpson, distinguished from the Californian *Randallia ornata* by the coarsely and evenly granulated carapace, the less prominent front, and slenderer chelipedes. This species occurred also at the Fijis (Station 173) in 315 fathoms, together with *Pseudorhombila* (*Pilumnoplax*) *abyssicola*, n. sp., a species with nearly glabrous carapace, straight entire front, and three antero-lateral marginal teeth, of which the two last only are spiniform and acute, and a new species of *Mursia* (*Mursia curtispina*) allied to *Mursia armata*, de Haan.

“The Crustacea of the northern and northeastern coasts of Australia are as a rule very distinct from those of the eastern and southern shores; but few species collected by the Challenger in the Torres Strait and Arafura Sea are new to science. At the Ki (Ké) Islands, however, in 140 fathoms, occurred some of the most interesting and remarkable forms in the collection. There are specimens of a large and beautiful Maioid Crustacean which I have designated *Cyrtomaia murrayi*, a new genus and species (see fig. 196), apparently allied to *Euprognatha*, Stimpson, but distinguished by the remarkable convexity of the carapace, which is almost vertically deflexed at the gastric region, by the great development of the gastric spines, and by the elongated and spinuliferous chelipedes; also *Oxypleurodon stimpsoni*, a new genus and species allied to *Leucippe*, *Epialtus*, and *Eupleurodon*, and characterized by the subpyriform deeply channelled carapace, the slender divergent rostral spines, the distinct præocular and branchial spines, and the non-dentigerous ambulatory legs; and apparently new species of *Pugettia*, *Hyastenus*, *Pilumnus*, *Lupocyclus*, and *Platyonychus* (*Platyonychus iridescens*). The last-named is a very fine species, and is distinguished by the strongly granulated and spiniferous palm and dactyl of the chelipedes, and by the iridescent reflections of the carapace.

“At Banda and Ternate the few crabs taken were common species. At Amboina new species of *Naxia* and *Gonoplax* were dredged in 100 and in 15 to 25 fathoms; the latter (*Gonoplax sinuatifrons*) very nearly allied to the common European *Gonoplax rhomboides*, and distinguished only by the sinuated frontal margin and shorter chelipedes. In the Molucca Passage *Oncinopus aranea*, de Haan, was dredged at Station 196 in 825 fathoms; this, with two exceptions, referred to above, is the greatest depth at which any Brachyurous Crab was taken by the Expedition.

“At the Philippines, Brachyura were collected at several different localities on the beach or in shallow water, but the most interesting forms from these islands occurred at Station 210 in 375 fathoms, where were dredged a new species of *Amathia* (*Amathia pulchra*) nearly allied to the Mediterranean *Amathia rissoana* (Roux) and the West Indian deep-water *Amathia hystrix*, Stimpson, but distinguished from both by having six spines on the gastric region of the carapace and from *Amathia rissoana* by the distinctly developed præocular spine; it is distinguished from *Amathia agassizi*, S. I. Smith, by the more robust and carinated palms of the chelipedes; here also occurred

