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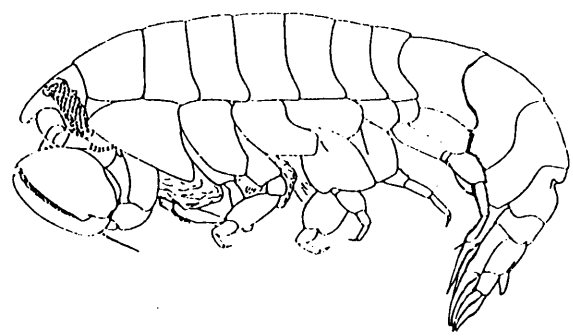

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Crustacea Decapoda : The Sponge Crabs (Dromiidae) of New Caledonia and the Philippines with a review of the genera

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ABSTRACT

Although this paper concerns a large collection of dromiid crabs from the Philippine Islands and New Caledonia, with a few specimens from Indonesia and Hawaii, the opportunity is taken to review and revise most of the genera of the Dromiidae. The basis of the revision involves a much wider range of characters than have been used before. Excessive emphasis on the nature of the female sternal grooves is abandoned, and more attention is paid to relative dimensions and ornamentation of the carapace, arrangement of spines on and around the dactyli of all the legs, fusion of the last two segments of the abdomen, and size of the uropod plates. A new set of characters describing the second antenna and the male abdominal locking mechanism are also used. The importance of the cheliped epipod character is discussed and is shown to be variable in some genera. A total of 28 genera are defined or redefined and a key to their identification is provided, along with keys to the identification of 99 species in these genera.

The following genera are restricted and/or redefined : *Cryptodromia* Stimpson, 1858, *Cryptodromiopsis* Borradaile, 1903, *Dromia* Weber, 1795, *Dromidia* Stimpson, 1858, *Dromidiopsis* Borradaile, 1900, *Epigodromia* (a replacement name for *Epidromia* Kossmann, 1818, which is preoccupied), *Homalodromia* Miers, 1884, *Paradromia* Balss, 1921, *Petalomera* Stimpson, 1858, and *Pseudodromia* Stimpson, 1858, resulting in the creation of 10 new genera.

Ascidiophilus Richters, 1880, *Conchoecetes* Stimpson, 1858, *Epipedodromia* André, 1932, *Eudromidia* Barnard, 1947, *Exodromidia* Stebbing, 1905, *Hemisphaerodromia* Barnard, 1954, *Hypoconcha* Guérin-Méneville, 1854, *Speodromia* Barnard, 1947, and *Sphaerodromia* Alcock, 1899, remain unmodified. After the elimination of many synonyms and together with the new material described herein, the Dromiidae now includes 29 genera and 109 species. The generic revision has major implications for the dromiid crabs of, not only the Philippines and New Caledonia but also, the rest of the Indo-Pacific region, Australia, South Africa, and the Atlantic.

Until now only six species of dromiid crabs were known from New Caledonia and the Philippine Islands. This number is increased to 29 species belonging to 13 genera. The most common species are *Lauridromia intermedia* (Laurie, 1906) nov. comb., *Petalomera pulchra* Miers, 1884, *Cryptodromia coronata* Stimpson, 1858, *Dromidiopsis dubia* Lewinsohn, 1984, and *Epigodromia areolata* (Ihle, 1913) nov. comb. Most of these dromiids come from shallow water, less than

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100 m, and the maximum number of species occurs in the depth interval of 30-60 m. The greatest depth of 437 m is shown by *Frodromia atypica* (Sakai, 1936) nov. comb. There is a large range of body size from a few millimetres, for *Homalodromia coppingeri*, to around 200 mm CW, for *Dromia dormia*. Egg size ranges from 0.4 mm to 1.1 mm diameter but there is no evidence of direct development amongst these dromiids.

The apparent biogeographic affinities of the dromiids from New Caledonia and the Philippines are, in decreasing order, with Japan, Indian Ocean, Indonesia, and Australia. The apparent affinity with Japan may well be an artifact of more intensive collecting. The most wide ranging species are *Lauridromia intermedia* (Laurie, 1906), *Dromia dormia* (Linnaeus, 1763), *D. wilsoni* (Fulton & Grant, 1902) nov. comb., *Cryptodromiopsis unidentata* (Rüppell, 1830) nov. comb., *Cryptodromia hilgendorfi* De Man, 1888, and *C. fallax* (Lamarck, 1818) nov. comb. These species also represent the most wide ranging genera. The collection of species largely consists of widely distributed species typical of an island fauna.

RÉSUMÉ

Ce travail, qui porte sur une grande collection de Dromiidae des Philippines et de la Nouvelle-Calédonie, a fourni l'occasion de passer en revue et de réviser la plupart des genres de cette famille. Cette révision a pris en compte beaucoup plus de caractères que cela n'avait été fait jusqu'alors. L'importance primordiale accordée aux sillons sternaux des femelles est abandonnée et on a privilégié les dimensions relatives et l'ornementation de la carapace, la disposition des épines associées au dactyle des différentes pattes, la fusion des deux derniers segments de l'abdomen et la taille des uropodes. Un nouvel ensemble de caractères concernant les antennes et le mécanisme, chez le mâle, du blocage de l'abdomen est également utilisé. La valeur, du point de vue de la systématique, de l'épipode des chélipèdes est discutée et il est montré que ce caractère peut varier dans un même genre. Au total, 28 genres sont décrits ou redécrits et une clé pour leur identification est proposée, de même que des clés pour l'identification des 99 espèces comprises dans ces genres.

Les genres suivants sont restreints et/ou redéfinis : *Cryptodromia* Stimpson, 1858, *Cryptodromiopsis* Borradaile, 1903, *Dromia* Weber, 1795, *Dromidia* Stimpson, 1858, *Dromidiopsis* Borradaile, 1900, *Epigodromia* (un nom de remplacement pour *Epidromia* Kossmann, 1878, qui est préemployé), *Homalodromia* Miers, 1884, *Paradromia* Balss, 1921, *Petalomera* Stimpson, 1858, et *Pseudodromia* Stimpson, 1858, tandis que 10 genres nouveaux sont établis.

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Après de nombreuses mises en synonymie et les descriptions d'espèces nouvelles faites ici, les Dromiidae comprennent maintenant 29 genres et 109 espèces. La révision des genres a des conséquences importantes non seulement pour les espèces des Philippines et de la Nouvelle-Calédonie mais également pour le reste de l'Indo-Pacifique, l'Australie, l'Afrique du Sud et l'Atlantique.

Jusqu'à présent, seules six espèces de Dromiidae étaient connues de la Nouvelle-Calédonie et des Philippines. Ce nombre est porté à 29 espèces appartenant à 13 genres. Les espèces les plus communes sont *Lauridromia intermedia* (Laurie, 1906) nov. comb., *Petalomera pulchra* Miers, 1884, *Cryptodromia coronata* Stimpson, 1858, *Dromidiopsis dubia* Lewinsohn, 1984, et *Epigodromia areolata* (Ihle, 1913) nov. comb. Les tailles de ces espèces peuvent varier de quelques millimètres pour *Homalodromia coppingeri* à environ 200 mm (largeur de la carapace) pour *Dromia dormia*. La taille des œufs (diamètre) varie de 0,4 à 1,1 mm, mais il n'y a de mise en évidence d'un développement direct chez les espèces examinées.

Les affinités biogéographiques des espèces de la Nouvelle-Calédonie et des Philippines sont, par ordre décroissant, avec le Japon, l'océan Indien, l'Indonésie et l'Australie. Les espèces ayant les répartitions les plus larges sont *Lauridromia intermedia* (Laurie, 1906), *Dromia dormia* (Linnaeus, 1763), *D. wilsoni* (Fulton & Grant, 1902) nov. comb., *Cryptodromiopsis unidentata* (Rüppell, 1830) nov. comb., *Cryptodromia hilgendorfi* De Man, 1888, et *C. fallax* (Lamarck, 1818) nov. comb. Les genres auxquels appartiennent ces espèces sont ceux dont la répartition géographique est la plus grande. La collection étudiée ici est constituée, en grande partie, d'espèces à large répartition géographique, typiques d'une faune insulaire.

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INTRODUCTION

The Dromiidae De Haan, 1833, is a family of primitive brachyuran crabs whose species occur in tropical and warm temperate seas of all the major oceans. These crabs typically carry pieces of camouflage over their backs, using the last two pairs of legs, and because of some primitive larval and adult features they have sometimes been excluded from the Brachyura Latreille, 1803. Thus an accurate picture of this group is essential to an understanding of the origins and relationships of these crabs to the other Brachyura. It is not within the objectives of this paper, to examine the place of the Dromiidae amongst the primitive brachyuran families or to consider the question of whether these crabs should be excluded from the Brachyura. Within the Dromiidae, generic groupings have grown in a largely *ad hoc* manner with the discovery of new species and there is an urgent need to review the genera. Since the collection, upon which this study is based, contains a diverse array of species, the opportunity is taken to undertake a major revision of the whole family.

Crabs of the family Dromiidae from New Caledonia and the Philippines are very poorly known. Although early collections of Brachyura from New Caledonia, made by M. BALANSA, contained dromiid crabs, now in the collection of Muséum national d'Histoire naturelle, Paris, the papers by A. MILNE EDWARDS (1872, 1873, 1874) did not include them. This old material is included in the present paper. The only published record of a dromiid crab from New Caledonia is *Cryptodromia canaliculata* Stimpson, 1858, from the Ile des Pins, by TAKEDA and NUNOMURA (1976).

ESTAMPADOR (1937) provided a checklist of Philippine decapods, including *Dromia (Cryptodromia) tuberculata* (Stimpson, 1858) and *Cryptodromia lateralis* (Gray, 1831) from the Challenger Expedition (HENDERSON, 1888). But the inclusion of this latter species is based on the synonymy of *Dromia verrucosipes* White, 1847 (a *nomen nudum*) and *Dromia lateralis* Gray, 1831. An examination of WHITE'S type (British Museum) shows that it is not the same species and should be referred to *Stimdromia* gen. nov., probably a new species. WARD (1941) identified *Cryptodromia canaliculata* Stimpson, 1858, *C. tumida* Stimpson, 1858, and *C. bullifera* Alcock, 1899, in a shallow water collection from the Gulf of Davao, Mindanao, held by the American Museum of Natural History, New York. Later, ALCALA (1974) added *Dromia dormia* (Linnaeus, 1763). This makes a total of six species from the Philippines.

This paper is based upon the study of more than 300 specimens from about 200 stations ranging in depth from the intertidal to 437 m. A total of 27 species belonging to 13 genera have been identified.

The paper is organized as follows : a revised definition of the family Dromiidae is given, the genera are reviewed and a key is provided, and then the results are presented by genus with a key to the species in each genus. The scope of this review is defined by the species in the present collection, and the genera to which they belong, as well as closely related species from other genera. In order to provide a complete key to dromiid genera, including those not represented in the collection, it is necessary to indicate which species do not belong in these genera. Only those species bearing a close resemblance to the type species of each genus are retained, while the others are transferred to existing genera or are shown to require new genera. After dealing with the primitive genera, including *Sphaerodromia* Alcock, 1899, the remaining genera are presented in the following order : firstly, large dromiids with a cheliped epipod (including *Dromia* Weber, 1795, and *Dromidiopsis* Borradaile, 1903), secondly, small dromiids with an epipod (including *Petalomera* Stimpson, 1858), thirdly, large dromiids without an epipod (including *Dromidia* Stimpson, 1858), and finally, small dromiids without an epipod (including *Cryptodromia* Stimpson, 1858 and *Homalodromia* Miers, 1884). The division into large and small species is largely arbitrary. This order of presentation begins with the most primitive genera and proceeds to deal with the more advanced genera, reflecting my hypothesis about the pattern of evolution of the Dromiidae.

Particular attention has been paid to verification of the dromiid names in use prior to 1858, when STIMPSON established many new genera. This results in several recently used specific names being replaced by older names which have priority. As well as reorganization and clarification of the relationships amongst dromiid species, an underlying objective is to explore the reproductive strategies of these crabs. Of particular interest are egg size and egg numbers and any evidence of direct development, given that the collections come from an island fauna. Use of camouflage, a distinctive (but not exclusive) feature of dromiids, is also investigated.

MATERIAL EXAMINED

Some of the material used in this study came from the following MUSORSTOM cruises : MUSORSTOM 1, Philippine Islands, Cruise Leader, J. FOREST, April, 1976, R. V. "*Vauban*"; MUSORSTOM 2, Philippine Islands, J. FOREST, November-December, 1980, "*Coriolis*"; MUSORSTOM 3, Philippine Islands, J. FOREST, May-June, 1985, "*Coriolis*"; MUSORSTOM 4, New Caledonia, B. RICHER DE FORGES, September-October, 1985, "*Vauban*"; MUSORSTOM 5, New Caledonia, B. RICHER DE FORGES, October, 1986, "*Coriolis*"; MUSORSTOM 6, Loyalty Islands, B. RICHER DE FORGES, February, 1989, "*Alis*". Other material came from CHALCAL 1, Chesterfield Islands, B. RICHER DE FORGES, July, 1984, "*Coriolis*"; CORAIL 1 & 2, Chesterfield Islands, B. RICHER DE FORGES, July-August, 1988, "*Coriolis*" (see RICHER DE FORGES, 1990, for details). A particularly important source of material was the LAGOON SURVEY, New Caledonia, by B. RICHER DE FORGES, 1984-89, "*Vauban*" and "*Alis*" (see RICHER DE FORGES, 1991, for details), and the reef collections of P. LABOUTE and J.-L. MENOU, taken on SCUBA gear. Other specimens came from the cruises VOLSMAR, Matthew and Hunter Islands, B. RICHER DE FORGES, May-June, 1989, "*Alis*"; SMIB 5, New Caledonia, C. DEBITUS, September, 1989, "*Alis*"; SMIB 6, New Caledonia, C. DEBITUS, February-March, 1990, "*Alis*"; BERYX 4, New Caledonia, R. GRANDPERRIN, January, 1992, "*Alis*"; KARUBAR, Indonesia (Kei and Tanimbar Islands), K. MOOSA and A. CROSNIER, October-November, 1991, "*Baruna Jaya I*" and MUSORSTOM 7, Wallis and Futuna Islands, B. RICHER DE FORGES, May 1992, "*Alis*". In the collection

of the Muséum national d'Histoire naturelle are some very old specimens collected along the shores of New Caledonia by M. BALANSA 1861-73, who collected and studied the flora of New Caledonia.

All the specimens dealt with in this paper have been deposited in the Muséum national d'Histoire naturelle, Paris (MNHN). Other specimens mentioned in this paper came from the British Museum (BM), Zoologisches Institut and Museum, Hamburg, Siboga Collection, Zoologisch Museum, Amsterdam, and the National Museum of Natural History, Washington (USNM).

In the lists of "Material Examined" from the above cruises, I have divided the localities into geographic areas (latitude and longitude limits are only approximate) because there are large numbers of islands and it is not easy to associate some localities with particular islands. The areas which I have used are **Philippine Islands**, 5-20°N, 119-127°E, **D'Entrecasteaux Reefs**, 16-18°S, 167-168°E, **Chesterfield Islands**, 18-20°S, 157-161°E, **Bellona Reefs**, 21-23°S, 159-160°E, (both of the latter areas are on the **Bellona Plateau**), **New Caledonia** (including the **Ile des Pins**), 19-23°S, 163-167°E, and the **Loyalty Islands**, 20-22°S, 166-168°E.

The abbreviations of the gears used are : DC = Charcot dredge; DW = Waren dredge; DE = Epibenthic sledge; CP = Beam trawl; CC = Otter trawl (shrimps); CAS = trap.

TERMINOLOGY AND PRESENTATION

Carapace dimensions are given as carapace width (CW) x carapace length (CL) e.g. 1 ♀ 40.6 x 39.7 mm. Measurements, to an accuracy of 0.1 mm, were made using vernier calipers. Carapace width includes any anterolateral teeth and was measured across the widest point, which could vary from the level of the first teeth to the level of the posterolateral teeth. Carapace length includes any rostral teeth and was measured to the posterior carapace margin in the mid-line.

The description of each species is presented according to the following format : cephalothorax, including shape, ornamentation, grooves, then orbit, antenna, epistome, and ventral regions of cephalothorax including female sternal grooves. This is followed by description of the five pairs of pereiopods and the arrangement of spines associated with the dactyli. Finally, the abdomen, telson, abdominal locking mechanism and male pleopods are described (see Fig. 1).

When describing the rostral teeth on the carapace, the length of the median tooth, relative to the lateral teeth, is assessed assuming that the plane of the carapace is horizontal. Teeth around the orbit are treated as being supraorbital, postorbital or suborbital (= infraorbital). The orbital fissure is a narrow slit at the lateral corner which separates the supraorbital and suborbital margins. The anterolateral carapace margin is usually clearly marked, beginning at or above the level of the suborbital margin, and extends as far as the posterolateral tooth which lies behind the branchial groove. Thereafter, the carapace margin is referred to as posterolateral. Anterolateral teeth are sometimes bilobed but they are not counted as being separate unless the indentation extends to the anterolateral margin. In some species the anterolateral teeth are quite variable in size and number, both within and between specimens e. g. *Dromidiopsis lethrinusae* (Takeda & Kurata, 1976) nov. comb. The subhepatic area lies ventrolateral to the orbit and below the anterolateral margin. In some species the subhepatic area is not clearly defined, with the result that any tubercles which may be present can be confused with the anterolateral teeth. Where the anterolateral margin is not clearly evident, I have treated all tubercles which lie below a line extending from the suborbital level to the first anterolateral tooth or to the shoulder of the carapace, as being subhepatic tubercles.

The pereiopods fall naturally into three groups : firstly, the cheliped which is used for feeding as well as cutting out pieces of other living organisms for concealment, secondly, the first two pairs of legs, used for walking, and thirdly, the last two pairs of legs used for carrying the camouflage over the dorsal surface. Rather than referring to "first pereiopod" I use the term "cheliped" and "first two pairs of legs" and "last two pairs of legs" refer to "second and third pereiopods" and "fourth and fifth pereiopods" respectively. This terminology recognizes the functional roles of each group of limbs.

In describing the arrangement of spines associated with the dactyl of each leg I use the terms "inner" and "outer" margins. These terms are necessary because of the differences in orientation of the legs. The legs used for

walking have the normal brachyuran orientation so that their margins could be referred to as "dorsal" or "ventral", but the legs used to carry camouflage are oriented dorsally or sub-dorsally to varying degrees so that these terms no longer have a clear meaning. In order to achieve consistency between the two groups of limbs, I use "inner" to refer to the concave margin of the curved dactyl and "outer" for the convex (flexor) margin of the dactyl. Both these margins of the dactyli of the last two pairs of legs may bear small spines. Distal propodal spines opposing the dactyl, forming a prehensile mechanism, are located on the "inner" propodal margin, while other spines occur on the "outer" propodal margin at the base of the dactyl. Thus the terms "inner" and "outer" reflect the way in which the last two pairs of legs are adapted for grasping pieces of camouflage and, for consistency, these terms are applied to the first two pairs of legs as well. On these legs spines are restricted to the "inner" margins of the dactyl and propodus. Reference is also made to the "posterior" and "anterior faces of the dactyli of the first two pairs of legs. These terms have their normal meaning.

The articles of the antenna, which are all mobile, are referred to as "segments" one through four. These segments correspond to coxa (or urinal segment), fused basis-ischium, merus and carpus. The excretory organ opens into a beak-like structure on the medial margin of the first segment and a well developed exopod is fused to the distolateral corner of the second segment. The third segment may be attached terminally, or attached at an angle on a distomedial extension of the second segment.

All of the Dromiidae have phyllobranchiate gills, stacks of leaf-like plates arranged around a central axis. According to GORDON (1950) the maximum number of gills and epipods on each side are 14 + 4, respectively, but may be as few as 9 + 3 in some species. Variation in gill number is greatest in *Pseudodromia*, ranging from 12-9 + 3, and as few as 6 + 3 in *Ascidiophilus*. However, the numbers may be higher in *Sphaerodromia* spp., which can have as many as 20 + 6 (M. DE SAINT LAURENT, pers. comm.). Typically, dromiids have 14 + 3 or 4 gills and epipods respectively.

An important aspect of identifying dromiid specimens is determining whether an epipod is present or absent on the cheliped. This structure is very small and given the small size of some crabs it is easy to understand how problems have arisen in the past through errors. Even if the epipod has been dislodged, as happens in older material, its presence or absence can still be determined by looking closely for the small pit in the coxa, associated with the epipod. Either way, it is necessary to cut away the lateral wall of the gill chamber to allow close inspection.

Female sternal grooves may end apart, with or without tubercles, or end together on a single tubercle. The grooves may end behind the genital openings or as far forward as the cheliped segment. Since this character shows ontogenetic change, the description is based on the state found in the sexually mature female. Sternal grooves of mature females are often plugged with a hardened secretion indicating that they have already mated.

In describing the abdomen, I treat it as consisting of six segments plus the telson. Some species have the joint between the last two segments fused. However, the position of the joint is always marked by a groove which can be seen in the middle of the abdomen and/or at the lateral margins. The dimensions of the telson are expressed as a ratio of maximum length, measured in the mid-line, and maximum width, measured across the base. The posterior margin of the telson may be rounded, bluntly narrowed, divided into lobes, or armed with a sharp spine.

In some species uniramous uropods are inserted at the posterior border of the last abdominal segment and in front of the telson. I have recognized five different states for the uropod character : a) large, visible externally, occluding much of the last abdominal segment from the lateral margin, b) small, visible externally, occluding less than 10% of the last abdominal segment from the lateral margin, c) small, concealed under last abdominal segment, d) vestigial, concealed under last abdominal segment, and e) absent.

The abdominal locking mechanism is the means by which the abdomen is held in place against the thorax of males and immature females. Tubercles or spines on the coxae of the first two pairs of legs are held against the lateral margins of the telson or last two segments to grasp the abdomen. Usually only the coxae of the first pair of legs are involved. The uropods may also be involved by fitting in front of the coxal tubercles and preventing the abdomen from slipping out. Mature females cannot lock their abdomen in place because it is too wide and the coxal tubercles are not present.

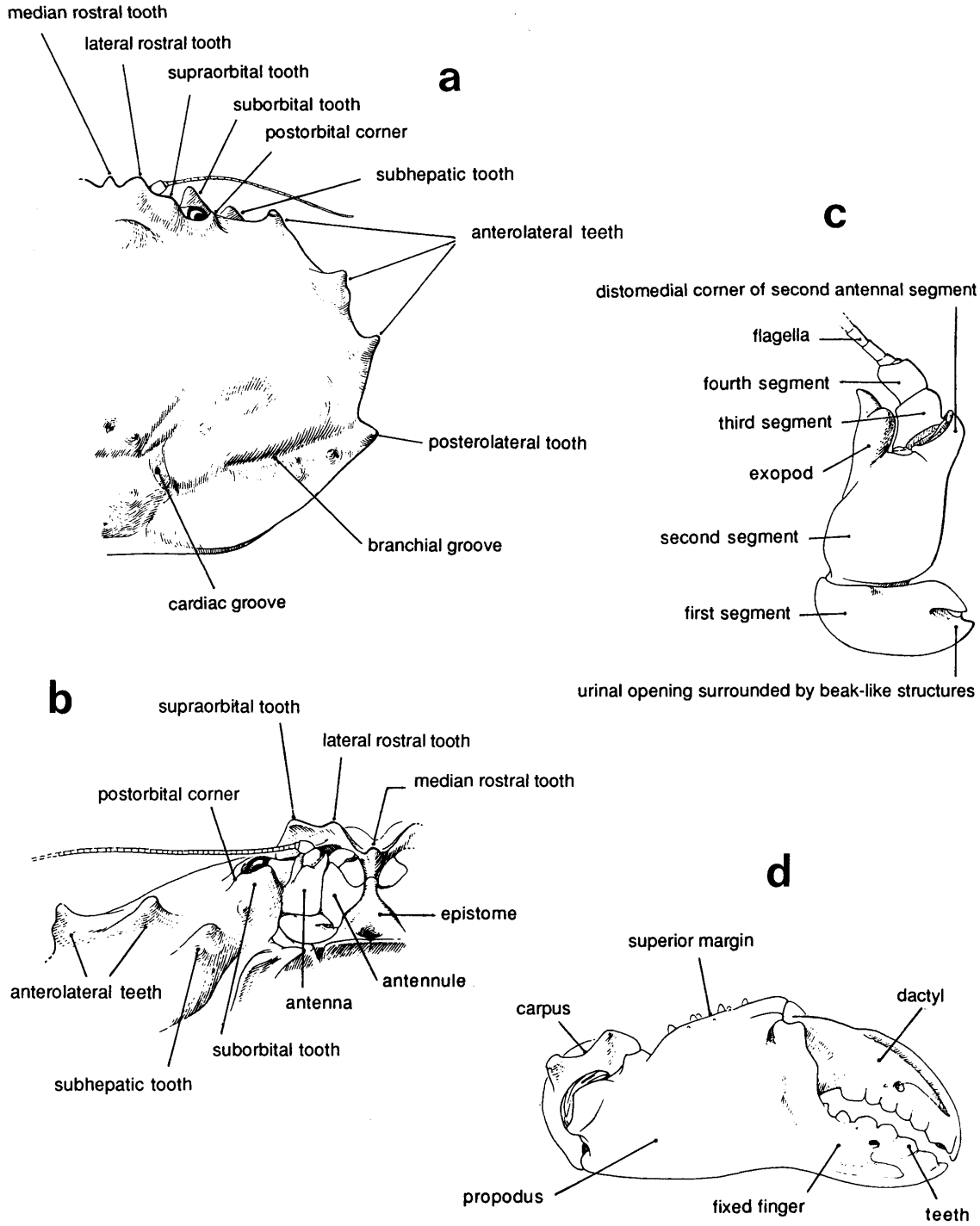
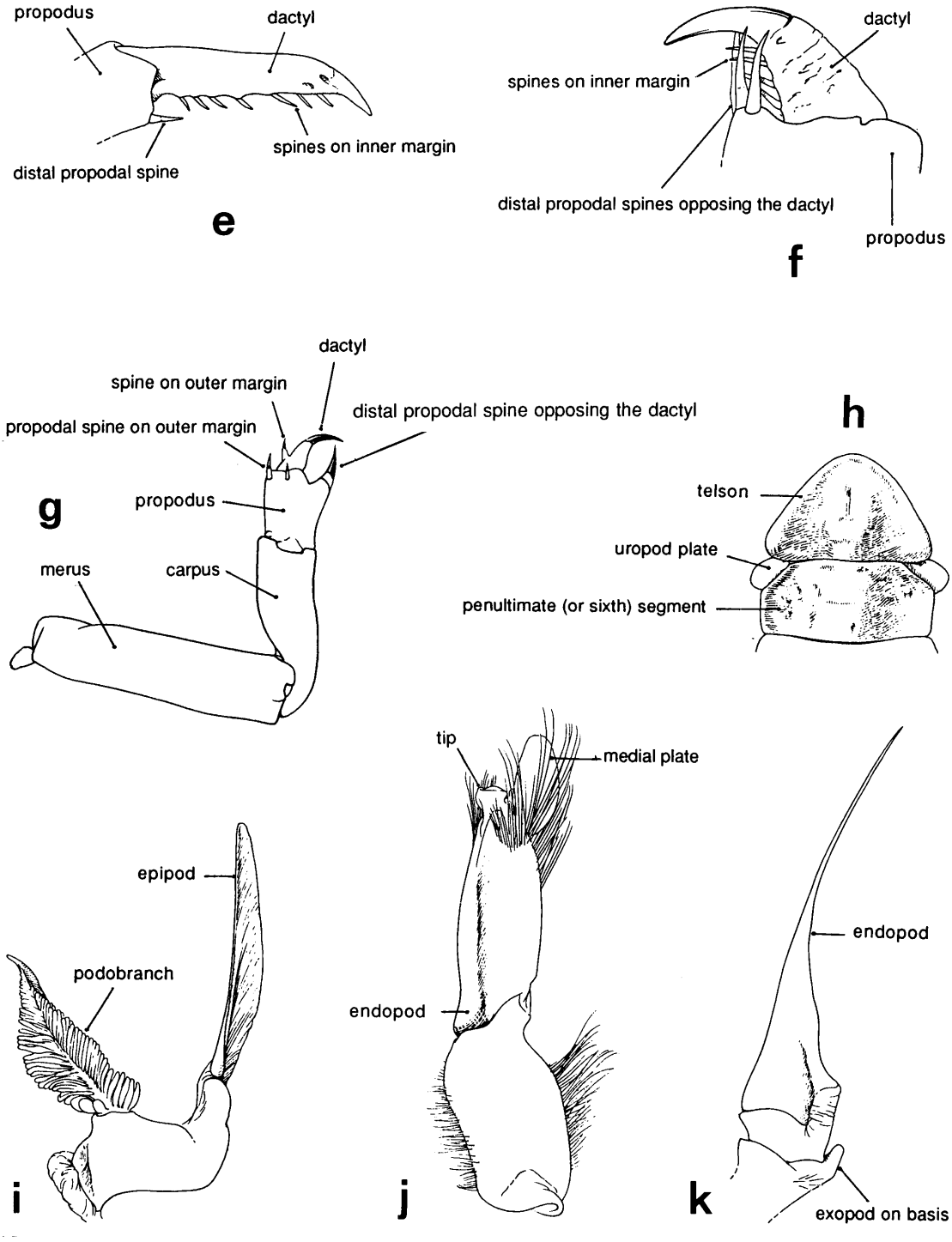


FIG. 1. — Selected figures illustrating the terminology used to describe crabs of the family Dromiidae : 1 a-d, h, based on *Dromia wilsoni* (from McLay, 1991), 1 e-f, based on *Sphaerodromia ducoussoi* (from McLay, 1991), 1 g, based on *Austrodromidia australis* nov. comb. (McLay, unpublished), 1 i-k, based on *Sphaerodromia brizops* (from McLay & Crosnier, 1991). **a**, dorsal view of right half of carapace; **b**, ventral view of right orbit and anterolateral margin;



c, basal segments of right antenna, ventrolateral view; **d**, right cheliped, outer face; **e**, dactylus of second right leg, posterior view; **f**, dactylus of third right leg, anterior view; **g**, right fourth leg, dorsal view; **h**, telson and penultimate segment of abdomen with uropods; **i**, epipod and podobranch from right cheliped; **j**, left first male pleopod, dorsal view; **k**, left second male pleopod, ventral view. Note : Figs 1c, e-g, i-k, are drawn at a higher scale.

In assessing the reproductive strategy of each species, I have focussed on size at maturity, egg size and egg numbers. I have used data about relative size of the female abdomen, development of the sternal grooves and presence of a spermathecal plug to determine the size range over which females reach maturity. Dromiid crabs show a wide range of egg sizes from 0.5 mm diameter for *Lauridromia intermedia* (Laurie, 1906) nov. comb., to 2.8 mm (see HALE, 1941) for *Haledromia bicavernosa* (Zietz, 1887) nov. comb. The eggs of *H. bicavernosa* are amongst the largest known for any brachyuran crab. Similarly, egg numbers also show wide variation, ranging from around 24,000 eggs for *Dromia dormia* (Linnaeus, 1763) to less than 20 eggs for *Epigodromia sculpta* (Haswell, 1882) nov. comb.. Even when the effects of female size are removed, the relationship between egg size and egg numbers is not a simple trade-off. However, for the purposes of this paper, when presenting data about the reproductive biology of each species, I attempt to place it within the range of variation indicated above. One of the most interesting features of dromiid crabs is the occurrence of direct development in some species, whereby the young crabs are carried by the female. These include *Dromidiopsis globosa* (Lamarck, 1818) nov. comb. (until now known as *Dromidiopsis excavata*), *Austrodromidia octodentata* (Haswell, 1882) nov. comb., and *Stimdromia lateralis* (Gray, 1831) nov. comb., all of which come from Australian coasts. Like many other Australian species these all have large eggs (> 1.0 mm). Other species, with smaller eggs, such as *Dromia wilsoni* (Fulton & Grant, 1902) nov. comb., *Cryptodromiopsis antillensis* (Stimpson, 1858), nov. comb. and *Conchoecetes artificiosus* (Fabricius, 1798), have a free-living zoeal stage.

Finally, when giving the authors of species names described by DAI, YANG, SONG, & CHEN (1981, 1986), and DAI & YANG (1991) from China, I have followed the recommendations given by NG (1992) and L. HOLTHUIS (pers. comm.). Species described as being new in the 1991 paper were in fact first described in the 1986 paper and for new species in both the 1981 and 1986 publications, the species are attributed to all of the authors of the publication rather than those simply indicated alongside each name. This course of action follows from a strict interpretation of Art. 50a of the International Code of Zoological Nomenclature.

Family DROMIIDAE De Haan, 1833

Dromiacea De Haan, 1833 : ix.

Dromiidae - ORTMANN, 1892 : 541, 543. — ALCOCK, 1900 : 128; 1901 : 37. — IHLE, 1913 : 4. — RATHBUN, 1923a : 144; 1937 : 30. — BARNARD, 1950 : 306. — WILLIAMS, 1965 : 143. — INGLE, 1980 : 79. — DAI & YANG, 1991 : 16.

Carapace shape variable, width may be greater than or less than length, generally convex in both directions, commonly ovoid or subcircular, may be pentagonal. Lateral carapace margins usually distinctly marked and armed with teeth. Branchial and frontal grooves usually evident. Rostrum usually consists of three teeth, median tooth on a lower plane but may be absent. Eyestalk short, stout, eyes protected by well defined orbits. Sternal grooves of female are variable : they may end either apart or together anywhere between bases of chelipeds or second pair of walking legs.

Antennal flagella shorter than carapace length. First (or urinal) and second segments of antenna movable, exopod firmly fixed to second segment (rarely absent). External maxillipeds typically opercular, completely closing the buccal cavern, basis and ischium of endopod fused but joint always marked by a groove. Bases (coxae) of maxillipeds may fit tightly together or be separated by a gap, and they can be inserted directly under the rounded tip of the sternum or they can be inserted at a lower level on a triangular extension of the sternum. Chelipeds equal, generally much stouter than walking legs. Podobranchs may be present on any of first three pereiopods, and an epipod may be present on cheliped. Gills are phyllobranchiate. First two pairs of legs generally stout, usually not much shorter than chelipeds. Last two pairs of legs usually reduced, third pair usually shortest, both pairs usually subdorsal and prehensile. Grasping mechanism involves distal propodal spines and dactyli. Genital openings coxal.

Abdomen of six segments and telson, folded under thorax. Small uropod plates may be present or absent, and these are often involved in the abdominal locking mechanism.

Five pairs of pleopods present in female, first pair rudimentary. Male may also have five pairs of pleopods, but usually only two pairs. These pleopods are very uniform in structure : first pair, stout semi-rolled, setose, sharply tipped tubes, second pair simple, needle-like.

Body usually protected by a piece of sponge, ascidian or a bivalve shell which is carried over the dorsal surface by the last two pairs of legs.

DISCUSSION. — The above definition of the family Dromiidae is largely based on ALCOCK (1900) with the addition of details about the antennae, uropod plates, and pleopods. Previous concepts of this family have assumed that uniramous uropods are always present in adults, but in fact they are often absent from the abdomen. Uropod plates are absent in *Tunedromia* gen. nov., *Ascidiophilus* Richters, 1880, and *Epipedodromia* André, 1932, and are vestigial and concealed (maybe absent in some species), in *Haledromia* gen. nov., *Pseudodromia* Stimpson, 1858, *Exodromidia* Stebbing, 1905, *Eudromidia* Barnard, 1947, *Dromidia* Stimpson, 1858, *Austrodromidia* gen. nov., *Barnardromia* gen. nov., *Speodromia* Barnard, 1947, and *Hypoconcha* Guérin-Méneville, 1854. In *Frodromia* gen. nov. the uropods are small and concealed in females, but visible externally in males. In all other genera the uropods are small, but visible externally except in *Dromidiopsis globosa* (Lamarck, 1818) nov. comb. where they are visible externally in juveniles but concealed in adults.

Not only is the uropod character variable amongst adults, but it is also variable among dromiid larvae. Well developed uropods (which may be biramous or uniramous) are found in the megalopae of *Cryptodromia tuberculata*, *Cryptodromiopsis antillensis* nov. comb., *Dromia personata*, *D. erythropus*, *Lauridromia dehaani* nov. comb., *Paradromia japonica*, *Conchoecetes artificiosus*, *Hypoconcha arcuata*, and *H. parasitica*, but in *Dromia wilsoni* nov. comb. and *Stimdromia lateralis* nov. comb. (in this case in the juvenile crab stage) they are reduced (see TAN, LIM, & NG, 1986, using the name *C. pileifera*; RICE & PROVENZANO, 1966; RICE, INGLE & ALLEN, 1970; LAUGHLIN, RODRIGUEZ & MARVAL, 1982; HONG & WILLIAMSON, 1986; SANKOLLI & SHENOY, 1968; KIRCHER, 1970; LANG & YOUNG, 1980; WEAR, 1970, 1977, as *Petalomera wilsoni*; MONTGOMERY, 1922, and HALE, 1925, as *Petalomera lateralis*). However, the state of the larval uropods does not always predict the adult state. Whereas in *Dromia wilsoni* and *Stimdromia lateralis* the uropods are reduced in the larvae or juvenile crab stage, respectively, they are well developed in the adults. The reverse is true in *Hypoconcha arcuata* and *H. parasitica* (until recently known as *H. sabulosa*, see HOLTHUIS & MANNING, 1987).

The main characters which have been used to separate the Dromiidae from the other dromioid families, Homolodromiidae Alcock, 1899, and Dynomeniidae Ortmann, 1892, are the presence of uropods, as well as the nature of the last two pairs of legs, and the presence of podobranchs on the pereiopods. For example, the key given by BORRADAILE (1903b) assumes that uropods are absent in the Homolodromiidae, which is clearly not true (see BAEZ & MARTIN, 1989, and MARTIN, 1992), and that only *Hypoconcha*, among the Dromiidae, lack uropods. It is clear that the uropod character is not a reliable way to separate these families. There is a need to clarify the definitions and relationships of these families.

Dromiid Genera

Some twenty six generic names have been used in the family Dromiidae and these have undergone two major revisions : firstly, by STIMPSON (1858), based on specimens collected by the Ringgold and Rodgers expedition in the Pacific, and secondly, by BORRADAILE (1903a), based on his study of a collection from the Maldives, Indian Ocean. Prior to 1858 there were only two generic names in use : *Dromia*, Weber, 1795, and *Hypoconcha*, Guérin-Méneville, 1854, and STIMPSON (1858) proceeded to establish *Dromidia*, *Cryptodromia*, *Pseudodromia*, *Petalomera*, and *Conchoecetes*. Following these came *Epidromia* Kossmann, 1878 which was a significant development but unfortunately it was submerged under *Cryptodromia* by BORRADAILE (1903a). In this paper I separate these two genera again but *Epidromia* being preoccupied I propose the replacement name *Epigodromia*. *Platydromia* Brocchi, 1877, was erected for *P. depressa* which is shown herein to be a synonym for *Dromidia spongiosa* Stimpson, 1858, and therefore this genus is no longer necessary. *Ascidiophilus* Richters, 1880, and *Homalodromia* Miers, 1884, are two monotypic genera based on Indian Ocean specimens. *Eudromia* Henderson, 1888, was based on South African material from the Challenger expedition.

Later, ALCOCK erected *Sphaerodromia* Alcock, 1899, and *Lasiodromia* Alcock, 1901 (a replacement name for *Homalodromia* Miers, 1884). BORRADAILE (1900) established *Dromidiopsis*, and in 1903a, *Dromides* (later absorbed into *Cryptodromia*) and *Cryptodromiopsis*, and he redefined *Dromidia* and *Cryptodromia*. Further genera added were *Exodromidia* Stebbing, 1905, *Paradromia* Balss, 1921, *Epipedodromia* André, 1932 (a replacement name for *Platydromia* Fulton & Grant, 1902, which was preoccupied), *Eudromidia* Barnard, 1947 (erected because *Eudromia* Henderson, 1888, was a preoccupied name), *Speodromia* Barnard, 1947, and *Hemisphaerodromia* Barnard, 1954. *Ascidiophilus* Richters, 1880, was absorbed into *Pseudodromia* by BALSS (1922), and *Paradromia* Balss, 1921, was included in *Petalomera* by SAKAI (1936).

Most recently, the genus *Sphaerodromia* Alcock, 1899, has been reviewed by McLAY and CROSNIER (1991), and McLAY (1991). The genus *Parasphaerodromia* Spiridonov, 1992, was erected for a male specimen collected from an isolated seamount in the western Indian Ocean but it is shown herein to be a synonym of *Dromidia* Stimpson, 1858.

The genus *Conchoedromia* Chopra, 1934, remains enigmatic and obscure, and its position cannot be established until further specimens are collected. The status of *Sternodromia* Forest, 1974, and its relationship with *Dromia* Weber, 1795, are discussed in this paper. The monotypic genus *Genkaia* Miyake & Takeda, 1970, which includes *G. gordonae* Miyake & Takeda, 1970, was placed in the Dromiidae, but belongs in the Tymolidae Alcock, 1896 (M. TAVARES, pers. comm.).

The genera of the Dromiidae have not been reviewed or revised since BORRADAILE (1903a) who recognized 12 genera. The characters which BORRADAILE considered important in generic definition were presence or absence of the cheliped epipod, definition of the regions of the carapace, ratio of carapace width to length, shape of the legs and arrangement of the female sternal grooves. By themselves these features are an inadequate basis for resolution of the species into a series of natural groups.

My generic revision of the Dromiidae uses a wider range of characters than that used by BORRADAILE (1903a), including epipods and podobranchs of the pereiopods, ratio of carapace width to length, texture of the carapace surface, development of the rostrum, sexual dimorphism of chelipeds, tubercles of the first two pairs of legs, arrangement of spines on and around the dactyli of the legs, size of the uropod plates, presence of vestigial pleopods on the male abdomen, fusion of the last two segments of the abdomen and sternal grooves of mature females. HENDERSON (1888) doubted that STIMPSON'S revision had resulted in natural groups because too much reliance had been placed on disposition of the female sternal grooves. By themselves, the sternal grooves are of only limited value because they show ontogenetic change and can only be used for mature females. Later, both LEWINSOHN (1977) and MANNING & HOLTHUIS (1981) questioned the importance which has been placed on the sternal groove character. Variation in the structure of male pleopods, which has been so valuable in the study of other Brachyura, proves to be of little use in the Dromiidae. Apart from some minor differences, the male pleopods of all known members of the Dromiidae are very uniform.

The use of the cheliped epipod character by BORRADAILE (1903a) was perhaps the major innovation which helped to resolve many problems with dromiid taxonomy. Amongst these crabs it has always been assumed that it is a very conservative character and therefore useful for separating large groups of genera within the family. For example, absence of a cheliped epipod seems to separate the species of *Dromidia* from *Dromia* and *Dromidiopsis*. In the same way, species of *Cryptodromia* have been separated from *Petalomera*. However, there are some cases where species, which are very similar in every other respect, differ only in this character. Two examples, involving species assigned to *Petalomera* Stimpson, 1858, because they have an epipod, are firstly, *P. nodosa* Sakai, 1936, which has an areolate carapace and closely resembles species of *Epigodromia* gen. nov., and secondly *Petalomera fukuii* Sakai, 1936, which has a smooth carapace and closely resembles species of *Cryptodromia*. In this paper I allow the cheliped epipod character to be a variable in the genera *Cryptodromia* and *Epigodromia*.

In my approach to this generic revision I have given emphasis to suites of characters rather than treating each character by itself. For example, I have considered the characters of the last two pairs of legs which have to do with the carriage of camouflage as one suite. Other suites of characters include the nature of the carapace surface and the size and shape of uropods in relation to their role in the abdominal locking mechanism. I make the assumption that comparison of these character suites amongst genera will give us an indication of the direction of evolution in the family as a whole.

The genera dealt with in this paper are *Sphaerodromia* Alcock, 1899, *Eodromia* gen. nov., *Tunedromia* gen. nov., *Dromidiopsis* Borradaile, 1903, *Lauridromia* gen. nov., *Dromia* Weber, 1795, *Haledromia* gen. nov., *Hemisphaerodromia* Barnard, 1954, *Fultodromia* gen. nov., *Paradromia* Balss, 1921, *Petalomera* Stimpson, 1858, *Stimdromia* gen. nov., *Frodromia* gen. nov., *Conchoecetes* Stimpson, 1858, *Pseudodromia* Stimpson, 1858, *Ascidiophilus* Richters, 1880, *Exodromidia* Stebbing, 1905, *Eudromidia* Barnard, 1947, *Barnardromia* gen. nov., *Speodromia* Barnard, 1947, *Dromidia* Stimpson, 1858, *Austrodromidia* gen. nov., *Cryptodromiopsis* Borradaile, 1903, *Cryptodromia* Stimpson, 1858, *Takedromia* gen. nov., *Epigodromia* gen. nov., *Epipedodromia* André, 1932, *Homalodromia* Miers, 1884.

The only remaining dromiid genus, not dealt with herein, is *Hypoconcha* Guérin-Méneville, 1854, from American coasts [including *H. arcuata* Stimpson, 1858, *H. californiensis* Bouvier, 1898, *H. lowei* Rathbun, 1933, *H. panamensis* Smith, 1869, *H. parasitica* (Linnaeus, 1763) and *H. spinosissima* Rathbun, 1933]. The question of whether the genus *Hypoconcha* should remain in the family Dromiidae is dealt with in the Discussion (see later).

The generic revision, undertaken here, results in the recognition of twenty nine genera, and has major implications for the dromiid crabs of, not only the Philippines and New Caledonia, but also the rest of the Indo-Pacific region, Australia, South Africa and the Atlantic. After elimination of many synonyms, the total number of known species in the family Dromiidae is one hundred and nine, by far the majority coming from the Indo-Pacific region.

Key to the genera of Dromiidae

The genus *Conchoedromia*, enigmatic and obscure, is not included in this key.
Genera studied in this paper are in bold.

1. Carapace flattened, membranous, hourglass-shaped, frontal and lateral margins expanded, covering the eyes, dactyli of last two pairs of legs short, stout, lunate, used to carry a bivalve shell ..... *Hypoconcha* Guérin-Méneville, 1854
— Frontal and lateral margins not as above, dactyli of last two pairs of legs not lunate **2**

2. Carapace flattened, subpentagonal, not membranous, front tridentate, dactyl of penultimate leg large and talon-like, used for carrying a bivalve shell ..... ***Conchoecetes*** Stimpson, 1858 (p. 174)
— Carapace variously shaped, usually convex, dactyl of penultimate leg not talon-like and usually opposed or surrounded by one or more propodal spines **3**

3. Cheliped with epipod and podobranch, first two pairs of legs also with epipods, and sometimes podobranchs ..... ***Sphaerodromia*** Alcock, 1899 (p. 126)
— Cheliped may have an epipod but no podobranch, first two pairs of legs without podobranchs **4**

4. Cheliped usually with an epipod, last two abdominal segments may be fused or freely movable **5**
— Cheliped usually without an epipod, last two abdominal segments freely movable **16**

5. Carapace surface smooth or at most only finely denticulated **6**
— Carapace surface granular or tuberculate, maybe areolate **12**

6. Uropod plates on the abdomen vestigial or absent, not visible externally **7**
— Uropod plates small, but visible externally **8**

7. Uropod plates vestigial, carapace width much greater than carapace length, deep reniform cavities on front of carapace ..... ***Haledromia*** gen. nov. (p. 158)
— Uropod plates absent, carapace as wide as long, no cavities on front of carapace ..... ***Tunedromia*** gen. nov. (p. 134)

8. Carapace approximately as long as wide, small spine on outer margin of dactyl of fourth leg, and last two segments of abdomen usually partially or wholly fused; or carapace wider than long, no spine on fourth leg dactyl, and abdomen partially fused; or carapace longer than wide, no spine on fourth leg dactyl, and abdominal segments not fused **9**
— Carapace as wide or wider than long, no spine on outer margin of dactyl of fourth leg and all segments of the abdomen freely movable **10**

9. Rostral and anterolateral teeth well developed, acute, superior margin of cheliped carpus and propodus armed with two to four large tubercles, female sternal grooves terminate in well developed tube-like structures, male abdominal locking mechanism does not involve uropods but instead there are serrated flanges on the bases of the first two pairs of legs which grip lateral margins of the abdomen ..... ***Lauridromia*** gen. nov. (p. 145)
— Rostral and anterolateral teeth blunt, superior margin of cheliped carpus and propodus without large tubercles, female sternal grooves do not terminate in well developed tubes, male abdominal locking mechanism involves uropods in front of serrated flanges on base of first legs ..... ***Dromidiopsis*** Borradaile, 1900 (p. 135)

10. Carapace strongly convex, lateral rostral teeth not developed, anterolateral margin rounded, without teeth ..... ***Hemisphaerodromia*** Barnard, 1954 (p. 159)
— Carapace may be convex, but lateral rostral teeth and anterolateral teeth well developed **11**

11. Chelipeds and first two pairs of legs strongly tuberculated and lobed .... ***Stimdromia*** gen. nov. (p. 167)
— Chelipeds and first two pairs of legs smooth ..... ***Dromia*** Weber, 1795 (p. 149)

12. Carapace longer than wide **13**
— Carapace as wide or wider than long **15**

13. Carapace sub-globose, a small spine on ventral distal margin of propodi of first two pairs of legs, several small spines on the inner margins of dactyli of last two pairs of legs, vestigial pleopods on male abdomen ..... ***Eodromia*** gen. nov. (p. 130)
— Carapace angular, no spines on propodi of first two pairs of legs or on inner margins of dactyli of last two pairs of legs, no vestigial pleopods on male abdomen **14**

14. Petaloid meri on chelipeds and first two pairs of legs .... ***Petalomera*** Stimpson, 1858 (p. 164)
— Meri of chelipeds and first two pairs of legs not petaloid .... ***Fultodromia*** gen. nov. (p. 162)

15. Rostral teeth bluntly rounded, carapace may be areolated .... ***Paradromia*** Balss, 1921 (p. 163)
— Rostral teeth sub-acute, carapace not areolated ..... ***Frodromia*** gen. nov. (p. 170)

16. Carapace surface smooth **17**
— Carapace surface granular **25**

17. Uropod plates on abdomen concealed or absent **18**
— Uropod plates on abdomen small, but visible externally **23**

18. Posterior margin of telson sharply pointed **21**
— Telson may be narrowed, but posterior margin not sharply pointed **19**

19. Rostrum bidentate, transverse ridge behind rostrum divided into four lobes, no spines on the outer propodal margins of the last two pairs of legs..... ..... ***Epipedodromia*** André, 1932 (p. 224)
— Rostrum tridentate or unidentate, no transverse ridge behind rostrum, spines present on the outer propodal margins of the last two pairs of legs **20**

20. Carapace longer than wide, rostrum unidentate, no exopod on antenna, last pair of legs as long or longer than first two pairs, no propodal spines opposing the dactyli of last two pairs of legs, instead there are spines placed on the lateral propodal margins..... ..... ***Ascidiophilus*** Richters, 1880 (p. 177)
— Carapace as wide or wider than long, rostrum tridentate, exopod on antenna well developed, last pair of legs much shorter than either of first two pairs, one or two propodal spines opposing dactyli of last two pairs of legs .... ***Austrodromidia*** gen. nov. (p. 185)

21. Carapace wider than long, rostrum tridentate ..... ***Dromidia*** Stimpson, 1858 (p. 183)
— Carapace longer than wide, rostrum unidentate or bi-lobed **22**

22. Rostrum tridentate, not eave-like, last pair of legs as long or longer than first two pairs, no propodal spines opposing the dactyli of last two pairs of legs, instead there are spines placed on the lateral propodal margins ..... ***Pseudodromia*** Stimpson, 1858 (p. 175)
— Rostrum bi-lobed, well developed as an overhanging sinuous eave, last pair of legs much shorter than first two pairs, dactyli of last two pairs of legs opposed by single propodal spines ..... ***Eudromidia*** Barnard, 1947 (p. 179)

23. Female sternal grooves end close together between chelipeds or first legs, usually a small spine on the outer margin of fourth leg dactyl .... ***Cryptodromiopsis*** Borradaile, 1903 (p. 187)
— Female sternal grooves end apart, no spine on outer margin of fourth leg dactyl **24**

24. Carapace length significantly greater than width, rostrum consists of two widely separated bifid lobes, no median tooth ..... ***Homalodromia*** Miers, 1884 (p. 225)
— Carapace approximately as wide or wider than long, rostrum tridentate .... ***Cryptodromia*** Stimpson, 1858 (p. 197)

25. Uropods small but visible externally, telson without a terminal spine **27**
— Uropods absent, or if present, they are not visible externally, telson with a terminal spine..... **26**

26. Carapace length equal to or greater than carapace width, lateral rostral teeth produced as long spines, no sub-branchial cavity under lateral carapace margin..... ..... ***Exodromidia*** Stebbing, 1905 (p. 178)
— Carapace wider than long, rostrum triangular, deflexed, but not bearing teeth, deep sub-branchial cavity under the lateral carapace margin ... ***Speodromia*** Barnard, 1947 (p. 182)

27. Carapace shape sub-circular, anterolateral teeth well developed, lacinated and tuberculated. ..... ***Takedromia*** gen. nov. (p. 211)
— Carapace shape angular, anterolateral teeth often not distinct, may be tuberculated, but not lacinated **28**

28. Last anterolateral tooth strongly developed, projecting laterally, posterior margin of telson rounded ..... ***Barnardromia*** gen. nov. (p. 179)
— Last anterolateral tooth not strongly developed, posterior margin of telson may be bilobed ..... ***Epigodromia*** gen. nov. (p. 216)

SPECIES LIST OF NEW CALEDONIAN AND PHILIPPINE DROMIIDAE

The following is a list of all the species identified in the collection from both New Caledonia and surrounding areas (NC), and the Philippines (PH) :

Sphaerodromia kendalli (Alcock & Anderson, 1894) (PH).
Eodromia denticulata gen. nov., sp. nov. (NC).
Dromidiopsis dubia Lewinsohn, 1984 (NC).

Dromidiopsis lethrinusae (Takeda & Kurata, 1976) nov. comb. (PH, NC).
Dromidiopsis tridentata Borradaile, 1903 (NC).
Lauridromia intermedia (Laurie, 1906) nov. comb. (PH, NC).
Dromia dormia (Linnaeus, 1763) (NC).
Dromia foresti sp. nov. (NC).
Dromia wilsoni (Fulton & Grant, 1902) nov. comb. (PH, NC).
Petalomera pulchra Miers, 1884 (NC).
Stimdromia angulata (Sakai, 1936) nov. comb. (PH).
Frodromia atypica (Sakai, 1936) nov. comb. (PH).
Cryptodromiopsis bullifera (Alcock, 1900) nov. comb. (NC).
Cryptodromiopsis plumosa (Lewinsohn, 1984) nov. comb. (NC).
Cryptodromiopsis unidentata (Rüppell, 1830) nov. comb. (PH, NC).
Cryptodromia ?coronata Stimpson, 1858 (NC).
Cryptodromia fukuii (Sakai, 1936) nov. comb. (NC).
Cryptodromia amboinensis De Man, 1888 (PH, NC).
Cryptodromia hilgendorfi De Man, 1888 (PH, NC).
Cryptodromia fallax (Lamarck, 1818) (NC).
Cryptodromia longipes sp. nov. (NC).
Takedromia cristatipes (Sakai, 1969) nov. comb. (NC).
Takedromia longispina gen. nov., sp. nov. (NC).
Epigodromia areolata (Ihle, 1913) nov. comb. (NC).
Epigodromia rotunda sp. nov. (NC).
Epigodromia rugosa sp. nov. (NC).
Homalodromia coppingeri (Miers, 1884) (NC).

Genus ***SPHAERODROMIA*** Alcock, 1899

Sphaerodromia Alcock, 1899 : 16; 1900 : 152; 1901 : 38. — Balss, 1922 : 106. — Sakai, 1936 : 15. — McLay, 1991 : 459.

Carapace sub-globose, as wide or wider than long, surface gradually rounded, tomentose. Front broadly triangular, grooved in midline, rostrum not developed, continuous with supraorbital margin. Distomedial corner of second antennal segment not produced. Coxae of third maxillipeds closely approximated and inserted under tip of sternum. Female sternal grooves end wide apart behind genital openings. Cheliped with an epipod and well developed podobranch, first two pairs of legs also have epipods, with or without podobranchs. Chelipeds longer and stouter than first two pairs of legs, which are not nodose. Usually a small propodal spine on inferior margin overlapping with dactyli of first two pairs of legs. Last two pairs of legs reduced, similar in size, only last pair subdorsal. Three to five propodal spines opposing dactyli, no spines on outer propodal margin, but two to four small spines on inner margin of dactyli. Abdomen of six free segments. Telson rounded, longer than wide in male, wider than long in female. Uropod plates well developed, visible externally and occluding up to approximately half the sub-terminal abdominal segment from the lateral margins. Abdominal locking mechanism consists of denticulate ridge on coxae of first two legs against lateral margins of telson and last two segments, uropods not used. First male pleopod with a small rounded terminal plate, second pleopod simple, needle-like with an exopod on the basis. Vestigial pleopods present on male segments three-five.

Type species. — *Dromidia kendalli* Alcock & Anderson, 1894, by monotypy.

Other species. — *Sphaerodromia brizops* McLay & Crosnier, 1991, *S. ducoussoi* McLay, 1991, and *S. nux* Alcock, 1899.

DISCUSSION. — The genus *Sphaerodromia* Alcock, 1899, has been reviewed by McLAY (1991). A more detailed definition of the genus is given above. The important characters which make *Sphaerodromia* the most primitive known genus of the Dromiidae, and clearly differentiate it from other genera are as follows : distomedial corner of second antennal segment not produced, exopod extending beyond joint of segments three and four, epipods present on chelipeds and first two pairs of legs, a podobranch present on chelipeds (and sometimes legs), usually a propodal spine at base of dactyli of first two pairs of legs, multiple propodal spines opposing dactyli of last two pairs of legs, inner margins of these dactyli armed with small spines, uropods large, vestigial pleopods on male abdominal segments three-five, first male pleopod has an apical plate, basis of second pleopod has an exopod (see Table 1).

In the other genera these characters show a more advanced state. The distomedial corner of the second antennal segment is produced as a spine, on which the third segment is inserted at an angle, and the exopod attached to the opposite side is shorter. Thus, whereas in *Sphaerodromia*, the second antenna is fairly straight, in other genera it is angled at the junction between second and third segments. An epipod may be present on the cheliped but there are none on any of the other pereiopods. A propodal spine at the base of the dactyli of the first two pairs of legs is only rarely present in these genera. Similarly, spines on the inner margins of the dactyli of the last two pairs of legs, are rare. Uropods, although often visible externally, are smaller and sometimes absent. First two pleopods of males are extremely uniform, lacking an apical plate on the first, and an exopod on the basis of the second. Vestigial male pleopods on third to fifth segments are only found in two other genera (*Eodromia* gen. nov., and *Exodromidia* Stebbing, 1905).

S. lethrinusae Takeda & Kurata, 1976, does not belong in this genus and will be transferred to *Dromidiopsis* Borradaile, 1900 (see below).

Species of *Sphaerodromia* often carry large pieces of sponge for camouflage.

DISTRIBUTION. — The distribution of this genus includes Madagascar, Seychelles, India, Burma, Japan and French Polynesia. *S. nux* Alcock, 1899, has been recorded from Burma, Seychelles and Madagascar but this distribution is extended by a female (CW = 41.7 mm, CL = 36.0 mm, MNHN-B 10523), from Réunion Island, Indian Ocean.

Key to the species of *Sphaerodromia*

(Species studied in this paper are in bold)

1. Orbit divided horizontally into two chambers ..... *Sphaerodromia brizops* McLay & Crosnier, 1991
— Orbit not divided horizontally, but with incipient vertical division **2**

2. Carapace approximately as wide as long (ratio CW/CL = 1.0 ± 0.05) **3**
— Carapace significantly wider than long (ratio CW/CL > 1.05) ..... *Sphaerodromia nux* Alcock, 1899

3. Carapace surface smooth, anterolateral margin of carapace entire ..... ***Sphaerodromia kendalli*** (Alcock & Anderson, 1894)
— Carapace surface granulated, anterolateral margin of carapace with a deep notch at about the middle ..... *Sphaerodromia ducoussoi* McLay, 1991

Sphaerodromia kendalli (Alcock & Anderson, 1894)

Figs 2 a-i, 15 a

Dromidia kendalli Alcock & Anderson, 1894 : 175.
Dromia (Sphaerodromia) kendalli - ALCOCK, 1899 : 16.

Sphaerodromia kendalli - ALCOCK, 1900 : 153; 1901 : 39, pl. 4, figs 18, 18a. — IHLE, 1913 : 92 (list). — BALSS, 1922 : 106. — SAKAI, 1936 : 15; 1976 : 28, text fig. 16.

MATERIAL EXAMINED. — **Philippine Islands.** MUSORSTOM 3 : stn CP 143, 11°29.00'N, 124°11.00'E, 205-214 m, 7.06.1985 : 1 ♀ 40.6 x 39.7 mm (MNHN-B 22543).

South East Molucca Islands. KARUBAR : stn DW 18, 5°18.00'S, 133°01.00'E, 205-212 m, 24.10.1991 : 1 ♂ 20.1 x 20.8mm (MNHN-B 22542).

DESCRIPTION. — Carapace subcircular, approximately as wide as long, globose, smooth except for some scattered granules near the borders, covered with a short thick, erect, yellowish tomentum. Branchial notch evident but grooves faint. Rostrum consists of two prominent lateral teeth separated by a shallow sinus. Anterolateral borders of carapace begin at outer orbital angle, initially shoulder-like then curving more gradually, convex, continuous, with a few small granules before the branchial notch.

Border of lateral rostral tooth extends back as supraorbital margin, slightly notched near middle, to postorbital corner which is not produced. Dorsal surface of orbit ridged, tending to divide the orbit into two sections. No orbital fissure, margin continues on to suborbital lobe which is prominent, rounded, triangular and visible dorsally.

Basal segment of antenna much wider than long, beaked medially, gaping widely, twisted, upper lobe shorter than lower, second segment much longer than wide, convex, a small central distal tubercle, distomedial corner not produced, third segment longer than wide inserted terminally, exopod firmly fixed to second segment, surface convex, tip truncated, blunt, extending as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.58. Epistome triangular, wider than long, lateral margins notched mid-way, adorned by a row of small granules, surface slightly concave with a pair of central granules.

Subhepatic area swollen with two small granules. Female sternal grooves shallow, scarcely developed, partially concealed by bases of third legs, ending wide apart behind bases of second legs on a common transverse ridge.

Chelipeds well developed, borders of merus granulate, carpus inflated, two strong distal tubercles, covered with many small granules. Similar granules on propodus, fingers elongate, slightly down-curved, not gaping in female. Teeth on fingers tend to be obsolete, especially on dactyl. Chelipeds have a well developed podobranch.

First two pairs of legs slightly shorter than chelipeds, smooth, distal borders of carpi lobed. Dactyli shorter than propodi, not strongly curved, inner borders armed with 6-8 small spines set at an angle to the dactyl. A small spine occurs on the inferior distal border of propodi, overlapping the dactyli for a short distance. First legs have a smaller podobranch than the chelipeds and second legs have a very small podobranch.

Last two pairs of legs reduced, similar in size. Dactyl of third leg short, strongly curved, opposed by four propodal spines with 3-4 smaller spines on the inner margin of the dactyl itself. Fourth leg dactyl reduced and opposed by 6-7 closely-spaced propodal spines and six small spines on inner margin of dactyl as for the third leg.

Abdomen of six free segments, smooth. Telson in female slightly wider than long, longer than wide in male, tip rounded. Uropod plates in female very large, each occupying about one-half of lateral margin. Male uropod plates well developed, visible externally, lying between the bases of first and second walking legs when abdomen is closed but they are not involved in locking the abdomen. The abdominal locking mechanism consists of finely denticulate ridges on the coxae of first and second legs; the coxal ridge of the first leg engages with the margin of the proximal corner of the telson, while the coxal ridge of the second leg engages with the inner face of the joint between the fifth and sixth abdominal segments.

First male pleopod stout, openly grooved to carry needle-like second pair; distal end of endopod bears a blunt lateral knob and a semi-oval, curved medial plate; basis of second pleopod has a long blunt exopod.

DISCUSSION. — The present specimens differ in three minor ways from the description of *S. kendalli* given by McLAY (1991) : distal propodal spines are present on the first two pairs of legs (absent on earlier specimens), spines on of last pair of legs are six-seven opposing the dactyl, none on the outer margin and six spines on the inner margin of the dactyl itself (given earlier as 3 + 0 + 3). The number of propodal spines seems to be variable amongst individuals and this is further complicated by breakage of spines. With this character it seems better not to be too precise about the exact numbers of spines which should be expected. Lastly, the anterolateral margin of the male specimen has up to ten small granules (only five on the left side) which tend to be arranged in groups.

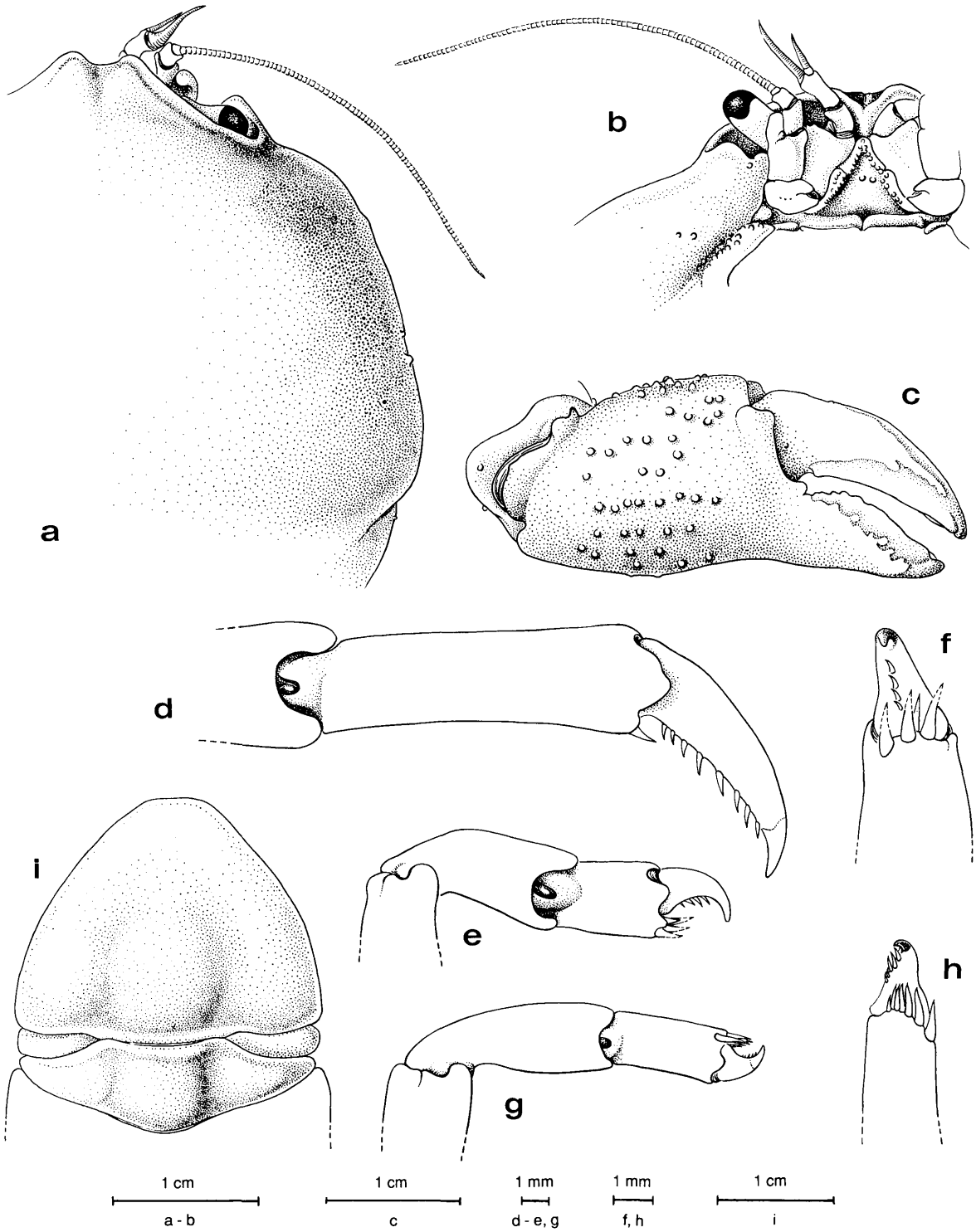


FIG. 2. — *Sphaerodromia kendalli* (Alcock & Anderson, 1894), ♀ 40.6 x 39.7 mm, Philippine Islands, MUSORSTOM 3, stn CP 143, 205-214 m (MNHN-B 22543) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of right third leg; **f**, ventral view propodus and dactyl of right third leg; **g**, posterior view of right fourth leg; **h**, ventral view propodus and dactyl of right fourth leg; **i**, ventral view of telson and terminal segments of female abdomen.

Only three females, including one of the present specimens, of *S. kendalli* have been collected. The male specimen reported here is the first to be collected and so important male characters are now known. In their original description ALCOCK and ANDERSON (1894) stated that the sternal grooves "unite opposite base of chelipeds" but later ALCOCK (1899) stated that they "are very short, ending well behind the level of the genital openings". The female from the Philippines confirms that the latter description is correct. All three of the females collected have been sexually mature and they suggest that this species reaches maturity at a relatively small size. The egg size is evidently at the small end of the range for dromiids.

McLAY (1991) presented a table comparing some of the important characters of the species of *Sphaerodromia*. Since the male of *S. kendalli* was unknown at that time, the information about these characters could not be entered. Now that a male is available, it can be confirmed that this species is in agreement with all of the other three, confirming that all these species form a well-defined, natural group.

SIZE. — The type specimen was a female CW = 19.0, CL = 18.0 mm and BALSS' (1922) specimen from Japan was an ovigerous female CW = 13.5, CL = 12.0 mm with eggs 0.5 mm diameter. Thus the present female is much larger than any of the earlier specimens, and the male is the only known specimen.

DEPTH. — Only three depth records for *S. kendalli* are available : the type specimen (200 m), and the present records, 205-214 m for the female, and 205-212 m for the male, giving a depth range of 200-214 m and suggesting that this species is a deepwater dromiid. Although only a few specimens are known, they come from widely separated localities and the depth range is remarkably narrow.

CAMOUFLAGE. — The kind of camouflage carried by this crab is unknown because none of the specimens have been accompanied by their concealment.

DISTRIBUTION. — Previous records came from the Bay of Bengal and Japan, and so the Indonesian and Philippine specimens provide a link between these two localities, without extending the range.

Genus ***EODROMIA*** nov.

Carapace sub-globose, longer than wide, front projecting well beyond orbits, rostrum bidentate. Regions of carapace not well defined, surface denticulate and tomentose. Coxae of third maxillipeds closely approximated and separated from tip of sternum by a narrow gap. Female sternal grooves end apart behind the genital openings. Chelipeds longer and stouter than first two pairs of legs, not nodose, fingers not down-curved, epipod present, but without podobranch. Epipods absent from other pereiopods. Dactyli of first two pairs of legs as long as propodi, inner margins armed with small spines, a ventral, distal propodal spine may be present. Last two pairs of legs reduced, similar in size, only the fourth pair are sub-dorsal. Dactyli of both legs opposed by more than one propodal spine, several small spines on the inner margin. Abdomen composed of six free segments and telson. Uropod plates on the female abdomen occluding the penultimate abdominal segment from lateral margin, plates smaller in male. Vestigial pleopods on abdominal segments three to five in the male.

TYPE SPECIES. — *Eodromia denticulata* sp. nov. by monotypy.

ETYMOLOGY. — The generic name is derived from *Dromia* by adding the Greek *eos*, meaning dawn, and was chosen to indicate that this dromiid represents an 'early' stage in the evolution of this group.

DISCUSSION. — *Eodromia* is closely related to *Sphaerodromia* but has some features which must be regarded as more advanced states of these characters (see Table 1).

The similarities of the two genera are as follows : carapace sub-globose, rostrum bidentate, shape of segments of second antenna, epipod present on cheliped, distal propodal spine usually present on first two pairs of legs, six-

eight small spines present on inner margins of dactyli of these legs, on last two pairs of legs no spines on the outer propodal margin and several small spines on inner margin of dactyli, segments of abdomen unfused, uropod plates large occluding a substantial portion of the lateral margin, vestigial pleopods on the male abdomen and female sternal grooves ending apart behind genital openings.

Differences between the two genera are : in *Eodromia* the rostrum is more prominent, carapace surface denticulate rather than smooth, no incipient division of the orbit, no epipods on first two pairs of legs, dactyli and propodi the same length rather than propodi being longer. The absence of epipods on the first two pairs of legs

CHARACTER	*Sphaerodromia*	*Eodromia*	*Tunedromia*
Ratio CW/CL	Carapace width equal to or greater than length.	Carapace width less than length.	Carapace width approximately equal to length.
Carapace surface	Smooth.	Denticulate.	Smooth.
Rostrum	Bidentate, teeth blunt.	Bidentate, teeth blunt, forming a thickened eave.	Tridentate, teeth small, subacute.
Anterolateral carapace margin	Without teeth but may be granulate.	Small denticles.	Very small teeth.
Orbit	Orbit horizontally divided or with ridge beneath supra-orbital margin.	Orbit not restricted.	Orbit not restricted.
Antenna	Distomedial corner of second segment not produced. Exopod extends beyond third segment.	Distomedial corner slightly produced. Exopod as long as third segment.	Distomedial corner produced. Exopod as long as third segment.
Sternal grooves	End apart behind second legs.	End apart behind second legs.	End apart between second legs
Epipods/Podobranchs	Epipod on cheliped and first two legs. Podobranch on cheliped and sometimes on legs.	Epipod on cheliped only. No podobranchs on pereiopods.	Epipod on cheliped only. No podobranchs on pereiopods.
First two pairs of legs	Segments not nodose. Distal propodal spine present.	Segments not nodose. Distal propodal spine present.	Segments not nodose. Distal propodal spine absent.
Last two pairs of legs	Multiple propodal spines opposing dactyli. No spines on outer propodal margins. Inner margins of dactyli armed with spines. Last leg shorter than first leg. No spine on outer margin of dactyl of last leg.	Multiple propodal spines opposing dactyli. No spines on outer propodal margins. Inner margins of dactyli armed with spines. Last leg shorter than first leg. No spine on outer margin of dactyl of last leg.	Multiple propodal spines opposing dactyli. Multiple spines on outer propodal margins. Inner margin of third leg dactyl armed with spines. Last leg shorter than first leg. Spine present on outer margin of dactyl of last leg.
Abdominal segments.	No segments fused. Both bases of first two legs used in abdominal locking mechanism.	No segments fused. Both bases of first two legs used in abdominal locking mechanism.	No segments fused. Abdominal locking mechanism unknown.
Uropods	Large, visible externally.	Large, visible externally.	Absent.
Telson	Rounded.	Rounded.	Rounded.
Male pleopods	First pleopod with an apical plate. Basis of second pleopod has an exopod. Vestigial third to fifth pleopods.	Unknown.	Unknown.

TABLE 1. — Comparison of the key characteristics of the genera *Sphaerodromia* Alcock, 1899, *Eodromia* gen. nov., and *Tunedromia* gen. nov.

must be regarded as a more advanced character state. In general, the male pleopods are of little use to the study of dromiid taxonomy, but in *Sphaerodromia* they are different because of the presence of an apical plate on the first and a basal exopod on the second pleopod. Unfortunately the first two pairs of pleopods in the male of *Eodromia denticulata* are not properly developed and so this character cannot be compared.

Besides *Sphaerodromia* and *Eodromia*, vestigial male pleopods are also found in *Exodromidia* Stebbing, 1905.

Eodromia denticulata sp. nov.

Figs 3 a-j, 15 b

MATERIAL EXAMINED. — **New Caledonia - Norfolk Ridge**. SMIB 5 : stn DW 98, 23°01.70'S, 168°16.10'E, 335 m, 14.09.1989 : 1 ♀ (ovig.) 5.7 x 5.8 mm.

Loyalty Islands. MUSORSTOM 6 : stn DW 485, 21°23.48'S, 167°59.53'E, 350 m, 23.02.1989 : 1 ♂ 7.8 x 8.2 mm.

TYPES. — Holotype : ♀ (ovig.), 5.7 x 5.8 mm (MNHN-B 22544) from SMIB 5, stn DW 98. Paratype : ♂, 7.8 x 8.2 mm (MNHN-B 22545) from MUSORSTOM 6 : stn DW 485.

DESCRIPTION. — Carapace slightly longer than wide, evenly convex, frontal and branchial grooves faintly marked, cardiac area weakly defined, surface evenly covered by minute denticles beneath a sparse pile of short stiff setae. Front bidentate, projecting well forward in front of orbits, no median rostral tooth, lateral teeth blunt, continuous with supraorbital margin. Anterolateral margin begins at postorbital corner, margin divergent, armed with 6-7 small blunt denticles before a slight notch mid-way and then followed by a similar number of denticles towards the widest point, two-thirds along carapace length.

Two-thirds of length of supraorbital margin forms a thickened eave and then becomes a denticulated margin flush with the carapace. This margin meets the beginning of the anterolateral and suborbital margins at a triangular intersection at the postorbital corner. Suborbital margin an evenly rounded lobe armed with 6-7 small, blunt denticles. Beside the triangular intersection mentioned above, is a small concavity overhung by the anterolateral margin.

Basal segment of antenna much wider than long, granulated, beaked medially, gaping widely. Second segment much longer than wide, granulated, convex, distomedial corner slightly produced, on which the third segment is inserted at a slight angle. Distal region of second segment, at point of insertion of third segment, swollen and forming a small tubercle. Exopod firmly fixed to second segment, but insertion line still evident. Tip of exopod sloping with a sharp ventral spine, and extending as far as joint between third and fourth segments. Third segment longer than wide, increasing in width distally. Fourth segment longer than wide, ratio of length of antennal flagella to CW = 0.70.

Subhepatic area evenly convex, minutely denticulated. Blunt lobe at corner of buccal frame and a shallow groove extending from beside this lobe, around under anterolateral margin. Female sternal grooves end wide apart, but connected by a ridge, behind the base of the second legs.

Chelipeds well developed, merus trigonal, borders granulated, carpus convex, covered with small sharp granules, propodus inflated, minutely granulated, these tend to be arranged in longitudinal rows. Fingers not especially downcurved, hollowed out internally, teeth poorly developed, similar pattern on each finger : stout proximal tooth (larger on fixed finger), edentate cutting margin, followed by four to five larger teeth. Fingers close along their entire length. Cheliped with a small epipod without podobranch.

First two pairs of legs shorter than chelipeds, smooth, not knobbed although distal margins of carpi slightly lobed. Inferior distal margins of propodi have a short spine which parallels the dactyli for a short distance. Dactyli as long as propodi, inner margins armed with six small spines all of similar size.

Last two pairs of legs reduced, similar in size, last pair sub-dorsal. Dactyl of third leg small, curved, hook-like, opposed by two stout propodal spines with three spines on inner margin of dactyl itself. Dactyl of fourth leg the same as third but opposed by three propodal spines.

Abdomen of six free segments. Male telson as wide as long, tip rounded, surface convex. Uropod plates small but visible externally, occluding only about one tenth of penultimate abdominal segment from lateral margin. Abdominal locking mechanism consists of weak granulated swelling on base of first leg against notch between

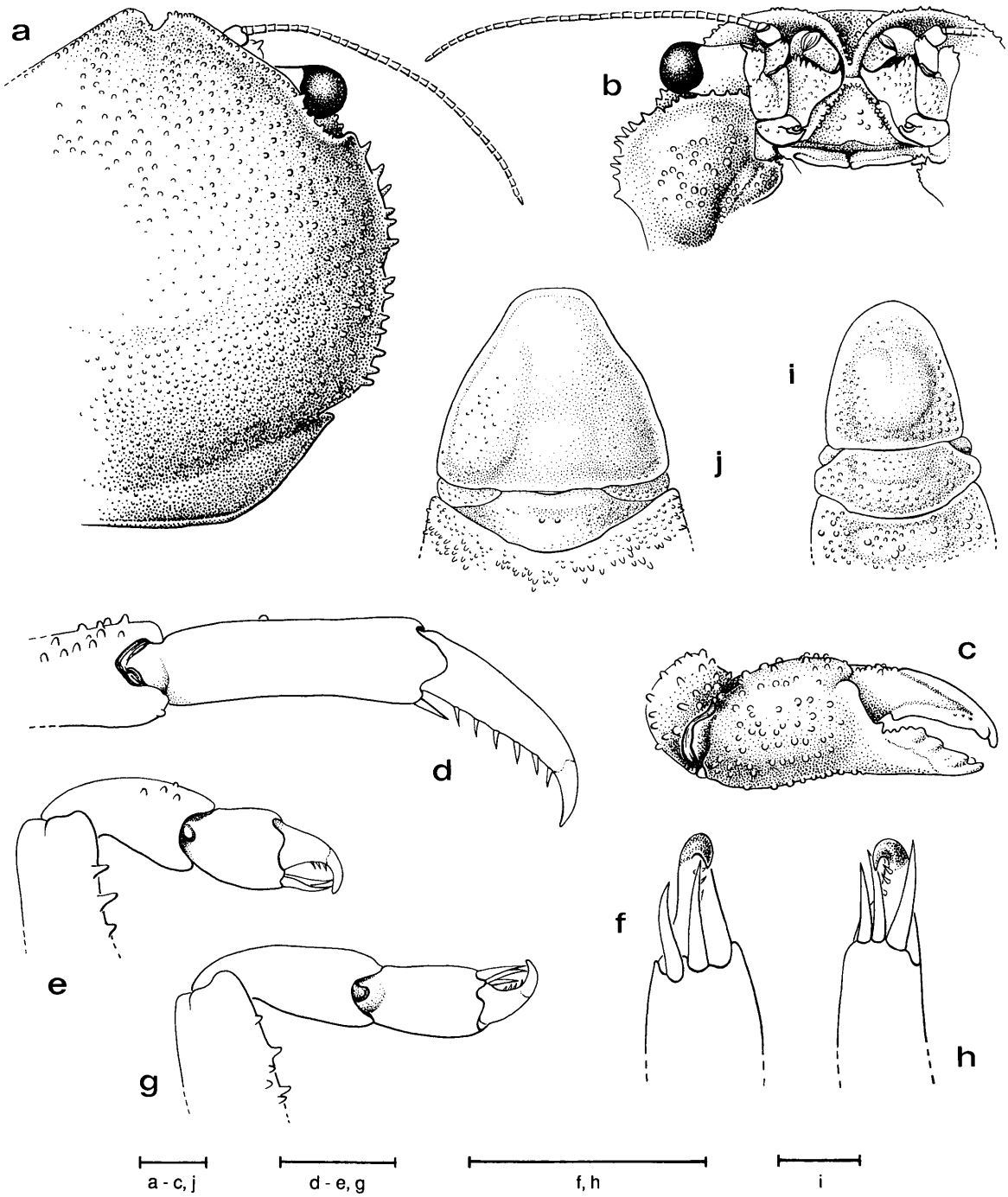


FIG. 3. — *Eodromia denticulata* gen. nov., sp. nov. : **a-i**, ♂ paratype, 7.8 x 8.2 mm, Loyalty Islands, New Caledonia, MUSORSTOM 6, stn DW 485, 350 m (MNHN-B 22545) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of right third leg; **f**, ventral view propodus and dactyl of right third leg; **g**, posterior view of right fourth leg; **h**, ventral view propodus and dactyl of right fourth leg; **i**, ventral view of telson and terminal segments of male abdomen. — **j**, ♀, holotype, 5.7 x 5.8 mm, New Caledonia-Norfolk Ridge, SMIB 5, stn DW 98, 335 m (MNHN-B 22544) : ventral view of telson and terminal segments of female abdomen.

Scale bars represent 1.0 mm.

proximal corner of telson and the uropod plate, which lies behind rather than in front of the swelling, and a better developed serrated ridge on base of second leg against inner surface of fifth abdominal segment. Telson of female also as wide as long, tip tends to be truncated. Uropod plates much larger than in male, entirely occluding the penultimate abdominal segment from the lateral margin.

The male has five pairs of pleopods, the first two pairs larger, but not properly developed, which may indicate that it has been feminized by a parasite, and the last three pairs are vestigial.

ETYMOLOGY.— The specific name of this species is derived from the Latin *denticulus* and refers to the finely denticulated surface of the carapace.

DISCUSSION. — The ovigerous female, CW = 5.7 mm, is mature at a very small size and has some 120 eggs of diameter = 0.4 mm. This egg size is similar to that reported by BALSS (1922) for an ovigerous female, CW = 13.5 mm, of *Sphaerodromia kendalli* which was 0.5 mm. Size at maturity for *Eodromia denticulata* is similar to that seen in some species of *Cryptodromia* (see below). The rudimentary first two pairs of pleopods on the female do not carry eggs.

DEPTH. — The depth range of 335-350 m for *Eodromia denticulata* is similar to many of the records for the *Sphaerodromia* species, suggesting that both these genera are typically found in deep water.

DISTRIBUTION. — Known only from New Caledonia.

Genus *TUNEDROMIA* nov.

Petalomera; - TAKEDA & MIYAKE, 1970 : 203 (in part). — DAI & YANG, 1991 : 25 (in part).

Carapace about as wide as long, surface smooth, tomentose. Rostrum tridentate, median tooth very small, deflexed. Antennal exopod well developed. Female sternal grooves end apart on low tubercles behind bases of the first legs. Anterolateral teeth small. Cheliped with an epipod. Legs not knobbed or ridged. Propodi and dactyli of first two pairs of legs equal in length, inner margins of dactyli armed with five or fewer small spines. Dactyl of third leg opposed by more than one propodal spine, more than one spine on the outer propodal margin and a spine on the inner margin of the dactyl itself. Fourth leg shorter than second leg, dactyl opposed by more than one propodal spine with a similar number of spines on the outer margin and a spine on the outer margin of the dactyl itself. Uropods absent from abdomen and joint between last two segments freely movable. Male characters unknown.

TYPE SPECIES. — *Petalomera yamashitai* Takeda & Miyake, 1970, by monotypy.

ETYMOLOGY. — *Tunedromia* is named to recognize the significant contribution of Tune SAKAI to the study of Pacific and especially Japanese Brachyura.

DISCUSSION. — *Petalomera yamashitai* Takeda & Miyake, 1970, was described from two ovigerous females collected from near Nagasaki on the west coast of Kyushu Island, Japan. Although the depth of the station was not reported, it must have been approximately 100-150 m, judging by the depths given for nearby localities. TAKEDA and MIYAKE (1970) chose to place this new species in the genus *Petalomera* because of an epipod on the cheliped coxa, but they noted that the meri of the cheliped and ambulatory legs were not petaloid. On account of the smooth carapace and two small anterolateral teeth, they likened the new species to *P. lateralis* (Gray, 1831) which they believed was its nearest kin. However, in *P. lateralis* the carapace is wider than long, a subhepatic tooth is prominent, and chelipeds and first two pairs of legs are prominently tuberculated. In addition there are several other features which preclude placement of *P. yamashitai* in this genus : the last two pairs of legs have multiple spines

opposing the dactyli and on the outer propodal margins, spines on the inner dactyl margin (third leg) and outer dactyl margin (fourth leg), and the uropod plates on the abdomen are absent. These characters make *P. yamashitai* closer to such genera as *Dromidiopsis* Borradaile, 1903, and *Lauridromia* gen. nov. but none of these genera lack uropod plates and the last two segments of the abdomen are usually fused. A new genus is therefore necessary to accommodate *P. yamashitai* (see Table 1).

TAKEDA (1989) recorded a specimen from Japan which he identified as *Petalomera* sp. and noted that it was most similar to *P. yamashitai*. This mature female is different in having a carapace longer than wide, covered with very short, thick tomentum, and a rostrum apparently composed of only two lobes. This may be an additional species which should be placed in *Tunedromia* but additional information about spines associated with the dactyli of the last two pairs of legs and the nature of the uropods must first be established.

DISTRIBUTION. — Known only from Japanese waters.

Genus ***DROMIDIOPSIS*** Borradaile, 1900

Dromidiopsis Borradaile, 1900 : 572; 1903a : 298 (in part). — IHLE, 1913 : 25 (in part). — BARNARD, 1950 : 311 (in part).
Dromia - HENDERSON, 1888 : 3.

Carapace as long as wide or longer than wide, surface smooth. Rostrum tridentate, lateral teeth rounded, not prominent. Coxae of third maxillipeds usually separated by a narrow gap and inserted close to the tip of the sternum. Female sternal grooves end on tubercles either apart or together, behind chelipeds. Cheliped with an epipod. Legs not knobbed or ridged. Propodi and dactyli of first two pairs of legs equal in length, inner margins of dactyli armed with five or fewer small spines. Dactyl of third leg opposed by one propodal spine with up to two spines on the outer propodal margin. Fourth leg may be as long as second leg, dactyl opposed by up to two propodal spines, usually one spine on the outer propodal margin and another on the outer margin of the dactyl itself. Uropods usually well developed, visible externally and used in the abdominal locking mechanism by fitting in front of serrated flange on the bases of the first pair of legs. Last two segments of the abdomen maybe fused or freely movable.

TYPE SPECIES. — *Dromia australiensis* Haswell, 1882, by present designation.

OTHER SPECIES. — *Dromidiopsis dubia* Lewinsohn, 1984, *Dromidiopsis edwardsi* Rathbun, 1919, *Dromia globosa* Lamarck, 1818, *Sphaerodromia lethrinusae* Takeda & Kurata, 1976, and *Dromidiopsis tridentata* Borradaile, 1903.

DISCUSSION. — The genus *Dromidiopsis* was erected by BORRADAILE (1900) for three specimens (2 ♂♂, and 1 ♀) from Rotuma and Fiji which he identified as *Dromia australiensis* Haswell, 1882. However a complete definition of the genus did not appear until BORRADAILE (1903a). Subsequently LEWINSOHN (1984) showed that BORRADAILE (1900) was in error and that the specimens which he studied should be *Dromidiopsis tridentata* Borradaile, 1903, although the name *D. tridentatus* was first used by BORRADAILE (1903a), but without a description. Using material from the Laccadive and Maldive Archipelagoes, *D. tridentatus* was first described by BORRADAILE (1903b) who at the same time, identified two varieties of *D. australiensis*, *bidens*, and *unidens*. He mentioned that these two species closely resembled each other, and he used differences in the anterolateral teeth, sternal grooves and presence of a propodal spine on the last pair of legs to separate them. However, the first two characters are variable, and the last character is easily mis-interpreted. Therefore all of these specimens should have been identified as *D. tridentatus* and the recognition of two varieties was not justified. Thus the name of the genus, definition of the genus, and description of the type species all occurred at different times. Consequently, BORRADAILE gave a definition of *Dromidiopsis* which clearly included *D. tridentata* but not necessarily

Dromia australiensis. The chief difference between these two species is that the rostrum in *D. australiensis* is distinctly lobed instead of being rounded. However, this is a minor difference and both species can be accommodated in the same genus.

The definition of *Dromidiopsis* given by BORRADAILE (1903a) is as follows : "Dromiidae with an epipod on the cheliped, the walking legs not knobbed or ridged, the carapace longer than broad, the furrows between the regions almost completely lost, the ridges of the efferent branchial channels well made, the sternal grooves of the female ending together on the cheliped segment or on that of the first walking-leg, the fifth leg about as long as the third and often with a thorn on the outer side of its last joint." However several characters are omitted from the definition of BORRADAILE (1900) : "rostrum triangular, with sides not distinctly lobed; gills phyllobranchiate; uropods present and visible in dorsal view in the angle between the sixth segment and the telson." Furthermore two characters are given differently : "sternal furrows in the female reach the chelipeds, converge, but do not join, and end in a single ill-defined tubercle; fourth and fifth legs (last two walking legs) subchelate." In the case of the sternal grooves, BORRADAILE evidently tried to make the character less specific, but for the last two pairs of legs he in fact focussed on a different aspect of their structure. Having phyllobranchiate gills is not a generic character because all dromiids have phyllobranchiate gills. BARNARD (1950) gave a different definition, selecting some characters from each of BORRADAILE's definitions, but fortunately, it does not greatly conflict with either of the originals.

Clearly it is essential that *Dromidiopsis* should be given an unambiguous definition and any species which do not fall within this definition should be transferred to other genera. The definition of *Dromidiopsis* given above has been slightly modified and amended, after BORRADAILE, so as to accommodate new species which are similar to *D. tridentata*. The major differences are that the last leg need not be as long as the second leg, there may or may not be a spine on the outer propodal margin of the last leg, and the female sternal grooves may end apart or together.

The genera *Dromidiopsis* and *Dromia* include most of the large dromiid crabs found in the Atlantic and Indo-Pacific Oceans. In the past there has been a great deal of confusion about which species should belong to which genus and there have been numerous synonyms. When examining the Dromiidae of Madagascar and the Seychelles, LEWINSOHN (1984) considered *Dromia dehaani*, *D. intermedia*, *Dromidiopsis dormia*, *D. tridentata* and *D. dubia*, and noted some of the specific characters which distinguish them. While clarifying some difficult problems, and introducing some important new characters, he did not apply these to the generic definitions.

The major differences between *Dromia* and *Dromidiopsis*, as defined above, are as follows (see Table 2) : in *Dromidiopsis* the carapace is longer than wide (wider than long in *Dromia*), female sternal grooves usually end together between bases of the chelipeds or first legs (usually end apart behind chelipeds), and a spine is present on the dactyl of the last leg (no spine present). For the species that currently belong in the two genera, these characters, along with the uropods, details of the spines on the last two pairs of legs, ratio of length of dactyli and propodi of first two pairs of legs, abdominal locking mechanism, and fusion of the last two abdominal segments have been used to create several new genera (see below). One consequence of this reorganization is that *Dromidiopsis* species are shown to be typically small crabs (CW < 40 mm) while all the large dromiid crabs are contained in genera such as *Dromia*, *Lauridromia* gen. nov., and *Haledromia* gen. nov.

FOREST (1974) showed that for the Atlantic *Dromia* there was considerable variation in the ratio of CW/CL within species and that a large proportion of this variation was accounted for by crab size; larger crabs had larger ratios of these two measures. However, this is of little consequence since most interest centers on whether the ratio is greater than, approximately equal to, or less than 1.0.

In his analysis of the use of the name *Dromidiopsis tridentata* Borradaile, 1903, LEWINSOHN (1984) showed that many of the supposed records of *D. australiensis* were in fact the former species. He concluded that the only certain records of *D. australiensis* were from Australia. Another Australian species, *D. abrolhensis* Montgomery, 1931, known only from a female from the Abrolhos Islands, Western Australia, is in fact a synonym of *D. australiensis*. Like *D. edwardsi*, *D. australiensis* is a variable species, especially in the nature of the anterolateral teeth. Comparison of the type specimen of *D. abrolhensis*, in the British Museum (registration number, 1931: 7: 24: 10), with specimens of *D. australiensis* shows that it lies within the range of variation of this species. SAKAI (1976) recorded a female of *D. abrolhensis* (locality uncertain, "off Hayama (?)", date unknown), which would imply that the distribution of *D. australiensis* also includes Japan. He verified his identification by comparing his

specimen with the type of *D. abrolhensis* but the origin of his specimen needs verification or alternatively confirmation by collection of additional material from Japan.

Dromidiopsis edwardsi is a name given by RATHBUN (1919) to Indo-Pacific specimens called *Dromia caput-mortuum* by H. MILNE EDWARDS (1837). Although most records of *D. edwardsi* are from Australia, others are from the Indian Ocean and Indonesia. There is a need to clarify the validity of the records outside Australia because this species is difficult to separate from *D. tridentata*. Further investigation may show that these two are the same species, with small specimens being identified as *D. tridentata* and large specimens as *D. edwardsi*.

The name *Dromidiopsis globosa* (Lamarck, 1818) is a new combination for the Australian species which has long been known as *Dromidiopsis excavata* (Stimpson, 1858). The original name for this species was *Dromidia excavata* Stimpson, 1858. A specimen in the Muséum national d'Histoire naturelle, Paris (locality unknown, B 22033), consisting of many dried fragments, and labelled *Dromidia globosa* Lam., is clearly the specimen studied by H. MILNE EDWARDS (1837) and later by DE MAN (1888a) who used the name *Dromidia globosa*. The frontal region and one cheliped are intact and when these are compared with three specimens (MNHN-B 22041), one female and two males, of *Dromidiopsis excavata* from Sydney Harbour they can be seen to be identical in every respect. LAMARCK'S description of *Dromia globosa* was exceedingly brief : "D. tomento brevissimo obducta; testa globulosa; marginibus deflexis", but H. MILNE EDWARDS (1837) gave a more detailed description which fits *Dromidiopsis excavata*. Thus there can be little doubt that the name as used by H. MILNE EDWARDS and DE MAN referred to this species. BORRADAILE (1900) identified a small male (5.8 x 5.2 mm) collected by J. STANLEY GARDINER from Rotuma Island as being *Dromidia globosa* but examination of this specimen shows that it is an undescribed species of *Stimdromia* gen. nov. At present, *Dromidiopsis globosa* is known only from Australia.

D. globosa is one of a small number of dromiid crabs which are known to have direct development and brood their young (HALE, 1941). The rich ruby red eggs are reported to be 1.9-2.0 mm diameter and the female examined by HALE, carried about 80 young crabs under its abdomen.

It should be noted that another Australian species, *Dromidiopsis michaelseni* Balss, 1935, is a synonym of *Fultodromia nodipes* (Lamarck, 1818), gen. nov., originally known as *Dromia nodipes*, dealt with later in this paper.