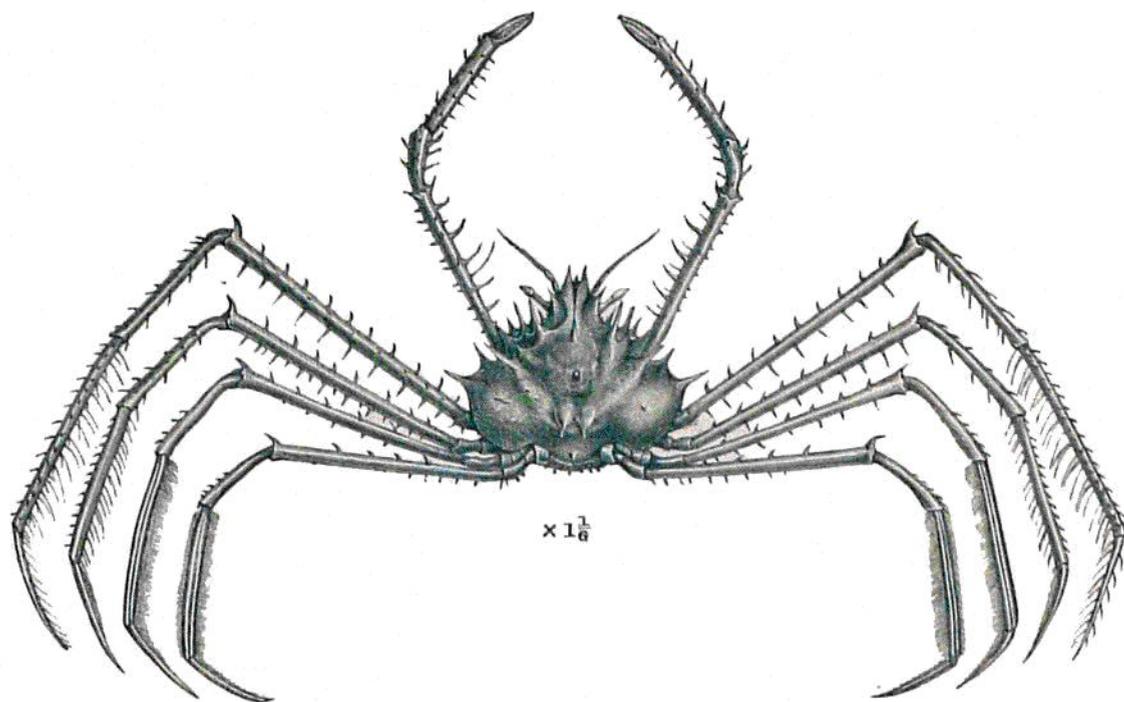


FIG. 196.—*Cyrtomaia murrayi*, n. gen. et sp.

Echinoplax moseleyi, a new genus and species very nearly allied to *Amathia*, but having the carapace covered with very numerous small spines and spinules, and the spines of the rostrum armed with small accessory spines; and the *Oxypleurodon stimpsoni* already referred to as occurring at the Ki Islands (Station 192).

“The few Brachyura taken at Hong Kong were common and well-known species, and need not be specially mentioned. Off Celebes some more interesting crabs were taken in 10 fathoms (Station 212), among them a species of *Lissocarcinus*, probably new, and a new *Leucosia*, which had already occurred in the Arafura Sea.

“At Station 214, between the Meangis and Tulus Islands, in 500 fathoms, occurred a second species (*Cyrtomaia suhmi*) of the remarkable new genus *Cyrtomaia*, distinguished from *Cyrtomaia murrayi*, dredged at the Ki Islands, by the greater development of the gastric spines, the longer rostrum, and the shorter thicker eyes.

“ At the Admiralty Islands species were trawled in 150 fathoms (Station 219), among which are some of the most interesting new forms collected by the Expedition ; these are *Platymaia wyville-thomsoni* (see fig. 197), a large and fine new genus and species allied to *Cyrtomaia* and to *Euprognatha*, Stimpson, but characterised by the depressed suborbiculate carapace, and the remarkably elongated and dissimilar ambulatory legs, the first pair of which have the fourth to last joints armed with strong spines ; the second to last pairs are almost devoid of spines, but have the penultimate joints dilated and compressed as in *Eurypodius* ; here also was taken a new species (*Ergasticus naresi*) of the genus

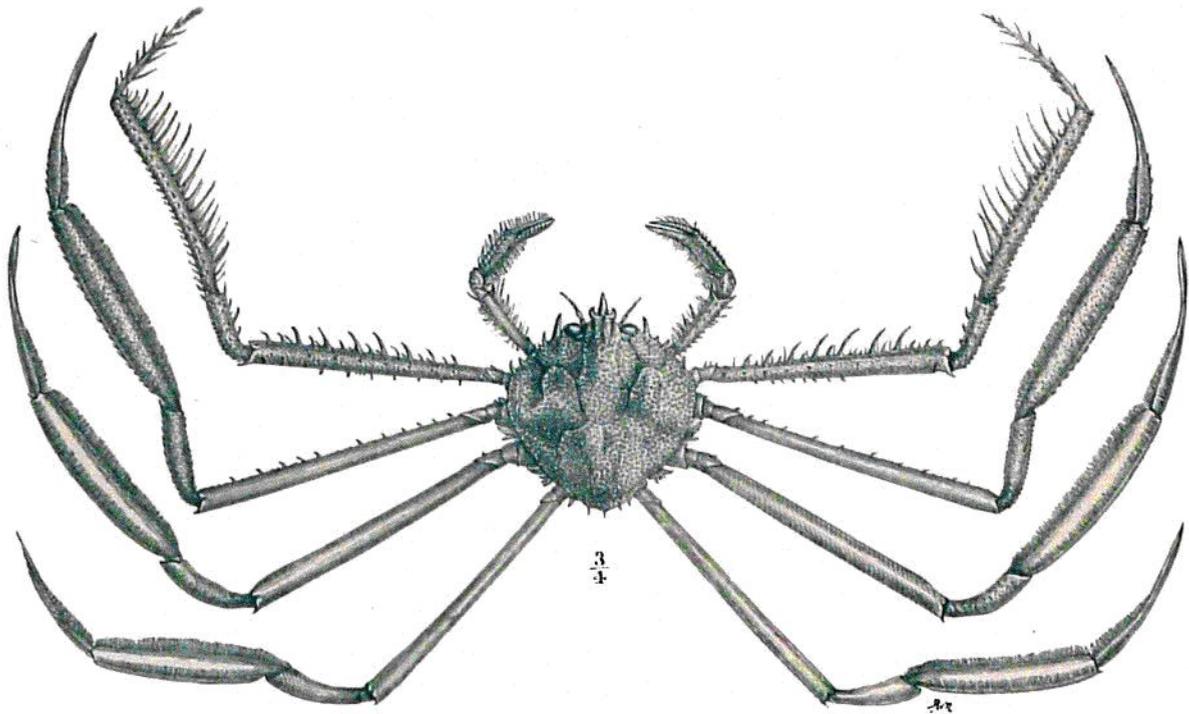


FIG. 197.—*Platymaia wyville-thomsoni*, n. gen. et sp.

Ergasticus, A. M.-E.,¹ distinguished from the type of the genus *Ergasticus clouei*, A. M.-E., found in the deep waters of the Mediterranean, by the different disposition of the spines and spinules of the carapace, and by having spines on the inferior as well as the superior wall of the orbit ; lastly, a remarkable new genus and species of Oxystomatous Brachyura which I propose to designate *Paracyclois milne-edwardsi* (see fig. 198), allied to *Calappa*, *Cryptosoma*, and *Platymera*, but distinguished from the first mentioned genus by the rudimentary lateral wings of the carapace, which in *Calappa* are developed so as to cover the bases of the ambulatory legs, and from the two last by the absence of the lateral marginal spines of the carapace and by other characters.

¹ Rapport sur la faune sous marine dans les grandes profondeurs de la Méditerranée et de l'Océan Atlantique, p. 17 (1882).

“ At Japan, Brachyura were collected at several different localities, but among them are few novelties or species of special interest; I need only refer to the Land-crab *Telphusa (Geotelphusa) dehaani*, White, which was taken at Hakoui at an elevation of 2500 feet above the sea level, and occurred also at Kobe and near Lake Biva. Its occurrence at this remarkable elevation has already been alluded to by Mr. Moseley.¹

“ The Brachyura collected at the Sandwich Islands (Hilo and Honolulu) and Society Islands (Tahiti) require no special mention. None were taken at Juan Fernandez, where the ship remained for two or three days.

“ *Chili, Magellan Strait, and Falkland Islands.*—At Valparaiso, Chili, the only crabs taken were the well-known *Cancer longipes*, Bell, *Leptograpsus variegatus* (Fabr.).

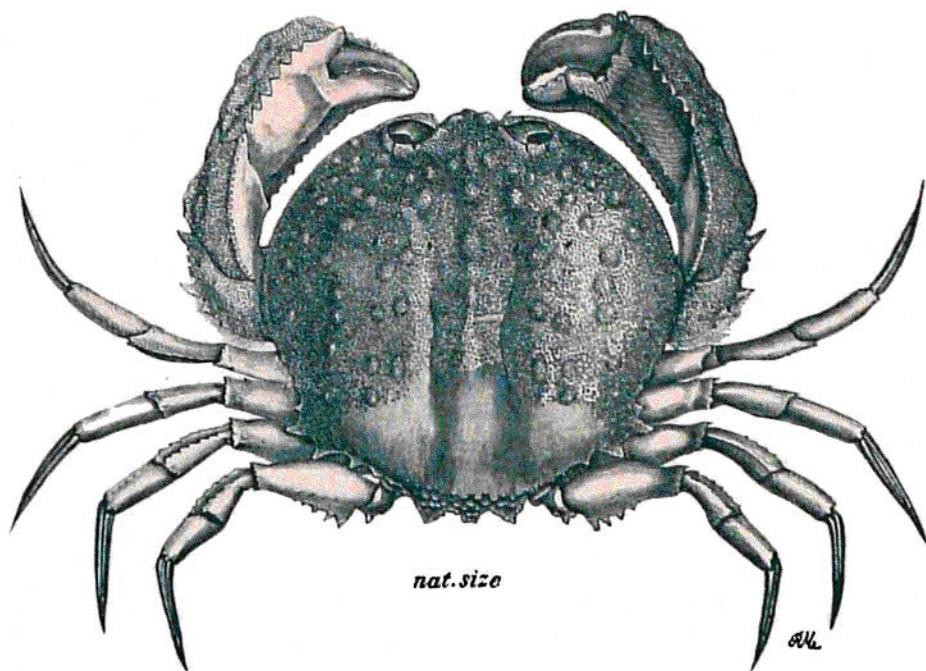


FIG. 108.—*Paracyclois milne-edwardsi*, n. gen. et sp.