DISTRIBUTION. — The distribution of the species of *Dromidiopsis* includes Madagascar, India, Indonesia, the coast of Australia, New Caledonia and the Pacific as far east as Fiji and as far north as Japan i.e. an Indo-West Pacific genus.

Key to the species of *Dromidiopsis*

(Species studied in this paper are in bold)

1. Carapace approximately as long as wide **3**
— Carapace distinctly longer than wide **2**

2. Anterolateral margin has two blunt teeth, last two abdominal segments not fused, no spine on outer margin of dactyl of fourth leg, large posteriorly directed tooth mid-way along cheliped dactyl ..... ***Dromidiopsis dubia*** Lewinsohn, 1984
— Anterolateral margin with one-three teeth, last two segments of the abdomen fused together, spine present on outer margin of dactyl of fourth leg .... *Dromidiopsis australiensis* (Haswell, 1882)

3. Last two segments of abdomen not fused, anterolateral margin with a single tooth, carapace with a dense fringe of setae extending transversely across the front .... *Dromidiopsis globosa* (Lamarck, 1818) nov. comb.
— Last two segments of abdomen fused or partially fused, anterolateral margin with more than one tooth **4**

4. Inner margins of first two pairs of legs armed with four-five spines, two spines on outer propodal margin of third leg, dactyl of fourth leg opposed by two spines **5**

— Inner margins of dactyli of first two pairs of legs armed with two spines, no spines on the outer propodal margin of third leg, dactyl of fourth leg opposed by a single spine .... ***Dromidiopsis lethrinusae*** (Takeda & Kurata, 1976) nov. comb.

5. Last leg comparatively long, almost reaching supraorbital margin when extended forward ..... ***Dromidiopsis tridentata*** Borradaile, 1903

— Last leg shorter, not reaching supraorbital margin when extended forward..... ..... *Dromidiopsis edwardsi* Rathbun, 1919

Dromidiopsis dubia Lewinsohn, 1984

Fig. 15 c

? *Dromidiopsis dubia* Lewinsohn, 1984 : 102, fig. 2a-g.

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 15, 22°19.70'S, 166°31.50'E, 27 m, 22.05.1984 : 1 ♀ 6.7 x 7.5 mm. — Stn 48, 22°6.60'S, 166°15.20'E, 28 m, 25.05.1984 : 1 ♀ (ovig.) 9.5 x 11.1 mm. — Stn 54, 22°12.90'S, 166°15.40'E, 25 m, 25.05.1984 : 1 ♂ 8.2 x 9.2 mm. — Stn 55, 22°11.40'S, 166°16.60'E, 23 m, 25.05.1984 : 1 ♂ 9.3 x 11.2 mm. — Stn 58, 22°9.40'S, 166°12.90'E, 22 m, 25.05.1984 : 1 ♀ (ovig.) 7.5 x 8.5 mm. — Stn 86, 22°27.00'S, 166°33.70'E, 29 m, 21.08.1984 : 1 ♂ 4.5 x 4.9 mm. — Stn 104, 22°26.00'S, 166°40.40'E, 24 m, 22.08.1984 : 1 ♀ (ovig.) 8.5 x 9.6 mm. — Stn 111, 22°24.30'S, 166°47.70'E, 25 m, 22.08.1984 : 1 ♂ 9.1 x 10.4 mm. — Stn 113, 22°29.90'S, 166°44.00'E, 32 m, 22.08.1984 : 1 ♀ 8.0 x 9.4 mm. — Stn 125, 22°31.20'S, 166°44.00'E, 19 m, 23.08.1984 : 1 ♂ 12.7 x 14.9 mm. — Stn 169, 22°8.00'S, 166°8.40'E, 22 m, 18.09.1984 : 2 ♂♂ 5.2 x 5.9, 9.9 x 11.6 mm; 1 ♀ (ovig.) 8.0 x 9.4 mm. — Stn 215, 21°52.90'S, 165°49.90'E, 14 m, 21.09.1984 : 1 ♀ (ovig.) 10.3 x 12.0 mm. — Stn 303, 22°38.00'S, 166°49.10'E, 30-35 m, 27.11.1984 : 1 ♂ 9.7 x 11.3 mm. — Stn 316, 22°35.30'S, 166°54.00'E, 68 m, 27.11.1984 : 3 ♂♂ 5.7 x 6.3, 7.2 x 8.5, 8.8 x 10.0 mm; 1 ♀ (ovig.) 8.3 x 9.3 mm. — Stn 319, 22°32.20'S, 166°56.70'E, 75 m, 27.11.1984 : 1 ♀ 5.2 x 5.9 mm. — Stn 569, 22°48.80'S, 166°58.90'E, 62 m, 17.07.1985 : 1 ♀ (ovig.) 8.6 x 9.4 mm; 1 ♀ 8.4 x 10.1 mm, carrying a sponge cap. — Stn 570, 22°50.20'S, 167°1.00'E, 52-53 m, 17.07.1985 : 1 ♂ 7.8 x 8.7 mm. — Stn 619, 22°3.2'S, 166°54.2'E, 27-42 m, 6.08.1986 : 1 ♂ 13.2 x 16.2 mm. — Stn 718, 21°25.1'S, 165°56.3'E, 32-34 m, 11.08.1986 : 1 ♀ 8.0 x 9.2 mm.

DESCRIPTION. — Carapace longer than wide, only branchial groove well marked, surface smooth under a dense layer of short, fine setae, some longer setae fringing limbs. Front weakly tridentate, median rostral tooth small, blunt, deflexed scarcely visible dorsally, lateral rostral teeth broadly rounded, eave-like. Anterolateral margin begins at level of suborbital lobe, armed with three evenly spaced teeth, the first largest, blunt and close to orbit, second close by, narrower, and third, smallest and directed almost laterally. Sometimes the third tooth may be very weak or absent. Branchial notch distinct, followed by a small blunt lobe which hardly counts as a posterolateral tooth.

Supraorbital margin interrupted by a small blunt tooth, postorbital corner not produced. A deep fissure separates suborbital border which has a small blunt central tooth.

First segment of antenna much wider than long, beaked medially, slightly gaping, upper lobe of beak downcurved. Second segment much longer than wide, a proximal tubercle on lateral margin, medial margin concave, distomedial corner produced as a blunt spine on which third segment is inserted at an angle. Exopod firmly fixed, tip bilobed, extending as far as joint between third and fourth segments. Epistome triangular, slightly concave, lateral margins adorned with four-five small tubercles and interrupted by a small fissure.

Subhepatic area inflated, a single small inconspicuous tubercle, blunt lobe at corner of buccal frame and between these a shallow groove extending for only a short distance around under the anterolateral margin. Female sternal grooves end apart on small tubercles between bases of first legs.

Chelipeds small, merus trigonal, borders unarmed, carpus outer face slightly sculptured, two distal tubercles, inner margin of superior face with three small tubercles. Propodus smooth, fingers downcurved, hollowed out internally, with a unique arrangement of teeth : distally there are three-four interlocking typical dromiid teeth but proximally there is a large bifid tooth on fixed finger, opposite four small teeth on dactyl which also has a large proximally directed tooth which fits beside the bifid tooth of the fixed finger.

First two pairs of legs shorter than chelipeds, distal margins of carpi and propodi lobed. Dactyli as long as propodi, inner margins armed with three-four small spines increasing in size distally. On posterior face of dactyli there is a pearl-like basal swelling which articulates with the propodus.

Last two pairs of legs reduced, third pair shortest, dactyl opposed by a small propodal spine, none on outer propodal margin. Dactyl of fourth leg also opposed by a single propodal spine but with another spine on outer margin.

Abdomen composed of six free segments. Male telson about as long as wide, tip rounded. Uropod plates large, visible externally. Abdominal locking mechanism consists of uropod plate fitting in front of serrated flange on base of first leg, and lateral margin of penultimate abdominal segment concave, to accommodate the flange. Female telson slightly wider than long, uropod plates well developed.

First male pleopod stout, a semi-rolled setose tube with sharp horny tip, second pleopod simple, needle-like.

DISCUSSION. — LEWINSOHN (1984) based his original description of *Dromidiopsis dubia* on a single male specimen from Madagascar but now that females have been collected, their characteristics can be included. The holotype male had only two blunt anterolateral teeth, second largest, with a suggestion of a third tooth on the right hand side but the present specimens show that the anterolateral teeth are variable in relative size and number both within and between specimens. The peculiar proximal teeth on the fingers of both chelipeds, noted by LEWINSOHN, are confirmed and they are certainly unique amongst dromiids. The teeth are probably used for grasping and possibly severing stems, of perhaps algae, and they may indicate a specialized feeding strategy. In other respects all the specimens agree with the original description. LEWINSOHN was uncertain about where this species should be placed, largely because he did not have a female, but on the basis of some similarities (frontal and general body shape, smooth walking legs) with *Dromidiopsis australiensis* and *D. tridentata*, he chose this genus. The similarities are much greater to *D. tridentata*, and as will be subsequently shown, to *D. lethrinusae*.

SIZE. — Until now the single known specimen of *D. dubia* was a male, CW = 9.0 mm, from Madagascar. The 25 specimens from New Caledonia have a size range for males of CW = 4.5-13.2 mm, for females CW = 5.2-10.3 mm and for ovigerous females CW = 7.5-10.3 mm. The range of clutch sizes for females is 100 eggs (CW = 7.5 mm) to 192 eggs (CW = 10.3 mm) with a mean of 163 eggs (mean egg diameter = 0.7 mm). Females with a smaller carapace width did not have mature sized abdomens and there is no evidence of any overlap in size at maturity with the moult to maturity occurring between CW = 6-7 mm. Compared to *D. lethrinusae* this species has smaller numbers of larger eggs.

DEPTH. — The type specimen was collected from 30 m, which falls within the range, 14-75 m, of the New Caledonian specimens. Thus the depth range of *D. dubia* is extended to shallower and deeper waters.

CAMOUFLAGE. — Only one crab was accompanied by its camouflage cap which was constructed from a piece of sponge.

DISTRIBUTION. — As a result of finding these specimens off New Caledonia, the distribution of *D. dubia* is considerably extended from Madagascar and it is evident that this species is a small, shallow water dromiid.

Dromidiopsis lethrinusae (Takeda & Kurata, 1976) nov. comb.

Fig. 15 e-f

Sphaerodromia lethrinusae Takeda & Kurata, 1976 : 118, text fig. 1a-d.

MATERIAL EXAMINED. — **Philippines.** MUSORSTOM 1 : J. FOREST and M. DE SAINT. LAURENT coll., Cebu Marine Station, 3-4.04.1976, (det. *Cryptodromia* sp. by R. SERÈNE, 8.06.1976) : 1 ♀ 10.0 x 11.0 mm, carrying a compound ascidian cap.

Chesterfield Islands. CORAIL 2 : stn DW 92, 19°03.00'S, 158°53.93'E, 8 m, 26.08.1988 : 1 ♀ 5.3 x 5.5 mm. — Stn DW 97, 19°06.00'S, 158°38.43'E, 32 m, 27.08.1988 : 1 ♀ 7.8 x 8.1 mm. — Stn CP 127, 19°27.73'S, 158°27.30'E, 45 m, 29.08.1988 : 2 ♀♀ (ovig.) 10.9 x 11.7, 17.2 x 18.1 mm; 2 ♂♂ 9.5 x 9.8, 11.9 x 12.5 mm.

DESCRIPTION. — Carapace strongly convex, as wide as long, semi-circular shape, regions not defined, surface smooth, covered with short, fine, soft hairs except for tips of fingers. Lateral cardiac grooves sometimes evident, three indistinct cardiac tubercles may be present, branchial grooves usually well developed. Frontal region broadly rounded, not projecting, rostral teeth very small, median tooth strongly deflexed and not visible dorsally. Anterolateral margin begins at suborbital level and extends almost straight posteriorly. There is usually one tooth close to corner of orbit, sometimes followed by a smaller tooth, and another tooth may be present equidistant between the first and posterolateral tooth which marks a distinct notch. (The anterolateral teeth in this species are quite variable to the extent of being almost absent in some specimens, and may be different on each side of the carapace, but a common feature is the presence of at least one tooth close to the postorbital corner.) Posterior margin of carapace slightly concave.

Supraorbital margin smoothly curved, postorbital corner also rounded, a small fissure separating the rounded infraorbital margin.

First segment of antenna much wider than long, beaked medially, upper lobe shorter than lower lobe. Second segment much longer than wide, lateral margin convex, distomedial corner produced as an acute spine. Third segment inserted at an angle. Exopod firmly fixed to second segment, tip blunt, slightly concave, barely reaching joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.54.

Sternal grooves end together on a common raised tubercle between bases of chelipeds.

Chelipeds well developed, fingers pink or red. Merus trigonal, inferior borders finely denticulate. Outer face of carpus convex, with strong dorsal, distal tooth. Outer face of propodus also convex, superior margin may have a few fine denticles. Male fingers gaping basally, armed with seven-eight teeth, proximal three teeth very small, distal four-five teeth large and interlocking. Female fingers close along their entire length. When the outer surface of carpus and, especially, propodus are cleared of setae, an inlaid pattern of pale areas is revealed.

First two pairs of legs slightly shorter than chelipeds, smooth, distal posterior borders of carpi and propodi produced as rounded lobes. Dactyli as long as propodi, inner margins with two spines, distal spine much longer.

Third pair of legs smaller than first two pairs. Dactyl strongly curved, opposed by a single strong propodal spine, no spines on inner margin of dactyl but there are two small spines on the outer propodal margin at the posterior corner (these may not be present in juveniles). Fourth legs very long, slender, flattened, almost reaching supraorbital margin when extended. Curved dactyl opposed by a propodal spine, none on inner margin of dactyl, but there is a strong spine on outer margin and a small spine on outer propodal margin (this may be absent in smaller specimens).

Male telson as long as wide, tip rounded. Uropod plates well developed, visible externally. Fifth and sixth abdominal segments fused, although division still marked by a groove. Abdominal locking mechanism consists of uropods fitting in front of a serrated ridge on base of first leg which engages with the narrowed border of the penultimate abdominal segment. Mature female telson much wider than long, tip bluntly pointed, fifth and sixth abdominal segments also fused.

First male pleopod a simple rolled tube, bluntly tipped but densely setose, second pleopod simple, needle-like, no exopod on basis.

DISCUSSION. — TAKEDA and KURATA (1976) described *Sphaerodromia lethrinusae* on the basis of small male and female specimens recovered from the stomach of a fish (*Lethrinus variegatus* Valenciennes). The female was clearly immature with incompletely developed sternal grooves which ended apart just behind the second pair of legs. This female characteristic lead them to place this species in *Sphaerodromia* despite the absence of vestigial pleopods on the abdomen of their male specimen. The material reported in this paper includes three mature females whose sternal grooves are well developed and end together between the bases of the chelipeds and two males which lack vestigial pleopods. These characters indicate that *S. lethrinusae* should be placed in *Dromidiopsis*. Other characters which confirm this are : fusion of the fifth and sixth abdominal segments (a feature overlooked by TAKEDA and KURATA, 1976), epipod on cheliped, carapace width approximately equal to carapace length, fourth leg well developed and presence of a small spine on the outer margin of the dactyl of the fourth leg.

The smallest female (CW = 5.3 mm) in this collection has sternal grooves similar to those found in the original female from Japan, i.e. the grooves end apart between base of second legs, and the abdomen width is narrow, but the female (CW = 7.8 mm) has sternal grooves ending together on a raised tubercle just behind the

chelipeds and has a wider, mature abdomen. The female (CW = 10.9 mm) has similar sternal grooves while the largest female (CW = 17.2 mm) has sternal grooves ending together on a common raised tubercle between the chelipeds. Evidently female *D. lethrinusae* reach sexual maturity around CW = 7-8.0 mm, but the smallest female with eggs was CW = 10.9 mm. This female carried some 300 eggs while the large female had some 1100 eggs, with egg diameter = 0.6 mm. Amongst the species of this genus *D. lethrinusae* is relatively small with a reproductive strategy which combines small egg size with relatively large numbers.

SIZE. — Specimens in the present collection, increase the known maximum CW to 11.9 mm for males and 17.2 mm for females.

CAMOUFLAGE. — One of the present specimens was carrying a piece of compound ascidian camouflage.

DEPTH. — The fish, from which the original specimens were obtained, was caught in shallow water over rocky bottom (TAKEDA & KURATA, 1976). The present specimens all came from depths ranging from 8-45 m, confirming that this is a shallow water species.

DISTRIBUTION. — The distribution of *D. lethrinusae* now includes the Philippine Islands, and New Caledonia as well as Ogasawara Islands, Japan.

Dromidiopsis tridentata Borradaile, 1903

Figs 4 a-j, 16 a-b

Dromidiopsis tridentatus Borradaile, 1903b : 576, pl. 33, fig. 2a. — IHLE, 1913 : 90 (list).
Dromidia australiensis - DE MAN, 1888a : 396, pl. 17, fig. 6. — HENDERSON, 1893 : 406 (not *Dromia australiensis* Haswell, 1882).
Dromidia australiensis var. - DE MAN, 1896 : 372 (not *D. australiensis* Haswell, 1882).
Dromidiopsis australiensis - BORRADAILE, 1900 : 572; 1903b : 576. — IHLE, 1913 : 30 (not *D. australiensis* Haswell, 1882).
Dromidiopsis tridentata - BALSS, 1934 : 502. — GUINOT, 1967 : 239 (list). — LEWINSOHN, 1984 : 97, fig. 1.

MATERIAL EXAMINED. — **New Caledonia**. LAGON : stn DW 436 (d'Entrecasteaux Reefs), 18°6.40'S, 162°50.30'E, 45 m, 25.02.1985 : 1 ♀ (ovig.) 7.0 x 7.3 mm, carrying a sponge cap. — Stn DW 554, 22°50.20'S, 166°53.50'E, 25-29 m, 16.07.1985 : 1 ♂ 12.0 x 12.7 mm; 1 ♀ (ovig.) 12.0 x 12.7 mm, carrying a purple compound ascidian cap. — Stn DW 1157, 19°9.60'S, 163°9.80'E, 48 m, 30.10.1989 : 1 ♀ 6.2 x 6.8 mm.
Chesterfield Islands. CHALCAL 1 : stn DC 34, 19°52.10'S, 158°20.10'E, 37 m, 21.07.1984 : 1 ♂ 7.8 x 8.9 mm, carrying a sponge cap.

DESCRIPTION. — Carapace at least as long as wide, often longer, evenly convex, only the branchial groove evident, surface otherwise smooth under a sparse, short, fine tomentum. Front only weakly tridentate. Median rostral tooth on a lower level, deflexed, just visible in dorsal view. Lateral rostral teeth very short, blunt. Anterolateral margin gradually convex, beginning at level of postorbital corner. Always a small, blunt tooth near postorbital corner, there may be another tooth two-thirds towards the branchial groove, and a third tooth between these, but two teeth seems more common. Branchial notch well marked but not followed by a posterolateral tooth.

Supraorbital margin sinuous, uninterrupted, to postorbital corner which is produced as a rounded lobe. A fissure separates the suborbital lobe which is broad and bluntly produced.

First segment of antenna much wider than long, beaked medially, gaping, upper lobe shorter. Second segment much longer than wide, proximal lateral margin has a small tubercle, otherwise smooth, distomedial corner produced as a short spine on which the third segment is inserted at an angle. No distal central tubercle on second segment. Exopod firmly fixed, curving over eyestalk, tip blunt, sloping, not bilobed, extending as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.43. Epistome triangular, wider than long, surface concave, a narrow fissure between apex and median rostral tooth.

Subhepatic area smooth, concave. A blunt tooth at the corner of the buccal frame and a distinct groove extending from beside the tooth around under the anterolateral margin towards the branchial groove. Female sternal grooves end together between chelipeds on an elevation which consists of a triangle of three pearl-like knobs.

Chelipeds small, merus trigonal, borders unarmed. Carpus smooth except for two small distal tubercles on superior border and two distal tubercles on outer face. Propodus short, smooth except for two small tubercles on the superior margin. Fingers white, downcurved, hollowed out internally, armed with seven-eight small teeth, gaping basally.

First two pairs of legs shorter than chelipeds, distal margins of carpi and propodi bluntly lobed. Dactyli as long as propodi, inner margins armed with three-four small spines increasing in size distally. A small, proximal, pearl-like tubercle on posterior face of dactyli.

Last two pairs of legs smaller than first two pairs. Third leg shortest, dactyl opposed by one propodal spine with two very small spines on the outer propodal margin. Fourth leg comparatively long and flattened, almost reaching supraorbital margin when extended forward. Dactyl opposed by a single propodal spine, with another spine on the outer propodal margin and a small spine on the outer margin of the dactyl itself.

In both sexes the joint between fifth and sixth abdominal segments is fused and only evident at the margins. Uropod plates well developed and visible externally, in the female occupying about one quarter of lateral margin. Male telson longer than wide, tip bluntly rounded. Proximal margins of sixth abdominal segment narrowed to accommodate serrated ridge on base of first legs and abdominal locking mechanism consists of uropods fitting in front of these ridges. Female telson much wider than long, tip rounded.

First male pleopod a semi-rolled, setose tube with a sharp tip, second pleopod simple, needle-like.

DISCUSSION. — The anterolateral teeth of specimens from New Caledonia are variable in number with a maximum of three teeth, but two are more common and there is always one tooth close to the postorbital corner. BORRADAILE (1903b) suggested the varietal names *bidens* and *unidens* for specimens with different numbers of teeth, but this seems unnecessary. LEWINSOHN (1984) listed the major differences between *Dromidiopsis tridentata* and *Dromidiopsis australiensis* with which it was often confused. In *D. tridentata* the lateral rostral teeth are weaker and merge gradually with the orbital margin (strong and distinct in *D. australiensis*), anterolateral teeth variable in number and unequally spaced (three unequal teeth regularly spaced), epistome wider than long (as wide as long), last leg relatively long, almost reaching orbital margin (only reaching first anterolateral tooth), females reach maturity at CW less than 10 mm (reach maturity at CW greater than 25 mm).

Two females from New Caledonia were carrying eggs : CW = 7.0 mm (with 70 eggs) and CW = 12 mm (with 1000 eggs). In both egg clutches the egg diameter is 0.7 mm. The female with CW = 6.2 mm had an immature sized abdomen. Clearly this species reaches maturity at a relatively small size (CW = 6-7.0 mm) and produces relatively large eggs, a reproductive strategy similar to *D. dubia*.

SIZE. — Some 33 specimens of *D. tridentata* (including the New Caledonian specimens) have been recorded, 1 juvenile, 19 males, and 13 females (including 4 ovigerous females). The maximum size for males is CW = 13 mm and for females CW = 18 mm.

CAMOUFLAGE. — Camouflage carried by this species has been reported by HENDERSON (1893) as sponge, and by BORRADAILE (1900) as an ascidian. I have examined the specimens (MNHN-B 6881, B 6882, B 6887, B 7391) reported by LEWINSOHN (1984) and three carried compound ascidian caps, and one a sponge cap. In the New Caledonian material four specimens were accompanied by caps, three with sponges and one with a compound ascidian. Thus the camouflage used by *D. tridentata* seems to include both of these kinds equally frequently.

DEPTH. — Depth records previously reported for *D. tridentata* range from the intertidal to 62 m, and the present material falls within this range.

DISTRIBUTION. — The distribution of *D. tridentata* extends from India through Indonesia to the Fiji Islands and now includes New Caledonia and Chesterfield islands.

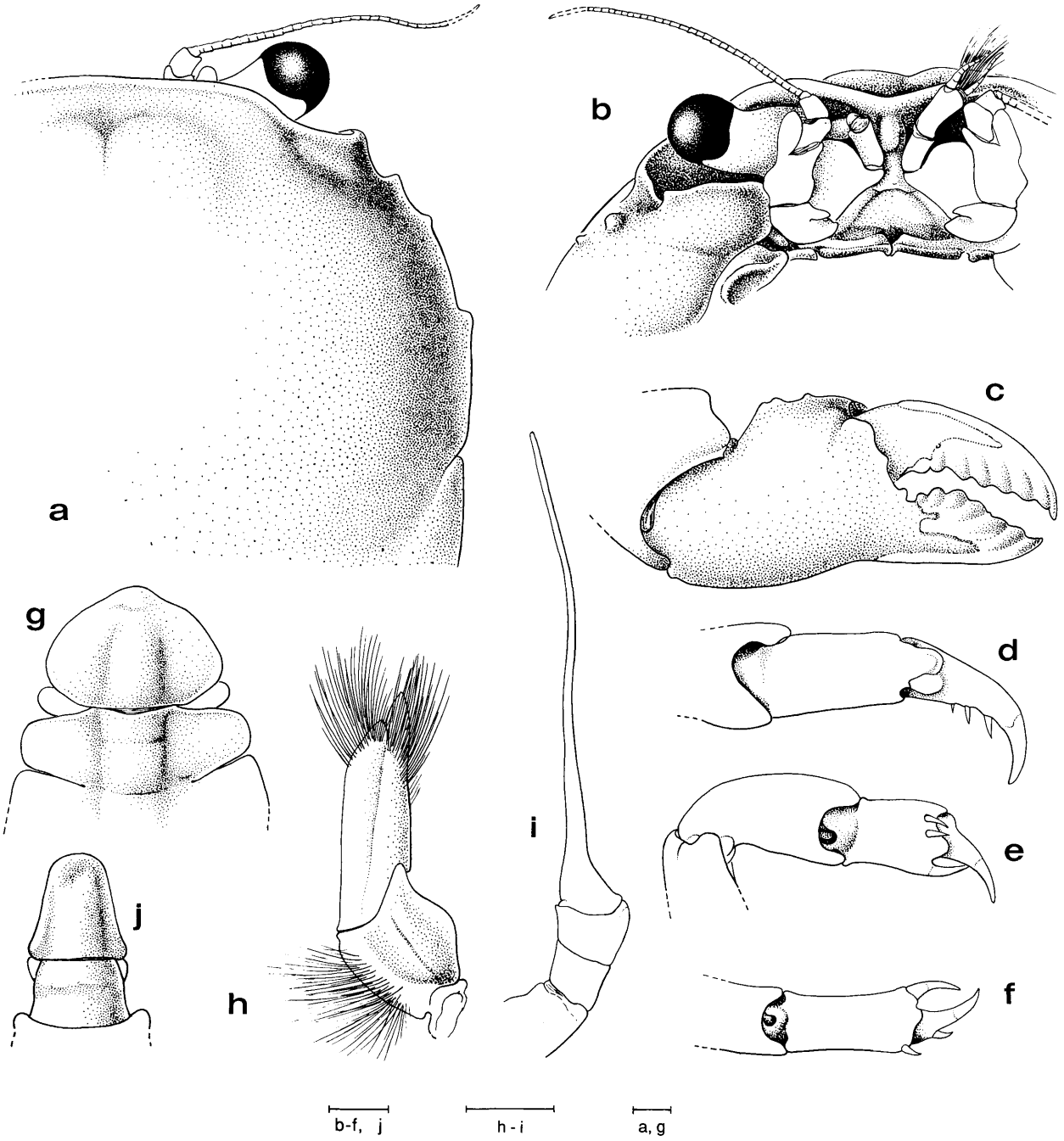


FIG. 4. — *Dromidiopsis tridentata* Borradaile, 1903 : **a-g**, ♀ (ovig.) 12.0 x 12.7 mm, New Caledonia, LAGON, stn 554, 25-29 m (MNHN-B 22549) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, ventral view of telson and terminal segments of female abdomen. — **h-i**, ♂ 7.8 x 8.9 mm, Chesterfield Islands, CHALCAL 1, stn DC 34, 37 m (MNHN-B 22550) : **h**, first pleopod of male; **i**, second pleopod of male.

Scale bars represent 1.0 mm.

CHARACTER	*Dromidiopsis*	*Lauridromia*	*Dromia*	*Haledromia*
Ratio CW/CL	Carapace width less than or equal to length.	Carapace width greater than or equal to length.	Carapace width greater than length.	Carapace width much greater than length.
Carapace surface	Smooth.	Smooth.	Smooth but may be sculptured.	Smooth.
Rostrum	Tridentate, usually weakly developed, broad.	Tridentate, well developed, subacute.	Tridentate, well developed.	Tridentate, broad, blunt.
Anterolateral margin of carapace	Small teeth.	Large teeth.	Large teeth.	No teeth.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.
Sternal grooves	End apart or together on tubercles behind chelipeds.	End apart on prominent tubes behind chelipeds.	End apart or together between or behind chelipeds.	End together between chelipeds.
Epipods/Podobranchs	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.
First two pairs of legs	Segments not nodose. No distal propodal spine.	Segments not nodose. No distal propodal spine.	Segments not nodose. No distal propodal spine.	Segments not nodose. No distal propodal spine.
Last two pairs of legs	Third leg dactyl opposed by one propodal spine, up to two spines on outer propodal margin, no spines on inner or outer margins of dactyl. Fourth leg may be as long as first leg, dactyl opposed by up to two propodal spines, one spine on outer propodal margin, and one spine on outer margin of dactyl.	Third leg dactyl opposed by one propodal spine, up to two spines on outer propodal margin, no spines on inner or outer margins of dactyl. Fourth leg shorter than first leg, dactyl opposed by up to two propodal spines, up to three spines on outer propodal margin, and one spine on outer margin of dactyl.	Third leg dactyl opposed by one propodal spine, no spines on outer propodal margin, spines may be present on inner margin of dactyl. Fourth leg shorter than first leg, dactyl opposed by up to two propodal spines, one spine on outer propodal margin, no spine on outer margin of dactyl.	Third leg dactyl opposed by one propodal spine, no spines on outer propodal margin, or on the dactyl. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, no spines on outer propodal margin, or on the dactyl.
Abdominal fusion	Joint between last two segments may be fused.	Joint between last two segments fused.	No segments fused.	No segments fused.
Uropods	Small, visible externally.	Small, visible externally.	Small, visible externally.	Vestigial, concealed.
Telson	Rounded or subtruncate.	Rounded.	Rounded.	Rounded.
Male pleopods	First sharply tipped. No exopod on second.	First sharply tipped. No exopod on second.	First sharply tipped. No exopod on second.	First sharply tipped. No exopod on second.

TABLE 2. — Comparison of the key characteristics of the genera *Dromidiopsis*, Borradaile, 1900, *Lauridromia* gen. nov., *Dromia* Weber, 1795, and *Haledromia* gen. nov.

Genus *LAURIDROMIA* nov.

Dromia - ALCOCK, 1900 : 136 (in part); 1901 : 43 (in part). — LAURIE, 1906 : 351. — IHLE, 1913 : 21 (in part). — RATHBUN, 1923 : 68. — SAKAI, 1976 : 8. — DAI & YANG, 1991 : 17.
Dromidiopsis Borradaile, 1903a : 298 (in part). — IHLE, 1913 : 25 (in part). — DAI & YANG, 1991 : 17 (in part).

Carapace as wide or slightly wider than long. Coxae of third maxillipeds closely approximated and inserted under tip of sternum. Sternal grooves of mature females end apart on well developed tubes behind base of chelipeds. Cheliped with an epipod, superior margin of carpus and propodus armed with two to four large tubercles. Legs not knobbed or ridged. Propodi and dactyli of first two pairs of legs equal in length, inner margin of dactyli typically armed with seven or more small spines. Dactyl of third leg opposed by a single propodal spine, usually two spines on the outer propodal margin. Fourth leg shorter than second, dactyl usually opposed by two propodal spines with up to three spines on the outer margin and usually a spine on the outer margin of the dactyl itself. Uropods well developed, visible externally, but not used in the locking mechanism. This consists of serrated flange on the bases of first and second legs, sometimes on cheliped base, which fit against lateral margins of abdomen. Joint between the last two abdominal segments wholly or at least partially fused.

TYPE SPECIES. — *Dromia intermedia* Laurie, 1906, by present designation.

OTHER SPECIES. — *Dromia dehaani* Rathbun, 1923; *Dromia indica* Gray, 1831.

ETYMOLOGY. — *Lauridromia* is named after R. Douglas LAURIE, lecturer in Zoology, University of Liverpool, who made a significant contribution to the study of Brachyura from Sri Lanka and the Red Sea.

DISCUSSION. — Although not dealt with in this collection, some comments need to be made about the other two species included in this new genus. *Dromia dehaani* does not belong in the genus *Dromia* because the joint between the last two abdominal segments is partially fused, a character shared by the other species of *Lauridromia* gen. nov., and most species of *Dromidiopsis* Borradaile, 1900. Furthermore, the female sternal grooves of *Dromia dehaani* end on prominent tubes, a unique feature shared by the other species in *Lauridromia* (see Table 2).

Dromia orientalis Miers, 1880, also shares this sternal groove character, and has until now usually been known as *Dromidiopsis cranioides* (De Man, 1888). Comparison of the description of *D. cranioides* by DE MAN (1888b) with MIERS' type specimen (British Museum, 1880 : 6) of *D. orientalis* shows that DE MAN'S name is a synonym. A somewhat inaccurate original description and poor illustrations caused MIERS' species to be overlooked by subsequent authors.

Also in the collection of the British Museum, is a female (CW = 25.9 mm, CL = 26.4 mm) labelled *Dromia indica* which came from GRAY'S dry collection. There are no data accompanying the specimen but it was probably presented by Thomas HARDWICKE and therefore came from India (see WHITE'S, 1847, catalogue). The description of *Dromia indica* Gray, 1831, was based on a specimen, presented by HARDWICKE, of unknown sex, CW = 18 lines (38.1 mm) and CL = 19 lines (40.2 mm) and, as was typical of the time, it is very brief. However three important characters are mentioned : obscure median rostral tooth, five anterolateral teeth and upper edge of carpus (presumably of cheliped) tubercular. Although it is clear that the female specimen in the British Museum cannot be GRAY'S type, because of the size difference, it has the features mentioned in the original description and was presumably identified by GRAY. A comparison of this specimen of *D. indica* with the type of *Dromia orientalis* Miers, 1880, shows that they are the same species. Therefore the name for this species should be *Lauridromia indica* (Gray, 1831). Another name, *D. gibbosa* H. Milne Edwards, 1837, may also be a synonym, but this species was poorly described and there is no type material.

All the species placed in *Lauridromia* are comparatively large crabs with maximum sizes in excess of approximately 40 mm CW. The larvae of one species, *L. dehaani*, is known (TERADA, 1983).

DISTRIBUTION. — The distribution of this genus includes the Indian and Pacific oceans. The recent record of *L. dehaani* from Sala y Gomez (approx. 26°S, 105°E) extends the distribution of this genus across the Pacific (see ZARENKOV, 1990).

Key to the species of *Lauridromia*

(Species studied in this paper are in bold)

1. Carapace approximately as wide as long, posterolateral tooth directed obliquely forward, five to eight small spine on inner margins of dactyli of first two pairs of legs, spines present on outer propodal margins of last two pairs of legs and a spine on outer margin of dactyl of last leg. **2**

— Carapace much wider than long, posterolateral tooth directed laterally, sixteen-twenty tiny spines on inner margins of dactili of first two pairs of legs, spines absent on outer propodal margins of last two pairs of legs on dactyl of last leg .... *Lauridromia dehaani* (Rathbun, 1923) nov. comb.

2. Median rostral tooth small, not visible dorsally, supraorbital tooth strong, subacute, anterolateral carapace margin with three acute, equidistant teeth .... **Lauridromia intermedia** (Laurie, 1906) nov. comb.

— Median rostral tooth smaller than lateral teeth, but visible dorsally, supraorbital tooth weak, blunt, anterolateral carapace margin with five subacute, variable teeth. .... *Lauridromia indica* (Gray, 1831) nov. comb.

Lauridromia intermedia (Laurie, 1906) nov. comb.

Fig. 15 d

Dromia intermedia Laurie, 1906 : 351. — IHLE, 1913 : 23, pl. 1, figs 1-3. — SAKAI, 1936 : 10, pl. 6, fig. 1. — CAMPBELL, 1971 : 29. — SAKAI, 1976 : 8, pl. 1, fig. 3. — LEWINSOHN, 1984 : 92, pl. 1B.

MATERIAL EXAMINED. — **New Caledonia**. "*Vauban*": Canal Woodin, no stn, 40 m, 14.11.1973 : 1 ♀ 35.4 x 37.3 mm, 1 ♂ 57.0 x 52.5 mm. — South Lagoon, no stn, no locality, 130 m, May 1985 : 1 ♀ 31.6 x 32.7 mm, carrying a sponge cap.

"*Vauban*". St. Vincent Bay : 21°58.30'S, 166°01.00'E, 7 m, 6.11.1984 : 1 ♀ (ovig.) 51.5 x 49.0 mm; 1 ♀ 57.2 x 53.3 mm. — No depth, 6.08.1984 : 1 ♂ 37.0 x 35.0 mm. — 22°05.60'S, 166°05.25'E, 16 m, 24.04.1985 : 3 ♂♂ 32.9 x 31.7, 35.3 x 34.0, 39.5 x 36.6 mm; 3 ♀♀ (ovig.) 27.7 x 29.6, 28.0 x 28.9, 28.7 x 27.9 mm; 2 ♀♀ 27.6 x 27.9, 45.0 x 42.8 mm. — 22°04.20'S, 166°05.30'E, 14 m, 30.04.1985 : 1 ♀ (ovig.) 45.2 x 43.0 mm. — 22°05.00'S, 166°05.35'E, 16 m, 20.08.1985 : 4 ♀♀ 30.2 x 29.0, 36.2 x 36.4, 41.4 x 39.9, 44.4 x 44.3 mm. — 21°59.10'S, 166°01.50'E, 17 m, 21.08.1985 : 1 ♀ 34.5 x 34.2 mm. — 21°59.10'S, 166°01.25'E, 18 m, 22.08.1985 : 1 ♂ 16.5 x 17.5 mm. — No depth, 22.04.1986 : 1 ♀ (ovig.) 41.0 x 40.0 mm, carrying a sponge cap. — 12 m, 20.11.1986 : 1 ♀ 30.3 x 29.7 mm. — No depth, 2.12.1986 : 1 ♂ 51.2 x 45.5 mm. — No depth, 23. 04.1986 : 1 ♀ (ovig.) 56.8 x 53.5 mm, carrying a sponge cap.

"*Vauban*". Northern Lagoon : 19°51.10'S, 163°50.20'E, 33-35 m, 14.06.1985 : 1 ♂ 9.2 x 9.7 mm. — 19°36.50'S, 163°39.50'E, 39-41 m, 20.06.1985 : 2 ♂♂ 33.0 x 32.2, 35.2 x 33.3 mm; 2 ♀♀ 25.3 x 25.9, 27.8 x 26.7 mm. — 19°29.30'S, 163°31.50'E, 44-50 m, 22.06.1985 : 1 ♂ 40.3 x 39.4 mm. — 19°32.50'S, 163°35.50'E, 39-41 m, 22.06.1985 : 2 ♂♂ 31.0 x 30.2, 51.2 x 48.7 mm; 3 ♀♀ (ovig.) 29.4 x 29.3, 36.0 x 36.2, 38.3 x 37.9 mm. — 19°46.5'S, 163°47.40'E, 38 m, 23.06.1985 : 1 ♀ 14.7 x 14.2 mm.

Northern Lagoon. SCUBA : 25 m, 3.07.1986, P. LABOUTE coll. : 1 ♂ 17.5 x 18.1 mm, carrying a sponge cap; 2 ♀♀ (ovig.) 42.7 x 42.4, 47.3 x 47.6 mm; 2 ♀♀ 38.0 x 36.7, 42.5 x 41.4 mm.

LAGON : stn 101, 22°31.0'S, 166°35.9'E, 18 m, 21.08.1984 : 2 ♂♂ 30.2 x 29.0, 40.0 x 37.7 mm. — Stn 102, 22°29.4'S, 166°37.2'E, 19 m, 22.08.1984 : 1 ♀ 22.4 x 23.0 mm. — Stn 169, 22°8.0'S, 166°8.4'E, 22 m, 18.09.1984 : 1 ♂ 17.2 x 18.2 mm. — Stn 190, 22°02.1'S, 165°57.3'E, 135-150 m, 19.09.1984 : 1 ♀ 7.0 x 6.7 mm. — Stn 230, 22°37.9'S, 166°41.1'E, 35 m, 22.10.1984 : 1 ♂ 9.3 x 9.2 mm. — Stn 235, 22°30.9'S, 166°52.1'E, 70 m, 23.10.1984 : 1 ♀ 17.0 x 17.4 mm. — Stn 252, 22°20.8'S, 166°23.7'E, 22 m, 7.11.1984 : 1 ♂ 45.2 x 42.3 mm. — Stn 267, 22°21.5'S, 166°14.9'E, 65 m, 8.11.1984 : 1 ♂ 9.0 x 9.5 mm. — Stn 269, 22°18.0'S, 166°18.1'E, 20 m, 8.11.1984 : 1 ♀ (ovig.) 29.7 x 30.0 mm. — Stn 297, 22°38.9'S, 166°45.6'E, 30 m, 26.11.1984 : 1 ♂ 13.4 x 13.5 mm. — Stn 298, 22°37.0'S, 166°47.1'E, 35-37 m, 26.11.1984 : 1 ♀ 41.5 x 41.3 mm. — Stn 312, 22°41.9'S, 166°48.8'E, 26 m, 27.11.1984 : 1 ♀ 6.9 x 7.4 mm. — Stn 337, 22°43.0'S, 166°50.5'E, 33 m, 28.11.1984 : 1 ♂ 26.1 x 25.5 mm. — Stn 558, 22°46.0'S, 166°54.0'E, 43 m, 16.07.1985 : 1 ♂ 17.3 x 16.7 mm. — Stn 564, 22°46.8'S, 166°56.0'E, 32-38 m, 16.07.1985 : 1 ♀ (ovig.) 11.2 x 11.8 mm. — Stn 744, 22°13.6'S, 167°03.2'E, 76-81 m, 13.08.1986 : 1 ♀ 6.9 x 7.3 mm. — Stn 933, 20°44.9'S, 164°14.9'E, 90-100 m, 27.04.1988 : 1 ♀ (ovig.) 12.1 x 12.7 mm. — Stn 1013, 20°7.8'S, 163°55.4'E, 18 m, 3.04.1988 : 1 ♂ 20.0 x 20.2 mm. — Stn 1068, 19°57.3'S, 153°52.8'E, 26 m, 23.10.1989 :

1 ♀ 11.0 x 11.3 mm. — Stn 1116, 19°37.3'S, 163°52.6'E, 38 m, 25.10.1989 : 1 ♂ 29.5 x 30.6 mm; 1 ♀ 12.2 x 13.6 mm.

Bellona Plateau. CORAIL 1 : no stn, no locality, no depth, August 1988 : 1 ♂ 9.0 x 9.8 mm; 4 ♀♀ 17.1 x 18.0, 25.6 x 26.9, 26.7 x 26.5, 34.3 x 33.2 mm.

Chesterfield Islands. CHALCAL 1 : stn CP 1, 20°45.80'S, 161°02.50'E, 70 m, 15.07.1984 : 1 ♀ (ovig.) 15.7 x 16.2 mm. — Stn CP 12, 20°35.30'S, 158°47.40'E, 67 m, 23.07.1984 : 2 ♀♀ 10.0 x 11.1, 12.6 x 13.0 mm, carrying a sponge cap; 1 ♂ 9.1 x 9.3 mm. — Stn CP 15, 21°24.90'S, 159°9.30'E, 60 m, 25.07.1984 : 2 ♂♂ 14.2 x 14.6, 24.0 x 24.7 mm. — Stn CP 16, 21°41.60'S, 159°21.90'E, 53 m, 25.07.1984 : 4 ♀♀ 11.4 x 11.8, 17.7 x 18.6, 32.4 x 32.8, 49.3 x 47.3 mm.

CORAIL 2 : stn CP 23, 20°30.60'S, 161°03.55'E, 88 m, 22.07.1988 : 1 ♂ 12.9 x 13.6 mm. — Stn CP 24, 20°27.35'S, 161°04.70'E, 75 m, 22.07.1988 : 2 ♂♂ 15.2 x 14.4, 48.4 x 44.6 mm; 1 ♀ (ovig.) 49.0 x 47.1 mm. — Stn CP 98, 19°02.83'S, 158°56.20'E, 48-44 m, 26.08.1988 : 1 ♂ 13.5 x 13.3 mm. — Stn DW 122, 19°28.17'S, 158°17.86'E, 32 m, 29.08.1988 : 1 ♂ 10.7 x 11.3 mm; 1 ♀ 6.1 x 6.5 mm.

Philippines. MUSORSTOM 3 : stn CP 117, 12°31.00'N, 120°39.00'E, 92-97 m, 3.06.1985 : 1 ♀ 16.8 x 15.6 mm. — Stn CP 121, 12°08.00'N, 121°18.00'E, 73-84 m, 3.06.1985 : 1 ♂ 35.0 x 36.0 mm.

DESCRIPTION. — Carapace approximately as wide as long, subcircular, convex, rising gradually from the margins, covered by short, coarse tomentum with longer setae on the anterior branchial areas and along carapace margins.

Carapace surface smooth but branchial and cardiac grooves distinct, also frontal groove which extends back from between lateral rostral teeth separating two prominent rounded protuberances. Rostrum tridentate but median tooth very small, strongly deflexed and scarcely visible dorsally. Lateral rostral teeth prominent, acute, separated by a U-shaped sinus. Supraorbital tooth strong, subacute. Anterolateral carapace margin armed with three acute, equidistant teeth, first on the same level as anterior corner of buccal frame. All teeth anterolaterally directed at an angle of approximately 45°. Behind the second and third teeth the carapace margin is laterally inflated and rounded. A prominent, acute, posterolateral tooth which is directed laterally. Posterolateral margins slightly convergent and posterior carapace margin slightly convex.

Orbital margin extends back from lateral rostral tooth as a straight line to a strong, subacute supraorbital tooth which is upturned. Beyond this tooth supraorbital margin is slightly concave to postorbital corner which is slightly produced as a blunt tooth. A narrow fissure separates the suborbital lobe which is produced as a strong, acute tooth visible dorsally.

First segment of antenna wider than long, beaked medially, gaping narrowly, not twisted. Second segment longer than wide, a median distal tubercle present, distomedial corner produced as a short blunt spine on which the third segment is inserted at an angle. Exopod extending as far as joint between third and fourth segments, tip bilobed, inner lobe flattened and curving over base of eyestalk. Ratio of length of antennal flagella to CW = 0.57.

Subhepatic area smooth, convex, marked by a strong groove extending from in front of the first anterolateral tooth, beneath the anterolateral margin and emerging at posterolateral tooth. This groove is interrupted by a dorsoventral groove which ends between the first and second anterolateral teeth. Anterolateral corner of buccal frame has two subacute teeth. Female sternal grooves end well apart, each on a prominent ventrally directed tube, just behind base of cheliped.

Chelipeds fringed with longer setae. This limb is moderately sized in small specimens, but massive in large males, with propodus especially deep. Merus trigonal, borders armed with small tubercles : superior margin has four-five larger tubercles, outer inferior border has seven-eight tubercles and inner inferior border has nine-ten very small tubercles. Inner and outer faces and superior margin near distal end of merus are deeply incised. Outer face of carpus smooth and inflated, distal margin with two very prominent acute tubercles. Upper border of inner carpus face has two unequal, acute distal tubercles, most distal tubercle largest. Distal border of inner face has two small tubercles near lower corner (a large male specimen had four large tubercles). Outer face of propodus smooth and inflated. Upper border armed with two unequal acute tubercles, most distal tubercle largest. A prominent subacute tubercle at base of dactyl. Fingers white or pink, curved, gaping and armed with seven teeth, first three small and last four larger and interlocking.

First two pairs of legs as long as chelipeds. Distal borders of carpi produced. Dactyli about as long as propodi, inner margins of dactyli bear five small spines increasing in size distally. These legs fringed with longer setae.

Last two pairs of legs smaller than first two pairs. Third leg shortest, dactyl opposed by a single propodal spine with two (sometimes three) short propodal spines on the outer margin. Dactyl of fourth leg opposed by two propodal spines with three smaller spines on outer propodal margin and a prominent spine on outer margin of dactyl itself. When extended forward the last leg reaches the second anterolateral tooth.

Male telson longer than wide, posterior margin subacute. Female telson wider than long, posterior margin rounded. A low rounded median ridge along length of abdomen in both sexes. Fifth and sixth abdominal segments fused, the only evidence of a joint is at the margins and on median ridge. Abdominal locking mechanism consists of tuberculate posterior corner of base of cheliped against proximal margin of telson and serrated ridge on base of first leg against proximal margin of penultimate segment. The proximal corner of telson and distal corner of fifth segment are expanded. Uropod plates well developed and visible externally, but lie between bases of first legs and are not used in locking the abdomen.

First male pleopod stout semi-rolled tube, narrowing to a sharp, horny tip which is densely setose. Second pleopod simple, needle-like, tapering to a sharp tip.

DISCUSSION. — *L. intermedia* has always been placed in *Dromia* because the female sternal grooves end apart behind the bases of the chelipeds but there are other characters which must be taken into account. In this species the carapace is approximately as wide as long (in *Dromia* the carapace is distinctly wider than long), it has two spines opposing the dactyl of the third leg (species of *Dromia* have only one), there are three spines on the outer propodal margin of the fourth leg (species of *Dromia* have none or only one spine), and the fifth and sixth abdominal segments are fused (not fused in *Dromia*). These characters clearly distinguish *Lauridromia intermedia* from *Dromia dormia* (Linnaeus, 1763), for example, and suggest that it is more logically placed in a separate genus (see Table 2).

As noted by LEWINSOHN (1984) the sternal grooves of *L. intermedia* differ markedly between immature and mature females. In the smallest ovigerous female, CW = 11.2 mm, the sternal grooves end apart just behind the chelipeds on separate tubercles but in other females of similar size the sternal grooves are only faintly marked and end apart without tubercles behind the bases of the first legs. This is the condition found in smaller immature females and even in females as large as CW = 17-18 mm. Females as large as CW = 34-35 mm have sternal grooves which terminate between the chelipeds but without prominent tubercles. All larger females have fully developed sternal grooves which end apart between the chelipeds on large ventrally directed tubes. All ovigerous females have this condition. The other sexually dimorphic character, abdomen size, shows a similar pattern of change. The process of sexual maturation in female *L. intermedia* evidently occurs over a wide size range from CW = 11-35 mm which is considerable when it is remembered that the maximum size is around CW = 60 mm (see below). This implies that some females do not reproduce until they are more than half the maximum size, whereas other females reproduce when they are less than 20% of the maximum size. Clearly, female maturation is not associated with a particular moult in the life history of this crab. Variation in the development of the female sternal grooves indicates that great care must be taken when using this feature as a taxonomic character and it partially explains why there has been such confusion about identifying and arranging the larger dromiids into well defined genera.

SIZE. — *L. intermedia* is the most abundant (almost 30% of the collection), large dromiid in the material from New Caledonia and the Philippines : the collection (made during the years 1984-88) includes 90 specimens, 35 males (mean CW = 26.2 mm, range 9-51.2 mm), 38 females (mean CW = 35.8 mm, range 6.1-57.2 mm), 17 ovigerous females (mean CW = 34.7 mm, range 11.2-56.8 mm). Overall the mean CW = 31.9 mm (range 6.1-57.2 mm). Previously the maximum recorded male CW = 60.7 mm, female CW = 49.0 mm, and minimum ovigerous female CW = 22.2 mm. Collectively these data show that males and females grow to a similar maximum size and that females reach maturity at a relatively small size. The smallest ovigerous female (CW = 11.2 mm) carried 128 eggs, the largest ovigerous female (CW = 56.8 mm) carried approximately 17,280 eggs, the mean egg number = 7700 and the mean egg diameter = 0.55 mm. In the spectrum ranging from small eggs-large numbers to large eggs-small numbers, *L. intermedia* lies near the former extreme and almost certainly has a planktonic larval stage. Ovigerous females collected in April had newly laid eggs as well as eggs showing some

development (but without eyespots) suggesting that the egg-bearing season began earlier, perhaps in March. Females collected in June and July also had newly laid eggs suggesting that the egg-laying season lasts for at least six months, while females collected in November only had eggs showing some development. Overall, ovigerous females were collected from April to November but staging of egg development suggests that the egg-bearing season must extend from at least March until perhaps December or January. It is not clear from this small sample of ovigerous females, whether breeding is seasonal or continuous (it should be noted that the sample spans the years 1984-88). The reproductive strategy of this large dromiid provides an interesting contrast with that of the species of *Dromidiopsis* which are smaller and have smaller numbers of larger eggs (see above).

CAMOUFLAGE. — Previous authors have not indicated the kind of camouflage carried by *L. intermedia*. Only a few of the present specimens were accompanied by a cap and in all cases these were made of pieces of sponge.

DEPTH. — The depth range of this collection of *L. intermedia* was 7-150 m, exceeding the previously recorded range of 15-112 m. The average depth was 38.5 m.

DISTRIBUTION. — The distribution of *L. intermedia* includes Madagascar and the Seychelle Islands (LEWINSOHN, 1984), Sri Lanka (Galle, type locality, LAURIE, 1906), south coast of Timor (IHLE, 1913), various localities off Japan (SAKAI, 1936, 1976), South Queensland (Caloundra, CAMPBELL, 1971) and now New Caledonia and the Philippine Islands. This is a widespread Indo-West Pacific species whose distribution does not apparently include the east coast of Africa, Red Sea or the wider Pacific region. Given the breeding biology outlined above this wide distribution is not unexpected and may well be extended in the future.

Genus ***DROMIA*** Weber, 1795

Dromia Weber, 1795 : 92. — FABRICIUS, 1798 : 359. — DE HAAN, 1833 : 104. — H. MILNE EDWARDS, 1837 : 170 (in part). — STIMPSON, 1858 : 226. — BORRADAILE, 1903a : 298. — STEBBING, 1905 : 61. — IHLE, 1913: 21 (in part).— RATHBUN, 1937 : 30. — BARNARD, 1950 : 309. — FOREST, 1974 : 76. — MANNING & HOLTHUIS, 1981 : 11.
Dromidiopsis - RATHBUN, 1923 : 67. — SAKAI, 1976 : 9 (in part). — DAI & YANG, 1976 : 9 (in part).
Petalomera - SAKAI, 1976 : 20 (in part).
Sternodromia Forest, 1974 : 100.

Carapace wider than long, surface smooth or sculptured. Rostrum tridentate. Antennal exopod well developed. Coxae of third maxillipeds usually closely approximated (but may be separated by a wide gap) and inserted under tip of telson. Female sternal grooves end apart or together between or behind cheliped bases. Cheliped with an epipod. Legs not knobbed or ridged. Length of propodi and dactyli of first two pairs of legs usually equal, inner margins of dactyli armed with 5-7 small spines. Dactyl of third leg opposed by a single propodal spine, no spine on the outer propodal margin, there may be some very small spines on inner dactyl margin. Fourth leg shorter than second leg, dactyl opposed by up to two spines with sometimes another spine on the outer propodal margin. Margin of telson rounded. Uropod plates well developed, visible externally, used in male abdominal locking mechanism by fitting in front of serrated flange on the bases of first legs. Joint between last two abdominal segments freely movable.

TYPE SPECIES. — *Cancer personata* Linnaeus, 1758, by designation of the International Commission of Zoological Nomenclature (1964, opinion 688).

OTHER SPECIES. — *Dromia bollorei* Forest, 1974, *Cancer dormia* Linnaeus, 1763, *Cancer erythropus* George-Edwards, 1771, *Dromia foresti* sp. nov., *D. marmorea* Forest, 1974, *D. monodi* Forest & Guinot, 1966, *D. nodosa* A. Milne Edwards & Bouvier, 1898, *D. spinirostris* Miers, 1881, *Cryptodromia wilsoni* Fulton & Grant, 1902.

DISCUSSION. — Definitions of the genus *Dromia* Weber, 1795, have been given by many authors, but the definition of BORRADAILE (1903a) seems to embody the essential features : "Dromiidae with an epipodite on the cheliped, the walking-legs not knobbed or ridged, the carapace broader than long, the regions well marked or indistinct, the ridges of the efferent branchial channels broken, indistinct, or well made, the sternal grooves of the female ending apart behind the cheliped segment, the fifth leg shorter than the third and with no thorn on the outer side of its last joint". Most of the other definitions include some subset of these characters although STIMPSON (1907) added an important feature : that the abdominal uropod plates are conspicuous. The above definition of *Dromia* summarizes and corrects errors in earlier definitions and adds some important characters which have been overlooked.

Apart from the species dealt with below, some comments need to be made about the inclusion of *Sternodromia spinirostris* (Miers, 1881) in the genus *Dromia*, thereby making *Sternodromia* Forest, 1974, unnecessary. MANNING and HOLTHUIS (1981) have discussed the similarity of *D. monodi* to this species and the difficulty of separating juveniles. While the two species can be clearly separated, their similarities strongly support the contention that both belong to the same genus. I agree with FOREST (1974) that *Sternodromia spinirostris* does not belong in *Dromidiopsis*, where it had been placed by MONOD (1956), but the grounds for erecting a separate genus for it hardly seem necessary. *Sternodromia spinirostris* is characterized by a carapace wider than long, the third and fourth legs have single spines opposing the dactyl, uropods well developed, visible externally, used in the male abdominal locking mechanism by fitting in front of angled, serrated ridges on the bases of the first legs which fit against the narrowed distal borders of the penultimate abdominal segment, the last two segments of the abdomen are freely movable, and the female sternal grooves end together on a tubercle between bases of the first legs. Apart from the sternal grooves, this suite of characters is typical of the species belonging to the genus *Dromia*, and the characters emphasized by FOREST (1974) seem to be more of specific value rather than serving to isolate this species in a separate genus. The only significant change to the generic concept of *Dromia* is to include a species with the female sternal grooves ending together rather than apart. In this respect, *D. spinirostris* is not so very different from *D. bollorei* which has closely approximated sternal grooves. The drastic ontogenetic change in the sternal grooves of *D. spinirostris* has been noted by MANNING and HOLTHUIS (1981) and I agree that such a character by itself should not be used to separate genera.

With the revision of *Dromidiopsis* presented earlier in this paper, and the creation of several new genera, the relationships amongst these large dromiids are considerably clarified (see Table 2) and the characters considered important by FOREST (1974) are placed in their proper perspective. There is no reason for not accepting the hypothesis that all the large Atlantic dromiids with a cheliped epipod belong to a single genus.

As in the genus *Lauridromia* gen. nov., the genus *Dromia* includes some of the larger species of dromiids whose maximum size is usually in excess of 40 mm CW.

The larvae of three species of *Dromia* are known : *D. personata*, *D. erythropus*, *D. wilsoni* (LAUGHLIN *et al*, 1982; RICE *et al*, 1970; TERADA, 1983; WEAR, 1970, 1977).

DISTRIBUTION. — *Dromia* species occur in the Atlantic, Indian and Western Pacific oceans but seven species are restricted to the Atlantic, two species (*D. dormia*, and *D. foresti* sp. nov.) are restricted to the Indo-West Pacific, and only one species (*D. wilsoni*) occurs in all three oceans. It is only in the Atlantic that *Dromia* has undergone a major radiation. I assume that the Atlantic *Dromia* are derived from a common ancestor and share a common ancestor with the Indo-Pacific species. *D. wilsoni*, whose distribution spans all the major oceans, has several primitive characters which may make it closest to the ancestral condition.

Key to the species of *Dromia*

(Species studied in this paper are in bold)

1. Anterolateral margin with four teeth which may be sub-equal **2**
— Anterolateral margin with three teeth, all well developed **5**

2. Four very small anterolateral teeth, no spine on the outer propodal margin of the last leg.
..... *Dromia spinirostris* Miers, 1881

— Four anterolateral teeth, all well developed except the third which is smaller and may be very close to the second, spine present on outer propodal margin of last leg **3**

3. Third anterolateral tooth smaller, placed midway between second and fourth tooth..... ..... *Dromia erythropus* (George Edwards, 1771)
— Third anterolateral tooth very small and close to second tooth **4**

4. Median rostral tooth large, extending further forward than lateral teeth, posterolateral tooth strong, tends to be directed anteriorly ..... ***Dromia dormia*** (Linnaeus, 1763).
— Median rostral tooth small, deflexed, little visible in dorsal view, posterolateral tooth small, directed laterally ..... *Dromia personata* (Linnaeus, 1758)

5. Carapace surface strongly sculptured **6**
— Carapace surface not strongly sculptured **7**

6. First anterolateral tooth blunt, flattened, second and third teeth sub-acute, dactyl of fourth leg opposed by a single spine with another spine on the outer propodal margin..... ..... *Dromia nodosa* A. Milne Edwards & Bouvier, 1898
— First and third anterolateral teeth slightly larger, an obtuse knob on the posterior margin of the second tooth, dactyl of fourth leg opposed by two spines, no spine on the outer propodal margin ..... *Dromia bollorei* Forest, 1974

7. Three acute or sub-acute anterolateral teeth, directed horizontally..... **8**
— Three blunt, conical anterolateral teeth, last two directed almost vertically..... .....***Dromia foresti*** sp. nov.

8. Carapace tomentum not areolate, inner margin of third leg dactyl without spines **9**
— Carapace densely covered with an areolate tomentum, inner margin of third leg dactyl armed with three small spines .... ***Dromia wilsoni*** (Fulton & Grant, 1902) nov. comb.

9. Carapace much wider than long, dactyl of fourth leg opposed by two spines..... ..... *Dromia marmorea* Forest, 1974.
— Carapace only a little wider than long, dactyl of fourth leg opposed by a single spine .... *Dromia monodi* Forest & Guinot, 1966

Dromia dormia (Linnaeus, 1763)

Fig. 16 c

Cancer lanosus Rumphius, 1705 : 19, pl. 11, fig. 1. — SEBA, 1759 : 42, pl. 18, fig. 1.
Cancer dormia Linnaeus, 1763 : 413; 1769 : 1043. — FABRICIUS, 1775 : 405.
Cancer dromia - FABRICIUS, 1781 : 501; 1787 : 320; 1793 : 451 (erroneous spelling for *dormia*).
Cancer dormitator Herbst, 1790 : 250, pl. 18, fig. 103.
Dromia rumphii Weber, 1795 : 92. — FABRICIUS, 1798 : 359. — LATREILLE, 1803 : 386; 1806 : 27; 1818 : 278, fig. 1. — LAMARCK, 1818 : 264. — HILGENDORF, 1879 : 812 (part, Inhambane : Mozambique). — LENZ, 1901 : 450. — DE MAN, 1902 : 687. — NOBILI, 1906a : 144. — EDMONDSON, 1922 : 33, pl. 1.
Dromia hirsutissima Dana, 1852 : 403 (part).
Dromia dormia - BORRADAILE, 1903 : 298. — MACNAE & KALK, 1958 : 71, 117, 125.
Dromidiopsis dormia - RATHBUN, 1923b : 67. — SAKAI, 1936 : 11, pl. 5, fig. 2. — BUITENDIJK, 1939 : 223. — WARD, 1942 : 70. — TINKER, 1965 : 66. — HOLTHUIS, 1968 : 220. — TAKEDA, 1973 : 79. — ALCALA, 1974 : 174, figs 1a-b. — SAKAI, 1976 : 9, pl. 3. — DAI, YANG, SONG & CHEN, 1981 : 131, figs 1-2, pl. 1 (1). — LEWINSOHN, 1984 : 95, pl. 2. — DAI & YANG, 1991 : 18, figs 4 (2-3), pl. 1 (2),
Not *Dromia rumphii* - H. MILNE EDWARDS, 1837 : 174. — DE HAAN, 1839 : 107. — STIMPSON, 1858 : 240; 1907 : 177, pl. 21, fig. 7. — TARGIONI TOZZETTI, 1877 : 207. — ORTMANN, 1892 : 548. — ALCOCK, 1900 : 137; 1901 : 44, pl. 2, fig. 4. — BORRADAILE, 1903b : 576, pl. 33, fig. 1 [= *Dromidiopsis dehaani* (Rathbun, 1923b)].
Not *Dromia dormia* - RATHBUN, 1902 : 32.— STEBBING, 1905 : 61; 1910 : 342. — IHLE, 1913 : 22. — SHEN, 1931 : 96, figs 3a-b, 4a-b. — BARNARD, 1950 : 310, fig. 58c-e [= *Dromidiopsis dehaani* (Rathbun, 1923b)].
Not *Dromia dornica* - BALSS, 1913 : 109 (erroneous spelling for *dormia*) (= *Dromidia aegibotus* Barnard, 1947).
Not *Dromia dormia* - BARNARD, 1947 : 366 (= *Dromidia aegibotus* Barnard, 1947).

MATERIAL EXAMINED. — **New Caledonia**. Port Bouquet, on SCUBA, 12 m, J.-L. MENOU coll., 8.08.1986 : 1 ♀ 105.8 x 88.0 mm. — Barrier Reef, external slope, on SCUBA, 10-30 m, 27.11.1986 : 1 ♀ (ovig.) 112.2 x 95.6 mm. — Tabu Reef, on SCUBA at night, 8 m, P. LABOUTE coll., 21.09.1987 : 1 ♀ 131.0 x 109.2 mm. — On SCUBA, no locality, no depth, no date : 1 ♀ 172.0 x 136.5 mm.

DESCRIPTION. — Carapace much wider than long, strongly convex, rising steeply behind front and from anterolateral margins, covered by a short velvety tomentum. Cardiac and branchial grooves shallow, as is frontal groove which extends back from median rostral tooth, separating two rounded protuberances. Frontal area narrowed, rostrum tridentate, median tooth large, blunt and extending further forward than lateral teeth, clearly visible dorsally. All three rostral teeth directed horizontally. Anterolateral carapace margin begins beneath suborbital level and bears four unequal teeth. The first tooth is by far the largest, the second much smaller and more acute, the third very small, close to the second, and the fourth intermediate in size between the first and second, narrow and more acute, directed slightly upward. Anterolateral teeth are arranged along an almost straight line connecting the rostrum and posterolateral tooth which is large, broad based, narrowing apically and directed anteriorly. Posterolateral carapace margin convergent and posterior margin almost straight.

Supraorbital margin extends uninterrupted from lateral rostral tooth, concave to postorbital corner where there is a narrow fissure. Suborbital margin has a small rounded lobe which is almost vertical rather than horizontal. Immediately beneath suborbital margin is a large, prominent suborbital tooth which is clearly visible dorsally, and beneath this again is a more acute tooth at corner of buccal frame, also visible dorsally. A deep furrow, beginning beneath suborbital tooth, curves around under anterolateral margin, ending at posterolateral tooth. Sternal grooves in female gradually convergent, ending with divergent tips between bases of chelipeds, separated by a prominent smooth ridge.

First segment of antenna much wider than long, beaked medially, gaping narrowly, not twisted. Second segment has a pitted longitudinal trough, a prominent distal, central tubercle, and a blunt distomedial extension on which the third segment is inserted diagonally. Exopod fixed to second segment, extending to joint between third and fourth segments, tip bilobed to accommodate fourth segment and antennal flagella. Epistome triangular with a smooth convex surface.

Chelipeds massive. Merus trigonal, posterior margin with seven-eight small tubercles, inferior margin with four-five larger tubercles, anterior margin smooth. Outer surface of carpus sculptured, distal margin with two blunt extensions, superior margin with a strong, acute distal tooth. Outer face of propodus inflated, inner superior margin with four tubercles, inner face covered with shaggy tomentum. Fixed finger armed with seven-eight large conical teeth. Dactyl has eight teeth, the first large, blunt, second to fourth much smaller, fifth large and more acute, and the last three much smaller. Fingers downcurved, only last four teeth interlocking.

First two pairs of legs shorter than chelipeds, distal borders of carpi and propodi produced as rounded lobes. Dactyli much shorter than propodi, inner margins armed with four-five strong spines, set at an angle close to the dactyl and increasing in size distally.

Last two pairs of legs reduced, fourth pair slightly shorter and stouter. Dactyl of third leg opposed by a strong propodal spine, no spine on outer propodal margin. Dactyl of fourth leg opposed by two similar spines with another small spine on the outer propodal margin.

Telson about as wide as long, a central longitudinal furrow present distally, central region distally convex which continues along segments of the abdomen. Abdominal locking mechanism in male consists of large serrated boss on bases of first legs against convergent margin of penultimate segment with well developed uropods in front of the bosses. All segments of abdomen freely movable in both sexes.

First male pleopod a semi-rolled tube, bluntly tipped and setose, second male pleopod simple, needle-like, without exopod.

DISCUSSION. — The two oldest names cited in the above synonymy are *Cancer lanosus*, Rumphius, 1705, and *C. dormia* Linnaeus, 1763. However, *C. lanosus* is not recognized by the International Code of Zoological Nomenclature because it is unavailable under Art. 3, and Art. 11a, which give the starting date of zoological nomenclature as 1 January 1758, and indicate that any name published before that date is unavailable. Furthermore, Art. 11c states that an "author must have consistently applied the Principle of Binomial Nomenclature in the work

in which the name is published". Although *C. lanosus* is binomial, many other names in RUMPHIUS' work are not. Therefore all of RUMPHIUS' names are unavailable for two reasons. *C. lanosus* Seba, 1759, appeared in vol. 3 of his Locupletissimi but SEBA did not consistently apply the Principle of Binomial Nomenclature and so his names are also unavailable. Thus *C. dormia* Linnaeus, 1763, is the oldest name and that specific name must be used (L. HOLTHUIS, pers. comm.).

There has been a great deal of confusion about the respective identities of *Dromia dormia* (Linnaeus, 1763) and of *Dromidiopsis dehaani* Rathbun, 1923, which both have a convex carapace, wider than long, with well developed tomentum and armed with prominent anterolateral teeth. The first attempt to clarify the situation was by RATHBUN (1923b) who pointed out that, without any consistency, two species had been given the names *D. rumphii* and *D. dormia*. RATHBUN, and later LEWINSOHN (1984) listed the major differences between these two large dromiids. The major differences are as follows : median rostral tooth longer than lateral teeth in *D. dormia* (shorter in *D. dehaani*), no supraorbital tooth or only a slight swelling (small tooth present), four unequal anterolateral teeth, the first much larger (three teeth of about equal size), posterolateral tooth directed obliquely forward (tooth directed more laterally), dactyli of first two pairs of legs distinctly shorter than propodi, upper margin not naked, inner or lower margin armed with four-five small spines increasing in size distally (dactyli approximately as long as propodi, upper margin naked, lower margin armed with about sixteen minute spines of similar size lying almost flat against dactyli), dactyl of last leg opposed by two, unequal propodal spines with another small spine on the outer margin (only a single spine opposing the dactyl and none on the outer margin), female sternal grooves gradually convergent, but diverging slightly near the end, terminating between cheliped bases, separated by a smooth ridge (convergent then parallel for a distance until diverging strongly to end on large conical tubercles just behind bases of chelipeds). One feature of the abdomen which both RATHBUN and LEWINSOHN seem to have overlooked is the fact that in both male and female *D. dehaani* the joint between the fifth and sixth abdominal segments is partially fused (not fused in *D. dormia*). Along with other features, this abdominal fusion serves to place *D. dehaani* in a separate genus, *Lauridromia* gen. nov. Another species which LEWINSOHN (1984) compared closely with *Dromia dormia* was *D. intermedia*, which also belongs in the new genus.

The problem of choosing the genus in which *D. dormia* should be placed has largely resulted from the vague definition of *Dromidiopsis* and misunderstanding about what exactly was meant by "female sternal grooves ending together". In *Dromia dormia* the sternal grooves are convergent and end, not close together on a tubercle, but with divergent tips, separated by a ridge, and its carapace is distinctly wider than long, rather than longer than wide as in *Dromidiopsis*. Thus *D. dormia* belongs in *Dromia* where the sternal grooves are variable in the proximity of their termination (see Table 2).

Although RATHBUN (1923b) attempted to allocate the old records to *Dromia dormia* and *D. dehaani*, LEWINSOHN (1984) questioned many of her decisions, especially those from the western Indian Ocean and, as a result, gave a very reduced synonymy for this species. Using the differences listed above for these two species, I have endeavoured to clarify the situation and have arrived at the synonymy given above for *D. dormia* which is considerably larger than that of LEWINSOHN (1984). However, insufficient information was available to determine the cases of *Dromia rumphii* Brocchi, 1877 : 106, *D. dormia* (err. *dromia*) Balss, 1915 : 13, and *D. dormia* Stephensen 1945 : 61, fig. 3. *Dromia rumphii* Ortmann, 1892 : 548 must be *D. dehaani* because he specifically mentions the fusion of the fifth and sixth abdominal segments. Similarly *D. rumphii* Alcock, 1900, and *D. rumphii* Alcock, 1901, must be *D. dehaani* because of the prominent tubercles on the ends of the female sternal grooves typical of this species. Although this character of the sternal grooves is shared with *Lauridromia intermedia*, the shape of the carapace is consistent with *Dromia dehaani*.

ALCALA (1974) gave a rough estimate of abundance of *Dromia dormia* on coral reefs, Dumaguete City, Philippines as being 4-5 specimens seen per man-hour of observation, noting that it was nocturnal, feeding upon the crown of thorns starfish (*Acanthaster planci*), usually carrying a large sponge and collected by local people for food. DAI and YANG (1991) report that in spite of its large size, this crab is not regarded as edible and is referred to by some chinese fishermen as a "poison crab". Other comments about the supposed toxic qualities of *Dromia dormia* can be found in RUMPHIUS (1705), TINKER (1965), and HOLTHUIS (1968).

Dromia dormia is a very large, widespread, shallow water species. The ovigerous female CW = 112.2 mm, carrying approximately 24,000 eggs, diameter = 0.5 mm, provides the first reproductive information about *D. dormia*. Clearly it has large numbers of small eggs, especially for a dromiid crab, and is similar to *D. dehaani*

(see BARNARD, 1950, recorded as *Dromia dormia* , "eggs very small and numerous"). This contrasts with the *Dromidiopsis* species which have small numbers of relatively large eggs (see above).

SIZE. — Maximum recorded sizes are ♂ CW = 200, CL = 160 mm, ♀ CW = 116, CL = 91 mm, and so the ♀ with CW = 172, CL = 136.5 mm, from New Caledonia, is the largest yet recorded.

DEPTH. — Despite numerous locality records of *Dromia dormia*, the only precise depth records are those of SAKAI (1976), 20-50 m, but many specimens have been caught by fishermen and they presumably also came from shallow water. All the present specimens from New Caledonia, were collected by SCUBA divers from depths of 8-30 m.

DISTRIBUTION. — The distribution of *Dromia dormia* includes the east coast of Africa, Madagascar, Seychelles, Mauritius, Red Sea, Amboina, Philippine Islands, China, Japan, Hawaii and now New Caledonia.

Dromia foresti sp. nov.

Figs 5 a-j, 16 d

MATERIAL EXAMINED. — **Bellona Reefs** : MUSORSTOM 5, stn DW 299, 22°47.70'S, 15°23.70'E, 360-390 m, 11.10.1986 : 1 ♂, holotype, 27.3 x 23.0 mm (MNHN-B 22553).

TYPE. — Holotype : ♂ 27.3 x 23.0 mm from MUSORSTOM 5, stn DW 299 (MNHN-B 22553).

DESCRIPTION. — Carapace wider than long, rising steeply at front but only gradually from other margins. Surface almost smooth, covered with very fine, sparse tomentum. A faint frontal groove separates two small protuberances behind rostrum, two small medial pits in cardiac region whose borders are deeply marked by grooves diverging anteriorly, branchial groove only faintly marked. Rostrum bluntly tridentate, median tooth narrower than lateral teeth, almost horizontal, margin rising steeply to blunt lateral teeth which are directed almost vertically. Anterolateral margin begins on level of suborbital margin, widening rapidly at first and then more gradually, bearing three blunt, equally spaced teeth. The first tooth close to orbit and directed almost horizontally, remaining two teeth set in from margin (i.e. sub-marginal) of carapace and directed vertically, posterolateral tooth similar to first anterolateral tooth. Posterolateral carapace margins convergent, posterior margin almost straight.

Prominent supraorbital tooth, similar to and close by lateral rostral tooth, but smaller, postorbital corner not produced. A shallow notch separates the large, blunt suborbital tooth which is visible dorsally. First segment of antenna beak-like medially, gaping narrowly, superior lobe larger than inferior lobe. Second segment elongate (ratio of length to width = 2.1), low rounded distal tubercle medially, distomedial corner produced. Third segment inserted at an angle on the medial extension of second segment. Exopod extending as far as joint between third and fourth segments, apex blunt (not bilobed), ratio of length of antennal flagella to CW = 0.36. Epistome firmly joined to rostrum but leaving distinct groove.

Distinct tooth at corner of buccal frame, subhepatic region inflated, marked by a strong groove which extends sinuously from near basal segment of antenna, beneath anterolateral margin to posterolateral tooth. Female sternal groove characters unknown.

Chelipeds well developed. Merus trigonal in cross-section, borders unornamented, small distal tubercle on superior surface. Carpus inflated, three large tubercles on outer face, one proximal, one inferior and the other distal, also a blunt distal tooth on inner superior margin. Inner face of propodus densely pubescent, outer face smooth, inflated, four small proximal tubercles on superior inner margin. Fingers pink, downcurved, hollowed out internally, both armed with nine-ten teeth. Proximal tooth on each finger largest, blunt, fingers gaping for most of their length and distal teeth do not interlock, tips offset on both chelipeds.

First two pairs of legs shorter than chelipeds, distal borders of meri, carpi and propodi each bearing prominent blunt tubercles. Posterior lower border of second leg merus armed with three small central tubercles. Dactyli as long as propodi, ventral borders of dactyli armed with five-seven small spines increasing in size distally.

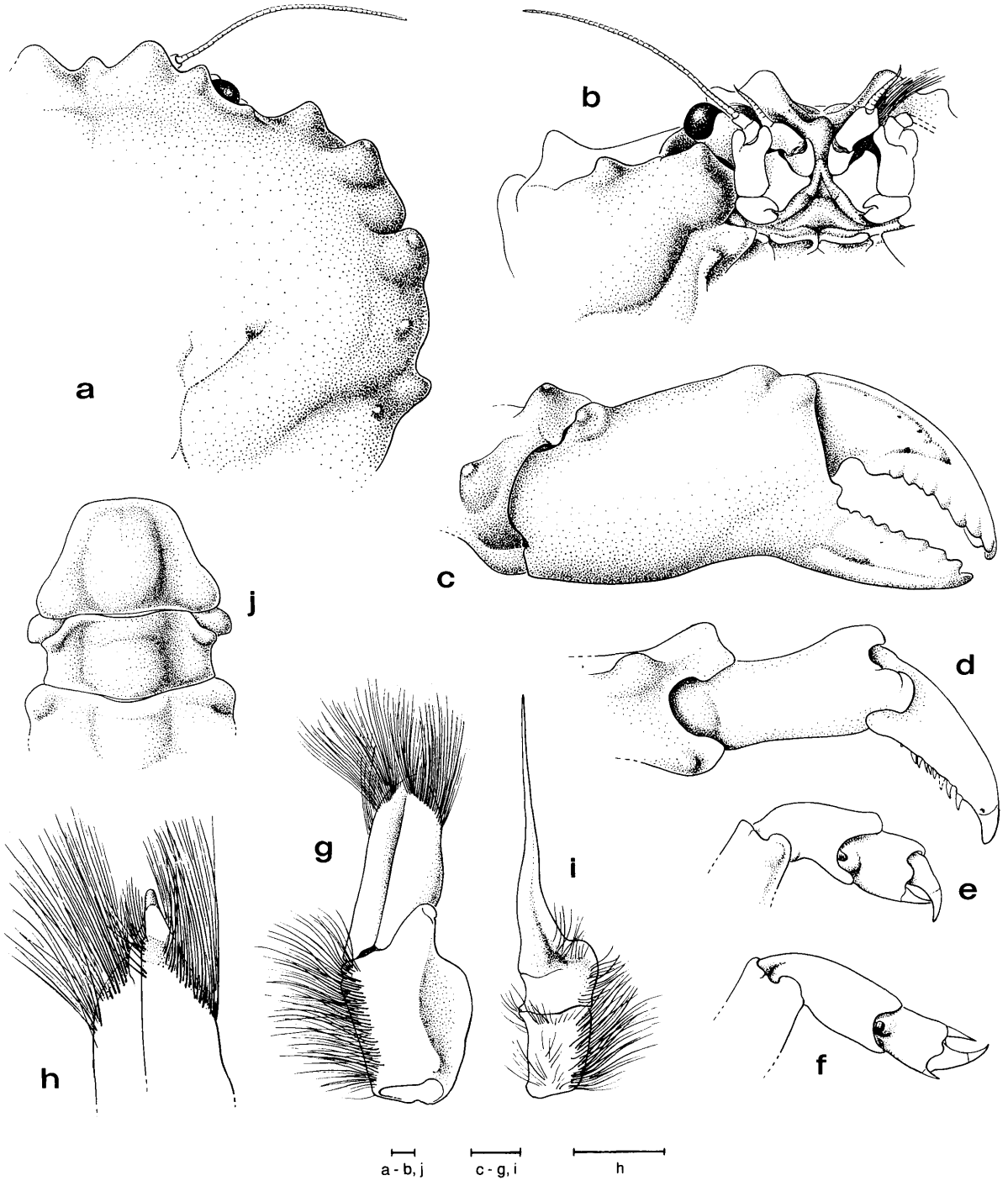


FIG. 5. — *Dromia foresti* sp. nov. : ♂, holotype, 27.3 x 23.0 mm, Chesterfield Islands (Bellona Reefs), MUSORSTOM 5, stn 299, 360-390 m (MNHN-B 22553) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area and anterolateral margin; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, first male pleopod; **h**, tip of first male pleopod; **i**, second male pleopod; **j**, ventral view of telson and terminal segments of male abdomen.

Scale bars represent 1.0 mm.

Last two pairs of legs much reduced, each of similar size, meri with two tubercles similar to second leg. Carpus of third leg with a single tubercle on distal border. Dactyli of both legs strongly curved and opposed by single propodal spines. Fourth leg has a single spine on outer propodal margin at base of dactyl.

Abdomen of six free segments. Telson much wider than long, terminal margin truncate. A low median ridge along length of abdomen, on segments two-four the ridge is ornamented with a pair of low rounded distal tubercles. Posterolateral corners of segments two-five produced as blunt lobes. Uropod plates well developed, visible externally and used in locking the abdomen, by fitting in front of curved ridge on bases of first legs.

First male pleopod a simple folded tube, produced as a blunt horny tip, densely setose, second pair of pleopods simple, needle-like.

ETYMOLOGY. — This new species of *Dromia* is named after Professor J. FOREST, in recognition of his contribution to the study of the other species in this genus. In particular, his analysis of the Atlantic *Dromia* has provided a model for my revision of the whole family.

DISCUSSION. — *Dromia foresti* is clearly different from the other species in this genus which occur in the waters of New Caledonia, i.e. *D. dormia* and *D. wilsoni*. All three species have a CW/CL ratio of 1.2-1.3 but *D. dormia* has a uniformly short velvety tomentum, no supraorbital tooth, four anterolateral teeth, and a strong, narrowed, anteriorly directed posterolateral tooth. *D. wilsoni* has a longer sculptured (uneven) tomentum, a supraorbital tooth, three anterolateral teeth, and a prominent posterolateral tooth similar to the anterolateral teeth. *D. foresti* has a uniformly short, close tomentum, a supraorbital tooth, three anterolateral teeth, and a small posterolateral tooth similar to the anterolateral teeth. Of these species, *D. dormia* grows much larger than the others.

DEPTH. — The depth at which the type specimen was collected, 360-390 m, is considerably deeper than most Atlantic *Dromia* species (down to about 100 m), but it is not as deep as the maximum for *D. wilsoni* which is 520 m. Thus, in the Pacific, each of the three *Dromia* species has a different maximum depth : *D. dormia* (50 m), *D. foresti* (390 m), and *D. wilsoni* (520 m).

DISTRIBUTION. — *Dromia foresti* is only known from the Bellona Reefs, off New Caledonia.

Dromia wilsoni (Fulton & Grant, 1902)

Fig. 16 e

Cryptodromia wilsoni Fulton & Grant, 1902b : 61, pl. 9.
Cryptodromia lateralis - CHILTON, 1911 : 49. Not *Dromia lateralis* Gray, 1831.
Petalomera wilsoni - RATHBUN, 1923a : 154, pl. 42, fig. 1. — DELL, 1968 : 14, pl. 2. — GRIFFIN, 1972 : 56. — McLAY, 1988 : 68, fig. 10a-f; 1991 : 470, pl. 1B, figs 6a-d, 7a-c, 8a-c (contains a full synonymy).

MATERIAL EXAMINED. — **New Caledonia**. LAGON : stn 754, 21°13.15'S, 165°49.25'E, 36 m, 7.01.1987 : 1 ♂ 14.8 x 12.7 mm.

SMIB 6 : stn DW 120, 18°58.5'S, 163°25.6'E, 310-325 m, 3.03.1990 : 1 ♂ 9.8 x 8.0 mm, (3 cryptoniscus larval stage isopods under the abdomen).

BERYX 4 : stn 2 (trap), 22°47.06'S, 167°18.92'E, 400 m, 22.01.1992 : 1 ♂ 44.0 x 32.3 mm.

Loyalty Islands. MUSORSTOM 6 : stn DW 460, 21°01.72'S, 167°31.45'E, 420 m, 20.02.1989 : 1 ♂ 47.7 x 34.8 mm.

Hunter Island. VOLSMAR : stn CAS 10, 22°23.1'S, 171°41.1'E, 280 m, 1.06.1989 : 1 ♀ 33.3 x 28.5 mm.

Chesterfield Islands. CHALCAL 1 : stn CP 8, 19°43.80'S, 158°35.25'E, 348 m, 19.07.1984 : 1 ♂ 21.5 x 19.6 mm.

MUSORSTOM 5 : stn 255, 25°15.40'S, 159°54.80'E, 280-295 m, 7.10.1986 : 1 ♂ 8.7 x 7.1 mm; 1 ♀ 13.2 x 10.3 mm. — Stn 256, 25°18.00'S, 159°52.70'E, 290-300 m, 7.10.1986 : 2 ♀♀ 5.9 x 5.1, 9.5 x 7.6 mm. — Stn 258, 25°32.80'S, 159°46.10'E, 300 m, 8.10.1986 : 1 ♀ 5.3 x 4.4 mm. — Stn 268, 24°44.70'S, 159°39.20'E, 280 m, 9.10.1986 : carapace only, 33.4 x 23.3 mm.

Philippine Islands. MUSORSTOM 2 : stn CP 4, 14°01.2'N, 120°18.4'E, 190-183 m, 20.11.1980 : 1 ♂ 25.4 x 18.9 mm.

DESCRIPTION. — Carapace distinctly wider than long, moderately convex, surface smooth, gently undulating under a thick cover of soft, long setae which give the surface an areolate appearance. Cardiac and branchial grooves well marked by depressions, a pair of medial cardiac pits and another single one further back. Rostrum tridentate, median tooth small, blunt and on a lower level, projecting as far forwards as lateral teeth which are separated by a U-shaped sinus, from which extends a distinct frontal groove separating two rounded protuberances. Three strong anterolateral teeth extend back from the level of the suborbital tooth : first tooth directed forwards and the last two upwardly directed. Both FULTON and GRANT (1902b) and RATHBUN (1923a), stated that there are four anterolateral teeth, but the first tooth is clearly subhepatic in position and only three teeth are on the anterolateral border. Posterolateral tooth large, also projecting upward. On the ridge behind the branchial groove there is a small tubercle close to the base of the posterolateral tooth. Posterolateral carapace margins convergent and posterior margin concave.

Lateral rostral teeth continuous with supraorbital margin, which has a broad, blunt supraorbital tooth. External orbital corner not produced and with a small fissure separating it from the strong suborbital tooth, which is visible dorsally. In dorsal part of the orbit, beneath supraorbital margin, there is the vestige of a parallel ridge and at the lateral end of the ridge it meets a weak vertical ridge (an extension of the supraorbital tooth), which tends to divide off a corneal region of the orbit.

First segment of antenna much wider than long, medially beaked, gaping, and twisted. Second segment much longer than wide, convex, with flange-like lateral margin, rounded distal tubercle at base of third segment, distomedial corner produced, curved, on which third segment is inserted at an angle. Exopod fused to second segment, produced beyond joint between third and fourth segments, tip bilobed, inner lobe acute and curved over base of eyestalk. Ratio of antennal flagella length to CW = 0.43.

Subhepatic area of carapace convex with a small blunt tubercle beneath the suborbital tooth and another, larger tubercle, lower and between it and the first anterolateral tooth. A well marked groove, beginning below the orbit, curves under the larger subhepatic tubercle and anterolateral margin, terminating near the posterolateral tooth. Female sternal grooves end wide apart on small raised tubercles between bases of first and second legs.

Chelipeds large, especially in male. Merus triangular in section, all three borders have small rounded granules. Carpus has two large distal nodules, inner angle has a sharp tooth. Propodus smooth, upper border in male sparsely covered in rounded nodules, in female these nodules are rudimentary. Inner and outer surfaces of fingers longitudinally grooved and covered with tomentum, distal surface alone is naked and glabrous. Fingers pink, hollowed out internally, armed with seven well developed teeth and gaping when closed, long silky hairs on inner surface of propodus and fingers.

First two pairs of legs shorter than chelipeds, first slightly longer than second. Carpi and propodi have tuberculiform nodules at distal ends of anterior borders. Dactyli approximately as long as propodi, inner margins have five-seven small spines which increase in size distally.

Last two pairs of legs much reduced and of similar size. A single propodal spine opposing the third leg dactyl whose inner margin has three-four tiny spines. Fourth leg dactyl opposed by a propodal spine. No spines on outer propodal margins of either leg.

Abdomen of six free segments. Telson much wider than long, male telson trigonal (ratio = 1.5), female telson subtruncate (ratio = 1.7). Uropod plates well developed and visible externally. Abdominal locking mechanism involves uropods fitting in front of well developed serrated flange on bases of first legs.

Male first pleopod is a partially rolled tube with a densely setose, broadly rounded tip armed with a sharp horny tubercle. Second pleopod simple and needle-like.

DISCUSSION. — A full synonymy of *Dromia wilsoni*, with illustrations, can be found in MCLAY (1991) under the name *Petalomera wilsoni*. In that paper I indicated the need for an extensive revision of the genus *Petalomera* and this is undertaken later in the present contribution. Only citations of *Dromia wilsoni* relevant to the New Caledonian and Philippine regions are included here.

Until now *D. wilsoni* has been placed in the genus *Petalomera*, but it lacks the petaloid cheliped meri and granulate carapace surface of this genus. The carapace shape, and surface, anterolateral teeth, and arrangement of the spines on the last two pairs of legs suggest that it should be placed in the genus *Dromia*. However, the larvae of this species, described by WEAR (1970) and TERADA (1983), are quite different from other known larvae of

Dromia spp. (*D. personata*, and *D. erythropus*) and present something of a problem. While the adult characters suggest that this species should belong in *Dromia*, the larvae are different. Indeed, the larvae of *D. wilsoni* are very different from all other known dromiid larvae. My conclusion is that since the adult characters of other dromiids are well known these should be used to place species in appropriate genera but when the larval characters are equally well known, then the situation could be readdressed.

One feature of the spines associated with the dactyli of the walking legs of *Dromia wilsoni* requires some comment. The dactyl of the third leg is opposed by a single spine with no spines on the outer propodal margin (typical of other *Dromia* species) but there are three small spines on the inner margin of the dactyl. This is a feature not seen on the other species of *Dromia*, but found in species of the primitive genus *Sphaerodromia.* Apart from this feature, which I consider primitive, *Dromia wilsoni* agrees well with the other species in this genus : its carapace is much wider than long, the structure of the antenna is in agreement, there are about five small spines on the inner margins of the dactyli of the first two pairs of legs, uropod plates are well developed and the abdominal locking mechanism involves these plates fitting in front of a serrated flange on the base of the first legs, there is no abdominal fusion, and the female sternal grooves end apart just behind bases of the first legs. FOREST (1974) showed that the sternal grooves in species of *Dromia* were quite variable and in different species could end together or apart between the bases of the chelipeds or first legs. The inclusion of this species brings the number of Atlantic *Dromia* to eight species. By contrast there are only three Pacific species and only *D. wilsoni* occurs in both oceans.

The cryptoniscus larval stages of an isopod found under the abdomen of the small male crab from stn DW 120 are the first record of such a parasite in this species, although McLAY (1991) recorded the cirripede *Poecilasma* sp. from a French Polynesian specimen.

Female *D. wilsoni* reach maturity at a size of CW = 12-14 mm and produce eggs of 0.7-0.8 mm diameter. The largest females, CW = 46 mm, have a clutch size of approximately 3500 eggs (see McLAY, 1991), and larval development involves only two zoeal stages (see HONG & WILLIAMSON, 1986, and TERADA, 1983). A full review of the biology of *Dromia wilsoni* can be found in McLAY (1988).

CAMOUFLAGE. — This species normally carries a sponge or ascidian cap, but larger crabs often do not have a piece of camouflage (see McLAY, 1991).

SIZE. — The largest male (CW = 47.7 mm) and female (CW = 33.3 mm) crabs from the collection do not extend the known size range for this species which is CW = 61.0 mm for males and CW = 49.1 mm for females.

DEPTH. — The specimen from 420 m (stn DW 460) does not exceed the known maximum depth of 520 m.

DISTRIBUTION. — The distribution of *D. wilsoni* includes all three of the world's major oceans and in the vicinity of New Caledonia, includes southern Australia and New Zealand. Its occurrence in the Philippine Islands confirms records from French Polynesia (McLAY, 1991) that *D. wilsoni* is common in tropical as well as temperate waters. In the Pacific, this species occurs on both sides of the equator.

Genus ***HALEDROMIA*** nov.

Dromia Zietz, 1887 : 299.

Carapace much wider than long, surface smooth very convex. Rostrum tridentate. Coxae of third maxillipeds separated by a narrow gap and inserted under tip of telson. Female sternal grooves end together on a large rounded tubercle between chelipeds. Cheliped with an epipod. Legs not knobbed or ridged, propodi and dactyli of first two pairs approximately equal in length. Fourth legs shorter than second. Segments of the last two pairs of legs flattened, dactyli opposed by single propodal spines, no spine on the outer propodal margin. Uropod plates on the abdomen vestigial and concealed. Joint between last two abdominal segments freely movable. Male abdominal locking mechanism involves tooth on bases of first legs against margin of penultimate segment.

TYPE SPECIES. — *Dromia bicavernosa* Zietz, 1887, by monotypy.

ETYMOLOGY. — The generic name *Haledromia* recognizes the substantial contribution of Herbert M. HALE to the study of Australian Brachyura.

DISCUSSION. — *Dromia bicavernosa* Zietz, 1887, from southern Australia is a very distinctive species, having, red, deep reniform cavities on either side of the rostrum, vestigial uropods, and a blunt tooth on the base of the first legs which is used in the abdominal locking mechanism. With this combination of features, this species does not belong in *Dromia* and it is necessary to establish a new genus (see Table 2).

The unusual carapace cavities on either side of the rostrum are not found among the other Dromiidae, but similar deep cavities, associated with the orbits, are found in *Sphaerodromia brizops* McLay & Crosnier, 1991, from the Seychelle Islands. In *Sphaerodromia* this character is regarded as only being important at the species level, and it would not be consistent to treat it as a generic character in *Haledromia*. The most important characters separating *Haledromia* from *Dromia* are the high CW/CL ratio (1.6, much larger than any recorded for species of *Dromia*, see FOREST, 1974), and the uropods : vestigial uropods (well developed and visible externally in *Dromia*).

H. bicavernosa has very large eggs (2.8 mm diam.) and may have direct development.

All the specimens of this large species (CW up to 93 mm) have been collected intertidally or from shallow coastal waters. It may have a similar shallow water distribution to *Dromia dormia*, another large dromiid crab.

DISTRIBUTION. — *Haledromia bicavernosa* nov. comb. is endemic to Australia.

Genus ***HEMISPHAERODROMIA*** Barnard, 1954

Cryptodromia- STEBBING, 1918 : 56.
Hemisphaerodromia Barnard, 1954 : 100. — LEWINSOHN, 1979 : 10; 1984 : 117.
Petalomera - KENSLEY, 1970 : 110.

Carapace wider than long, strongly convex, surface smooth, regions not defined, only branchial groove evident. Frontal region prominent, weakly tridentate, rounded eave-like margins, median tooth small, scarcely visible dorsally. No orbital teeth or fissure. Anterolateral margin evenly convex, bearing indistinct granules. Female sternal grooves end apart on tubercles just behind bases of first legs. Antennal exopod well developed. Coxae of third maxillipeds closely approximated and inserted under tip of sternum. Epipod on cheliped. First three pairs of pereiopods similar in length. Segments of first two pairs of legs lobed. Last two pairs of legs reduced, third pair shortest, fourth pair about three-quarters of carapace length when extended forward. Dactyli of these legs opposed by a propodal spine with another spine on the outer propodal margin. Abdomen of six free segments. Uropods well developed, visible externally, used in abdominal locking mechanism by fitting in front of serrated ridge on base of first leg. Telson wider than long, tip rounded.

TYPE SPECIES. — *Cryptodromia monodus* Stebbing, 1918, by monotypy.

DISCUSSION. — BARNARD (1954) erected this genus for male and female specimens from Madagascar. He noted that these specimens resembled *Sphaerodromia* Alcock, 1899, except that the last pair of legs were less robust, but longer than third pair, and almost as long as second pair, also the female sternal grooves end just behind bases of first legs. But it is only the shape of the carapace which resembles *Sphaerodromia*. Other features make *Hemisphaerodromia* closer to genera such as *Fultodromia* gen. nov. and *Stimdromia* gen. nov. (see Table 3).