and *Acanthocycclus gayi*, M.-Edw. and Lucas, which occurred also on the coast of Chiloe in fresh water. Off the coast of Chiloe occurred also two apparently new species of the Maioid genus *Libinia*, the first, *Libinia smithi*, taken at Station 311 in 245 fathoms, is characterised by the great length of the spines of the dorsal surface of the carapace, of which there are four in a longitudinal and median series, and three on each branchial region, one (the lateral spine) extremely long; the second (*Libinia gracilipes*), was dredged at Station 304 in 45 fathoms; and an *Eurypodius (Eurypodius longirostris)*, which I have regarded as new, but which may possibly be a deep-water variety of *Eurypodius latreillei*. It is distinguished by the elongated and remarkably reflexed

¹ Notes by a Naturalist on the Challenger, p. 561, London, 1870.

rostrum of the male, whose spines toward the apex are laterally divergent, and was trawled at Station 308 in 175 fathoms. In Magellan Strait and at the Falklands the only *Brachyura* taken were, as I have noted above, *Eurypodius latreillei*, Guér.-Ménév., *Halicarcinus planatus* (Fabr.), and *Pelturion spinulosum*, White."

AMBOINA TO TERNATE.

On the 10th October, at 3.30 P.M., after obtaining the requisite observations for rating the chronometers, the Expedition left Amboina for Ternate. When off the entrance to the bay the ship was swung for the errors of the compass, but a bank of clouds gathering in the western horizon hid the sun, and prevented the completion of the circle, so that after finishing swinging for the errors of the dipping needle, at 8 P.M., a course was shaped to the northward towards Suangi Island, sail being made at 10 P.M. to a fine easterly breeze.

On the 11th, at daylight, Suangi Island bore N. 17° W., the right extremity of Manipa, N. 33° E., Sial Point S. 87° E., and the left extremity of Bouro Island S. 67° W., showing a set of 7 miles to the northwestward during the night. Advantage was taken of a fine sunrise to complete the observations for the errors of the compass, again resuming the course to the northward at 8 A.M. The peaks of Manipa and Kelang, which were stated on the chart to be 500 and 600 feet in height respectively, are much higher, Manipa rising to an elevation of 2100 feet, Kelang to 2400 feet, and Suangi Island to 327 feet. Passing between Suangi Island and Bouro the bearings and angles obtained indicated a discrepancy between the position of the islands on the eastern side of Manipa Straits and Bouro on the western side. This may be owing to the position of Bouro Island having been based on the observations of Sir E. Belcher at Cajeli, whilst the islands on the other side of the strait are based on Dutch positions. A pleasant breeze with slightly misty weather was experienced the whole day.

On the 12th, at 5.30 A.M., the position of the ship by star observations was lat. 1° 53' S., long. 127° 5' E., showing a slight westerly set. At daylight the island of Obi Major was seen on the starboard bow, and a course shaped to pass just outside Obi Lato. As the bearings taken to the various islands did not agree, a running survey of them was attempted as the ship passed, but this was rendered extremely difficult, owing to the varying velocity of the tide, and to the cloudy state of the weather in the afternoon, which prevented the latitude being obtained either by the meridian altitude of Venus, or, later, by the stars. Some few observations were, however, made.

Gomomo Island is round-backed and about 850 feet high, but appeared to be incorrectly placed on the chart; its summit is in lat. 1° 50½' S., long. 127° 38' E. Obi Lato is a high island with three or four sharp well-defined peaks of nearly equal height, reaching an elevation of 2400 feet; the highest peak is in lat. 1° 25' S., long. 127° 18½' E. The northwest point of Obi Major has a remarkable bluff near its extremity, with apparently a knob (probably a clump of trees) on its highest part; the knob is in lat. 1° 24' S., long. 127° 24' E. Five miles southward of this knob is a projecting point which looks like an island. The interior of Obi Major is mountainous, but clouds capping the summit of the hills prevented their height being ascertained. Tapa Island has a single round-backed hill on it about 1000 feet in height, the summit of which is in lat. 1° 12' S., long. 127° 23' E.