Unfortunately, *Hemisphaerodromia abellana* Barnard, 1954, is a synonym for *Cryptodromia monodus* Stebbing, 1918. Indeed, another synonym for this species is *Petalomera laevis* Kensley, 1970. *Cryptodromia monodus* was described using a female from Durban, Natal, but inadequate illustrations and measurements meant that the species remained enigmatic and the name was never used by any other author. I have examined the type specimen in the British Museum (BM 1925: 12: 1: 227) in which the carapace is definitely wider than long,

median rostral tooth is not prominent (contrary to STEBBING'S figure, his pl. 8), the cheliped definitely has an epipod, and the uropod plates are well developed (contrary to STEBBING'S figure). More accurate illustrations were provided by BARNARD (1954), KENSLEY (1970, except for his fig. 6h of the male abdomen in which the uropods are omitted) and LEWINSOHN (1979). BARNARD (1954) stated that the carapace of his type and paratype specimens was as wide as long but I have measured these specimens (MNHN-B 7849) and the carapace is definitely wider than long. This correction was confirmed by LEWINSOHN (1979, 1984). None of the previous authors have noted the presence of a small spine, at the base of the dactyl, on the outer propodal margin of the last two pairs of legs. These spines are present on some specimens, but not all, but they are present in both of BARNARD'S specimens. It is possible that these spines are frequently broken off and therefore easily overlooked.

The distinctive features of *Hemisphaerodromia* are the evenly rounded carapace shape, smooth surface and eave-like, uninterrupted frontal margin which is continuous to the suborbital lobe.

H. monodus usually carries camouflage caps made from compound ascidians, and lives in shallow waters, down to approximately 25 m. The largest known specimen is STEBBING'S female type, CW = 20.5 mm. BARNARD (1954) noted that the eggs are comparatively large, 1.3 mm diameter.

DISTRIBUTION. — The only known species occurs in the western Indian Ocean, and Red Sea, including the coast of South Africa.

CHARACTER	*Hemisphaero dromia*	*Fultodromia*	*Paradromia*	*Petalomera*	*Stimdromia*	*Frodromia*
Ratio CW/CL	Carapace width greater than length.	Carapace width less than length.	Carapace width greater than length.	Carapace width equal to or less than length.	Carapace width equal to or greater than length.	Carapace width less than length.
Carapace surface	Smooth.	Sparsely tuberculated.	Sparsely granulate. Regions well defined.	Granulate, may be areolate.	Smooth.	Finely granulate.
Rostrum	Weakly tridentate, teeth eave-like.	Tridentate, teeth broad, blunt.	Tridentate, teeth broad, rounded.	Tridentate, teeth eave-like, blunt.	Tridentate, teeth broad, blunt.	Tridentate, teeth small, acute.
Anterolateral margin	Indistinct granules.	Well developed teeth.	Teeth short, broad and blunt.	Teeth small, granulate.	Teeth well developed, blunt.	Numerous small granules.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.
Sternal grooves	End apart behind first legs.	End apart between or behind chelipeds.	End apart between or behind first legs.	End apart between or behind first legs.	End apart between first legs.	End apart behind chelipeds. Blunt coxal tubercle behind genital aperture which opens anteriorly.

Epipods/Podobranchs	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.	Epipod on cheliped. No podobranchs on pereiopods.
First two pairs of legs	Segments distally lobed. No distal propodal spine.	Segments strongly nodular. No distal propodal spine.	Segments granulate, distal margins lobed. No distal propodal spine.	Meri and carpi petaloid (also on chelipeds). Segments may be granulated. No distal propodal spine.	Segments strongly knobbed or ridged (chelipeds similar). No distal propodal spine.	Segments not nodose. No distal propodal spine.
Last two pairs of legs	Third leg dactyl opposed by one propodal spine, and another spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, and another spine on outer propodal margin.	Third leg dactyl opposed by up to two propodal spines, and up to three spines on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by up to two propodal spines, and up to three spines on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, and one spine on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, and one spine on outer propodal margin.	Third leg dactyl opposed by one propodal spine, one spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, and one spine on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by two propodal spines, no spines on outer propodal margin.
Abdominal segments	No segments fused.	No segments fused.	No segments fused.	No segments fused.	No segments fused. Posterior corners of third to fifth segments bluntly produced.	No segments fused.
Uropods	Small, visible externally in both sexes.	Small, visible externally in both sexes.	Small, visible externally in both sexes.	Small, visible externally in both sexes.	Small, visible externally in both sexes.	Small, visible externally in male, concealed in female.
Telson	Rounded.	Rounded in female, bilobed in male.	Rounded or subtruncate.	Rounded or subtruncate.	Rounded, subtruncate or bilobed.	Rounded.
Male pleopods.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.

TABLE 3. — Comparison of the key characteristics of the genera *Hemisphaerodromia* Barnard, 1954, *Fultodromia* gen. nov., *Paradromia* Balss, 1921, *Petalomera* Stimpson, 1858, *Stimdromia* gen. nov., *Frodromia* gen. nov.

Genus *FULTODROMIA* nov.

Dromia; - H. MILNE EDWARDS, 1837 : 170 (in part).
Cryptodromia Stimpson, 1858 : 225 (in part); 1907 : 172 (in part). — BAKER, 1907 : 180. — IHLE, 1913 : 32 (in part).
Petalomera - RATHBUN, 1923 : 154 (in part). — HALE, 1927 : 112 (in part).
Dromidiopsis - BALSS, 1935 : 113.

Carapace length greater than width, surface convex, sparsely tuberculate. Lateral rostral teeth prominent, anterolateral teeth well developed, bluntly tipped. Coxae of third maxillipeds closely approximated, but separated from tip of sternum by a deep trough. Female sternal grooves end apart on transverse ridge between or just behind chelipeds. Epipod on the cheliped. First two pairs of legs nodular, margins of dactyli armed with four spines. Last two pairs of legs reduced, third pair usually shortest, dactyli of these two legs opposed by up to two propodal spines with up to three spines on the outer propodal margin. Abdomen of six free segments. Uropod plates well developed, visible externally, used in the abdominal locking mechanism by fitting in front of a small tubercle on bases of first legs. Tip of male telson bilobed.

TYPE SPECIES. — *Dromia nodipes* Guérin-Méneville, 1832, by present designation.

OTHER SPECIES. — *Cryptodromia tumida* var. *spinifera* Montgomery, 1931.

ETYMOLOGY. — The generic name *Fultodromia* is formed by combining *Dromia* with the name of S.W. FULTON, in recognition of his contribution to the study of Australian Brachyura.

DISCUSSION. — LAMARCK (1818) was the first to use the name *Dromia nodipes* but did so without a description and so it was a *nomen nudum*. The first available publication of this name, accompanied by an illustration, is GUÉRIN-MÉNEVILLE (1832, pl. 14, fig. 1) and so he is the author of *Dromia nodipes*. H. MILNE EDWARDS (1837) referred to GUÉRIN's plate and gave the following description of *Dromia nodipes* : "Carapace bombée, et présentant de chaque côté une gouttière oblique, assez profonde entre les régions hépatiques, qui sont très grandes, et les branchiales qui sont très petites; beaucoup de petits tubercules sur la partie antérieure de la carapace. Front très large et divisé en trois dents, dont les deux latérales très larges et très avancées; une dent au-dessus de l'angle orbitaire interne, et une autre très saillante à l'angle orbitaire externe. Bords latéro-antérieurs convexes et armés de quatre dents, dont la première grosse, aplatie, saillante et arrondie; les deux suivantes médiocres, et la dernière rudimentaire. Pattes des trois premières paires hérissées de gros tubercules arrondis". Even though this species was illustrated, including the male pleopods by BROCCHI (1877), it has been ignored. Fortunately the female type specimen of *Dromia nodipes* Guérin-Méneville, 1832 (locality, Cap de Bonne Espérance), is in the collection of the Muséum national d'Histoire naturelle (MNHN-B 15). HENDERSON (1888) mentions (p. 9) examining this specimen. Neither LAMARCK, GUÉRIN-MÉNEVILLE, H. MILNE EDWARDS, nor HENDERSON give a locality for *D. nodipes* and it appears that "Cap de Bonne Espérance" was added at some later date. This term usually refers to the Cape of Good Hope, South Africa, but this cannot be accurate because no specimens even remotely resembling *D. nodipes* have ever been collected from South Africa. If there is any truth at all in the use of "Cap de Bonne Espérance" then it must refer to Port Esperance, Esperance Bay, or Esperance Point all in South Australia. The only other known specimens of *D. nodipes* all come from the south-western coasts of Australia. Thus the exact type locality of this species is unknown but is most likely somewhere in South Australia.

Comparison of the type of *Dromia nodipes* with specimens of *Cryptodromia depressa* Baker, 1907 [not of BROCCHI, 1877, until now known as *Petalomera depressa* (Baker, 1907)] from the Western Australia Museum shows that these are the same species and so BAKER'S name is no longer necessary. Similarly, I have examined the type specimen of *Dromidiopsis michaelseni* Balss, 1935 (Zoologisches Institut and Museum, Hamburg, registration number, K-11578), which was not accurately illustrated. This species is also a synonym of *Petalomera depressa*. Examination of a range of specimens from the Western Australian Museum shows that *P. depressa* is a

very variable species, particularly in the size and arrangement of the anterolateral teeth, and the density of tubercles around the frontal region.

Figures of this species were first published by GUÉRIN-MÉNEVILLE (1832) and a photograph by HALE (1927). The inadequate illustrations of BALSS (1935) meant that the name *Dromidiopsis michaelseni* was never subsequently used.

The most distinctive features of *Fultodromia* gen. nov. are the sparse rounded granules on the carapace, which also ornament the bluntly rounded anterolateral teeth, carapace length greater than width, and the presence of multiple propodal spines associated with the dactyli of the last two pairs of legs (see Table 3).

DISTRIBUTION. — Both species in this new genus are known only from Western Australia, and so it is an Australian endemic.

Key to the species of *Fultodromia*

— Carapace ornamented with large tubercles which also adorn the anterolateral teeth, outer propodal margins of last two pairs of legs armed with three spines .... *Fultodromia nodipes* (Guérin-Méneville, 1832) nov. comb.

— Carapace sparsely covered with small tubercles, anterolateral teeth not adorned, outer propodal margins of last two pairs of legs armed with up to two spines .... *Fultodromia spinifera* (Montgomery, 1931) nov. comb.

Genus ***PARADROMIA*** Balss, 1921

Cryptodromia - HENDERSON, 1888 : 5 (in part). — IHLE, 1913 : 32 (in part). — MONTGOMERY, 1931 : 413.
Paradromia Balss, 1921 : 178; 1922 : 108.
Petalomera - SAKAI, 1936 : 28 (in part); 1976 : 20 (in part). — TAKEDA & MIYAKE, 1970 : 203 (in part). — DAI & YANG, 1991 : 25 (in part).

Carapace width greater than length, subpentagonal in outline, surface convex, granulate, regions well defined. Frontal and branchial grooves especially evident. Rostrum prominent, tridentate, teeth bluntly rounded. Anterolateral teeth short, broad, and blunt. Supraorbital margin scarcely overhanging eye, suborbital margin blunt, visible dorsally. Small tooth above anterolateral margin and close to postorbital corner. Antennal exopod well developed. Coxae of third maxillipeds closely approximated, but separated from tip of sternum by a deep trough. Female sternal grooves end apart on low tubercles between or behind bases of first legs. Cheliped with an epipod. First two pairs of legs lobed, inner margins of dactyli armed with up to six small spines. Last two pairs of legs reduced, third pair shortest. Dactyl of third leg opposed by a propodal spine. Dactyl of fourth leg opposed by a propodal spine and there may be another spine on the outer propodal margin. Abdomen of six free segments. Uropod plates well developed, visible externally. Telson wider than long, tip subtruncate in male, obtusely rounded in female.

TYPE SPECIES. — *Cryptodromia japonica* Henderson, 1888, by present designation.

OTHER SPECIES. — *Petalomera sheni* Dai, Yang, Song & Chen, 1981.

DISCUSSION. — BALSS (1921) erected *Paradromia* and included two species : *Cryptodromia japonica* Henderson, 1888, and *Dromia lateralis* Gray, 1831. Although he did not designate a type species, it is evident that BALSS was trying to accommodate *Cryptodromia japonica* from Japan. The inclusion of *Dromia lateralis* was as a result of BORRADAILE (1903a) pointing out that this species, which had been known as *Cryptodromia lateralis*, had an epipod on the cheliped. In fact BORRADAILE transferred this species to *Petalomera* Stimpson, 1858. Subsequently,

only HALE (1925) used the combination *Paradromia lateralis*. However, this species does not belong in *Paradromia* or *Petalomera*, and should be placed in a new genus (see below). Thus, the type species of *Paradromia* must be *Cryptodromia japonica* Henderson, 1888.

BALSS never gave a definition of *Paradromia*, but simply separated the type species from *Cryptodromia* because it had an epipod on the cheliped. Thus, the above generic definition is the first detailed statement of the characteristics of this genus. Synonyms of *Paradromia japonica* include *Cryptodromia stearnsii* Ives, 1891, *C. canaliculata* var. *ophryoessa* Ortmann, 1892, and *C. asiatica* Parisi, 1915.

SHEN (1931) identified some specimens from North China as *Petalomera granulata* Stimpson, 1858, but SAKAI (1965) reassigned them to *Petalomera japonica*. DAI, YANG, SONG, and CHEN (1981) reexamined the material and assigned it to a new species, *Petalomera sheni* Dai, Yang, Song, & Chen, 1981. *P. sheni* closely resembles, but is different from *Paradromia japonica*, and should be included in *Paradromia* Balss, 1921.

Neither *Petalomera japonica* nor *P. sheni* have petaloid meri on the first three pairs of pereiopods and so they cannot belong to *Petalomera*. Also the bluntly rounded features of the carapace in *Paradromia* are distinctive (see Table 3).

HONG and WILLIAMSON (1986) compared the larval stages of *Paradromia japonica* (as *Petalomera japonica*) and *Dromia wilsoni* (as *Petalomera wilsoni*) and concluded that they should be placed in separate genera. My generic revision, based on the adults, confirms this conclusion.

DISTRIBUTION. — *Paradromia* is a West Pacific genus : *P. japonica* has been recorded from China, Japan, Korea, Indonesia, and North West Australia, but *P. sheni* is only known from China. HONG and WILLIAMSON (1986) have described the larval development of *P. japonica* based on material from Korea. The record of *P. japonica* from Funafuti Atoll, Ellice Islands, by WHITELEGGE (1897) is doubtful.

Key to the species of *Paradromia*

— Carapace surface sparsely granular, suborbital tooth compressed and oriented obliquely ... . *Paradromia japonica* (Henderson, 1888)

— Carapace densely granular, suborbital tooth conical .... *Paradromia sheni* (Dai, Yang, Song, & Chen, 1981) nov. comb.

Genus *PETALOMERA* Stimpson, 1858

Petalomera Stimpson, 1858 : 226; 1907 : 179. — ALCOCK, 1900 : 147; 1901 : 55. — BORRADAILE, 1903a : 300 (in part). — IHLE, 1913 : 48. — SAKAI, 1936 : 28 (in part); 1965 : 9; 1976 : 20 (in part). — BARNARD, 1950 : 312. — McLAY, 1991 : 474. — DAI & YANG, 1991 : 25 (in part).

Cryptodromia - ORTMANN, 1894 : 34 (in part). — IHLE, 1913 : 32 (in part).

Carapace width about equal to or less than length, surface slightly convex, granulated and may be areolate. Lateral rostral teeth prominent, anterolateral teeth small. Antennal segments granulated, lateral margin of second segment convex, exopod well developed. Coxae of third maxillipeds closely approximated and separated from tip of sternum by a deep trough. Female sternal grooves end apart between or behind base of first legs. Cheliped with an epipod. Chelipeds and first two pairs of legs with petaloid meri, carpi and propodi may be crested. Legs not knobbed, inner margins of dactyli of first two pairs armed with up to seven small spines. Last two pairs of legs reduced, third pair shortest, dactyli opposed by single propodal spines with sometimes another spine on the outer propodal margin. Abdomen of six free segments. Uropod plates well developed, visible externally, used in abdominal locking mechanism by fitting in front of large tuberculate knob on bases of first legs. Telson wider than long, tip bluntly rounded.

TYPE SPECIES. — *Petalomera granulata* Stimpson, 1858, by original designation and monotypy.

OTHER SPECIES. — *Petalomera pulchra* Miers, 1884.

DISCUSSION. — The original definition of the genus *Petalomera* Stimpson, 1858, was as follows : "Carapax oblongus, convexus, epimeris post suturam membranaceis. Palatum utrinque colliculo instructum. Foeminae sterni sulci — ? Meri pedum sex anticorum laminato-dilatati. Chelipedum digiti apicibus cornei, cochleariformes. Pedes 4 postici iis *Dromiæ* similes". This genus has been expanded from the original form by BORRADAILE (1903a) as follows : "Dromiidae with an epipodite on the chelipeds, the walking legs bearing sharp ridges, the carapace varying in the relation of its length to its breadth, but usually broader than long, the regions clearly or indistinctly marked, the efferent branchial channels well made, the sternal grooves of the female ending apart behind the cheliped segment, the fifth leg shorter than the third, and without a thorn on the outer side of its last joint".

The most distinctive feature of the type species, *P. granulata* Stimpson, 1858, is the petaloid meri on the chelipeds and first two pairs of legs. Indeed, this character is the basis of the name for this genus and it is unfortunate that it was omitted by BORRADAILE (1903a) from his generic definition when it was part of STIMPSON'S definition. The only other species which fits this generic concept is *P. pulchra* Miers, 1884. RATHBUN (1923a) transferred *Cryptodromia lamellata* Ortmann, 1894, to the genus *Petalomera* but it lacks truly petaloid meri and belongs in *Stimdromia* gen. nov.

It is clear that most authors have followed BORRADAILE'S generic definition because most species assigned to *Petalomera* do not fit the original definition of STIMPSON. Both ALCOCK (1900) and BARNARD (1950) included the petaloid meri character in their definition of the genus, but did not allow the absence of such meri to exclude some species. ALCOCK also included a granular carapace as being an essential feature.

It is apparent that the species assigned to *Petalomera* should have petaloid meri, granular carapace, and sternal grooves ending apart behind the chelipeds which bear an epipod (see Table 3). I think that *Petalomera* should be restricted to the original concept and the remaining species assigned to existing or to new genera.

Of the nineteen species (*Petalomera angulata* Sakai, 1936, *P. atypica* Sakai, 1936, *P. atypica reticulata* Sakai, 1974, *Cryptodromia depressa*, Baker, 1907, *Petalomera fukuii*, Sakai, 1936, *P. granulata* Stimpson, 1858, *P. indica*, Alcock, 1901, *Cryptodromia japonica*, Henderson, 1888, *Petalomera kosugei* Takeda & Miyake, 1972, *P. laevis* Kensley, 1970, *Cryptodromia lamellata* Ortmann, 1894, *Dromia lateralis*, Gray, 1831, *Petalomera longipedalis* Dai, Yang, Song, & Chen, 1986, *P. longipes* Ihle, 1913, *P. nodosa* Sakai, 1936, *P. pulchra* Miers, 1884, *P. sheni* Dai, Yang, Song, & Chen, 1981, *Cryptodromia wilsoni* Fulton & Grant, 1902, *Petalomera yamashitai* Takeda & Miyake, 1970) which have been assigned to *Petalomera* the only ones which remain are *P. granulata*, and *P. pulchra*. Even to include these species it has been necessary to modify BORRADAILE'S interpretation of *Petalomera* by noting that there may be a propodal spine on the outer margin of the last legs, and that the meri of the chelipeds and first two pairs of legs are ridged or petaloid. The above definition contains the essential characters of STIMPSON (1858) and has been expanded to encompass important features not originally considered.

DISTRIBUTION. — *P. granulata* occurs off Japan, China, and also the Andamans and Sri Lanka (as *P. indica* Alcock, 1901). *P. pulchra* has been recorded from North Australia and Indonesia. Thus this restricted concept of *Petalomera* shows that the genus is so far known only from the vicinity of India, Indonesia, and includes the Western Pacific from northern Australia to Japan. With the following specimens the distribution now includes New Caledonia.

Key to the species of *Petalomera*

(Species studied in this paper are in bold)

— Carapace surface granulate, two small anterolateral teeth .....
..... ***Petalomera pulchra*** Miers, 1884

— Carapace surface granulate and areolate, three small anterolateral teeth .....
..... *Petalomera granulata* Stimpson, 1858

Petalomera pulchra Miers, 1884

Fig. 17 a-b

Petalomera pulchra Miers, 1884 : 260, pl. 27, fig. A. — IHLE, 1913 : 48.
Petalomera longipes Ihle, 1913 : 49, pl. 2, fig. 12.

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 247, 22°24.0'S, 166°50.9'E, 43 m, 24.10.1984 : 1 ♀ 13.9 x 14.1 mm. — Stn 403, 22°34.5'S, 167°17.5'E, 46-44 m, 23.01.1985 : 1 ♀ (ovig.) 19.9 x 20.6 mm. — Stn 465, 18°22.1'S, 163°05.0'E, 45 m, 1.03.1985 : 1 ♂ 7.3 x 7.7 mm. — Stn 522, 19°08.2'S, 163°38.2'E, 42 m, 5.03.1985 : 1 ♂ 10.9 x 11.4 mm. — Stn 539, 19°05.0'S, 163°17.3'E, 240 m, 6.03.1985 : 1 ♀ 5.5 x 6.0 mm. — Stn 626, 21°57.9'S, 166°52.5'E, 47-48 m, 6.08.1986 : 1 ♂ 8.1 x 8.8 mm. — Stn 709, 21°22.2'S, 166°03.5'E, 39-40 m, 10.08.1986 : 1 ♀ 10.3 x 10.6 mm. — Stn 716, 21°22.1'S, 165°58.9'E, 30 m, 11.08.1986 : 1 ♀ 9.4 x 9.7 mm. — Stn 724, 21°19.7'S, 165°57.8'E, 36-38 m, 12.08.1986 : 1 ♀ 9.4 x 9.7 mm. — Stn 1015, 20°10.1'S, 163°51.6'E, 25 m, 3.04.1988 : 1 ♀ (ovig.) 15.4 x 16.0 mm. — Stn 1087, 19°48.3'S, 163°59.5'E, 24 m, 24.10.1989 : 1 ♂ 10.0 x 10.5 mm; 1 ♀ 9.5 x 10.0 mm. — Stn 1168, 19°15.9'S, 163°09.3'E, 50 m, 30.10.1989 : 1 ♂ 5.2 x 5.5 mm.

Chesterfield Islands. CHALCAL 1 : stn DC 10, 20°36.09'S, 161°05.82'E, 87 m, 15.07.1984 : 1 ♀ 8.0 x 8.3 mm. — Stn DC 12, 20°31.33'S, 161°06.51'E, 80 m, 15.07.1984 : 1 ♂ 15.0 x 15.9 mm. — Stn CP 12, 20°35.30'S, 158°47.40'E, 67 m, 23 July, 1984 : 2 ♂♂ 6.2 x 6.7, 20.8 x 22.5 mm; 2 ♀♀ (ovig.) 16.2 x 16.9, 17.3 x 18.0 mm; 1 ♀ 10.2 x 10.5 mm. — Stn DC 43, 20°41.50'S, 158°38.40'E, 78 m, 23.07.1984 : 1 ♀ 16.6 x 17.4 mm. — Stn DC 50, 21°4.40'S, 158°40.70'E, 70 m, 24.08.1984 : 1 ♀ (ovig.) 10.5 x 10.8 mm. — Stn CP 14, 21°13.50'S, 158°50.20'E, 66 m, 24.07.1984 : 1 ♀ 22.5 x 18.1 mm. — Stn DC 53, 21°19.50'S, 158°55.30'E, 60 m, 24.07.1984 : 1 ♂ 13.6 x 14.1 mm; 1 ♀ 16.8 x 17.1 mm, bopyrid (Isopoda) parasite in right gill chamber. — Stn CP 15, 21°24.90'S, 159°9.30'E, 60 m, 25.07.1984 : 1 ♀ (ovig.) 19.0 x 19.4 mm. — Stn CP 16, 21°41.67'S, 159°21.92'E, 53 m, 25.07.1984 : 1 ♂ 15.0 x 16.2 mm. — Stn DC 61, 21°42.40'S, 159°29.00'E, 50 m, 26.07.1984 : 1 ♀ 7.1 x 7.0 mm.

CORAIL 1 : stn unknown : 1 ♂ 18.0 x 19.2 mm.

CORAIL 2 : stn DW 21, 20°36.14'S, 161°01.75'E, 86 m, 22.07.1988 : 1 ♂ 6.2 x 6.0 mm. — Stn CP 27, 20°21.29'S, 160°58.60'E, 75 m, 22.07.1988 : 1 ♀ 8.5 x 9.0 mm, carrying a compound ascidian cap. — Stn DW 34, 19°21.62'S, 158°55.77'E, 47 m, 23.07.1988 : 1 ♂ 6.6 x 7.3 mm. — Stn DW 73, 19°12.11'S, 158°22.57'E, 41 m, 25.08.1988 : 1 ♀ 9.6 x 10.7 mm. — Stn DW 125, 19°28.05'S, 158°24.39'E, 54 m, 29.08.1988 : 1 ♂ 9.8 x 10.0 mm. — Stn DW 140, 19°33.89'S, 158°23.89'E, 57 m, 30.08.1988 : 1 ♀ (ovig.) 6.7 x 7.2 mm. — Stn DW 154, 19°52.04'S, 158°26.50'E, 35 m, 1.09.1988 : 2 ♂♂ 7.3 x 7.2, 11.2 x 10.7 mm; 1 ♀ (ovig.) 10.6 x 11.5 mm. — Landsdowne Bank, stn unknown, depth unknown, August, 1988 : 1 ♀ 11.8 x 11.6 mm.

DESCRIPTION. — Carapace as long or longer than wide, slightly convex, covered with small rounded granules, sparsely pubescent with a few longer setae fringing limbs. Frontal groove well marked, separating a pair of low rounded protuberances behind rostrum. Cervical groove distinct, branchial groove less well marked. Urogastric region well defined, crescent shaped with branchiocardiac groove curving back from this area. Rostrum tridentate, all teeth serrated and horizontally directed, median tooth small and on a lower level, lateral teeth eave-like separated by a U-shaped sinus. Anterolateral margin of carapace begins at level of postorbital corner, two similar granulated teeth separated by cervical groove, no posterolateral tooth although there are several granules along margin behind second anterolateral tooth.

A small supraorbital tooth followed by a distinct notch and a curved, flange-like postorbital tooth. A narrow fissure separates suborbital margin which has a single, central, acute tooth.

First segment of antenna wider than long, oblong, beaked medially, not gaping, upper lobe of beak curved. Second segment much longer than wide, scattered small granules, a central distal tubercle, distomedial corner produced as a curved blunt spine on which third segment is inserted at an angle. Exopod firmly fixed with a central longitudinal furrow, tip reaching as far as joint between third and fourth segments, only slightly bilobed, inner lobe longest and curving over base of eyestalk. Epistome triangular, flat, apex and lateral margins adorned with large granules.

Subhepatic region convex, granulated with a single granulated tubercle which is visible dorsally. A similar granulated tooth at corner of buccal frame and a distinct groove curving around under anterolateral margin towards branchial groove. Female sternal grooves end well apart on tubercles situated just behind base of first legs.

Chelipeds well developed, longer in male. Merus trigonal, inferior borders granulated, superior border petaloid, inner surface nacreous. Carpus convex, minutely granulated, two strong distal tubercles, inner margin of upper border with four-five sharp granules. Propodus outer face lined with one or more longitudinal rows of small

granules, inner margin of upper border with four-five sharp granules. Fingers short, downcurved, hollowed out internally, gaping in male, armed with seven-eight teeth, which increase in size distally.

First two pairs of legs shorter than chelipeds. Meri petaloid as for chelipeds, especially merus of first leg. Carpi and propodi tend to be flattened, distal borders bluntly lobed, dactyli as long as propodi, inner margins armed with six-seven short spines all of similar size.

Last two pairs of legs reduced, third pair smallest, both subdorsal. Dactyl of third leg opposed by a single propodal spine. Dactyl of fourth leg also opposed by a single spine with another spine on outer propodal margin at base of dactyl.

Abdomen of six free segments. Telson wider than long, tip truncate in male, bluntly rounded in female. Uropod plates well developed and visible externally. Abdominal segments covered in small rounded granules similar to carapace. Abdominal locking mechanism consists of uropod plates fitting in front of very prominent serrated boss on bases of first legs.

First male pleopod, stout, a semi-rolled setose tube with a sharp horny tip; second pleopod simple, needle-like.

DISCUSSION. — In the *"Siboga"* collection, IHLE (1913) had one ovigerous female which he referred to *P. pulchra* and one smaller male which he named *P. longipes*. Comparison of the type specimen of *Petalomera longipes* Ihle, 1913, from Indonesia, with MIERS' description shows that it is a synonym of *P. pulchra* Miers, 1884, which came from Prince of Wales Channel, Torres Strait, north Australia. The differences between these two species are attributable to sexual dimorphism.

The collection included eight ovigerous females CW = 6.7-19.9 mm whose clutch size ranged from 120-1278 eggs respectively, mean = 526 eggs (diam. = 0.7 mm). Egg-bearing females occurred in January, April, and from July to September, when newly laid eggs were recorded. Although the smallest ovigerous female had a CW = 6.7 mm, other females up to CW = 11.8 mm still had an immature abdomen, with the abdominal locking mechanism still functional. The moult to maturity evidently occurs over a wide size range and some females reach maturity at a very small size (see *Lauridromia intermedia* for comparison)..

A female, CW = 16.8 mm, from station D 53, 60 m depth, contained a bopyrid (Isopoda) parasite in its right gill chamber which was swollen and distorted. An egg-laden female (7.5 mm long) was attached to the gills and attached to her was a small male (2.2 mm long). This is the first record of a bopyrid parasite from a known dromiid host.

SIZE. — Until now only four specimens of *P. pulchra* have been recorded, three females (maximum CW = 18.0 mm, one ovigerous CW = 11.5 mm) and one male (CW = 8.5 mm) and yet this species is the second most abundant dromiid in the New Caledonian fauna. The size range for males CW = 5.2-20.8 mm, and females CW = 5.5-22.5 mm, in the New Caledonian collection, increases the maximum size for both sexes.

DEPTH. — The previously known depth range (7-45 m) of *P. pulchra* is increased to 86 m by the present collection. One sample from stn 539 (LAGON) contained a small female which supposedly came from a depth of 240 m, but the rest came from 25-86 m and it seems likely that this deep record may be an error or contamination from a previous shallow sample.

CAMOUFLAGE. — *P. pulchra* has not been recorded as carrying camouflage material but a female CW = 8.5 mm, from stn CP 27 (CORAIL 2), 75 m depth, carried a small fragment of a compound ascidian which only covered the rear half of its carapace. All the other specimens did not have any covering.

DISTRIBUTION. — The distribution of *P. pulchra* includes Indonesia, Northeast Australia (Prince of Wales Channel), and now New Caledonia.

Genus ***STIMDROMIA*** nov.

Petalomera - BORRADAILE, 1903a : 300 (in part). — SAKAI, 1936 : 28 (in part); 1965 : 9 (in part); 1976 : 20 (in part). — TAKEDA & MIYAKE, 1972 : 254. — DAI & YANG, 1991 : 25 (in part).
Cryptodromia - IHLE, 1913 : 32 (in part).

Carapace as wide or wider than long, convex, surface smooth or finely granulated. Rostrum tridentate, lateral rostral teeth prominent. Anterolateral teeth well developed, blunt. Antennal exopod well developed. Coxae of third maxillipeds close together or separated by triangular extension from tip of sternum. Female sternal grooves end apart on small tubercles between base of first legs. Cheliped with an epipod. First two pairs of legs strongly knobbed, may be ridged, inner margins of dactyli armed with three-four small spines. Last two pairs of legs reduced, third pair shortest. Dactyli of both legs opposed by a single propodal spine and there may be another spine on the outer propodal margin. Abdomen of six free segments. Uropod plates well developed, visible externally, used in the abdominal locking mechanism by fitting in front of large serrated tubercles on the bases of the first legs. Distolateral corners of third to fifth abdominal segments produced as blunt tubercles. Male telson tends to be truncated or bilobed.

TYPE SPECIES. — *Dromia lateralis* Gray, 1831, by present designation.

OTHER SPECIES. — *Petalomera angulata* Sakai, 1936, *Petalomera kosugei* Takeda & Miyake, 1972, *Cryptodromia lamellata* Ortmann, 1894, *Petalomera longipedalis* Dai, Yang, Song, & Chen, 1986.

ETYMOLOGY. — The generic name *Stimdromia* recognizes the valuable contribution to the study of dromiid crabs made by W. STIMPSON who created most of the early generic names in this family. His name is combined with *Dromia* to create the new genus.

DISCUSSION. — A distinctive feature of the species in this genus is the tubercular or nodular chelipeds and first two pairs of legs. This feature, combined with the nature of the sternal grooves, carapace shape, smooth carapace surface, presence of an epipod on the cheliped, and the absence of petaloid meri on the first three pairs of pereiopods make this genus different from *Petalomera* Stimpson, 1858, *Paradromia* Balss, 1921, *Fultodromia* gen. nov., and *Frodromia* gen. nov. (see Table 3).

Dromia lateralis Gray, 1831, was described, briefly, on the basis of a specimen from Australia. The species *Dromia verrucosipes* White, 1847, from the Philippines, was listed without a description and treated as a synonym of *Cryptodromia lateralis* (Gray, 1831) by HENDERSON (1888). However these species are not the same and *Dromia verrucosipes* is an undescribed species of *Stimdromia*. This undescribed species is not dealt with in this paper and is not included in the key. The only known specimen, purchased from Mr H. CUMING, is held by the British Museum (see WHITE, 1847).

The species until now known as *Petalomera lamellata* (Ortmann, 1894) is also included in *Stimdromia*. It is closely related to *S. lateralis* and GRIFFIN (1972) has listed the major differences between the two species.

One species, *S. lateralis*, from Australia, has direct development (HALE, 1925, MONTGOMERY, 1922).

DISTRIBUTION. — The distribution of the species belonging to *Stimdromia* includes the Andaman Islands, Indonesia, Australia, New Caledonia, Samoa, Philippines, China and Japan, i.e. the Indo-West Pacific area.

Key to the species of *Stimdromia*

(Species studied in this paper are in bold)

1. Carapace approximately as wide as long **2**
— Carapace significantly wider than long **3**

2. Anterolateral margin armed with four teeth, first and third strongest, distolateral corners of third to fifth abdominal segments produced as distinct lobes ..... ***Stimdromia angulata*** (Sakai, 1936) nov. comb.
— Anterolateral margin armed with two similar teeth, distolateral corners of third to fifth abdominal segments angular .. *Stimdromia kosugei* (Takeda & Miyake, 1972) nov. comb.

3. Carapace very convex, anterolateral margin broadly rounded, armed with three small teeth, tending to increase in size from first to last, lateral cardiac groove not deeply marked..... *Stimdromia longipedalis* (Dai, Yang, Song & Chen, 1986) nov. comb.
— Carapace not strongly convex, anterolateral margin angular, armed with two prominent teeth **4**

4. Sub-hepatic region bearing a strong, blunt tubercle, inner surface of male cheliped propodus entirely covered by dense pubescence, outer surface smooth, ridges of carpi and propodi of first two legs poorly developed .... *Stimdromia lateralis* (Gray, 1831) nov. comb.
— Sub-hepatic region bearing a low, straight ridge, inner surface of male cheliped propodus with dense pubescence distally only, outer surface granular, ridges of carpi and propodi of first two legs well developed, cristate..... ..... *Stimdromia lamellata* (Ortmann, 1894) nov. comb.

Stimdromia angulata (Sakai, 1936) nov. comb.

Fig. 16 f

Petalomera angulata Sakai, 1936 : 29, text fig. 7; 1965 : 11, pl. 5, fig. 2; 1976 : 21, pl. 5, fig. 3. — SUZUKI & KURATA, 1967 : 95. — TAKEDA, 1977 : 73.

MATERIAL EXAMINED. — **Philippines**. MUSORSTOM 3 : stn CP 134, 12°01.1'N, 121°57.3'E, 92-95 m, 5.06.1985 : 1 ♀ (ovig.) 7.8 x 7.6 mm.

DESCRIPTION. — Carapace slightly wider than long, evenly convex, surface smooth under sparse, short, fine tomentum. Frontal, branchial and cardiac grooves only faintly marked. Rostrum tridentate, teeth prominent, blunt, all of similar size. Median tooth on a lower level, slightly deflexed, lateral teeth directed anterovertically. Anterolateral margin begins at level of postorbital corner. Three equidistant, blunt, teeth, first strongest, second smallest, tip may be slightly bilobed. Small posterolateral tooth behind branchial notch.

Supraorbital margin eave-like, supraorbital tooth well developed, postorbital corner bluntly produced. A shallow fissure separates the suborbital margin which has a strong tooth at its inner corner, visible dorsally.

First segment of antenna much wider than long, beaked medially, gaping, upper lobe shorter. Second segment much longer than wide, a prominent central distal tubercle, distomedial corner bluntly produced, on which the third segment is inserted at an angle. Exopod firmly fixed, extending as far as joint between third and fourth segments, tip bilobed, inner lobe narrower and curving over base of eyestalk. Epistome triangular, slightly concave.

A strong subhepatic tubercle visible dorsally close to and below postorbital corner with another tubercle lower down just above the groove which runs around under anterolateral margin. A small tubercle at corner of buccal frame. Female sternal grooves convergent, but ending apart on small tubercles between bases of first legs.

Chelipeds elongate, lightly built. Merus trigonal, borders unarmed except for a small distal tubercle on superior margin. Carpus and propodus heavily tuberculated. Carpus with four small tubercles on inner margin, another four similar tubercles on outer surface as well as three stronger distal tubercles. Inner face of propodus densely tomentose, superior margin has three small tubercles, three more on upper face and a strong tubercle at base of dactyl and five tubercles scattered over outer face. Fingers gaping basally, slightly downcurved, hollowed out internally, armed with seven small interlocking teeth.

First two pairs of legs slightly shorter than chelipeds, heavily tuberculated. Meri have a strong tubercle midway along posterior inferior margin. Carpi with four strong tubercles along superior margin, distal tubercle strongest, and two tubercles on posterior inferior margin. Propodi with two tubercles on superior margin, distal tubercle strongest, two similar tubercles on posterior margin. Dactyli as long as propodi, strongly curved at tips, inner margin armed with four small spines increasing in size distally. On the posterior face of dactyli there is a pearl-like tubercle which articulates with the penultimate segment.

Last two pairs of legs reduced, non-tuberculate, third pair shortest, fourth pair subdorsal. Dactyli on both legs strongly curved, opposed by a single propodal spine with another smaller spine on outer propodal margin.

Abdomen of six free segments, uropod plates well developed, visible externally. Telson wider than long, tip rounded in female, subtruncate in male. Central ridge of abdominal segments four-six adorned with a pair of distal tubercles (pair on the fourth segment largest), and a broader proximal swelling. Distolateral corners of segments three-five produced as blunt tubercles (only weakly on third segment). In this way segments four and five have a row of four distal tubercles, one at each corner and a pair in the middle. Abdominal locking mechanism consists of uropod plates fitting in front of serrated ridge on bases of first legs.

Details of male pleopods unknown.

DISCUSSION. — SAKAI (1936) described *Petalomera angulata* as having four anterolateral teeth on the carapace, obviously treating the second tooth as representing two teeth. This tooth is smaller, only slightly bilobed at the tip and without proper separation between the lobes extending to the carapace margin. Thus there is only a single tooth involved and the total number of anterolateral teeth is only three. Otherwise the description given above is largely in agreement with that given by SAKAI. With the present specimen a total of twenty three crabs (including nine females) have been reported, but the nature of the female sternal grooves have not been recorded. In the present female, which is ovigerous, the grooves are convergent but ending apart on small tubercles between the first legs.

The eggs carried by the Philippine female, CW = 7.8 mm, are 1.1 mm diameter and there are only twenty four, which means that *Stimdromia angulata* has a reproductive strategy incorporating a small number of relatively large eggs. Nothing has been recorded about the reproductive status of females collected from Japan. An Australian species in this genus, *S. lateralis*, also has large eggs (1.14 mm diameter) and development is direct (MONTGOMERY, 1922; HALE, 1925). The development of *S. angulata* is unknown but may also be direct.

CAMOUFLAGE. — SAKAI (1936) recorded the male holotype as carrying a sponge cap.

SIZE. — The largest crab reported is the holotype male CW = 12.0, CL = 11.5 mm, but the only female size known is the Philippine specimen, CW = 7.8 mm. However, it would appear that *S. angulata* is a small dromiid crab.

DEPTH. — Previous depths are from the low intertidal down to 50 m. Several of the Japanese specimens have been obtained from lobster pots. With the Philippine specimen, the depth range is extended down to 95 m. In shallow water this crab is found in rocky areas and on coral reefs (*Madrepora*) but the habitat of the Philippine specimen is unknown.

DISTRIBUTION. — Until now *Stimdromia angulata* has been known only from Japanese waters. The distribution has now been extended to the Philippines.

Genus ***FRODROMIA*** nov.

Petalomera - SAKAI, 1936 : 28 (in part); 1974 : 87; 1976 : 20 (in part).

Carapace longer than wide, convex, covered with small granules hidden under a short fine tomentum. Lateral borders of carapace sub-parallel, granulated. Rostrum tridentate, teeth acute. Antennal exopod well developed. Coxae of third maxillipeds closely approximated and inserted on tip of sternum. Female sternal grooves end apart on prominent tubercles behind chelipeds. Cheliped with an epipod, granulated. First two pairs of legs without adornment, inner margins of dactyli armed with up to ten small spines. Last two pairs of legs much smaller than first two pairs, dactyli opposed by one or two propodal spines. Abdomen of six free segments. Telson rounded. Uropod plates well developed, visible externally in male (concealed in female), used in the abdominal locking mechanism by fitting in front of serrated flange on the bases of the first legs. Female genital opening located on

the anterior border of the coxal segment of the second leg, and directed anteriorly, with a blunt tubercle behind the genital opening

TYPE SPECIES. — *Petalomera atypica* Sakai, 1936, by present designation.

OTHER SPECIES. — *Petalomera reticulata* Sakai, 1974.

ETYMOLOGY. — The generic name *Frodromia* is formed by combining the name of Frodo Baggins, one of the Hobbits of Bag End, a character from J. R. R. TOLKIEN's "Lord of the Rings", and *Dromia*.

DISCUSSION. — As explained earlier, an essential character of *Petalomera* is the presence of petaloid meri on the first three pairs of pereiopods, and therefore *P. atypica* and *P. reticulata* cannot belong to this genus. Distinctive features of this genus are the carapace shape, finely granulated surface, uropods dissimilar in males and females, location of the female genital opening, and presence of an unusual tubercle behind the genital opening (see Table 3).

On the basis of three specimens (two males and one female), from Japan, depth 100-150 m, SAKAI (1974) described a subspecies, *Petalomera atypica reticulata*, which differs from the typical form in having a coarse network of purplish colouration on the carapace and abdomen. However there seem to be some major differences from the typical form : the illustration in SAKAI (1976, pl. 5, fig. 1) has remarkably small eyes, no evidence of teeth or granules on the anterolateral margins, carapace width approximately equal to carapace length (but according to the dimensions given, CW/CL = 0.9). Also the figure supposedly shows a male and yet it seems to have a female abdomen. There are also supposed to be differences in the rostral teeth but these are not confirmed by comparison of the illustrations of the two forms. Thus it is likely that two different species are involved, although several morphological details remain to be established.

DISTRIBUTION. — Previously known only from Japan, but now recorded from New Caledonia.

Key to the species of *Frodromia*

(Species studied in this paper are in bold)

— Carapace longer than wide, anterolateral margin granulated .....
..... ***Frodromia atypica*** (Sakai, 1936) nov. comb.
— Carapace approximately as long as wide, anterolateral margin without teeth or granules ..
..... *Frodromia reticulata* (Sakai, 1974) nov. comb.

Frodromia atypica (Sakai, 1936) nov. comb.

Figs 6 a-j, 17 d

Petalomera atypica Sakai, 1936 : 33, pl. 2, fig. 1; 1976 : 23, pl. 5, fig. 2.

MATERIAL EXAMINED. — **New Caledonia**. MUSORSTOM 4 : stn CP 171, 18°57.8'S, 163°14.0'E, 435 m, 17.09.1985 : 1 ♂ 9.5 x 10.6 mm; 1 ♀ 7.3 x 8.5 mm.

Loyalty Islands. MUSORSTOM 6 : stn DW 412, 20°40.00'S, 167°03.75'E, 437 m, 15.02.1989 : 1 ♀ 7.1 x 8.0 mm. — Stn CP 464, 21°02.30'S, 167°31.60'E, 430 m, 21.02.1989 : 1 ♂ 8.2 x 9.7 mm; 2 ♀♀ 7.2 x 8.0, 9.8 x 10.1 mm.

Indonesia (South East Molucca Islands). KARUBAR : stn DW 44, 7°52.00'S, 132°48.00'E, 291-295 m, 29.10.1991 : 1 ♂ 5.0 x 5.7 mm.

DESCRIPTION. — Carapace longer than wide, lateral borders parallel, giving the impression of an oblong shape. Frontal, lateral cardiac and branchial grooves only faintly marked. Carapace surface quite convex and covered in small granules in amongst a short, fine tomentum. Rostrum tridentate, teeth acute, median rostral tooth as long

as lateral teeth which are directed anterovertically. Anterolateral margin begins at postorbital corner and extends almost directly backward in a straight line, adorned with about nine small granules, similar to those on carapace surface. A slight interruption in carapace margin for branchial groove followed by posterolateral border which also has about nine small granules.

Supraorbital tooth small, postorbital corner produced as a slight flange ornamented with small granules. Suborbital margin similarly adorned, separated off by a wide fissure, divided into one major acute tooth and one minor tooth at inner corner.

First segment of antenna wider than long, beaked medially, gaping. Second segment much longer than wide, surface convex with a few scattered tubercles, distomedial corner bluntly produced with third segment inserted at an angle. Exopod firmly fixed to second segment, extending as far as joint between third and fourth antennal segments, tip blunt and curved over base of eyestalk. Epistome triangular, not hollowed out, lateral margins lined with small tubercles, apex separated from median rostral tooth by a narrow fissure.

Subhepatic area inflated, covered in scattered small tubercles with a shallow groove extending from corner of buccal frame around under anterolateral margin towards posterolateral region. Sternal grooves end wide apart on small tubercles between bases of second legs. An unusual feature of the female is the orientation of the genital opening which is located on anterior border of coxal segment of second leg and directed anteriorly, and the presence of a prominent, blunt, coxal tubercle directed medially, behind genital opening. It is not obvious what the function of this tubercle might be, and it is not present in any other known dromiid crab. The coxal tubercle, genital opening and end of sternal groove are in close proximity.

Cheliped merus trigonal in section, all borders have small granules. Carpus elongate with scattered tubercles especially near margins, one especially elongate distal tubercle. Propodus with similar tubercles which are larger on upper border. Fingers downcurved, hollowed out internally and armed with eight-nine small teeth.

First two pairs of legs long, but shorter than chelipeds, without adornment. Dactyli curved, as long as propodi, inner margins armed with nine-ten small, similar spines.

Last two pairs of legs much smaller, both subdorsal and similar in size. Dactyl of third leg opposed by a single propodal spine, dactyl of fourth leg opposed by two spines. No spines on the outer propodal margins.

Abdomen of six free segments. Male telson wider than long, margin rounded, uropod plates well developed and visible externally. Abdominal locking mechanism consists of uropod plates fitting in front of small serrated flange on bases of first legs. Female telson much wider than long, margin rounded, uropod plates well developed, but not visible externally.

Male second pleopod simple, needle-like and fits into first pleopod which is a setose, semi-rolled tube with an acute apex.

DISCUSSION. — *Frodromia atypica* with its granulate carapace, which is longer than wide, acute rostral teeth, no anterolateral teeth, non-petaloid meri of first two pairs of legs, simple spine configuration on the last two pairs of legs, and concealed female uropods (but exposed male uropods) does not fit into *Petalomera* Stimpson, 1858, sensu stricto, or either of the other genera, *Fultodromia* gen. nov. and *Stimdromia* gen. nov. Hence a new genus is necessary to accommodate this species (see Table 3).

The only records of *Frodromia atypica* are those given by SAKAI (1936) with the original description and include the holotype male, CW = 6.0, CL = 7.0 mm, and a female of unknown size. SAKAI (1976) stated that the holotype specimen was no longer extant. The description given above largely agrees with that of SAKAI (1936) except that in the present material there are no prominent anterolateral tubercles, instead only several small granules, and the propodi and dactyli of the first two pairs of legs are of similar length, instead of propodi being longer than dactyli.

SIZE. — The New Caledonian and Indonesian collections include four females, maximum size CW = 9.8, CL = 10.1 mm, and three males, maximum size CW = 9.5, CL = 10.6 mm. Most of these specimens are larger than those reported by SAKAI. Although none of the females (CW = 7.1-9.8 mm) were ovigerous, all had a broad abdomen, indicating that they were sexually mature.

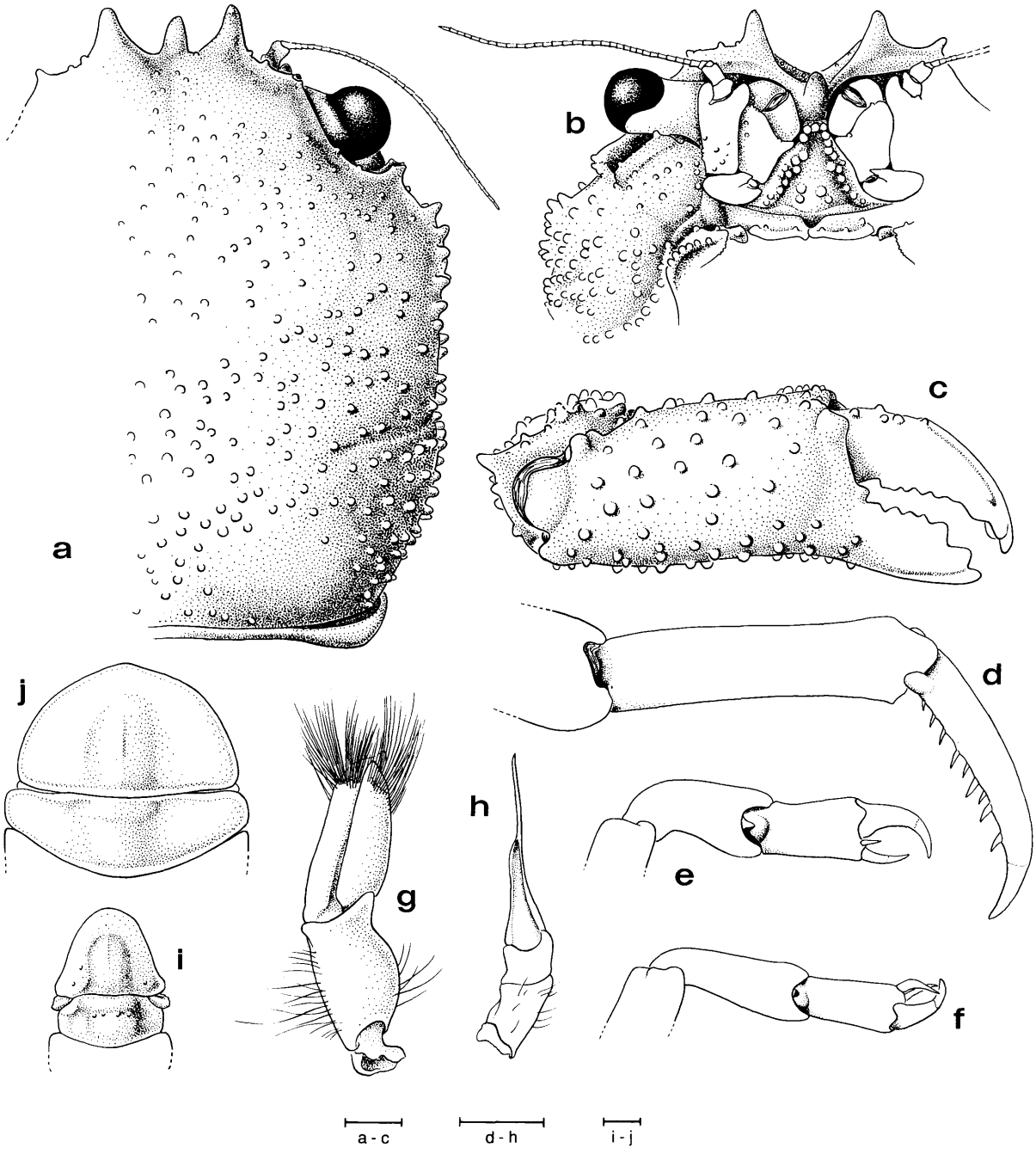


FIG. 6. — *Frodromia atypica* (Sakai, 1936) nov. comb. : **a-j**, ♂ 9.5 x 10.6 mm, New Caledonia, MUSORSTOM 4, stn 171, 435 m (MNHN-B 22559) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, first male pleopod; **h**, second male pleopod; **i**, ventral view of telson and terminal segments of male abdomen. — **j** : ♀ 9.8 x 10.1 mm, Loyalty Islands, MUSORSTOM 6, stn CP 464, 430 m (MNHN-B 22560), ventral view of telson and terminal segments of female abdomen.

Scale bars represent 1.0 mm.

CAMOUFLAGE. — SAKAI (1936) gave the habitat as being shelly or sandy grounds and his specimens were carrying compound ascidian caps. None of the present specimens were accompanied by camouflage material. SAKAI (1936) described the colour of his specimens as uniformly dark blue, presumably when alive or freshly preserved. The colour of the present preserved material was dark brown.

DEPTH. — The depth range in Japanese waters is 50-100 m, but all the New Caledonian material comes from deep water, 425-437 m and the Indonesian specimen from 291-295 m.

DISTRIBUTION. — The New Caledonian and Indonesian specimens extend the range of *F. atypica* into the southern hemisphere and show that this species is not endemic to Japan.

CHARACTER	*Pseudodromia*	*Ascidiophilus*
Ratio CW/CL	Carapace width much less than length.	Carapace width much less than length.
Carapace surface	Smooth.	Smooth.
Rostrum	Tridentate, teeth well developed.	Unidentate, broad. Branchial groove well marked.
Anterolateral margin	Usually without teeth.	No teeth.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment not produced. This segment narrow, elongate. Exopod absent.
Sternal grooves	End close together between chelipeds or first legs.	End close together between chelipeds or first legs.
Epipods/Podobranchs	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.
First two pairs of legs	Not nodose.	Not nodose.
Last two pairs of legs	Dactyli almost straight, not opposed by propodal spines, and no spines on outer propodal margin. Instead, third leg has one lateral propodal spine, and fourth leg has two lateral propodal spines. Fourth leg equal to or longer than first leg.	Dactyli almost straight, not opposed by propodal spines, and no spines on outer propodal margin. Instead. third leg has three lateral propodal spines, and fourth leg has four lateral propodal spines. Fourth leg equal to or longer than first leg.
Abdominal segments	No segments fused. No abdominal locking mechanism.	No segments fused. No abdominal locking mechanism.
Uropods	Minute, concealed.	Absent.
Telson	Acutely pointed.	Bluntly narrowed.
Male pleopods	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.

TABLE 4. — Comparison of key characteristics of the genera *Pseudodromia* Stimpson, 1858, and *Ascidiophilus* Richters, 1880.

Genus *CONCHOECETES* Stimpson, 1858

Conchoecetes Stimpson, 1858 : 226; 1907 : 180. — ALCOCK, 1900 : 150; 1901 : 40. — BORRADAILE, 1903 : 301. — IHLE, 1913 : 50. — SAKAI, 1936 : 41; 1965 : 11; 1976 : 26. — BARNARD, 1950 : 308. — LEWINSOHN, 1984 : 119. — DAI & YANG, 1991 : 30.

Dromia Fabricius, 1798 : 360 (in part). — HASWELL, 1882b : 139 (in part).

Carapace as wide as long, or slightly wider than long, flattened, subpentagonal, surface granular, with a tomentum of fine setae. Rostrum tridentate, lateral teeth well developed, anterolateral margin may be granular or bear distinct teeth. Coxae of third maxillipeds fit closely together and are inserted at tip of telson. Female sternal grooves end apart between or behind the first pair of walking legs. Epipod present on chelipeds which are well developed, with granular surface. First two pairs of legs shorter, dactyli armed with 20-30 tiny spines. Third leg shorter and stouter than first two pairs, dactyl enlarged, talon-like and opposed by a stout, proximal propodal extension. Fourth leg shortest, segments flattened, dactyl small, no opposing propodal spine. Abdomen of six free segments, uropod plates well developed and visible externally. Abdominal locking mechanism consists of uropod plates fitting in front of serrated flange on bases of first legs. First male pleopod a stout semi-rolled, setose tube; second pleopod needle-like.

TYPE SPECIES. — *Dromia artificiosa* Fabricius, 1798, by monotypy.

OTHER SPECIES. — *Conchoecetes andamanicus* Alcock, 1900, *C. intermedius* Lewinsohn, 1984.

DISCUSSION. — The species of *Conchoecetes* are unusual in that they carry bivalve shells as camouflage, a character which they share with species of *Hypoconcha,* and the characters which make them different derive from this habit : flattened carapace, and large talon-like dactyli on the third walking legs (see Table 5). The structure of the grasping mechanism on the last two pairs of legs is unique amongst the dromiids. Whereas the usual mechanism involves the dactyl being opposed by one or more spines arising from the distal margin of the propodus and forming a sub-chelate arrangement, in *Conchoecetes* these opposing spines are absent. Instead the third leg has a stout, curved dactyl which pinches against a tubercle near the base of the propodus. This means that there is a large gap between the margin of the dactyl and the propodus into which the edge of the camouflaging bivalve shell can fit. This limb resembles some of the limbs found amongst the Homolidae (see GUINOT and RICHER DE FORGES, 1981). The last leg has no sub-chelate mechanism and the dactyl is reduced and curved. The limb is used to support the shell held by the third pair of legs. STIMPSON (1907) claimed that the last two segments of the abdomen are "soldered together" but this is incorrect: all segments of the abdomen are freely moveable.

The larval development of only one species in this genus, *C. artificiosus*, has been provided by SANKOLLI & SHENOY (1968).

The species of *Conchoecetes* are distributed throughout the Indian Ocean from the coast of Africa to the coast of Australia, and in the western Pacific Ocean as far north as Taiwan. Most records are from shallow waters, but the maximum depth is 100 m.

Key to Species of *Conchoecetes*

1. Two teeth on the anterolateral margin ..... *C. artificiosus* (Fabricius, 1798)
— No teeth on the anterolateral margin **2**

2. Supraorbital tooth present ..... *C. intermedius* Lewinsohn, 1984
— Supraorbital tooth absent ..... *C. andamanicus* Alcock, 1900

Genus ***PSEUDODROMIA*** Stimpson, 1858

Pseudodromia Stimpson, 1858 : 226; 1907 : 177. — HENDERSON, 1888 : 15. — ALCOCK, 1900 : 149 (in part). — STEBBING, 1900 : 23. — BARNARD, 1950 : 315. — GORDON, 1950 : 209 (in part).

Carapace distinctly longer than wide, surface smooth, convex, covered with short setae. Branchial groove deeply marked. Rostrum prominent, divided into three teeth. Epistome triangular, apex very narrow, surface deeply sunken. Anterolateral margin rounded, usually without teeth. Coxae of third maxillipeds closely approximated and separated from tip of sternum by a deep trough. Female sternal grooves end close together on a low tubercle between bases of chelipeds or first legs. Orbital teeth maybe strongly or weakly developed. Cheliped without an epipod. First two pairs of legs about as long as chelipeds, segments not knobbed or ridged, inner margins of dactyli armed with three-four small spines. Third pair of legs smallest, dactyl, long, almost straight, not opposed by a propodal spine : instead, there may be one small, propodal spine laterally. Fourth pair of legs as long or longer than first three pairs of pereiopods, dactyl, long, almost straight, not opposed by a propodal spine : instead, there may be two small propodal spines laterally. Abdomen of six free segments. Uropods minute, concealed. Telson longer than wide, tip acutely pointed in male, blunt in female. No abdominal locking mechanism.

TYPE SPECIES. — *Pseudodromia latens* Stimpson, 1858, by original designation and monotypy.

OTHER SPECIES. — *Dromia rotunda* McLeay, 1838, and *Pseudodromia trepidus* Kensley, 1978.

DISCUSSION. — The above generic definition includes most of the essential features included by STIMPSON (1858) except for the epistome. STIMPSON, and subsequent authors, stated that the epistome is not joined to the rostrum but this feature is not unique to *Pseudodromia*. In all dromiids there is a small fissure separating the apex of the rostrum from the underside of the median rostral tooth but in *Pseudodromia* the fissure is a little wider than usual.

Some species which have been assigned to *Pseudodromia* Stimpson, 1858, must be shifted to other genera because they do not conform to the above definition. *Pseudodromia cacuminis* Kensley, 1980, should be placed in a new monotypic genus because the carapace is wider than long, supraorbital and anterolateral areas bear numerous short spines, last two pairs of legs are reduced, fourth pair only slightly longer than third pair, dactyli of both legs opposed by propodal spines. None of these characteristics are typical of *Pseudodromia*. *P. cacuminis* is known only from South Africa.

Pseudodromia spinosissima Kensley, 1977, is transferred to *Exodromidia* and *Pseudodromia caphyraeformis* (Richters, 1880) is returned to its original genus, *Ascidiophilus* Richters, 1880. ALCOCK (1901) accepted that *Pseudodromia quadricornis* Alcock, 1899, is a synonym of *Homalodromia coppingeri* Miers, 1884. *Pseudodromia inermis* Macpherson, 1988, is a synonym of *Dromidia spongiosa* Stimpson, 1858.

Although STIMPSON (1858) suspected that *Dromia rotunda* McLeay, 1838, should be placed in *Dromidia*, and was followed by many subsequent authors, it was BARNARD (1947) who transferred it to *Pseudodromia*. KENSLEY (1978) described a new species of *Pseudodromia* based on a female specimen collected in 1929 by the Th. Mortensen Java-South Africa Expedition and he was uncertain about the genus in which it should be placed. I have examined the type specimen of *Pseudodromia trepidus* Kensley, 1978, and it is clearly placed in the correct genus. The trepidation which KENSLEY experienced was not necessary. *P. trepidus* has propodal spines on the last two pairs of legs placed laterally rather than opposing the dactyli, the last leg is as long as any of the first three pereiopods, and the abdominal uropods are minute and concealed. Comparison of this species with specimens of *P. latens* and *P. rotunda* shows that it is clearly different.

Pseudodromia is most closely related to the South African genus *Dromidia* Stimpson, 1858, especially in sharing the characters of no epipod on the cheliped, a sharply pointed telson and uropods which may be minute and concealed or absent (see Table 4). But *Pseudodromia* differs in having a carapace longer than wide (wider than long in *Dromidia*), last pair of legs as long or longer than any of first three pairs of pereiopods (last legs reduced) and propodal spines placed laterally at base of dactyli of last two pairs of legs (propodal spines oppose dactyli and may be present on the outer propodal margin). The shape of the carapace and arrangement of propodal spines on the last two pairs of legs, reflect the intimate association of *Pseudodromia* with ascidians. Females carry small numbers of large eggs, 1.8-2.2 mm diameter. The camouflage and reproductive characters of *P. trepidus* are unknown.

DISTRIBUTION. — All species of *Pseudodromia* are confined to South Africa.

Key to the species of *Pseudodromia*

1. Anterolateral carapace margin begins at level of epistome, bearing a blunt tooth, supraorbital and suborbital margins each have a well developed tooth ..... *Pseudodromia trepidus* Kensley, 1978
— Anterolateral carapace margin begins at level of postorbital corner, evenly convex without a tooth, supraorbital tooth weakly developed, suborbital tooth absent..... **2**

2. Lateral rostral teeth, subparallel, close together, concealing much smaller median tooth beneath ..... *Pseudodromia latens* Stimpson, 1858
— Lateral rostral teeth separated, slightly divergent, revealing similar sized median tooth .... *Pseudodromia rotunda* (McLeay, 1838)

Genus *ASCIDIOPHILUS* Richters, 1880

Ascidiophilus Richters, 1880 : 158.— LENZ, 1905 : 364.
Pseudodromia Balss, 1922 : 110.

Carapace distinctly longer than wide, surface smooth, convex, covered with short setae. Branchial groove deeply marked. Rostrum prominent, unidentate. Epistome triangular, apex very narrow, surface deeply sunken. Coxae of third maxillipeds separated by a narrow gap and inserted at a lower level, well forward of tip of sternum. Anterolateral margin rounded, without teeth. Female sternal grooves end close together on a low tubercle between bases of chelipeds or first legs. Orbital teeth not developed. Antenna curved around under eyestalk, without an exopod. Cheliped without an epipod. First two pairs of legs about as long as chelipeds, segments not knobbed or ridged, inner margins of dactyli armed with three-four small spines. Third pair of legs smallest, dactyl, long, almost straight, not opposed by a propodal spine : instead, there may be three small, propodal spines arranged laterally. Fourth pair of legs as long or longer than first three pairs of pereiopods, dactyl, long, almost straight, not opposed by a propodal spine : instead, there may be four small propodal spines laterally. Abdomen of six free segments. Telson longer than wide in male, tip narrowed, blunt, telson as long as wide in female, tip rounded. No uropod plates. No abdominal locking mechanism.

TYPE SPECIES. — *Ascidiophilus caphyraeformis* Richters, 1880, by monotypy.

DISCUSSION. — RICHTERS (1880) described *A. caphyraeformis* from Mauritius. BALSS (1922) transferred this species to *Pseudodromia* Stimpson, 1858, and synonymized *P. integrifrons* Henderson, 1888, with it. LEWINSOHN (1977) established that *P. murrayi* Gordon, 1950, is also a synonym of *Ascidiophilus caphyraeformis.*

However, while *A. caphyraeformis* has an overall resemblance to *Pseudodromia* it is more different from the two species in this genus than they are different from each other. *Ascidiophilus caphyraeformis* lacks the sharply pointed telson and has several differences which are related to the organization of the orbital area. In this species the eyes are closer together and directed ventrally, with the base of the antenna forming the suborbital margin, the overhanging frontal margin of the carapace forming the supraorbital margin, and a very narrow epistome separating the two eyes. Associated with the narrow epistome, is a unidentate rostrum. As a result of the placement of the eyes, the structure of the antenna is radically different, being curved instead of straight and also lacking an exopod. GORDON (1950) has also noted the antennal differences of *A. caphyraeformis* as well as differences in the gills. It is clear that *A. caphyraeformis* should be returned to its original genus (see Table 4).

Like the species of *Pseudodromia*, *Ascidiophilus caphyraeformis* has an intimate association with ascidians wherein almost the whole body of the crab is tightly enclosed in a compound ascidian. Females also carry a small number of large eggs, 1.0 mm diameter.

DISTRIBUTION. — Whereas the two species of *Pseudodromia* are confined to South Africa, the distribution of *Ascidiophilus caphyraeformis* includes the Red Sea and western Indian Ocean, but not South Africa (see LEWINSOHN, 1979).

Genus *EXODROMIDIA* Stebbing, 1905

Exodromidia Stebbing, 1905 : 64. — BARNARD, 1950 : 324.

Carapace length (including rostral teeth) may be slightly longer than wide or approximately as long as wide, surface smooth, tuberculated or spinous. Furrows not evident on carapace, surface tomentose. Rostrum tridentate, lateral teeth may be elongate. Anterolateral margin convex, teeth may or may not be present. No fissure at lateral corner of orbit. Antennal segments may be spinous, exopod well developed. Coxae of third maxillipeds separated by a wide gap and separated from tip of sternum by a star-shaped plate on which they articulate. Female sternal grooves end together on a tubercle between or just behind chelipeds. No epipod on the chelipeds which are much larger in males. First two pairs of legs shorter than chelipeds, dactyli long, curved, inner margins armed with up to ten small spines. Last two pairs of legs very reduced, dactyli opposed by single propodal spines. Abdomen of six free segments. Telson terminated by a sharp or knobbed spine. Uropods very small, concealed or absent. Vestigial pleopods on male abdominal segments three to five.

TYPE SPECIES. — *Dromidia spinosa* Studer, 1883, by monotypy.

OTHER SPECIES — *Dromidia bicornis* Studer, 1883. *Pseudodromia spinosissima* Kensley, 1977, should probably be placed in this genus but details of some essential features are unknown.

DISCUSSION. — *Exodromidia* was created by STEBBING (1905) to accommodate *Dromidia spinosa* and later BARNARD (1950) added STUDER'S other species, *D. bicornis*. A character of central interest was the dimorphic chelipeds, much larger in the males. BARNARD (1950) thought that the reasons for erecting *Exodromidia* were not very strong but the major differences between it and *Dromidia* are that rostral teeth are often elongate, no furrows on the carapace, no fissure present at postorbital corner, chelipeds dimorphic, last two pairs of legs very reduced, dactyli opposed by only single propodal spines, and vestigial pleopods present on male segments three to five. These differences justify the existence of a separate genus (see Table 5).

BARNARD (1950) stated that *Exodromidia bicornis* and *E. spinosa* normally lie buried in mud or sand and there have been no reports of camouflage being carried. This is consistent with the very reduced last two pairs of legs, which may be unable to hold camouflage, and the presence of stiff bristles and spines on the carapace which would make it difficult, if not impossible, to have a cap close to the body. These are deep water species which have large eggs, 1.5-2 mm diameter, few in number.

DISTRIBUTION. — The species of *Exodromidia* are confined to South Africa.

Key to the species of *Exodromidia*

1. Carapace slightly wider than long, three well developed anteriorly directed anterolateral teeth, several prominent tubercles on carapace ..... *Exodromidia spinosa* (Studer, 1883)
— Carapace longer than wide, anterolateral margins adorned with spines rather than teeth, carapace smooth or spined **2**

2. Rostrum tridentate, lateral teeth much longer than median tooth, carapace surface smooth under a cover of long stiff bristles ..... *Exodromidia bicornis* (Studer, 1883)
— Rostrum tridentate, teeth narrow and of similar length, carapace surface covered in short needle-like spines ..... *Exodromidia spinosissima* (Kensley, 1977) nov. comb.

Genus *EUDROMIDIA* Barnard, 1947

Eudromia Henderson, 1888 : 13 (name preoccupied).
Eudromidia Barnard, 1947 : 368; 1950 : 314.
Eudromiopsis Balss, 1957 : 1605.
Not *Eudromia* - STEBBING, 1920 : 253.

Carapace convex, ovate, smooth, longer than wide. Only frontal and branchial grooves evident beneath short tomentum. Rostrum composed of prominent lateral teeth, which may be divergent or upturned, rostrum essentially bilobed. No supraorbital tooth. May be an anterolateral tooth, posterolateral tooth small. Antennal exopod well developed. Coxae of third maxillipeds closely approximated and inserted in front of tip of sternum. Female sternal grooves end together on a tubercle just behind chelipeds. No epipod on chelipeds which are narrow. First two pairs of legs smooth, dactyli long, inner margins armed with five or six small spines. Last two pairs of legs very reduced, dactyli opposed by single propodal spines and there may be a spine on the outer propodal margin. Abdomen of six free segments. Telson ends in a sharp point. Uropods very small, concealed. Abdominal locking mechanism consists of small tubercle on bases of first legs against margins of last abdominal segment.

TYPE SPECIES. — *Eudromia frontalis* Henderson, 1888, is the type species, by monotypy, of the genus *Eudromia* Henderson, 1888. As both *Eudromidia* Barnard, 1947, and *Eudromiopsis* Balss, 1957, are replacement names for *Eudromia* Henderson, 1888 (which is a junior homonym of *Eudromia* J. Geoffroy, 1832, for a genus of birds), they also have *Eudromia frontalis* as their type species.

OTHER SPECIES. — *Eudromia hendersoni* Stebbing, 1921.

DISCUSSION. — The main ways in which *Eudromidia* differs from *Dromidia* Stimpson, 1858, are carapace longer than wide, ovate, rostrum bilobed, lateral teeth of rostrum prominent, no spine present on inner distal margin of cheliped carpus, distal margins of carpi and propodi of first two pairs of legs not produced, and last two pairs of legs very small. The shape of the carapace and size of the last two pairs of legs are especially significant (see Table 5).

Besides the above two species, only one other species, *E. bituberculata* Stebbing, 1920, has been assigned to *Eudromia*. STEBBING noted that the ratio of carapace width to length (greater than 1.0), and nodulose, granulate leg segments of this species did not conform to the original definition of *Eudromia*. Because of this, BARNARD (1947) transferred this species to *Cryptodromiopsis* Borradaile, 1903. But additional features such as carapace adorned with prominent tubercles, anterolateral teeth acute, and laterally directed mean that *E. bituberculata* does not belong in either of these genera. *E. bituberculata* is transferred to *Barnardromia* gen. nov. (see below).

DISTRIBUTION. — The species of *Eudromidia* are known only from South Africa.

Key to the species of *Eudromidia*

— Rostrum consists of upturned, eave-like flanges covering the orbits forming a sinuous frontal margin ..... *Eudromidia frontalis* (Henderson, 1888)
— Rostrum consists of two blunt, horizontal, projecting lobes separated by a deep V-shaped sinus ..... *Eudromidia hendersoni* (Stebbing, 1921)

Genus *BARNARDROMIA* nov.

Eudromia - STEBBING, 1920 : 253 (in part).

Carapace wider than long, surface convex, strongly and densely granular, distinct areolae. Rostrum very prominent, tridentate, lateral teeth broad forming a large part of the supraorbital margin which is lateral rather than

frontal. Anterolateral margins subparallel, teeth subequal, acute. Antennal exopod well developed. Female sternal grooves end together just behind bases of chelipeds. No epipod on the cheliped. Chelipeds and legs strongly granular, segments nodular. Inner margins of dactyli of first two pairs of legs armed with small spines, dactyli of last two pairs of legs opposed by single propodal spines. Abdomen of six free segments, uropod plates reduced, concealed. Telson ends in a sharp point.

TYPE SPECIES. — *Cryptodromia hirsutimana* Kensley & Buxton, 1984, by present designation.

OTHER SPECIES. — *Eudromia bituberculata* Stebbing, 1920.

ETYMOLOGY. — *Barnardromia* is formed by combining *Dromia* with the name of K. H. BARNARD, in recognition of the important contribution he made to the study of South African Crustacea.

DISCUSSION. — When STEBBING (1920) described *Eudromia bituberculata* he recognized that it did not conform to the definition of this genus. Subsequently, BARNARD (1947) transferred it to *Cryptodromiopsis* Borradaile, 1903, where it has been until now.

The other species, *Cryptodromia hirsutimana* Kensley & Buxton, 1984, was placed in this genus because it lacked an epipod on the cheliped, but the strongly granular and nodular carapace are sufficient to exclude it from *Cryptodromia.*

CHARACTER	*Conchoecetes*	*Speodromia*	*Exodromidia*	*Eudromidia*	*Dromidia*	*Barnardromia*
Ratio CW/CL	Carapace width about equal to length.	Carapace width much greater than length.	Carapace width much less than length.	Carapace width less than length.	Carapace width greater than or equal to length.	Carapace wider than long.
Carapace surface	Granular.	Granular and areolate.	Smooth, tuberculate, or spinous.	Smooth.	Smooth or gibbous.	Granular, areolate.
Rostrum	Tridentate, teeth well developed.	Tridentate, lateral teeth eave-like.	Tridentate, teeth well developed.	Bidentate, divergent or plate-like teeth.	Tridentate, teeth well developed, acute, blunt or eave-like.	Tridentate, teeth broad, blunt.
Anterolateral margin	Teeth absent or small, granular.	Teeth equal, small, numerous.	Well developed teeth or spines.	Teeth absent or very small.	Teeth absent or well developed, acute.	Teeth sub-equal, acute, well developed.
Antenna	Proximal borders of second segment lobed, distomedial corner produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment slightly produced. Exopod as long as third segment.	Distomedial corner of second segment slightly produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.
Sternal grooves	End apart between or behind first legs.	End together between chelipeds.	End together between or behind chelipeds.	End together just behind chelipeds.	End together between chelipeds.	End together just behind chelipeds.

Epipods/Podobranchs	Epipod on cheliped. No podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.
First two pairs of legs	Granular.	Meri petaloid, segments flattened and produced distally.	Smooth, tuberculate or spinous. Male chelipeds much larger than in female.	Not nodose.	Not nodose.	Granular, nodular.
Last two pairs of legs	Dactyl of third leg talon-like, opposed by a stout, proximal, propodal extension. Both legs shorter than first two pairs, fourth pair shortest.	Dactyli opposed by single propodal spines. Both legs shorter than first two pairs, third pair shortest.	Dactyl of third leg opposed by one propodal spine, no spine on outer propodal margin. Fourth leg much shorter than first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.	Dactyl of third leg opposed by one propodal spine, one spine on outer propodal margin. Fourth leg much shorter than first leg, dactyl opposed by one propodal spine, one spine on outer propodal margin.	Dactyl of third leg opposed by one propodal spine, may be one spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, may be one spine on outer propodal margin.	Dactyl of third leg opposed by one propodal spine, no spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.
Abdominal segments	No segments fused. Abdominal locking mechanism used.	No segments fused. Abdominal locking mechanism used.	No segments fused. Abdominal locking mechanism used.	No segments fused. Abdominal locking mechanism used.	No segments fused. Abdominal locking mechanism used.	No segments fused. Abdominal locking mechanism used.
Uropods	Well developed, visible externally.	Small, concealed.	Absent, or minute, and concealed.	Minute, concealed.	Small, concealed.	Small, concealed.
Telson	Rounded.	Acutely pointed.	Acutely pointed or a knobbed spine.	Acutely pointed.	Acutely pointed.	Acutely pointed.
Male pleopods	First sharply tipped, second without exopod on basis.	Unknown.	First sharply tipped, second without exopod on basis. Vestigial pleopods on third to fifth segments.	First sharply tipped, second without exopod on basis.	First sharply tipped. second without exopod on basis.	Unknown.

TABLE 5. — Comparison of the key characteristics of the genera *Conchoecetes* Stimpson, 1858, *Speodromia* Barnard, 1947, *Exodromidia* Stebbing, 1905, *Eudromidia* Barnard, 1947, *Dromidia* Stimpson, 1858, *Barnardromia* gen. nov.

The species of *Barnardromia* share the characters which make the endemic South African genera, *Dromidia*, *Eudromidia*, *Exodromidia*, *Pseudodromia*, and *Speodromia* different from other genera. These are lack of an epipod on the cheliped, sharply pointed telson, and vestigial uropods (see Table 5). The size of the uropods in *Barnardromia* gen. nov. are unknown, but are likely to be the same as the other genera.

DISTRIBUTION. — All the known species of *Barnardromia* are restricted to South African waters.

Key to the species of *Barnardromia*

— Two anterolateral teeth, first largest, pair of acute protogastric tubercles behind rostral lobes ..... *Barnardromia bituberculata* (Stebbing, 1920) nov. comb.
— Four anterolateral teeth, last largest, pair of rounded protogastric areolae behind rostral lobes ..... *Barnardromia hirsutimana* (Kensley & Buxton, 1984) nov. comb.

Genus *SPEODROMIA* Barnard, 1947

Dynomene - STEBBING, 1905 : 58 (in part). Not Latreille, 1825.
Speodromia Barnard, 1947 : 370. — 1950 : 333.

Carapace distinctly wider than long, gastric and branchial regions strongly inflated, especially the latter because of a deep cavity in the subbranchial region, surface vermiculate and studded with minute scale-like setae. Rostrum prominent, triangular and deflexed, lateral rostral teeth united with supraorbital margin to form an eave. Anterolateral margin begins at level of buccal cavity, is broadly rounded and bears numerous small teeth. The deep subbranchial cavity has a membranous inner wall covered with clavate setae. Coxae of third maxillipeds closely approximated and inserted in front of the sternum. Female sternal grooves end close together on a low rounded tubercle between cheliped bases. Cheliped without an epipod, surface vermiculate, meral segment flattened, almost petaloid, bearing clavate and spiniform setae, fingers with well developed teeth. Legs shorter than chelipeds, third legs shortest, meral segments petaloid, other segments flattened and produced distally. Dactyli of first two pairs armed with 3-4 short spines, dactyli of last two pairs opposed by single propodal spines. Only last pair dorsally placed. Abdomen of six free segments, male telson terminated by a sharp spine, female telson rounded, uropod plates in both sexes reduced to small elongate lobes not visible externally. Abdomen held in place by small projecting plate on bases of first and second legs.

TYPE SPECIES. — *Dynomene platyarthrodes* Stebbing, 1905, by monotypy.

DISCUSSION. — STEBBING (1905) placed this species in the Dynomenidae because of the agreement of some features with *Dynomene filholi*. He believed that only the last pair of legs was reduced, uropods were present and there was an epipod on the cheliped. However, BARNARD (1947) showed that the gill formula for this species is 11+3 with no epipod on the cheliped. Also, both of the last two pairs of legs are reduced and while the uropods are present, they are much reduced compared to other dynomenids (see Table 5). These characters, along with reduced gill formula, and the peculiar subbranchial cavities, were the main reason for BARNARD erecting a new genus for *D. platyarthrodes*. Although BARNARD did not explain the etymology of his new generic name, it is no doubt derived by combining the Greek word for cave, '*speos*', with *Dromia*, thereby emphasizing the subbranchial cavities.

Speodromia platyarthrodes is known only from South Africa. STEBBING gave the type locality as off "Cape Point, N.E. by E., 36 miles. Depth, 650-700 fms" but as BARNARD (1947) noted, this was probably the result of mixing of labels as a consequence of bottles having been broken in transit. Thus the type locality is uncertain. All subsequent records have been from shallow water, maximum depth around 50 m.

Maximum size for this species is 40 mm CW and it is not known to carry pieces of camouflage.

Genus *DROMIDIA* Stimpson, 1858

Dromidia Stimpson, 1858 : 225 (in part); 1907 : 170 (in part). — HENDERSON, 1888 : 12 (in part). — BORRADAILE, 1903a : 299. — STEBBING, 1905 : 62 (in part). — BARNARD, 1950 : 319 (in part).
Platydromia Brocchi, 1877 : 54.
Dromidiopsis - BARNARD, 1950 : 311 (in part).
Parasphaerodromia Spiridonov, 1992 : 69.

Carapace approximately as wide or wider than long, surface smooth, gibbous or uneven, short dense tomentum with longer setae on the fringes. Rostrum tridentate, with frontal, branchial and cardiac grooves marked. Frontal groove separates two low rounded protuberances on carapace. Anterolateral margin begins at orbital level, teeth may or may not be present. Supraorbital tooth usually present, postorbital tooth present or else an obtuse lobe, fissure present at postorbital corner, single suborbital tooth and no subhepatic tubercles. Coxae of third maxillipeds separated by a gap and inserted in front of tip of sternum. Female sternal grooves end together on tubercle between chelipeds. No epipod on cheliped, borders of merus not dentate, distal spine usually present on the inner superior margin of carpus, superior margin of propodus smooth. Distal margins of carpi and propodi of first two pairs of legs produced, three-five small spines on inner margins of dactyli. Third leg smaller than fourth, dactyl opposed by one propodal spine and another spine may be present on the outer propodal margin. Fourth leg shorter than second, dactyl opposed by one propodal spine and another spine may be present on the outer propodal margin. Abdomen of six free segments. Telson usually wider than long, terminated by a sharp, stout spine in males, sometimes blunter in females. Uropod plates reduced and concealed. Abdominal locking mechanism involves serrated ridge on bases of first legs (uropods not used). First male pleopod stout, two segmented, sharp tubercle on tip, densely setose. Second pleopod simple, tapering needle or stouter and tapering only at tip.

TYPE SPECIES. — For *Dromidia* Stimpson, 1858, *Dromia hirsutissima* Lamarck, 1818, by original designation (STIMPSON, 1858), for *Platydromia* Brocchi, 1877, *Platydromia depressa* Brocchi, 1877, by monotypy, and for *Parasphaerodromia* Spiridonov, 1992, *Parasphaerodromia subglobosa* Spiridonov, 1992, by monotypy.

OTHER SPECIES. — *Dromidia aegibotus* Barnard, 1947, *Dromidiopsis cornuta* Barnard, 1947, *Dromidia dissothrix* Barnard, 1947, *Cryptodromiopsis lepidota* Barnard, 1947, *Dromidia spongiosa* Stimpson, 1858.

DISCUSSION. — No fewer than eight definitions of the genus *Dromidia* have been published (STIMPSON, 1858, HENDERSON, 1888, BORRADAILE, 1903a, STEBBING, 1905, STIMPSON, 1907, RATHBUN, 1937, BARNARD, 1950, and SAKAI, 1976) and each differs some important ways from the other. STIMPSON (1858) used the following characters : carapace convex, pilose, female sternal grooves end together on a tubercle between the chelipeds, uropod plates minute and concealed, and legs similar to *Dromia* (i.e. not knobbed or ridged). BORRADAILE (1903a) expanded the definition by adding that the carapace is not longer than broad, furrows between regions almost completely lost, fourth leg longer than third (this character is not correct because the type species is an exception), fourth leg as long as or shorter than second and with no spine on the outer side of the last joint (presumably the distal propodal margin, a character which is also not correct because the type species is an exception). BORRADAILE'S most important observation was that the cheliped lacks an epipod.

STIMPSON (1858) placed four quite different species in the new genus and until now only three remain : *D. hirsutissima*, *D. spongiosa* and *D. antillensis*. The other species, *D. excavata*, has been known as *Dromidiopsis excavata* (Stimpson, 1858) because it has an epipod on the cheliped, but it should be known as *Dromidiopsis globosa* (Lamarck, 1818) nov. comb. (see above). As will be shown later *Dromidia antillensis* does not belong in this genus, leaving only *D. hirsutissima* and *D. spongiosa* of the original species.

Dromidia spongiosa has had a somewhat chequered career, having been known under five specific names and placed in no less than six genera. The synonyms for this species include *Platydromia depressa* Brocchi, 1877, *Cryptodromia micronyx* Stebbing, 1920, *Cryptodromiopsis spongiosa* Barnard, 1947, *Pseudodromia inermis* Macpherson, 1988, and *Parasphaerodromia subglobosa* Spiridonov, 1992. *Dromidia spongiosa* was used by HENDERSON (1888), STEBBING (1910), BALSS (1913, 1921a), but more recently this species has been known as

Cryptodromiopsis spongiosa following BARNARD (1947). With the clarification of the generic definitions of *Dromidia* and *Cryptodromiopsis* (see below) it is clear that this species must be returned to its original genus and should be known as *Dromidia spongiosa* Stimpson, 1858.

Since BROCCHI (1877) set up the new monotypic genus, *Platydromia*, to accommodate his new species from St. Paul Island, Indian Ocean, and the name *P. depressa* Brocchi, 1877, is a synonym of *Dromidia spongiosa* Stimpson, 1858, the genus *Platydromia* is a junior synonym of *Dromidia*. Examination of the descriptions and illustrations of *Cryptodromia micronyx* Stebbing, 1920, and *Pseudodromia inermis* Macpherson, 1988, shows that they are synonyms of *Dromidia spongiosa* and were not placed in the correct genus. The history of the study of this species provides a good example of the extent of the confusion reigning amongst carcinologists about the concept of the genus *Dromidia*. Most recently, the same species has been described yet again, this time as *Parasphaerodromia subglobosa* Spiridonov, 1992. Thus *Parasphaerodromia* Spiridonov, 1992, is also a junior synonym of *Dromidia*.

To summarize the important characters for this genus : the carapace must be convex, pilose, regions not strongly marked (i.e. essentially smooth and unornamented), width equal to or greater than length, no epipod on cheliped, legs not knobbed or ridged, telson sharply pointed, uropod plates minute or reduced and concealed, female sternal grooves end together on a tubercle between the chelipeds (see Table 5). The only species which fit these criteria are *Dromidia aegibotus* Barnard, 1947, *D. dissothrix* Barnard, 1947, *Dromia hirsutissima* Lamarck, 1818, and *Dromidia spongiosa* Stimpson, 1858. To these should be added *Cryptodromiopsis lepidota* Barnard, 1947 (including *C. mortenseni* Kensley, 1978, which is probably a synonym) and *Dromidiopsis cornuta* Barnard, 1947, which also has a sharply pointed male telson and probably lacks an epipod on the cheliped.

All other species assigned to *Dromidia* Stimpson, 1858, do not belong in this genus because some have well developed uropod plates and all lack the sharply pointed male telson. These species fall naturally into two groups.

Firstly, a widespread Indo-Pacific-Atlantic group which includes *Dromidia antillensis* Stimpson, 1858, *D. larraburei* Stimpson, 1858, and *Dromia unidentata* Rüppell, 1830 (including *Cryptodromia unilobata* Campbell & Stephenson, 1970, which is a synonym), as well as *Cryptodromia bullifera* Alcock, 1900, and *Dromidiopsis plumosa* Lewinsohn, 1984. These species rightly belong in *Cryptodromiopsis* Borradaile, 1903a.

Secondly, *Dromidia australis* Rathbun, 1923, and *D. insignis* Rathbun, 1923, as well as *Cryptodromia incisa* Henderson, 1888, and *Cryptodromia octodentata* Haswell, 1882, all of which are Australian species. These species are placed in a new genus (see below).

DISTRIBUTION. — The distribution of the species of *Dromidia* is confined to South Africa where a local radiation has produced six species. The record of SPIRIDONOV (1992) (as *Parasphaerodromia subglobosa*) from seamounts to the east of South Africa, extends the range of this genus.

Key to the species of *Dromidia*

1. Carapace significantly wider than long **2**
— Carapace approximately as wide as long **4**

2. No anterolateral teeth, tomentum short, thick, undulating ..... *Dromidia spongiosa* Stimpson, 1858
— Anterolateral teeth present, tomentum short and stiff **3**

3. Three well developed anterolateral teeth, no propodal spine on the outer margin of the last two pairs of legs ..... *Dromidia aegibotus* Barnard, 1947
— Three anterolateral teeth, second and third may be weakly developed, propodal spine present on outer margin of last two pairs of legs .. *Dromidia hirsutissima* (Lamarck, 1818)

4. No anterolateral teeth **5**
— Two acute, evenly spaced, anterolateral teeth ..... *Dromidia dissothrix* Barnard, 1947

5. Rostral teeth acute, divergent, median rostral tooth and suborbital tooth visible dorsally ..... *Dromidia cornuta* (Barnard, 1947) nov. comb.
— Rostral teeth prominent but bluntly rounded, median tooth scarcely visible dorsally, suborbital tooth weak ..... *Dromidia lepidota* (Barnard, 1947) nov. comb.

Genus *AUSTRODROMIDIA* nov.

Dromia - HASWELL, 1882 : 139 (in part).
Cryptodromia - HENDERSON, 1888 : 5 (in part). — IHLE, 1913 : 32 (in part). — HALE, 1927 : 107. — SAKAI, 1976 : 12 (in part).
Dromidia - HASWELL, 1882 : 139 (in part).

Carapace as wide or wider than long, short dense tomentum with longer setae on the fringes, surface smooth, no low rounded protuberances but frontal and branchial grooves distinct. Rostrum tridentate, supraorbital tooth present, postorbital tooth blunt or obtuse. A fissure separates the suborbital margin which has a single tooth. Anterolateral margin begins at orbital level, teeth may or may not be present. Female sternal grooves end together between the first legs. No epipod on the cheliped. Borders of cheliped merus not dentate, no distal spine on inner superior margin of carpus, up to three tubercles on the superior margin of the propodus. Distal margins of carpi and propodi of first two pairs of legs produced, up to four small spines on inner margins of dactyli. Third leg shorter than fourth, dactyl opposed by one or two propodal spines with up to three spines on the outer propodal margin. Fourth leg shorter than second leg, dactyl opposed by a single propodal spine, up to three spines on the outer propodal margin and there may be a spine on the outer margin of the dactyl itself. Abdomen of six free segments. Telson usually wider than long, tip rounded. Uropod plates reduced and concealed or absent.

TYPE SPECIES. — *Dromidia australis* Rathbun, 1923, by present designation.

OTHER SPECIES. — *Cryptodromia incisa* Henderson, 1888, *Dromidia insignis* Rathbun, 1923, *Dromia octodentata* Haswell, 1882.

ETYMOLOGY. — The generic name *Austrodromidia* is formed by combining *Dromidia* with the word "*australis*", meaning southern and referring to the distribution of this group of species.

DISCUSSION. — When discussing the relationships of *Dromidia australis*, RATHBUN (1923a) believed that it was allied to *D. cranioides* De Man, 1888, [i.e. *Lauridromia indica* (Gray, 1831)]. However, despite the similarity of the female sternal grooves, *L. indica* has an epipod on the cheliped, the uropod plates are well developed and visible externally, and the joint between the last two segments of the abdomen is not movable.

When HENDERSON (1888) was describing the "*Challenger*" material he erected *Cryptodromia incisa* but noted that the sternal grooves were closer to the condition in *Dromidia* Stimpson, 1858. Indeed, he could have included the new species amongst the three species of *Dromidia* dealt with in the paper but he misinterpreted the sternal groove character for this genus. As a result, *Cryptodromia incisa* has always been in the wrong genus.

Some of the species which have until now been placed in *Dromidia*, are moved to *Cryptodromiopsis* Borradaile, 1903, and *Austrodromidia* gen. nov. These genera may be characterized as follows : *Dromidia* has reduced and concealed uropod plates, telson ending in a sharp spine, *Austrodromidia* has uropod plates reduced or absent and concealed, tip of abdomen bluntly rounded, and *Cryptodromiopsis* has well developed uropods, visible externally and telson bluntly rounded. In this way, they may be easily distinguished. These differences are associated with different abdominal locking mechanisms (see Tables 5 and 6).

Species in this genus commonly carry camouflage caps made from pieces of sponge or ascidian.

A feature of the species in *Austrodromidia* is that females have large eggs. RATHBUN (1923a) noted that *A. australis* has eggs 2 mm diameter. *A. octodentata* has large (1.9 mm diam.) eggs and broods its young (HALE, 1925). This reproductive strategy is shared with two other Australian dromiids, *Dromidiopsis globosa* (Lamarck, 1818) nov. comb., and *Stimdromia lateralis* (Gray, 1831) gen. nov.

DISTRIBUTION. — The distribution of the species in *Austrodromidia* gen. nov. is confined to Australia except for a single record of *Cryptodromia incisa* by YOKOYA (1933) from Japan. This needs further verification as the specimen is no longer in existence and it is quite possible that it refers to *Cryptodromiopsis unidentata* (Rüppell, 1830) nov. comb. Excluding the Japanese record, the distribution suggests a separate radiation in Australian waters which has produced four species.

CHARACTER	*Austrodromidia*	*Cryptodromiopsis*
Ratio CW/CL	Carapace wider than or equal to length.	Carapace wider than or equal to length.
Carapace surface	Smooth.	Smooth.
Rostrum	Tridentate, teeth well developed, subacute.	Tridentate, teeth well developed, subacute.
Anterolateral margin	Teeth usually well developed, but may be absent.	Teeth usually well developed, but may be absent.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced. Exopod as long as third segment.
Sternal grooves	End together between first legs.	End together between chelipeds, or first legs, or second legs.
Epipod/Podobranchs	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.
First two pairs of legs	Smooth.	Smooth.
Last two pairs of legs	Third leg dactyl opposed by up to two propodal spines, up to three spines on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, up to three spines on outer propodal margin, and there may be a spine on outer margin of dactyl.	Third leg dactyl opposed by up to two propodal spines, up to two spines on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by two propodal spines, up to three spines on outer propodal margin, and there may be up to two spines on outer margin of dactyl.
Abdominal segments	No segments fused.	No segments fused.
Uropods	Small, concealed, may be absent.	Small, visible externally.
Telson	Rounded.	Rounded or bluntly tipped.
Male pleopods	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.

TABLE 6. — Comparison of the key characteristics of the genera *Austrodromidia* gen. nov., and *Cryptodromiopsis* Borradaile, 1903.

Key to the species of *Austrodromidia*

1. No anterolateral teeth, carapace approximately as wide as long **2**
— Anterolateral teeth present, carapace wider than long **3**

2. Acute lateral rostral and supraorbital teeth .....
..... *Austrodromidia incisa* (Henderson, 1888) nov. comb.
— Blunt lateral rostral and supraorbital teeth .....
..... *Austrodromidia insignis* (Rathbun, 1923) nov. comb.

3. Three anterolateral teeth, uropod plates reduced concealed under abdomen .....
..... *Austrodromidia australis* (Rathbun, 1923) nov. comb.
— Five anterolateral teeth, uropod plates absent .....
..... *Austrodromidia octodentata* (Haswell, 1882) nov. comb.

Genus *CRYPTODROMIOPSIS* Borradaile, 1903

Cryptodromiopsis Borradaile, 1903a : 299. — BARNARD, 1950 : 329.
Cryptodromia - IHLE, 1913 : 32 (in part). — SAKAI, 1936 : 15 (in part); 1976 : 12 (in part). — DAI, YANG, SONG & CHEN, 1981 : 138 (in part). — DAI & YANG, 1991 : 19 (in part).
Dromia - ALCOCK, 1900 : 136 (in part); 1901 : 43 (in part).
Dromidia - ORTMANN, 1894 : 34. — IHLE, 1913 : 31. — RATHBUN, 1937 : 32. — SAKAI, 1936 : 13; 1976 : 11.

Carapace as wide or wider than long, surface smooth, short dense tomentum with longer setae on the fringes, frontal groove separating two low rounded protuberances, branchial and cardiac grooves marked. Rostrum tridentate, supraorbital tooth usually present, postorbital tooth blunt or obtuse, a fissure may or may not be present separating the suborbital margin on which there are usually two unequal teeth. Anterolateral margin begins at orbital level, teeth may or may not be present. Subhepatic region usually smooth, without teeth. Coxae of third maxillipeds closely approximated (or separated by a narrow gap) and inserted in front of tip of sternum, separated from it by a trough. Female sternal grooves end together between chelipeds, first or second legs, with or without tubercles. No epipod on cheliped, borders of merus may be dentate, no spine on inner superior margin of carpus, up to four tubercles on superior margin of propodus. Distal margins of carpi and propodi of first two pairs of legs lobe-like, two-five spines on inner margins of dactyli. Third leg shorter than fourth, dactyl opposed by one or two propodal spines with one or two spines on the outer propodal margin. Fourth leg shorter than second, dactyl opposed by one or two propodal spines, one-three spines on the outer propodal margin and usually one spine on the outer margin of the dactyl itself. Abdomen of six free segments. Telson rounded or bluntly tipped. Uropod plates well developed. Abdominal locking mechanism involves a serrated ridge or tooth on the bases of first legs and uropod plates may or may not be involved. First male pleopod stout, two segmented, usually tipped by a sharp tubercle, densely setose. Second pleopod simple, needle-like, tapering, or shorter and tapering only at tip.

TYPE SPECIES. — *Cryptodromiopsis tridens* Borradaile, 1903, by monotypy.

OTHER SPECIES. — *Dromidia antillensis* Stimpson, 1858, *Dromia (Cryptodromia) bullifera* Alcock, 1900, *Dromidia larraburei* Rathbun, 1910, *? Dromidiopsis plumosa* Lewinsohn, 1984, *Dromia unidentata* Rüppell, 1830.

Two other poorly known species should probably also be included in this genus : *Cryptodromia dubia* Dai, Yang, Song & Chen, 1981, and *Cryptodromia planaria* Dai, Yang, Song & Chen 1981.

DISCUSSION. — Some differences between the above generic definition and the original definition given by BORRADAILE (1903a) are that the carapace width and length may be equal, and grooves on the carapace may be evident (see Table 6). BORRADAILE erected *Cryptodromiopsis* to separate species of *Cryptodromia* with convergent sternal grooves, but there are other important differences between these genera in the development of spines on the last two pairs of legs. Propodal spines surrounding the dactyli of these legs are few in *Cryptodromia*, but in *Cryptodromiopsis* there are always a greater number. A key difference is the presence of a small spine on the outer margin of the dactyl of the last leg in *Cryptodromiopsis*. BARNARD (1950) questioned the value of this character at the generic level, but I believe that it is important. I have already shown that the presence of such a spine is one character which separates *Dromidiopsis*, and *Lauridromia* from *Dromia* (see Table 2).

McLAY (1991) has briefly discussed the problems with the species which have been placed in *Cryptodromiopsis* and the fact that they do not form a natural group. Besides *C. tridens* (LEWINSOHN, 1984, pointed out that *Dromidia fenestrata* Lewinsohn, 1979, is a synonym for *Cryptodromiopsis tridens*) these species are *C. bituberculata* (Stebbing, 1920) (originally placed in *Eudromia* by STEBBING and later in *Cryptodromiopsis* by BARNARD, 1947), *C. lepidota* Barnard, 1947, and *C. mortenseni* Kensley, 1978. BARNARD also included *Dromidia spongiosa* Stimpson, 1858, but this was not justified. Since McLAY (1991) I have revised my ideas for revision of this group of species. *C. bituberculata* (Stebbing, 1920) has been transferred to *Barnardromia* gen. nov., and *Cryptodromiopsis lepidota* Barnard, 1947, should be placed in *Dromidia* Stimpson, 1858. *Cryptodromiopsis mortenseni* Kensley, 1978, is probably a synonym for *C. lepidota* Barnard, 1947. I had indicated in the earlier

paper that *Cryptodromiopsis* was a redundant genus but this was incorrect. Many of the species which do not belong in *Dromidia*, should have been placed in *Cryptodromiopsis* and this is done herein.

Cryptodromia dubia Dai, Yang, Song & Chen, 1981, is only tentatively assigned to this genus. The original description is of such brevity, omitting several important details, that it is difficult to ascertain its status. I assume that it has no epipod on the cheliped (an essential character of *Cryptodromia*), judging from their plate I : 5, the carapace is clearly wider than long (despite the statement to the contrary), the dactyl of the last leg is opposed by two spines with another three or four on the outer propodal margin and the uropod plates are well developed and visible externally. The arrangement of the spines on the last leg excludes it from *Cryptodromia* and makes *Cryptodromiopsis* the most likely genus. A similar argument may be presented for the tentative placement of *Cryptodromia planaria* Dai, Yang, Song & Chen, 1981, in *Cryptodromiopsis*.

The larval development of one species in this genus, *C. antillensis*, is known (RICE & PROVENZANO, 1966).

DISTRIBUTION. — The distribution of this genus includes the entire Indo-Pacific region as well as the Atlantic. The Atlantic species formerly known as *Dromidia antillensis* Stimpson, 1858, as well as the closely related *D. larraburei* Rathbun, 1910, from the Pacific, should now be referred to as *Cryptodromiopsis antillensis* (Stimpson, 1858) and *C. larraburei* (Rathbun, 1910).

Key to the species of *Cryptodromiopsis*

(Species studied in this paper are in bold)

1. Carapace significantly wider than long **2**
— Carapace approximately as wide as long **6**

2. Outer propodal margin of last leg armed with three or more spines **4**
— Outer propodal margin of last leg armed with less than three spines **3**

3. Three unequal, acute anterolateral teeth, pearl-like tubercle beneath suborbital tooth and on merus of third maxilliped .....
..... ***Cryptodromiopsis bullifera*** (Alcock, 1900) nov. comb.
— Two unequal, acute anterolateral teeth, no pearl-like tubercles .....
..... *Cryptodromiopsis tridens* Borradaile, 1903

4. Supraorbital margin notched .....
..... ***Cryptodromiopsis plumosa*** (Lewinsohn, 1984) nov. comb.
— Supraorbital margin may have a small tooth but is not notched **5**

5. Prominent supraorbital tooth .....
..... *Cryptodromiopsis dubia* (Dai, Yang, Song & Chen, 1981) nov. comb.
— Margin from lateral frontal tooth to anterolateral tooth almost straight .....
..... *Cryptodromiopsis planaria* (Dai, Yang, Song & Chen, 1981) nov. comb.

6. Three anterolateral teeth **7**
— No anterolateral teeth .....
..... ***Cryptodromiopsis unidentata*** (Rüppell, 1830) nov. comb.

7. One small spine on the outer margin of dactyl of last leg, no tubercle on inner margin of cheliped carpus, three tubercles on upper margin of cheliped propodus .....
..... *Cryptodromiopsis antillensis* (Stimpson, 1858) nov. comb.
— Two small spines on the outer margin of dactyl of last leg, tubercle present on inner margin of cheliped carpus, four tubercles on upper margin of cheliped propodus .....
..... *Cryptodromiopsis larraburei* (Rathbun, 1910) nov. comb.

Cryptodromiopsis bullifera (Alcock, 1900) nov. comb.

Fig. 17 e

Dromia (Cryptodromia) bullifera Alcock, 1900 : 143.
Cryptodromia bullifera - ALCOCK, 1901 : 51, pl. 2, fig. 9. — BORRADAILE, 1903b : 577. — LAURIE, 1906 : 352. — LENZ, 1910 : 562. — IHLE, 1913 : 40. — SAKAI, 1936 : 23, pl. 7, fig. 3; 1976 : 16, text fig. 8. — WARD, 1941 : 1. — GORDON, 1950 : 206. — GUINOT, 1967 : 240 (list). — KENSLEY, 1970 : 107, figs 4a-c; 1981 : 36 (list). — ZARENKOV, 1971 : 169. — LEWINSOHN, 1977 : 15, fig. 3; 1984 : 111.

MATERIAL EXAMINED. — **Chesterfield Islands**. CHALCAL 1 : stn CP 14, 21°18.50'S, 158°50.90'E, 66 m, 24.07.1984 : 1 ♀ 5.0 x 4.7 mm. — Stn DC 56, 22°24.40'S, 159°08.80'E, 60 m, 25.09.1984 : 1 ♂ 5.5 x 6.3 mm, carrying a compound ascidian cap.

CORAIL 2 : stn DW 63, 19°15.15'S, 158°47.73'E, 71 m, 24.08.1988 : 1 ♂ 6.7 x 6.3 mm. — Stn DW 106, 19°9.00'S, 158°42.62'E, 62 m, 27.08.1988 : 1 ♂ 8.2 x 7.7 mm.

DESCRIPTION. — Carapace slightly wider than long, weakly convex, surface smooth beneath a short fine tomentum with longer spatulate setae interspersed, spatulate setae more evident at carapace margins and especially on legs. Frontal groove, branchial groove and cardiac region weakly marked. Rostrum tridentate, three similar long acute teeth. Median tooth directed horizontally, laterals directed anterovertically.

An acute almost vertically directed supraorbital tooth and similar anteriorly directed postorbital tooth. Although the orbital margin is concave beneath the postorbital tooth, there is no distinct fissure separating the suborbital margin which has a long acute tooth, visible dorsally, at the medial corner.

First segment of antenna reduced, much wider than long, almost crescent-shaped, beaked medially, gaping. Second segment much longer than wide, very convex, a short distal median spine projecting ventrally, distomedial corner produced as a curved spine on which the third segment is inserted at an angle. Exopod firmly fused to second segment, tip bilobed with inner lobe curved over base of eyestalk, extending as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.75.

Subhepatic area convex, one pearl-like tubercle beneath suborbital tooth, near corner of buccal frame which is marked by a tooth, another similar tubercle ventrolateral to the postorbital tooth and an acute tubercle beneath, the latter two visible dorsally. A small pearl-like tubercle on the merus of the third maxilliped. Female sternal grooves end close together on an elevated platform between bases of chelipeds.

Anterolateral margin begins at the level of the orbit, widening rapidly to a small tooth above the second pearl-like subhepatic tubercle, mentioned earlier, closely followed by a long acute tooth, which curves upward, and then by a smaller anterolaterally directed tooth, giving a total of three anterolateral teeth. In his original description, ALCOCK (1900) treated the small first tooth as belonging to the subhepatic area instead of the anterolateral margin, thus stating that there were only two anterolateral teeth. A small tooth behind the branchial groove, posterolateral margins convergent. A distinct groove extends from between the first pearl-like tubercle and the tooth at the corner of the buccal frame, around under the anterolateral margin, ending at the posterolateral tooth.

Chelipeds well developed, merus trigonal, borders minutely tuberculate. Surface of carpus convex, two strong acute distal tubercles. Propodus smooth, two distal tubercles at base of dactyl. Fingers downcurved, gaping, hollowed out internally, armed with seven-eight teeth of uneven size, proximal tooth on dactyl largest, a hiatus mid-way along fixed finger.

First two pairs of legs smaller than chelipeds, distal borders of carpi and propodi lobe-like. Dactyli as long as propodi, strongly curved at tips, inner margins armed with four-five small spines.

Last two pairs of legs much reduced, third pair shortest, dactyli short, curved and opposed by single propodal spines and another spine on outer propodal margin.

Abdomen of six free segments. Male telson longer than wide, tip rounded. Uropod plates well developed and visible externally. Small pearl-like lateral tubercles on abdominal segments three-six, tubercles poorly developed on female abdominal segments. Abdominal locking mechanism consists of uropod plates fitting in front of serrated flange on bases of first legs.

First male pleopod a stout semi-rolled, setose tube with a strong horny tip, second pleopod simple needle-like.

DISCUSSION. — In his original description ALCOCK (1900) noted the characteristic pearl-like tubercles below the suborbital lobe and on the merus of the third maxilliped but added that another similar tubercle was present on the second segment of the antenna. Such a tubercle is not evident on the present specimens, although the surface is clearly convex, and there is a short distal median spine projecting ventrally which may be what ALCOCK was referring to. ALCOCK (1900, 1901) did not give the sex of the original two specimens and did not comment on the arrangement of the female sternal grooves and LAURIE (1906) also recorded a small female without comment. IHLE (1913) had three females but only commented that in mature females the sternal grooves ended in front of the level of the fourth thoracic sternite, without indicating whether they ended apart or together. LEWINSOHN (1984) had several mature females which showed that the sternal grooves ended close together between the bases of the chelipeds and he noted that this conflicted with the generic diagnosis of *Cryptodromia* given by BORRADAILE (1903a) and that perhaps the species should be removed from *Cryptodromia*. This character alone indicates that this species does not belong in *Cryptodromia* Stimpson, 1858, and together with the absence of an epipod on the cheliped, suggests that it belongs in *Cryptodromiopsis*.

The number and arrangement of spines around the dactyli of the last two pairs of legs, were erroneously described by ALCOCK (1901) as "not cheliform", and subsequent authors have not corrected the situation : in fact the dactyli of both legs are opposed by single propodal spines with another spine on the outer propodal margin. This makes *Cryptodromiopsis bullifera* different because the other species in this genus also have a spine on the outer margin of the dactyl itself. This is regarded as an advanced feature of this species.

Good illustrations of *C. bullifera* are provided by ALCOCK (1901), SAKAI (1936, the same fig. appears in 1976), KENSLEY (1970), and LEWINSOHN (1977). The characteristic pearl-like tubercles on the ventral surface are well shown by ALCOCK (1901, Pl. II, fig. 9a) and KENSLEY (1970, fig. 4b). Originally, ALCOCK (1901) described the anterolateral margin as having two teeth but LEWINSOHN (1977) pointed out that in his specimen from the Red Sea there is another small tooth between the postorbital corner and the first large tooth. The New Caledonian material is also in agreement in having three anterolateral teeth.

CAMOUFLAGE. — None of the previous records of *C. bullifera* have included reference to the type of camouflage carried by these crabs but in the New Caledonian collection one of the small males was carrying a compound ascidian cap.

SIZE. — Including the four reported in this paper, a total of some twenty six specimens have been recorded : of these eleven are males (maximum size CW = 13.0, CL = 12.0 mm), ten are females (maximum size CW = 11.5, CL = 10.0 mm) and five are of unknown sex (including the type specimen). Four ovigerous females have been recorded ranging in size from CW = 5.5, CL = 5.0 mm to the largest female known, but the female recorded from stn CP 14, CW = 5.0, CL = 4.7 mm had plugged sternal grooves, indicating that it had already mated. *C. bullifera* obviously reaches maturity at a small size.

DEPTH. — Most records of *C. bullifera* are from depths between 30-60 m, both New Caledonian specimens are from near 60 m, although LEWINSOHN (1984) reported specimens from the intertidal zone of Madagascar and one specimen of ALCOCK (1900) supposedly came from 880 m but it seems likely that this is an error and that the depth distribution is from 0-60 m (approx.).

DISTRIBUTION. — The geographic distribution of *C. bullifera* ranges from the Red Sea, East Africa, Madagascar, South Nilandu Atoll, Maldive Archipelago, Cinque Is., Andaman Sea (type locality), Philippines, Japan, and now Chesterfield Islands. *C. bullifera* is a small, shallow water, Indo-West Pacific species.

Cryptodromiopsis plumosa (Lewinsohn, 1984) nov. comb.

Fig. 17 f

? *Dromidiopsis plumosa* Lewinsohn, 1984 : 104, fig. 3a-g.
Dromidia plumosa - McLAY, 1991 : 470.

MATERIAL EXAMINED. — **Chesterfield Islands.** CORAIL 2 : stn DW 84, 19°12.00'S, 158°56.80'E, 16-26 m, 25.08.1988 : 1 ♂ 13.3 x 11.7 mm, fragments of sponge attached to last pair of legs.

DESCRIPTION. — Carapace distinctly wider than long, smooth under a dense pile of long plumose setae, rising steeply in front but more gradually convex laterally. Shallow frontal groove separates two low protuberances, lateral borders of cardiac region marked by a paler colour, branchial grooves evident laterally in broad depression. Rostrum tridentate, median rostral tooth acute and slightly deflexed but visible dorsally, lateral rostral teeth slightly longer, also acute. Anterolateral margin of carapace begins at level of suborbital margin, close to postorbital corner, and has two teeth. First tooth blunt with an extended posterior margin, second tooth more acute, both directed anteriorly so that second tooth is almost parallel to the margin. A deep branchial notch, no posterolateral tooth, posterior corners of carapace convex, posterior carapace margin sinuous.

Orbital margin eave-like, no supraorbital tooth, instead a deep notch interrupts the supraorbital margin, postorbital corner produced as a blunt tooth. No fissure separates the suborbital margin which bears one blunt, central tooth, visible dorsally, and another smaller more acute tooth at the medial corner, these two teeth separated by a deep notch.

First segment of antenna wider than long (ratio = 2.0), beak-like medially, gaping and twisted. Second segment much longer than wide (ratio = 3.6), surface convex, a low distal medial tubercle, distomedial corner strongly produced, on which the third antennal segment is inserted. Attachment of exopod marked by a shallow groove, exopod extending slightly beyond joint between third and fourth segments, tip not bilobed but curving over base of eyestalk, ratio of length of antennal flagella to CW = 0.54. Apex of epistome produced as a blunt tooth immediately beneath median rostral tooth, the two separated by a groove.

Subhepatic area slightly concave, near corner of buccal frame is a low tubercle beneath which runs a shallow groove extending under the anterolateral margin and ending at the branchial notch. Nature of female sternal grooves unknown.

Chelipeds well developed, merus trigonal in section, borders smooth. Carpus convex, two large blunt distal tubercles. Propodus smooth with a prominent proximal tooth on the superior border. Fingers white, hollowed out internally, strongly downcurved, gaping, borders armed with seven-eight teeth increasing in size distally.

First two pairs of legs shorter than chelipeds. Distal corners of carpi knob-like. Propodi distinctly longer than dactyli, inferior distal margins have one-two short spines overlapping dactyli. Tip of dactyli strongly curved, inner margins armed with four-five small spines.

Last two pairs of legs reduced. Third pair shortest, dactyl strongly curved, opposed by three propodal spines with one, or two spines on the outer propodal margin. Dactyl of fourth legs opposed by two propodal spines with three spines (two broken off in the present specimen) on the outer propodal margin and an additional spine on the outer margin of the dactyl itself, near the base.

Abdomen of six free segments, low rounded ridge along length. Male telson triangular, tip rounded, about as wide as long. Uropod plates small but visible externally. Abdominal locking mechanism involves a serrated ridge on bases of the first legs against lateral margins of penultimate abdominal segment. Uropods are not used to lock the abdomen. Female characters unknown.

Tip of first male pleopod a setose blunt knob, second pleopod stout, only tapering to a sharp tip near the apex.

DISCUSSION. — *Dromidiopsis plumosa* Lewinsohn, 1984, was assigned, with some uncertainty to this genus by LEWINSOHN because of the absence of any female specimens. However, an examination of the type specimen, (MNHN-B 8572), shows that LEWINSOHN incorrectly stated that there was an epipod on the cheliped and so he should have placed this new species in *Dromidia* (see MCLAY, 1991).

Some comparison should be made between the New Caledonian and type specimens. Both are males but the type is clearly a small immature specimen : on the type the plumose setae are small and sparse (large and dense on the specimen from New Caledonia), ratio of CW/CL = 1.14 (1.36, thus the carapace is relatively much wider), regions of carapace not distinguished (frontal groove well marked and branchial grooves more evident). LEWINSOHN stated that margins of the frontal teeth are finely granular but this is not true (the margins are smooth), a granule on the right supraorbital tooth (not present), notch in supraorbital margin (this unusual feature is also very

apparent), and small fissure at postorbital corner separating supraorbital and suborbital margins (not present in the larger New Caledonian specimen). Features of the second antenna and epistome, which were not mentioned by LEWINSOHN, are in agreement. The type has two anterolateral teeth, the first broad and truncated, the second acute and spiniform (disposition of teeth similar except that the first is more acute and the second much closer to the posterior margin of the first and more spiniform than in the type). LEWINSOHN omitted an important feature of the cheliped propodus which is the proximal tooth on the superior margin (present on the New Caledonian specimen). Dactyli of the first two pairs of legs shorter than propodi and armed with four-five small spines (same). LEWINSOHN also missed a key feature of the propodi of the first two pairs of legs which is the presence of a distal propodal spine on the inferior margin, but these are very small and easily overlooked (larger and more apparent in the New Caledonian specimen). Dactyl of third leg opposed by two spines (three spines), and possibly two spines on the outer propodal margin, omitted from his Fig. 3e, (one or two spines). Dactyl of fourth leg opposed by two spines, with three spines on the outer propodal margin and an accessory spine on the dactyl (same). Telson as wide as long and abdominal segments much wider than long (same). LEWINSOHN did not comment on the abdominal locking mechanism but it is identical in both specimens. His comment that the male pleopods of the type are well developed, indicating sexual maturity, needs to be confirmed by other evidence, e.g. relative growth of secondary sexual characters. No female of this species has been collected so the nature of the sternal grooves remains unknown.

Amongst the species placed in *Cryptodromiopsis*, *C. plumosa* must be regarded as having a primitive arrangement of spines on the legs : the most primitive character is the presence of a distal propodal spine overlapping with the base of the dactyl on the first two pairs of legs, a condition found for e.g. in *Sphaerodromia*, but it also has the largest number of propodal spines on the last two pairs of legs, four on the third leg, and six on the fourth leg. This condition is intermediate, because while there is a spine on the outer margin of the dactyl of the last leg, there are no spines on the inner margins of the dactyli of either of the last two legs which are found in *Sphaerodromia*. Compared to *Cryptodromiopsis plumosa*, all the other species in *Cryptodromiopsis* have reduced numbers of spines.

CAMOUFLAGE. — The camouflage carried by *C. plumosa* is made from pieces of sponge.

SIZE. — The present male specimen, CW = 13.3 mm, is the largest known. No female of this species has been collected.

DEPTH. — LEWINSOHN'S small type specimen came from a depth of 55 m while the present larger male specimen came from a depth of 16-25 m.

DISTRIBUTION. — The type specimen came from the Seychelle Islands and the only other known specimen is from the Chesterfield Islands. It may be that this species has a similar geographic distribution to *C. bullifera* .

Cryptodromiopsis unidentata (Rüppell, 1830) nov. comb.

Figs 7 a-k, 18 a

Dromia unidentata Rüppell, 1830 : 16, pl. 4, fig. 2, 2a, pl. 5, fig. 9. — H. MILNE EDWARDS, 1837 : 178. — HELLER, 1861 : 21, 31; 1862 : 243. — A. MILNE EDWARDS, 1868 : 72. — HILGENDORF, 1879 : 813. — MÜLLER, 1887 : 472. — ALCOCK, 1900 : 139; 1901 : 47, pl. 2, fig. 6. — CHILTON, 1911 : 554.

Dromidia unidentata - KOSSMANN, 1880 : 67. — DE MAN, 1888b : 207, pl. 14, figs 4-5. — CANO, 1889 : 255 — HENDERSON, 1893 : 405. — ORTMANN, 1894 : 34. — NOBILI, 1903 : 23; 1905 : 4; 1906a : 145; 1906b : 92. — LAURIE, 1906 : 351; 1915 : 426. — RATHBUN, 1910b : 367. — IHLE, 1913 : 31. — BALSS, 1934 : 502. — SAKAI, 1936 : 13, pl. 6, fig. 2, text fig. 2. — RAMADAN, 1936 : 27. — STEPHENSEN, 1945 : 63. — BARNARD, 1950 : 323, figs 61h-i. — GORDON, 1950 : 206. — GUINOT, 1967 : 240 (list). — SAKAI, 1976 : 11, pl. 2, fig. 2, text figs 2a-b. — LEWINSOHN, 1977 : 9, fig. 1a-e; 1979 : 2; 1984 : 107.

Dromidia unidentata hawaiiensis Edmondson, 1922 : 6, pl II D, fig. 1a-j.

Dromidia unidentata unidentata Garth, 1957 : 316. — RETAMAL, 1981 : 25.

Cryptodromia unilobata Campbell & Stephenson, 1970 : 240, fig. 2A-I.

? *Cryptodromia incisa* Zarenkov, 1971 : 169 (error).

MATERIAL EXAMINED. — **Philippine Islands.** MUSORSTOM 3 : stn CP 142, 11°47.0'N, 123°01.5'E, 26-27 m, 6.06.1985 : 1 ♀ 7.5 x 7.4 mm.

Chesterfield Islands. CORAIL 2 : stn DW 96, 19°6.00'S, 158°41.92'E, 41 m, 27.08.1988 : 1 ♀ (ovig.) 11.9 x 13.0 mm. — Stn DW 109, 19°08.97'S, 158°52.50'E, 47-64 m, 28.08.1988 : 1 ♀ (ovig.) 14.3 x 13.8 mm. — Stn CP 111, 19°18.06'S, 158°48.86'E, 70-65 m, 28.08.1988 : 1 ♀ 7.8 x 7.2 mm.

New Caledonia. LAGON : stn 36, 22°17.2'S, 166°19.9'E, 20 m, 24.05.1985 : 1 ♀ 11.7 x 12.4 mm, carrying a sponge cap. — Stn 123, 22°29.8', 166°39.8'E, 21 m, 23.08.1984 : 1 ♀ (ovig.) 11.5 x 12.8 mm. — Stn 250, 22°18.5'S, 166°25.6'E, 10 m, 7.11.1984 : 1 ♀ (ovig.) 15.8 x 17.5 mm. — Stn 251, 22°19.3'S, 166°25.1'E, 20 m, 7.11.1984 : 1 ♂ 10.8 x 11.4 mm. — Stn 553, 22°51.10'S, 166°55.3'E, 35-40 m, 16.07.1985 : 1 ♂ 13.0 x 13.9 mm. — Stn 693, 21°30.3'S, 166°13.4'E, 35-38 m, 9.08.1986 : 1 ♂ 6.7 x 6.6 mm, carrying solitary ascidian cap.

No stn, trawl, no depth, 2.12.1986 : 1 ♂ (soft) 8.8 x 8.8 mm.

South West Lagoon, SCUBA, under *Sarcophyton*, 25 m, no date, P. LABOUTE coll. : 1 ♀ (ovig.) 18.8 x 19.9 mm.

DESCRIPTION. — Carapace approximately as long or longer than wide, evenly convex, surface smooth beneath a dense mat of fine setae, posterior half of carapace only thinly covered. Shallow frontal groove extends back from between lateral rostral teeth, branchial groove also shallow and cardiac area marked by a pair of shallow pits. Rostrum tridentate, median tooth small, strongly deflexed, not visible dorsally, lateral teeth prominent, sub-acute. Anterolateral margin begins at level of postorbital corner, without teeth and reaching its widest point just before posterolateral tooth which is very small and blunt. Posterolateral margins convergent, posterior carapace margin slightly concave.

Strong supraorbital tooth, margin concave to rounded postorbital corner. A narrow slit separates the suborbital margin which has a very prominent, subacute tooth extending forward almost as much as the lateral rostral tooth, visible dorsally, and a smaller blunt tooth at the inner corner. All these features of the frontal area are concealed by a thick cover of setae.

First segment of antenna much wider than long, beak-like medially, twisted, with upper lobe acute, and overhanging the lower lobe. Second segment narrow (ratio of width/length = 1.75), a small median distal tubercle, distomedial corner only slightly elongated, third segment essentially attached terminally. Exopod firmly fixed, bilobed, ventral lobe tooth-like, ending at the junction of the third and fourth segments, dorsal lobe flattened, extending beyond the junction and curving over base of eyestalk. Ratio of length of antennal flagella/CW = 0.62.

Subhepatic area inflated, smooth, a tooth at the corner of the buccal frame and a deep groove extending from beneath antenna, curving around below orbit and anterolateral margin to emerge at posterolateral tooth. Female sternal grooves end together on a central raised tubercle between bases of first pair of legs.

Cheliped merus trigonal in section, borders unarmed, superior surface has a distinct distal groove close to junction with carpus. Outer face of carpus smooth, inflated, two acute distal tubercles. Surface of propodus also smooth, fingers strongly downcurved, hollowed out internally, borders armed with six small teeth increasing in size distally, gaping in both sexes, interlocking only at tips.

First two pairs of legs almost as long as chelipeds, segments unadorned. Dactyli as long as propodi, inner margin of dactyli armed with eight-ten small spines.

Last two pairs of legs reduced, third pair shortest. Both legs have flattened segments and long, almost straight dactyli opposed by single, stout propodal spines and with two unequal spines on the outer propodal margin. While the third legs are ventrally placed, the fourth pair are subdorsal and extend almost as far forward as the orbits. The limbs are closely folded against the carapace and along with the tomentum this gives the crab the appearance of a hairy ball which fits tightly into the piece of camouflage which it carries.

Abdomen of six free segments. Telson slightly longer than wide in male, wider than long in the female, a pair of small central tubercles. Uropods well developed, visible externally, and these lock the male abdomen in place by fitting in front of elongate flange on bases of the first legs.

First male pleopod a semi-rolled, setose tube with blunt tip, second pleopod simple, needle-like.

DISCUSSION. —The original description of *Dromia unidentata* Rüppell, 1830, included accurate illustrations of a male and a female, including most of the spines around the dactyli of the last two pairs of legs, but somewhat inaccurate illustrations of the abdomen. The figure of the female abdomen shows the pleopods in a diagrammatic fashion and along with the male abdomen, omits the uropod plates at the base of the telson. These inaccuracies and omissions were corrected by LEWINSOHN (1977) who provided the most complete description and accurate figures.

The description provided here adds information about the antenna, the abdominal locking mechanism and the male pleopods.

RÜPPELL (1830) suggested that *Dromia globosa* Lamarck might be a synonym for *Dromia unidentata* but, as discussed above, this is not the case and the species should be known as *Dromidiopsis globosa* (Lamarck, 1818).

The sternal grooves in the mature female *Cryptodromiopsis unidentata* end close together between the bases of the first legs, but in the female, CW = 7.8 mm, from stn CP 111, they end together just behind this level, and in the female, CW = 7.5 mm, from stn CP 142, they end apart between the bases of the second legs. This ontogenetic change in the state of the sternal groove character is typical of dromiid females and has created many past difficulties in identifying sponge crabs. For example, CAMPBELL and STEPHENSON (1970) created a new species, *Cryptodromia unilobata*, on the basis of a single female from Moreton Bay, Queensland. Although having a strong resemblance to *Cryptodromiopsis unidentata*, the specimen had sternal grooves "ending on low, widely separated tubercles between the coxae of the second walking legs, just anterior to the genital openings". Since the *Cryptodromia unilobata* female had CW = 16.5 mm, exceeding the size of the smallest ovigerous female, it might be expected to be mature, and have adult sternal grooves, but this is not necessarily true because sexual maturation can occur over a wide size range.

The sternal groove character also led ZARENKOV (1971) to identify his two specimens as *Cryptodromia incisa* Henderson, 1888, when they probably should have been named *Dromidia unidentata* which was already known from the Red Sea (see LEWINSOHN, 1977).

One sub-species has been described as *Dromidia unidentata hawaiiensis* Edmondson, 1922, from a single, small male specimen collected from Hawaii. The differences noted by EDMONDSON included spots, and some softer, membranous areas on the carapace. These differences are just individual variation and no further specimens have been obtained. Because this name was used for the Hawaiian specimen, GARTH (1957) and RETAMAL (1981) used the name *Dromidia unidentata unidentata* for the typical form which was collected from Easter Is. It seems to me that neither of these sub-specific names are necessary and that the specimens from both of these Pacific islands should be known as *Cryptodromiopsis unidentata*.

SIZE. — The size range of *Cryptodromiopsis unidentata* recorded here is as follows : 4 males, CW = 6.7-13.0 mm, 3 females, CW = 7.5-11.7 mm, 5 females (ovig.), CW = 11.5-18.8 mm. Other records show that the maximum size for males is CW = 34.0 mm (LEWINSOHN, 1984), for females CW = 31.0 mm (SAKAI, 1936) and the minimum size for ovigerous females is CW = 11.0 mm (HENDERSON, 1893). Mean egg size for the ovigerous females = 0.9 mm (range 0.75-1.10 mm), and mean egg numbers = 331 (range 216-440). This combination of egg size and numbers is intermediate between the extremes of small eggs-large numbers, and large eggs-small numbers seen in other dromiid species.

CAMOUFLAGE. — *Cryptodromiopsis unidentata* has been recorded carrying a wide range of camouflage material : sponges (DE MAN, 1888b, HENDERSON, 1893, EDMONDSON, 1922, and GARTH, 1957 who identified the sponge as *Hymeniacidon* sp.), soft coral (ORTMANN, 1894), compound ascidian (CHILTON, 1911), solitary ascidians and sponges (SAKAI, 1936), an actinian, *Palythoa nelliae* (BARNARD, 1950), compound ascidians substantially larger than the crabs (LEWINSOHN, 1977), and a colony of *Xenia* (LEWINSOHN, 1984). In the New Caledonian material one crab was accompanied by a cap made of sponge and another had a solitary ascidian. The most common camouflage material used by *Cryptodromiopsis unidentata* is made of sponges and ascidians.

DEPTH. — The *Cryptodromiopsis unidentata* reported here came from depths of 10-70 m which is within the range of 0-100 m previously reported by LEWINSOHN (1984). Most specimens have been collected from the shallow end of this range, less than 50 m.

DISTRIBUTION. — Geographic distribution includes the Red Sea, east coast of Africa (as far south as Mozambique, see BARNARD, 1950), Persian Gulf, India and Sri Lanka, Andaman Is., Mergui Archipelago, Thailand, Singapore, Indonesia, Japan (approx. 36°N), Moreton Bay, Queensland (as *Cryptodromia unilobata* Campbell & Stephenson, 1970) with the southernmost Pacific record from Meyer Is., 29°15'S, Kermadecs (north of New Zealand). The distribution also extends eastward in the Pacific to Hawaii, north of the equator

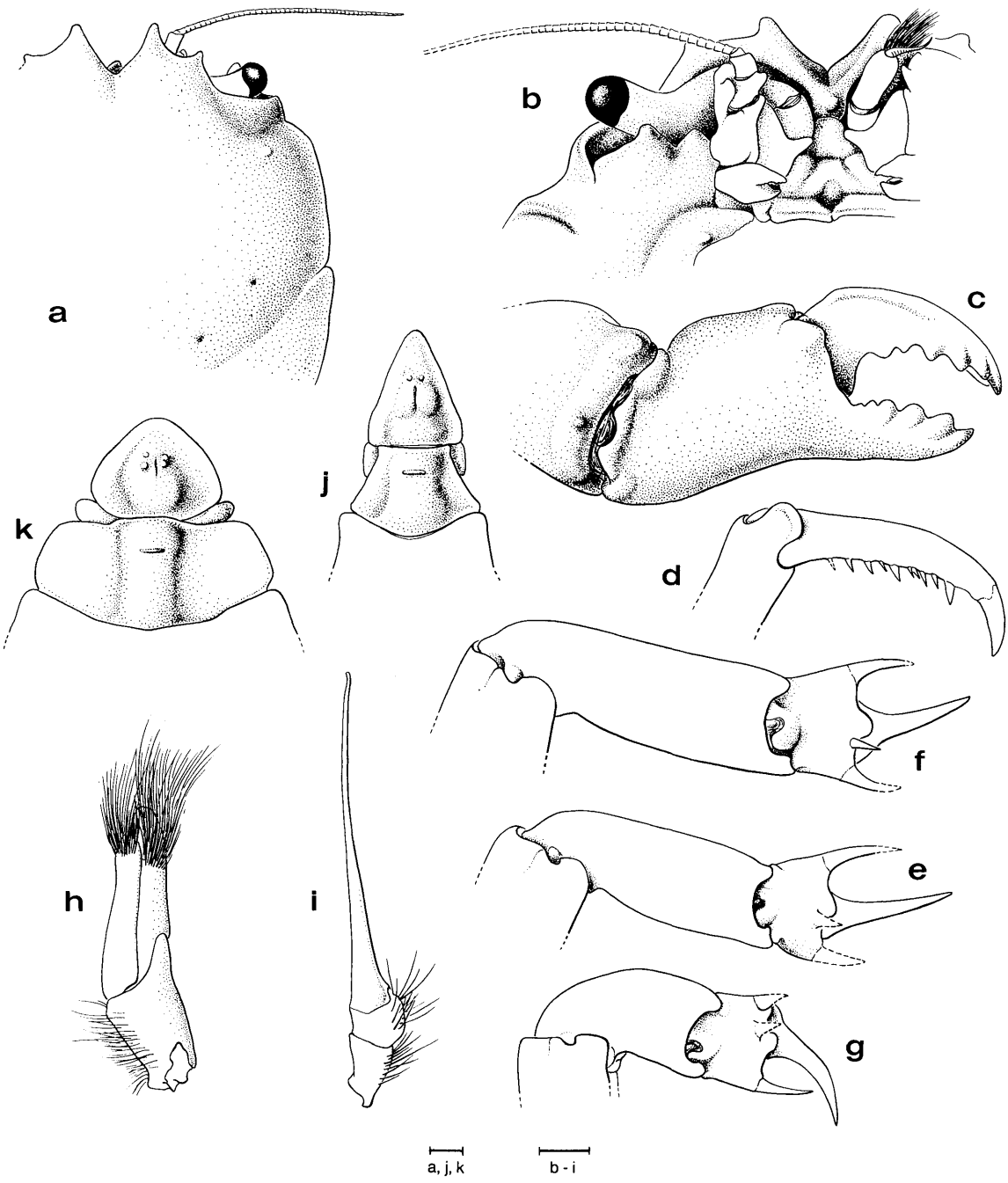


FIG. 7. — *Cryptodromiopsis unidentata* (Rüppell, 1830) nov. comb., ♂ 13.0 x 13.9 mm, New Caledonia, LAGON, stn 553, 35-40 m (MNHN-B 22563); ♀ (ovig.) 14.3 x 13.8 mm, Chesterfield Islands, CORAIL 2, stn DW 109, 47-64 m (MNHN-B 22564) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, ventral view of propodus and dactyl of male right third leg; **f**, ventral view of same leg of female; **g**, posterior view of propodus and dactyl of male right fourth leg; **h**, first pleopod of male; **i**, second pleopod of male; **j**, ventral view of male telson and penultimate abdominal segments; **k**, ventral view of female telson and penultimate abdominal segments. (Fig. 7 a-e, g-j based on male, 7 f, k on female).

Scale bars represent 1.0 mm.

(EDMONDSON, 1922) and to Easter Is. (approx. 27°S, 109°E), south of the equator (GARTH, 1957). Thus it is not surprising to record *Cryptodromiopsis unidentata* from New Caledonia and the Philippine Islands and it confirms that this is a very widespread Indo-Pacific species.

CHARACTER	*Cryptodromia*	*Takedromia*	*Epigodromia*
Ratio CW/CL	Carapace width greater than or equal to length.	Carapace width greater than length.	Carapace may be slightly less than, equal to, or greater than length.
Carapace surface	Smooth.	Granulate, tuberculate or areolate.	Granular, usually areolate.
Rostrum	Tridentate, teeth well developed, blunt, subacute.	Tridentate, teeth subacute or eave-like.	Tridentate, teeth blunt, divergent, may be eave-like.
Anterolateral margin	Teeth always present, blunt, subacute.	Teeth well developed, lacinated or tuberculate. Posterolateral margin also dentate or tuberculate.	Teeth usually broad, granulated lobes, but may be absent.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment produced, prominent median, distal spine. Exopod as long as third segment.	Segments granulate. Distomedial corner of second segment produced. Exopod as long as third segment.
Sternal grooves	End apart between or behind first legs.	End apart between first legs.	End apart between first legs.
Epipods/Podobranchs	Usually no epipod on cheliped, but may be present. No podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.	Usually no epipod on cheliped, but may be present. No podobranchs on pereiopods.
First two pairs of legs	Segments may be lobed, nodular, or tuberculate.	Segments tuberculate, granulate.	Segments tuberculate, granulate.
Last two pairs of legs	Third leg dactyl opposed by one propodal spine, may be another spine on outer propodal margin. Fourth leg shorter than first, dactyl opposed by one propodal spine, up to two spines on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg much shorter than than first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg much shorter than first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.
Abdominal segments	No segments fused, third to sixth segments often have small rounded tubercles arranged in different patterns.	No segments fused, third to sixth segments granulate with a pattern of tubercles superimposed.	No segments fused, third to sixth segments granulate with a pattern of transverse ridges superimposed.
Uropods	Small, visible externally. Abdominal locking mechanism used.	Small, visible externally. Abdominal locking mechanism used.	Small, visible externally. Abdominal locking mechanism used.
Telson	Rounded.	Rounded or subtruncate.	Truncate or bilobed.
Male pleopods	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.

TABLE 7. — Comparison of the key characteristics of the genera *Cryptodromia* Stimpson, 1858, *Takedromia* gen. nov., *Epigodromia* gen. nov.

Genus *CRYPTODROMIA* Stimpson, 1858

Cryptodromia Stimpson, 1858 : 225 (in part); 1907 : 172 (in part). — HASWELL, 1882 : 138. — DE MAN, 1888a : 398 . — ALCOCK, 1900 : 140 (in part); 1901 : 48 (in part). — BORRADAILE, 1903a : 299 (in part). — IHLE, 1913 : 32 (in part). — BALSS, 1922 : 106 (in part). — STEBBING, 1923 : 4. — SAKAI, 1936 : 15 (in part). — BARNARD, 1950 : 327 (in part). — SERENE & LOHAVANIJAYA, 1973 : 13 (in part).
Dromides Borradaile, 1903a : 299.

Carapace as wide or wider than long, surface smooth, convex. Rostrum tridentate. Supraorbital tooth small, blunt, usually a small postorbital tooth, and well developed suborbital tooth. Anterolateral border may bear up to three teeth and subhepatic area may have up to two small tubercles. Antennal exopod well developed. Coxae of third maxillipeds usually separated by a gap and may be inserted directly under tip of sternum or well forward and separated by a deep trough. Female sternal grooves end apart on small tubercles between or behind bases of first legs. Cheliped usually without an epipod but it may be present, carpal and propodal segments usually nodular. Carpi and propodi of first two pairs of legs may be lobed, nodular or tubercular and inner margins of dactyli have up to six small spines. Last two pairs of legs reduced, fourth pair longer, dactyli opposed by a single propodal spine with up to two spines on the outer propodal margin. Abdomen of six free segments. Uropod plates well developed and visible externally, employed in the abdominal locking mechanism by fitting in front of flange on bases of first pair of legs. Telson usually rounded, but may be truncate or even bilobed. Abdominal segments smooth and third to fifth segments may have lateral and/or median tubercles.

TYPE SPECIES. — Of *Cryptodromia* Stimpson, 1858 : *Cryptodromia coronata* Stimpson, 1858, by original designation (STIMPSON, 1858, p. 64). Of *Dromides* Borradaile, 1903a : *Cryptodromia hilgendorfi* De Man, 1888, by monotypy.

OTHER SPECIES. — *Cryptodromia amboinensis* De Man, 1888, *Dromia fallax* Lamarck, 1818, *Petalomera fukuii* Sakai, 1936, *Cryptodromia hilgendorfi* De Man, 1888, *Cryptodromia longipes* sp. nov., *Cryptodromia mariae* Ihle, 1913, *Dromia (Cryptodromia) pentagonalis* Hilgendorf, 1879, *Cryptodromia trituberculata* Buitendijk, 1939, *Cryptodromia tuberculata* Stimpson, 1858, *Cryptodromia tumida* Stimpson, 1858. Probably also includes *Cryptodromia nipponensis* Yokoya, 1933, and *Cryptodromia protubera* Dai, Yang, Song & Chen, 1981.

DISCUSSION. — The genus *Cryptodromia* was created by STIMPSON (1858) for a group of sponge crabs with the following characteristics : small size, carapace convex, covered with a short pubescence, female sternal grooves end apart on tubercles between the first pair of legs, palate armed with a ridge on each side, and legs always more or less nodose. STIMPSON (1907) added the following features : carapace generally broader than long, with a broad front, anterolateral teeth often bifurcated, last pair of pereiopods longer than the penultimate pair, segments of the abdomen freely movable, generally armed with nodiform or spiniform projections, telson usually broader than long, and uropods conspicuous.

The type species for the genus is *Cryptodromia coronata* Stimpson, 1858, and STIMPSON included three other new species : *C. canaliculata, C. tuberculata,* and *C. tumida* all from Japan. In addition he suggested that a further four species should be included : *Dromia nodipes* Lamarck, 1818, *D. lateralis* Gray, 1831, *D. fallax* Lamarck, 1818 and *D. caput-mortuum* H. Milne Edwards, 1837.

BORRADAILE (1903a) erected the new genus *Dromides* for *Cryptodromia hilgendorfi* De Man, 1888, a change that was not followed by any other authors, but he did make two significant changes which affected *Cryptodromia.* Firstly, he combined *Epidromia* Kossmann, 1878, with *Cryptodromia* but did not modify the generic definition to include species with a granulate carapace. In this paper I separate these genera again (see below). Secondly, BORRADAILE added a key character, the absence of an epipod on the cheliped, although ALCOCK (1901) had earlier stated that species of *Cryptodromia* may have an epipod, but none of the Indian species which he considered had an epipod. However, this was to allow the inclusion of *Dromia lateralis* Gray, 1831, which BORRADAILE (1903a) placed in *Petalomera* Stimpson, 1858. The generic definition given above contains a major change because it

allows the inclusion of species which do have an epipod on the cheliped. This allows the species previously assigned to either *Petalomera* or *Cryptodromia* to be reorganized into natural groups.

SERÈNE and LOHAVANIJAYA (1973) examined the history and current state of *Cryptodromia*, and while they suggested some possible synonyms, they did not propose any rationalization, apart from recognizing that there were two groups of species : those with a granular carapace and those with a smooth carapace. The existence of these groups was, of course, a consequence of the inclusion of *Epidromia*. In his key to the Indian species of *Cryptodromia*, ALCOCK (1900) used this as his first character to subdivide the genus, as did SAKAI (1936) for the Japanese species. In this paper I transfer the small dromiids, with a tuberculate or areolate carapace, which previously belonged to *Cryptodromia*, to two new genera (*Barnardromia* gen. nov., and *Takedromia* gen. nov.), and others are placed in *Epigodromia* gen. nov. (a replacement name for *Epidromia* Kossmann, 1878). The other species, with a smooth carapace, remain in *Cryptodromia* Stimpson, 1858 (see Table 7).

Apart from the species in the New Caledonian collection, some comments need to be made about the other species included in this genus. *Cryptodromia nierstraszi* Ihle, 1913, was described from three small males (CW = 8.5 mm) and a smaller female specimen (CW = 5.1 mm) collected from *Siboga* stn 313 (depth = 36 m) Dangar Besar, Saleh Bay, Indonesia. *C. nierstraszi* is known only from the type locality and has not been reported subsequently. Comparison of the male type (Zoologisch Museum, Amsterdam, De 102.961) with a *Cryptodromia pentagonalis* Hilgendorf, 1879, male (Mombasa, Kenya, MNHN-B 7392), reported by LEWINSOHN (1984), shows that these two species are identical. Similarly, *C. laevis* Ihle, 1913, which was based on an ovigerous female (CW = 13.0 mm) from Pulu Sanguisiapo, Sulu Archipelago, is also a synonym of *C. pentagonalis*. *C. laevis* has not been recorded by any other author and the differences from *C. nierstraszi* , noted by IHLE, are only minor variations in the rostral teeth and subhepatic tubercles which are attributable to size differences. LEWINSOHN (1979, 1984) summarized the records of *C. pentagonalis* which suggest that it only occurs in the Red Sea and Indian Ocean, but these synonymies establish that the distribution also includes Indonesia. Most of the records of *C. pentagonalis* are from the intertidal zone but RATHBUN (1911) recorded material from 70 m so IHLE'S material (from 36 m) is within the depth range for this species.

Cryptodromia nipponensis Yokoya, 1933, and *C. protubera* Dai, Yang, Song & Chen, 1981, are only tentatively included here because they were very poorly described. They are both known only from the type material collected from Japan and China respectively.

Following earlier authors, *Cryptodromia pileifera* Alcock, 1901, is regarded as a synonym of *C. tuberculata* Stimpson, 1858, although TAM, LIM and NG (1986) used the name for specimens which seem to me to be identical to *C. tuberculata*. These authors have provided the only information about larval development in this genus.

DISTRIBUTION. — The distribution of the species of *Cryptodromia* ranges from the Red Sea, through the Indian Ocean, Indonesia, Australia, north to Japan and eastward into the Pacific as far as French Polynesia. All of them are small, shallow water species which carry pieces of sponge or ascidian for camouflage. Prior to this paper, *C. tuberculata* Stimpson, 1858, and *C. tumida* Stimpson, 1858, had been recorded from the Philippine Islands, and *C. fallax* (Lamarck, 1818) had been recorded from New Caledonia as well as the Philippines.

Key to the species of *Cryptodromia*

(Species studied in this paper are in bold)

1. Carapace significantly wider than long **2**
— Carapace approximately as wide as long **9**

2. Single anterolateral tooth **3**
— More than one anterolateral tooth **4**

3. Anterolateral tooth small, almost concealed under margin ..... *Cryptodromia pentagonalis* Hilgendorf, 1879
— Anterolateral tooth prominent, laterally directed ..... *Cryptodromia protubera* Dai, Yang, Song, & Chen, 1981

4. Two anterolateral teeth, carapace surface canaliculated ..... ***Cryptodromia fallax*** (Lamarck, 1818)
— Two or more anterolateral teeth, carapace surface not canaliculated **5**

5. Rostrum bluntly tridentate, small supraorbital tooth **6**
— Rostrum truncate, no supraorbital tooth..... *Cryptodromia nipponensis* Yokoya, 1933

6. Median rostral tooth more prominent than lateral teeth, three anterolateral teeth, first two strongest, chelipeds strongly tuberculated, propodus with 20-25 tubercles of variable size, margins of carpi and propodi of first two pairs of legs sharply verrucose..... ..... *Cryptodromia tuberculata* Stimpson, 1858.
— Lateral rostral teeth more prominent than median tooth, distal margins of carpi and propodi of first two pairs of legs lobed, but not sharply verrucose **7**

7. Carapace minutely granular, frontal teeth sharply projecting, two large anterolateral teeth, posterior margin of each tooth elongated, chelipeds tuberculated but propodus with only a few prominent tubercles, third and fourth abdominal segments armed with four tubercles ..... ***Cryptodromia coronata*** Stimpson, 1858
— Carapace smooth, frontal teeth blunt, three anterolateral teeth **8**

8. Lateral cardiac grooves not marked, anterolateral teeth equal, outer face of cheliped propodus marked by some lines of small granules, abdominal segments without distinct tubercles ..... *Cryptodromia tumida* Stimpson, 1858
— Lateral cardiac grooves deeply marked, anterolateral teeth unequal (first largest, third smallest), outer face of cheliped propodus minutely denticulated, superior face tends to have ridge-like margins, fourth and fifth abdominal segments have a tubercle near posterior border ..... ***Cryptodromia fukuii*** (Sakai, 1936) nov. comb.

9. Single anterolateral tooth ..... ***Cryptodromia hilgendorfi*** De Man, 1888
— More than one anterolateral tooth **10**

10. Two anterolateral teeth **11**
— Three anterolateral teeth **12**

11. Last leg long, almost reaching orbit when straightened, a small tubercle close to the postorbital corner, above the level of the anterolateral margin .... ***Cryptodromia amboinensis*** De Man, 1888
— Last leg long, almost reaching orbit when straightened, no tubercle close to postorbital corner ..... ***Cryptodromia longipes*** sp. nov.

12. Lateral rostral teeth triangular, anterolateral teeth sharp, not flattened, first two pairs of legs very nodular ..... *Cryptodromia mariae* Ihle, 1913
— Lateral rostral teeth truncate, anterolateral teeth blunt, flattened, first two pairs of legs not strongly nodular..... *Cryptodromia trituberculata* Buitendijk, 1939

Cryptodromia ? coronata Stimpson, 1858

Fig. 18 b

Cryptodromia coronata Stimpson, 1858 : 239; 1907 : 173, pl. 20, fig. 2. — DE MAN, 1888a : 398, pl. 18, fig. 2. — IVES, 1891 : 217 (list). — ORTMANN, 1892 : 543. — NOBILI, 1907 : 378. — IHLE, 1913 : 41 [not specimens from stns 50 and 162, these are *Paradromia japonica* (Henderson, 1888)]. — SAKAI, 1936 : 25; 1976 : 17, text fig. 9. — BUITENDIJK, 1939 : 224; 1950 : 62. — DAI & YANG, 1991 : 22, pl. 2 (1), fig. 5b.

MATERIAL EXAMINED. — **New Caledonia**. LAGON : stn 63, 22°26.0'S, 166°26.3'E, 20 m, 20.08.1984 : 1 ♀ (ovig.) 7.4 x 6.7 mm. — Stn 84, 22°30.0'S, 166°31.2'E, 17 m, 21.08.1984 : 1 ♀ 5.5 x 5.3 mm; 2 ♀♀ (ovig.) 5.2 x 4.8,

6.1 x 5.5 mm. — Stn 100, 22°32.6'S, 166°34.6'E, 15 m, 21.08.1984 : 1 ♀ 6.1 x 6.3 mm, carrying compound ascidian cap; 1 ♀ (ovig.) 6.1 x 6.0 mm, carrying compound ascidian cap. — Stn 112, 22°23.6'S, 166°47.9'E, 42 m, 22.08.1984 : 1 ♀ (ovig.) 5.7 x 5.0 mm. — Stn 126, 22°31.6'S, 166°46.2'E, 19 m, 23.08.1984 : 1 ♀ 4.5 x 4.3 mm. — Stn 127, 22°30.6'S, 166°45.9'E, 55 m, 23.08.1984 : 4 ♀♀ 3.0 x 2.9, 4.6 x 4.2, 5.1 x 4.7, 5.2 x 4.8 mm; 1 ♀ (ovig.) 5.1 x 4.6 mm. — Stn 225, 22°35.9'S, 166°40.0'E, 15 m, 22.10.1984 : 1 ♀ (ovig.) 7.2 x 7.4 mm. — Stn 248, 22°23.8'S, 166°47.0'E, 47 m, 24.10.1984 : 3 ♂♂ 4.9 x 4.6, 5.1 x 4.8, 6.4 x 5.7 mm; 2 ♀♀ 4.5 x 4.1, 4.5 x 4.3 mm, carrying a sponge cap; 2 ♀♀ (ovig.) 5.0 x 4.7, 5.8 x 4.9 mm. — Stn 312, 22°41.9'S, 166°48.8'E, 26 m, 27.11.1984 : 1 ♂ 6.1 x 5.4 mm. — Stn 405, 22°37.5'S, 167°19.5'E, 27 m, 23.01.1985 : 1 ♂ 11.5 x 10.7 mm, carrying a sponge cap; 1 ♀ 4.8 x 4.4 mm, carrying an ascidian cap. — Stn 409, 22°41.5'S, 167°24.2'E, 13-18 m, 24.01.1985 : 1 ♂ 7.4 x 7.8 mm. — Stn 564, 22°46.8'S, 166°56.0'E, 32-38 m, 16.07.1985 : 1 ♂ 5.6 x 5.1 mm, carrying a sponge cap. — Stn 710, 21°24.0'S, 166°2.5'E, 30-31 m, 10.08.1986 : 1 ♂ 5.3 x 5.0 mm.

No locality, probably intertidal, no date (possibly came from M. BALANSA, 1861-73), A. MILNE EDWARDS det., 1903 : 1 ♂ 8.5 x 7.9 mm; 1 ♀ (ovig.) 8.8 x 7.9 mm, carrying sponge caps (MNHN-B 13883).

MISSION SINGER-POLIGNAC. Ile des Pins, no depth, 15.12.1961 : 1 ♀ 5.0 x 4.7 mm.

Indonesia. Ambon (Sieth), intertidal zone, 16.10.91, B. RICHER DE FORGES coll. : 1 ♀ 8.5 x 7.0 mm. — Ambon (Tial), intertidal zone, 16.10.91, B. RICHER DE FORGES coll. : 2 ♀♀ 5.8 x 4.9, 8.7 x 7.2 mm.

DESCRIPTION. — Carapace wider than long, surface smooth, very convex, rising steeply especially at front, covered by short fine tomentum with some longer plumose setae fringing limbs. Frontal, branchial and lateral cardiac grooves well marked. Rostrum tridentate, blunt, teeth horizontally directed, similar in size, median tooth on a lower level. Anterolateral margin convex, begins at level of postorbital tooth, bearing two blunt teeth, first strongest and near orbit, second small, more distant with a slight swelling on intervening margin. Branchial notch well marked with a small posterolateral tooth behind.

Supraorbital tooth smaller than lateral rostral tooth but prominent, postorbital tooth small, more acute. Suborbital margin extends directly without distinct fissure, from beneath postorbital tooth and bears a strong subacute tooth visible dorsally. This tooth is buttressed beneath as far as the groove running from near corner of buccal frame around under anterolateral margin towards branchial notch. On this buttress, just above the groove, is a small rounded swelling, and beneath the groove, at corner of buccal frame, are two small, subacute teeth.

On subhepatic region are two teeth, one larger, more acute, visible dorsally, ventrolateral to postorbital tooth and the other, smaller, just above groove. Epistome triangular, wider than long, surface concave, dorsal apex tooth-like beneath junction with rostrum. Female sternal grooves convergent, ending apart between bases of first legs on prominent tubercles connected by a ridge.

First segment of antenna much wider than long, slightly narrowed laterally, beak-like medially, upper lobe longer than lower. Second segment much longer than wide, surface convex, a small median distal tubercle, distomedial corner produced, curved, on which third segment is inserted at an angle. Exopod firmly fixed to second segment, tip only slightly bilobed, barely extending as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.46.

Chelipeds well developed. Merus trigonal, borders unarmed. Carpus outer face convex, smooth except for two strong, blunt distal tubercles, some specimens have two-three small central tubercles as well. Propodus upper face with one (sometimes two) proximal tubercles (maybe absent in females), another at base of dactyl and minutely granulated in between. Outer propodus face with a strong proximal tubercle articulating with carpus, lower face minutely granulated. Fingers downcurved, hollowed out internally, spoon-like, four-five tiny granules at base of dactyl, gaping widely, touching only at tips in male, gaping less in female, armed with seven-eight small teeth.

First two pairs of legs smaller than chelipeds, distal borders of carpi and propodi produced as two small lobes, dactyli as long as propodi, strongly curved at tips, inner margins armed with five-six small spines increasing in size distally, a small, pearl-like, proximal, tubercle on posterior face.

Last two pairs of legs reduced, third pair shortest, dactyl strongly curved, normally opposed by one propodal spine (sometimes two spines) with another smaller spine on outer propodal margin. Fourth pair reach approximately as far as second anterolateral tooth when extended forward, flattened, dactyl curved, opposed by a single propodal spine with another small spine on outer propodal margin.

Abdomen of six free segments. Telson much wider than long, tip rounded. Uropod plates well developed, visible externally, locking abdomen in place by fitting in front of small serrated ridge on bases of first legs. Distolateral corners of abdominal segments three-five produced as a blunt lobe, nearby there may be a small

tubercle. A pair of tubercles on central abdominal ridge of segments three-six, those on segments four and five largest, in some females only the pair on the fourth segment are prominent.

First male pleopod a setose semi-rolled tube with a sharp horny tip; second pleopod simple, needle-like.

DISCUSSION. — Only five male (maximum CW = 14.2 mm) and four female (maximum CW = 12.0 mm) *C. coronata* have been reported, all in shallow water (0-32 m), from China (Xisha Is.), Japan, Indonesia, Samoa, and Rikitea, Polynesia. Some of these specimens were associated with corals or *Halimede* (Chlorophyta, Codiacenae). The exact identity of this species is somewhat uncertain because there appear to be several small dromiids, including undescribed specimens, which closely resemble one another and are therefore difficult to separate. The citations of SAKAI (1936, 1976) both refer to STIMPSON's type, so that *C. coronata* has not been recorded from Japan since the original discovery in 1858.

ORTMANN (1892) noted the variability in abdominal tubercles on specimens from Samoa, and BUITENDIJK (1939, 1950) only tentatively assigned her specimens, from Timor and Singapore, to *C. coronata*. In the same manner, the present New Caledonian and Indonesian specimens are for the present, assigned to *C. coronata*. Clarification of this problem awaits the investigation of undescribed material and comparison with the earlier specimens.

SIZE. — The size ranges of *C. coronata* from New Caledonia and Indonesia are CW = 4.9-11.5 mm for males, CW = 3.0-8.7 mm for non-ovigerous females, and CW = 5.0-8.8 mm for ovigerous females. None of these specimens exceed the previously recorded maximum sizes. The smallest female with an abdomen of mature width is CW = 4.5 mm, but all females of equal or greater size than CW = 5.0 mm are mature, indicating that they reach maturity over a very small size range. Ovigerous females carry very small numbers (mean = 8.1) of large (mean diam. = 1.0 mm) eggs which suggests an extreme reproductive strategy. These females were collected during the months of August to October and their eggs were at various stages of development, indicating that the reproductive season extends beyond these months. *C. coronata* may have larval development similar to *C. tuberculata* which has a single, short-lived zoea (reported by TAN, LIM and NG, 1986, as *C. pileifera*).

CAMOUFLAGE. — DE MAN (1888a) recorded a crab carrying a sponge cap and many of the present crabs also carried not only sponge caps but also caps made from compound ascidians.

DEPTH. — The depth range of the New Caledonian and Indonesian specimens is 0-47 m, and so exceeds the previous maximum of 32 m.

DISTRIBUTION. — Previous records are from Japan, Indonesia, Samoa, and Rikitea, Polynesia. Occurrence of *C. coronata* off New Caledonia is new, but it does not extend the distribution beyond the previously known Indonesian-Pacific area (as far east as Polynesia), apart from extending the southern limit. It might not be surprising that *C. coronata* has similar larval development to *C. tuberculata*, because *C. tuberculata* also has an extensive distribution, although it extends westward into the Indian Ocean rather than eastward into the Pacific.

Cryptodromia fukuii (Sakai, 1936) nov. comb.

Fig. 17 c

Petalomera fukuii Sakai, 1936 : 31, pl. 1, fig. 2, text fig. 8a-c; 1965 : 9, pl. 4, fig. 1; 1976 : 21, text fig. 11. — SUZUKI & KURATA, 1967 : 95.

MATERIAL EXAMINED. — **New Caledonia**. No locality, probably intertidal, M. BALANSA coll., 1861-73 : 2 ♂♂ 6.5 x 5.6, 8.3 x 7.4 mm, carrying sponge caps; 4 ♀♀ 5.3 x 4.7, 10.6 x 9.1, 11.2 x 9.7, 14.5 x 12.3 mm, carrying sponge caps; 1 ♀ (ovig.) 10.4 x 8.9 mm, carrying a sponge cap (MNHN-B 22094).

DESCRIPTION. — Carapace distinctly wider than long, surface smooth, convex, sparsely covered with short setae, rising more steeply at front. Regions not defined but branchial and lateral cardiac grooves distinct. Rostrum

bluntly tridentate, median tooth deflexed, on a lower level although clearly visible dorsally. Lateral rostral teeth separated by a broad sinus and as long as median tooth. Three anterolateral teeth on an evenly convex margin. First tooth strong, blunt, on same level as suborbital margin, second tooth similar, close by, a rounded eave-like projection separating the third more distinct tooth which is smaller. A small posterolateral tooth follows the branchial groove. Posterolateral carapace margins convergent and posterior margin convex.

Supraorbital margin bearing a blunt tooth, postorbital corner slightly produced as a rounded lobe. Small fissure separating suborbital lobe which has a strong tooth at its inner corner, but this is obscured from above by the supraorbital tooth.

First segment of antenna much wider than long, beaked medially, gaping, not twisted. Second segment much longer than wide, small central distal tubercle, distomedial corner bluntly produced, curved, on which third segment is inserted at an angle. Exopod firmly fixed, tip distinctly bilobed, inner lobe flattened, extended over eyestalk base, tip of exopod extends as far as joint between third and fourth segment. Ratio of length of antennal flagella to CW = 0.37. Epistome triangular, slightly wider than long, concave.

Subhepatic area smooth, flat, a strong tubercle near lateral margin of buccal frame, separated by a distinct groove which runs around under anterolateral margin towards posterolateral tooth. (It is somewhat arbitrary as to whether this tubercle is regarded as being subhepatic or as first anterolateral tooth). A small tubercle close to anterior corner of buccal frame. Female sternal grooves well marked, ending apart on prominent tubercles just behind bases of chelipeds.

Chelipeds small, merus triangular in cross section, borders minutely denticulate. Borders of carpus similar to merus, outer face bears five tubercles, two low, rounded proximal tubercles near lower border and two more acute distal tubercles near joint with propodus and midway between these two pairs, on lower margin of carpus, is a single larger blunt tubercle. Propodus covered with minute denticles and granules, on superior face the margins tend to be ridge-like or a series of small tubercles, a low rounded tubercle at base of dactyl, a large proximal tubercle marking joint with carpus, along lower margin granules tend to be arranged in longitudinal rows. Fingers elongate, straight, gaping basally, cutting edges armed with ten-twelve small interlocking teeth.

First two pairs of legs shorter than chelipeds. Upper distal margins of carpi produced as three rounded lobes. Distal margins of propodi produced as two rounded lobes. Dactyli as long as propodi, inner margins armed with three-five small spines increasing in size distally, a proximal pearl-like tubercle on posterior face articulating with penultimate segment.

Last two pairs of legs reduced, third pair shortest, dactyl long and curved, opposed by a small propodal spine with another small propodal spine on outer margin. When extended forward fourth leg almost reaches last anterolateral tooth, dactyl long and curved, opposed by a single large propodal spine and another spine on outer propodal margin.

Abdomen of six free segments. Male and female telson wider than long, posterior margin rounded, but male telson has three-four spinules. Uropod plates well developed, visible externally and locking abdomen by fitting in front of small serrated ridge on bases of first legs. Median ridge on abdominal segments low and rounded, a prominent tubercle near posterior corner of fourth and fifth segments.

First male pleopod a semi-rolled setose tube with a sharp, horny tip; second pleopod simple, needle-like.

DISCUSSION. — SAKAI (1936) commented on the extreme similarity of *Petalomera fukuii* and *Cryptodromia tumida* Stimpson, 1858, the only substantial difference being the presence of an epipod on the cheliped of *Petalomera fukuii*. Later, SAKAI (1965) noted the similarity to *Cryptodromia tuberculata* Stimpson, 1858. These species, as well as *C. coronata* Stimpson, 1858, are indeed very close. Certainly, *Petalomera fukuii* shows greater affinities with the genus *Cryptodromia* than it does with *Stimdromia* gen. nov., which would be the alternate genus in which to include it. It seems as though it is necessary to assume that the epipod character is capable of reversal. In this case, we must assume that either *Petalomera fukuii* represents the ancestral condition or that the cheliped epipod can be regained after it has been lost.

In his original description of *Petalomera fukuii*, SAKAI (1936) figured lateral tubercles on fourth and fifth abdominal segments of both sexes and these were also present in the New Caledonian specimens. He also noted the differences between male and female telsons : the male telson has four small spinules on the posterior margin,

while the female telson is unarmed. I also observed these differences except that there were only two spinules on the male telson.

CAMOUFLAGE. — Many of SAKAI'S specimens of *P. fukuii* were carrying sponge or compound ascidian (e.g. *Botrylloides*) caps. All the New Caledonian specimens carried sponge caps.

SIZE. — The largest *P. fukuii* male found by SAKAI had CW = 15 mm. In the New Caledonian collection males were smaller, but females were as large as CW = 14.5 mm. All the females, except the smallest (CW = 5.3 mm), had mature-sized abdomens and the only ovigerous female (CW = 10.4 mm) was in such poor condition that nothing could be determined about the eggs.

DEPTH. — SAKAI (1936) reported large numbers of *P. fukuii* from shallow waters of Sagami Bay. All the New Caledonian specimens presumably came from shore collecting.

DISTRIBUTION. — Until now *C. fukuii* was only known from Japan but it clearly has a much wider distribution.

Cryptodromia amboinensis De Man, 1888

Fig. 18 c

Cryptodromia amboinensis De Man, 1888a : 406, pl. 18, fig. 4. — IHLE, 1913 : 34 (key), 90 (list).
Dromia (Cryptodromia) de manii Alcock, 1900 : 144.
Cryptodromia demanii - ALCOCK, 1901 : 52. — LAURIE, 1906 : 352. — IHLE, 1913 : 33 (key), 90 (list). — BUITENDIJK, 1939 : 225, pl. 7, fig. 1.

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 481, 18°57.4'S, 163°31.5'E, 33 m, 2.03.1985 : 1 ♀ (ovig.) 6.2 x 5.3 mm, carrying a sponge cap.
Philippine Islands. MUSORSTOM 3 : stn CP 142, 11°47.0'N, 123°1.5'E, 26-27 m, 7.06.1985 : 1 ♂ 5.1 x 4.4 mm; 1 ♀ (ovig.) 6.8 x 7.5 mm; 1 ♀ 6.3 x 5.7 mm, carrying a sponge cap.
Persian Gulf. Dredged on rocky bottom, April 1954. No other data : 1 ♀ 7.1 x 6.8 mm, carrying a sponge cap.

DESCRIPTION. — Carapace wider than long, convex, rising more steeply from lateral margins, surface roughened by patches of fine granules under short fine tomentum, a few longer setae and a dense tuft of long setae across front, just behind teeth is characteristic. Frontal, branchial and cardiac grooves only faintly marked. Rostrum tridentate, fringed with tiny granules, teeth blunt, median tooth on a lower level and further forward, slightly deflexed, lateral teeth directed horizontally. Anterolateral margin begins at level of postorbital corner and has two blunt teeth close together, a greater distance to branchial notch which is without a posterolateral tooth.

Small blunt supraorbital tooth, postorbital corner bluntly produced. Shallow fissure separates suborbital margin which has an unusual blunt tooth, not visible dorsally : this tooth is more like a narrow shelf, directed anterolaterally, buttressed by the subhepatic region. On this buttress is a small tubercle followed by a larger subhepatic tubercle at its base, dorsolateral to this tubercle is a second subhepatic tubercle in a straight line towards first anterolateral tooth. Between first anterolateral tooth and postorbital corner is a small tubercle close to orbit. Thus there are six tubercles, plus postorbital corner (most of which are visible dorsally) defining a roughly quadrangular, sunken subhepatic area. This arrangement is a very distinctive character of this species. Female sternal grooves end wide apart on low tubercles just behind bases of first legs.

First segment of antenna much wider than long, lateral margin narrowed, medial margin beaked, gaping. Second segment much longer than wide, small central distal tubercle which has a row of smaller granules running obliquely away from it towards lateral margin, distomedial corner bluntly produced, curved, on which third segment is inserted at an angle. Exopod firmly fixed, extending as far as joint between third and fourth segments where the tip is bilobed, inner lobe curving over base of eyestalk. Epistome triangular, wider than long, concave with a small tubercle on each lateral margin. Blunt tooth at corner of buccal frame.

Chelipeds, stout, well developed. Merus trigonal, borders unarmed. Carpus with three-four small granules along inner margin, a prominent central tubercle and two larger, blunt, distal tubercles. Propodus inner margin with four-five small granules, superior margin with two unequal tubercles at base of dactyl and another small proximal tubercle, outer face finely granulated with a small proximal tubercle near superior distal carpal tubercle. Fingers pearly white, downcurved, hollowed out internally, slightly gaping, armed with five-six small teeth.

First two pairs of legs shorter, fringed with longer setae, distal borders of carpi and propodi bluntly lobed. Dactyli as long as propodi, curved at tips, inner margins armed with four-five small spines increasing in size distally, a small pearl-like proximal tubercle on posterior margin.

Last two pairs of legs reduced, third pair shortest, dactyl strongly curved, opposed by a single propodal spine. Fourth legs long, flattened, almost reaching supraorbital margin if fully extended, dactyl strongly curved, opposed by a single propodal spine.

Abdomen of six free segments. Telson wider than long, tip bluntly rounded. Uropod plates well developed and visible externally. Male abdominal segments four-six have a small lateral tubercle, and a pair of small medial tubercles on fourth segment. These tubercles are only faintly developed in female. Abdominal locking mechanism consists of uropod plates fitting in front of serrated flange on bases of first legs.

First male pleopod is a semi-rolled, setose tube with a sharp horny tip; second pleopods simple, needle-like.

DISCUSSION. — One characteristic feature of *Cryptodromia amboinensis* De Man, 1888, is the arrangement of tubercles on the subhepatic area and near the orbit. This is best seen in DE MAN (1888a, fig. 4a) which shows a small tubercle near the orbit, above the level of the anterolateral margin, an unusual suborbital tooth with a small tubercle on its base, and two subhepatic tubercles in a straight line towards the first anterolateral tooth. Together, these six adornments define a roughly quadrangular area.

Comparison of DE MAN's figure with the description of *Cryptodromia demanii* Alcock, 1900, shows that this species is a synonym of *C. amboinensis*. ALCOCK (1900) stated that "A tooth on the hepatic region, dorsad of the anterolateral border, and just behind the outer orbital angle, is characteristic", and the subsequent illustration of *C. demanii* by BUITENDIJK (1939) confirms this synonymy. It is indeed ironic that a species named in honour of a person, turns out to be a synonym of a species already described by that same person. Until now, the only specimen of *C. amboinensis* known was the ovigerous female type (CW = 4.8 mm). Since ALCOCK described his species, other specimens have been known under this name, overlooking DE MAN'S species.

SIZE. — The size of the type specimen of *C. demanii* was CW = 5.0 mm, but the sex was not given. Including the type of *C. amboinensis*, only females have been recorded with maximum CW = 5.6 mm. The male, CW = 5.1 mm, from Philippines stn CP 142, is the first to be recorded and allows the male characters to be added to the description. All four of the females from New Caledonia and the Philippines and Persian Gulf are larger than any earlier specimens, giving a maximum female CW of 7.1 mm. The two ovigerous females carried 40 and 170 eggs (diam. = 0.7 mm) which is comparable to *C. hilgendorfi* (see McLAY, 1982) but the original type specimen of *C. amboinensis*, CW = 4.8 mm, is smaller than the smallest (CW = 6.0 mm) ovigerous *C. hilgendorfi*. This ovigerous female, less than CW = 5 mm, is one of the smallest mature females known amongst the dromiid crabs.

CAMOUFLAGE. — The type specimen of *C. amboinensis* had a small compound ascidian cap but three of the present specimens have small sponge caps. In this respect, this species uses similar camouflage to *C. hilgendorfi* (see McLAY, 1983).

DEPTH. — The only depth record for *C. amboinensis* of 18 m comes from LAURIE (1906). The New Caledonian and Philippine specimens came from 26-33 m, confirming the previous record, but increasing the known depth range.

DISTRIBUTION. — The distribution of this species includes Sri Lanka, Mergui Archipelago, Amboina and now the Philippine Islands and New Caledonia.

Because the Persian Gulf specimen is the first record outside the West pacific area, it was compared with DE MAN's type and there was good agreement in all features. Thus the distribution of *C. amboinensis* is now extended into the Indian Ocean.

Cryptodromia hilgendorfi De Man, 1888

Fig. 18 d

Cryptodromia hilgendorfi De Man, 1888a : 404, pl. 18, fig. 3. — NOBILI, 1899 : 249; 1906a : 146; 1907 : 93. — ALCOCK, 1900 : 145; 1901 : 52, pl. 3, fig. 11. — BORRADAILE, 1900 : 571. — LAURIE, 1906 : 352, 426. — IHLE, 1913 : 45. — BALSS, 1938 : 5. — BUITENDIJK, 1939 : 224. — GUINOT, 1967 : 240. — CAMPBELL & STEPHENSON, 1970 : 245, fig. 3. — TAKEDA, 1973 : 78. — LEWINSOHN, 1977 : 13, fig. 2; 1984 : 109. — McLAY, 1982 : 317. — DAI & YANG, 1991 : 24, pl. 2 (2), fig. 6b.
Dromia (Cryptodromia) hilgendorfi - ALCOCK, 1900 : 145.
Dromides hilgendorfi - BORRADAILE, 1903 : 299; 1906 : 577.

MATERIAL EXAMINED — **New Caledonia**. LAGON : stn 48, 22°16.6'S, 166°15.2'E, 28 m, 25.05.1984 : 1 ♂ 9.2 x 8.9 mm. — Stn 72, 22°18.5'S, 166°35.3'E, 15 m, 20.08.1984 : 1 ♂ 9.4 x 9.1 mm. — Stn 100, 22°32.6'S, 166°34.6'E, 15 m, 21.08.1984 : 1 ♂ 7.7 x 7.5 mm. — Stn 244, 22°25.0'S, 166°59.6'E, 47 m, 23.10.1984 : 1 ♂ 5.4 x 5.2 mm. — Stn 248, 22°23.8'S, 166°47.0'E, 47 m, 24.10.1984 : 1 ♀ (ovig.) 7.2 x 6.5 mm, carrying a sponge cap.

Chesterfield Islands. CHALCAL 1 : stn CP 2, 20°31.50'S, 161°06.45'E, 88 m, 15.07.1984 : 1 ♂ 4.3 x 4.4 mm, carrying a sponge cap. — Stn CP 12, 20°34.30'S, 158°47.40'E, 67 m, 23.07.1984 : 1 ♀ (ovig.) 5.7 x 5.0 mm, carrying a sponge cap.

CORAIL 2 : stn CP 29, 20°31.35'S, 160°52.72'E, 79-84 m, 22.07.1988 : 1 ♀ 4.0 x 3.4 mm, carrying a sponge cap. — Stn DW 34, 19°21.62'S, 158°55.77'E, 47 m, 23.07.1988 : 1 ♂ 5.5 x 5.6 mm.

Philippine Islands. MUSORSTOM 3 : stn DR 117, 12°31.2'N, 120°39.3'E, 92-97 m, 3.06.1985 : juvenile, 2.1 x 2.1 mm.

DESCRIPTION. — Carapace wider than long, subquadrangular, convex, especially laterally, smooth under dense cover of short setae, longer plumose setae near margins. Frontal, branchial and cardiac grooves faintly marked. Rostrum tridentate, teeth similar, subacute, horizontally directed. Anterolateral margin begins at level of suborbital tooth, forming a right angle, adorned by a single blunt tooth, thereafter margin is straight and convergent, interrupted only by branchial groove which is not followed by a recognizable posterolateral tooth.

Supraorbital margin interrupted by a small tooth. Postorbital tooth small, blunt. Narrow fissure separates suborbital margin which has a single acute anterolaterally directed tooth.

First segment of antenna much wider than long, wedge-shaped, almost no lateral margin, medial margin beaked but not gaping, second segment broad basally, tapering, about as wide basally as long, medial margin curved and distally produced as a blunt spine on which third segment is inserted at an angle, a prominent ventrally directed distal tubercle on second segment, exopod firmly fixed, tip bilobed and reaching as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.63. Epistome slightly concave, smooth.

Subhepatic area flat, shoulder-like with a single small tubercle beneath suborbital tooth. Female sternal grooves end wide apart on small tubercles between base of second legs.

Chelipeds small, merus trigonal, unarmed. Carpus smooth with two strong distal tubercles. Propodus smooth with a strong tubercle at base of dactyl. Fingers elongate, downcurved, hollowed out internally, armed with seven-eight small teeth, gaping basally in male.

First two pairs of legs, fringed with longer plumose setae, about as long as chelipeds. Propodi with strong distal lobe. Dactyli as long as propodi, narrow and talon-like, inner margins armed with four-five small spines, increasing in size distally. Last two pairs of legs reduced, about same length, last pair subdorsal, both have single propodal spines opposing dactyli. The dactyl of the last leg may have another spine on the outer propodal margin.

Abdomen of six free segments. Telson wider than long, tip truncate in male, rounded in female. Uropod plates well developed, visible externally. Abdominal locking mechanism consists of uropod plates fitting in front of a small flange on bases of first legs.

First male pleopod a semi-rolled, setose tube with a sharp horny tip; second pleopod simple, needle-like.

DISCUSSION. — *Cryptodromia hilgendorfi* is a distinctive species having a subquadrangular carapace shape, and a single anterolateral tooth. Indeed, BORRADAILE (1903a) erected a new genus, *Dromides*, for this species because he believed that its legs were not knobbed or ridged, its carapace was longer than wide, grooves between regions absent, and female sternal grooves ending apart between second walking legs. But most of these characters are inaccurate and compared to other species in *Cryptodromia*, the differences do not justify a separate genus.

In the only detailed study of the biology of a dromiid crab, McLAY (1982, 1983) examined the population biology and use of camouflage by *C. hilgendorfi* in an intertidal area of Moreton Bay, Queensland. Briefly, this species is a small, short-lived (maximum, 2-5 yrs), crab which produces planktonic larvae. Occurrence of ovigerous females is limited to summer months (September - February) and compared to other Brachyura of similar size, *C. hilgendorfi* produces smaller (150-600) broods of larger (diam. = 0.73 mm) eggs. Females reach maturity at CW = 5-6 mm and dominate the larger size classes but sex ratio at settling is equal, and growth is indeterminate, with differences in growth format between males and females.

An ovigerous female from New Caledonia stn 248, CW = 7.2 mm, carried 90 eggs (diam. = 0.75 mm), a similar clutch size to females from Moreton Bay. The ovigerous female from stn CP 12 was collected during July, suggesting an extended breeding season in the Chesterfield Islands compared to Moreton Bay. However this difference may be attributable to the fact that the Chesterfield Islands are approximately 7° closer to the equator.

CAMOUFLAGE. — Some crabs from New Caledonia carried sponge caps. In the Moreton Bay study (McLAY, 1983), the crabs used at least twelve different sponges as well as three ascidians for camouflage.

SIZE. — The specimens from New Caledonia and the Philippines do not exceed the maximum size for males (CW = 16.0 mm, NOBILI, 1907) or females (CW = 14.5 mm, LAURIE, 1906).

DEPTH. — The depth range of the New Caledonian and Philippine material, 15-88 m, exceeds the previously recorded maximum of 70 m (LEWINSOHN, 1984).

DISTRIBUTION. — The distribution of *C. hilgendorfi* includes the Indo-West Pacific (Red Sea to Funafuti Atoll, Gilbert and Ellice Islands) and it has been recorded from Xisha Is., China (DAI & YANG, 1991) and Queensland (CAMPBELL & STEPHENSON, 1970). Thus it is not unusual to find that it also occurs off New Caledonia, Chesterfield, and the Philippine Islands.

Cryptodromia fallax (Lamarck, 1818)

Fig. 18 e

Dromia fallax Lamarck, 1818 : 264. — H. MILNE EDWARDS, 1837 : 176. — A. MILNE EDWARDS, 1862 : 10. — RICHTERS, 1880 : 158 (list).

Cryptodromia canaliculata Stimpson, 1858 : 240; 1907 : 176. — DE MAN, 1888a : 402; 1929 : 21. — IVES, 1891 : 218 (list). — ALCOCK, 1900 : 142; 1901 : 50, pl. 2, fig. 8. — DOFLEIN, 1902 : 652. — LENZ, 1905 : 363. — NOBILI, 1906a : 145. — LAURIE, 1906 : 352. — RATHBUN, 1910b : 367; 1911 : 194. — IHLE, 1913 : 41. — BALSS, 1915 : 13; 1934 : 502; 1938 : 5. — BOUVIER, 1915 : 38. — SAKAI, 1936 : 24, pl. 7, fig. 2; 1976 : 16, pl. 4, fig. 1. — BUITENDIJK, 1939 : 224; 1950 : 61. — WARD, 1941 : 1. — STEPHENSEN, 1945 : 62. — HOLTHUIS, 1953 : 3. — GUINOT, 1967 : 240 (list). — KENSLEY, 1970 : 109, figs 5a-c; 1981 : 36 (list). — TAKEDA & NUNOMURA, 1976 : 64. — LEWINSOHN, 1977 : 18, fig. 4; 1979 : 8, fig. 2; 1984 : 108. — DAI, YANG, SONG & CHEN, 1981 : 132, pl. 1 (3), figs 5-6. — DAI & YANG, 1991 : 20, pl. 1 (4), fig. 4 (6).

Dromia tomentosa Heller, 1861 : 21; 1862 : 241.

Cryptodromia tomentosa - PAULSON, 1875 : 83. — KOSSMANN, 1880 : 68. — WARD, 1942 : 70. — BARNARD, 1955 : 37. — GUINOT, 1967 : 240.(list). — KENSLEY, 1981 : 36 (list).

Dromia (Cryptodromia) tomentosa - HILGENDORF, 1879 : 813, pl. 2, figs 3-5.

Cryptodromia fallax - IVES, 1891 : 217 (list). — ALCOCK, 1901 : 77 (list). — LENZ, 1905 : 363. — IHLE, 1913 : 33 (key), 90 (list). — GUINOT, 1967 : 240 (list).

Cryptodromia hirsuta Borradaile, 1903b : 577, pl. 33, fig. 3.

Cryptodromia canaliculata var. sibogae Ihle, 1913 : 42.

Cryptodromia canaliculata var. obtusifrons Ihle, 1913 : 43, pl. 1, fig. 7.

? *Cryptodromia oktahedros* Stebbing, 1923 : 4, pl. 12.

MATERIAL EXAMINED. — **New Caledonia**. No locality, probably intertidal, M. BALANSA coll., 1861-73 : 1 ♀ (ovig.) 8.8 x 8.1 mm, sponge cap (MNHN-B 22094).

Port Brise, intertidal zone, C. VADON coll., 1.10.1978 : 5 ♂♂ 7.5 x 6.6, 7.9 x 7.0, 8.4 x 7.4, 10.0 x 8.8, 10.2 x 9.0 mm, 3 with compound ascidian caps, 2 with sponge caps; 4 ♀♀ 7.5 x 6.5, 7.8 x 7.0, 8.0 x 7.2, 8.9 x 8.0 mm, 3 with compound ascidian caps, 1 with sponge cap; 2 ♀♀ (ovig.) 8.7 x 7.9, 9.6 x 8.6 mm, compound ascidian caps.

DESCRIPTION. — Carapace wider than long, surface smooth, gradually convex under a coarse, dense tomentum consisting of long plumose setae. Frontal, branchial and cardiac grooves well marked. Frontal groove runs back between two low rounded protuberances. Rostrum tridentate, horizontally directed, median tooth on a lower level, strong, projecting further forward, lateral teeth blunter. Anterolateral margin of carapace begins at level of postorbital corner, a single prominent anterolaterally directed tooth which is connected to postorbital corner and to strong subhepatic tooth by slight ridges, thus defining a slightly concave, triangular shoulder. The anterolateral tooth is followed by a broadly rounded, eave-like swelling which is an extension of anterolateral margin but is not tooth-like. Posterolateral tooth prominent, blunt and laterally directed.

Strong supraorbital and postorbital teeth. Margin beneath postorbital tooth strongly concave but not fissured, a strong suborbital tooth, visible dorsally. Two subhepatic teeth, first strongest, visible dorsally, lateral to suborbital tooth, second lower down, just above groove running around under anterolateral margin.

First segment of antenna much wider than long, lateral margin very short, medial margin beaked, gaping, upper lobe longer. Second segment much longer than wide, surface convex, strong central distal tubercle, distomedial corner produced, curved, on which third segment is inserted at an angle. Exopod firmly fixed, extending as far as joint between third and fourth segments, tip bilobed, inner lobe flattened and extending over base of eyestalk.

Blunt tooth at corner of buccal frame, epistome triangular, wider than long, slightly concave, apices produced as small tubercles. Female sternal grooves convergent, but ending apart on low tubercles between bases of first legs.

Chelipeds well developed. Merus trigonal, borders unarmed. Carpus smoothly convex, a central swelling on outer face and two distal tubercles, superior one much stronger. Propodus also smoothly convex, a proximal tubercle articulating with strong carpal tubercle and another tubercle at base of dactyl. Fingers slightly downcurved, hollowed out internally, rather spoon-shaped, especially the dactyl which is narrowed basally. Borders of fingers armed with seven-eight small teeth.

First two pairs of legs shorter than chelipeds. Distal margins of carpi and propodi bluntly lobed. Dactyli as long as propodi, inner margins armed with seven-eight small, blunt spines, the most distal spine largest but the others are all of similar size. Large pearl-like proximal tubercle on posterior face of dactyli articulating with grooved distal margin of propodi.

Last two pairs of legs reduced, of similar size, dactyli strongly curved. Third leg dactyl opposed by a single propodal spine. Fourth leg dactyl also opposed by one propodal spine, and another small spine on outer propodal margin.

Abdomen of six free segments. Telson much wider than long, tip rounded. Uropod plates well developed, visible externally, occupying approximately 20% of lateral margin in female. Surface of abdominal segments smooth with a low broad convex central ridge. Uropod plates lock abdomen by fitting in front of serrated ridge on bases of first pair of legs.

First male pleopod a stout semi-rolled, setose tube with a sharp horny tip; second pleopod simple, needle-like.

DISCUSSION. — *Cryptodromia fallax* (Lamarck, 1818) has had a somewhat chequered career having been initially described by LAMARCK (1818) as *Dromia fallax* from the Ile Bourbon (La Réunion now), Indian Ocean, but never in fact illustrated. H. MILNE EDWARDS (1837) provided a brief description noting the "Carapace médiocrement bombée et bosselée en dessus" and emphasizing a key feature : "Régions ptérygostomiennes hérissées de gros tubercules". By themselves, these features are not diagnostic, but fortunately a specimen (MNHN-B 6, syntype présumé) still exists with which later material can be compared. The only other record of *D. fallax* (as *Cryptodromia fallax*), from Zanzibar, was by LENZ (1905).

Meanwhile, STIMPSON (1858), in erecting his new genus, *Cryptodromia*, described a new species, *C. canaliculata*, from Japan. *C. canaliculata* was first illustrated by ALCOCK (1901), from his collection of Indian

material, and most authors have used this text, along with the expanded description by STIMPSON (1907), to identify their specimens. IHLE (1913) recognized two additional varieties, *C. canaliculata* var. *obtusifrons* and *C. canaliculata* var. *sibogae* among the *"Siboga"* material, on the basis of some differences in the rostral and anterolateral teeth and in the subhepatic tubercles.

Next, *Dromia tomentosa* Heller, 1861, was described from the Red Sea and subsequently illustrated by HILGENDORF (1879), as *Dromia (Cryptodromia) tomentosa*, using an example from Mozambique. Comparison of HILGENDORF's illustration with the presumed syntype of *Dromia fallax* Lamarck, 1818, shows correspondence in almost every detail and there is no doubt that these species are synonyms.

Again, *Cryptodromia hirsuta* Borradaile, 1903b, was described and illustrated using material from the Maldives and comparison of BORRADAILE's illustration with the presumed syntype of *Dromia fallax* Lamarck, 1818, shows that the two are synonyms.

Finally, *Cryptodromia oktahedros* Stebbing, 1923, was described from Durban, South Africa. STEBBING'S illustrations of this species have been difficult to interpret chiefly because the shape of the carapace was strangely narrowed posteriorly and the anterolateral teeth were crudely drawn. However, the limbs and abdomen closely resemble those of *Dromia fallax*. BARNARD (1950) noted that *Cryptodromia oktahedros* was possibly the same as *Dromia tomentosa* Heller, 1861, and I agree with this hypothesis.

Thus, *Dromia fallax* has been known under five specific and two varietal names. *C. canaliculata* was used for Japanese, Indonesian and Indian specimens, while the other four specific names were used for western Indian Ocean, African, and Red Sea specimens.

I was able to compare the New Caledonian specimens with the presumed syntype of *Dromia fallax* (♂ 13.7 x 12.2 mm) and it is clear that they belong to the same species. Within this material there is variation in the development of the anterolateral teeth so that I believe that the varieties recognized by IHLE (1913) are only the result of individual variation. Comparison of the descriptions and illustrations of all the material described under the other four names, *Dromia tomentosa*, *Cryptodromia canaliculata*, *C. hirsuta*, and *C. oktahedros* suggests that all belong to LAMARCK'S species which should be known as *Cryptodromia fallax* (Lamarck, 1818).

SIZE. — At least 111 specimens (49 ♂♂, 59 ♀♀, 3 of unknown sex) of *Cryptodromia fallax* have been recorded. The maximum sizes known are for females CW = 15.0 mm, and males CW = 13.7 mm, although ALCOCK (1900) measured one of CW = 16.0 mm, but of unknown sex. The smallest ovigerous female was recorded by IHLE (1913), CW = 6.8 mm. The size range of the twelve specimens from New Caledonia, males CW = 7.5-10.2 mm, females CW = 7.5-9.6 mm, and ovigerous females CW = 8.7-9.6 mm, is within the previously known range. The clutch size of the females ranged from 147-196 eggs (average diameter = 0.7 mm).

CAMOUFLAGE. — Most of the crabs from New Caledonia carried a camouflage cap consisting of either a piece of sponge or compound ascidian. Other authors have recorded the utilization of similar material although STIMPSON (1907) recorded a crab carrying a piece of seaweed. BUITENDIJK (1939) found two specimens infected with a sacculinid parasite.

DEPTH. — Almost all records for *C. fallax* are from low intertidal depths or subtidal reefs and rocky areas to about 3 m. RATHBUN (1911) recorded a small male from 55 m but this may be an error.

DISTRIBUTION. — The distribution of *C. fallax* includes the Red Sea, coast of East Africa, Indian Ocean, Indonesia, Philippine Islands, New Caledonia, Gilbert and Ellice Islands, Japan, Marshall Islands, Niue Island, and Raroia Atoll (French Polynesia). This species is one of the few dromiids known from the Philippines and New Caledonia prior to this study (see WARD, 1941, and TAKEDA & NUNOMURA, 1976). A more detailed listing of localities can be found in LEWINSOHN (1977, 1979, 1984), as *C. canaliculata.*

Cryptodromia longipes sp. nov.

Fig. 8 a-g

MATERIAL EXAMINED. — **Chesterfield Islands.** CORAIL 2 : stn DW 8, 20°52.07'S, 161°38.21'E, 63 m, 20.07.1988 : 1 ♂ 3.9 x 3.9 mm. — Stn CP 111, 19°18.06'S, 158°48.86'E, 70-65 m, 28.08.1988 : 1 ♂ 4.4 x 4.6 mm. — Stn DW 159, 19° 46.00'S, 158° 20.00'E, 52 m, 1.08.1988 : 1 ♂ 4.4 x 4.3 mm, with sponge cap.

TYPE — Holotype : 1 ♂, 4.4 x 4.6 mm from CORAIL 2, Stn CP 111 (MNHN-B 22569).

DESCRIPTION. — Carapace longer than wide, lateral sides almost parallel, surface smooth, very convex. Frontal, cardiac and branchial grooves only faintly marked. Rostrum tridentate, all teeth of similar size, blunt, median tooth slightly deflexed, lateral teeth horizontal. Anterolateral margin begins at level of postorbital corner, armed with two small blunt teeth, first slightly larger and close to orbit, second nearby. A greater distance to branchial notch which has a small lobe behind, but this can hardly be called a tooth.

Supraorbital tooth almost as large as lateral rostral tooth, postorbital corner bluntly rounded, not tooth-like. No orbital fissure, strong, blunt suborbital tooth visible dorsally, a small tubercle very close to and just below postorbital corner, subhepatic area flattened to accommodate cheliped when folded away. Female sternal grooves unknown.

First segment of antenna wider than long, beaked medially, gaping, lateral margin shorter than medial margin. Second segment much longer than wide, a small central distal tubercle, distomedial margin produced, curved, on which third segment is inserted at an angle. Exopod firmly fixed to second segment, tip extends as far as joint between third and fourth segments and is bluntly terminated except that inner margin is produced and curves over base of eyestalk. Epistome triangular, wider than long, surface concave, blunt tubercle at corner of buccal frame.

Chelipeds well developed, stout. Merus trigonal in section, borders unarmed. Carpus outer surface convex, slightly uneven, two strong distal tubercles. Propodus with a strong tubercle matching the superior carpal tubercle and another tubercle at base of dactyl. Fingers straight, hollowed out internally, not gaping, armed with seven small teeth.

First two pairs of legs small. Distal borders of carpi and propodi bluntly lobed. Dactyli as long as propodi, strongly curved at tips, inner margins armed with four-five small spines increasing in size distally, a small pearl-like proximal tubercle on posterior margin of dactyli.

Third pair of legs reduced, dactyl strongly curved, opposed by a single propodal spine with another smaller spine on outer propodal margin. Fourth pair of legs flattened, almost as long as first two pairs, when extended forward they reach as far as supraorbital margin. Dactyl opposed by a single propodal spine with two smaller spines on outer propodal margin.

Abdomen of six free segments. Male telson wider than long, a medial elongate shallow pit, margins subparallel, tip deeply concave giving two lateral lobes. Abdominal segments four-six have a small tubercle near distolateral corners. Uropod plates well developed and visible externally. Abdominal locking mechanism consists of uropod plates fitting in front of small serrated flange on bases of first legs. Female characters unknown.

First male pleopod a stout, setose semi-rolled tube with a sharp horny tip; second pleopod simple and needle-like.

ETYMOLOGY. — The specific name, from the latin *longus*, is a reference to the unusually long last pair of legs.

DISCUSSION. — A distinctive feature of *Cryptodromia longipes* sp. nov. is the long last pair of legs, a character shared by *C. amboinensis* De Man, 1888, but *C. longipes* can be distinguished by the prominent supra-orbital tooth (small in *C. amboinensis*), no postorbital tooth (a small tooth), no tubercle near postorbital corner (tubercle present), only one subhepatic tubercle (two tubercles), one propodal spine on outer margin of third leg and two spines on outer margin of fourth leg (no spines on outer margins of either leg), and male telson bilobed (male telson rounded).

C. hilgendorfi De Man, 1888, is also similar to *C. longipes* but differs in having a small supraorbital tooth, no propodal spines on outer margins of last two pairs of legs (as in *C. amboinensis*), a single anterolateral tooth (two in *C. longipes)*, and unornamented abdominal segments (fourth to sixth segments have a small tubercle near distolateral corners in *C. longipes*).

C. mariae Ihle, 1913, like the above species, also has a carapace as wide as long, but has very tuberculate first two pairs of legs, single spines on the outer propodal margins of the last two pairs of legs, and no subhepatic tubercles.

CAMOUFLAGE. — One specimen was accompanied by a sponge cap.

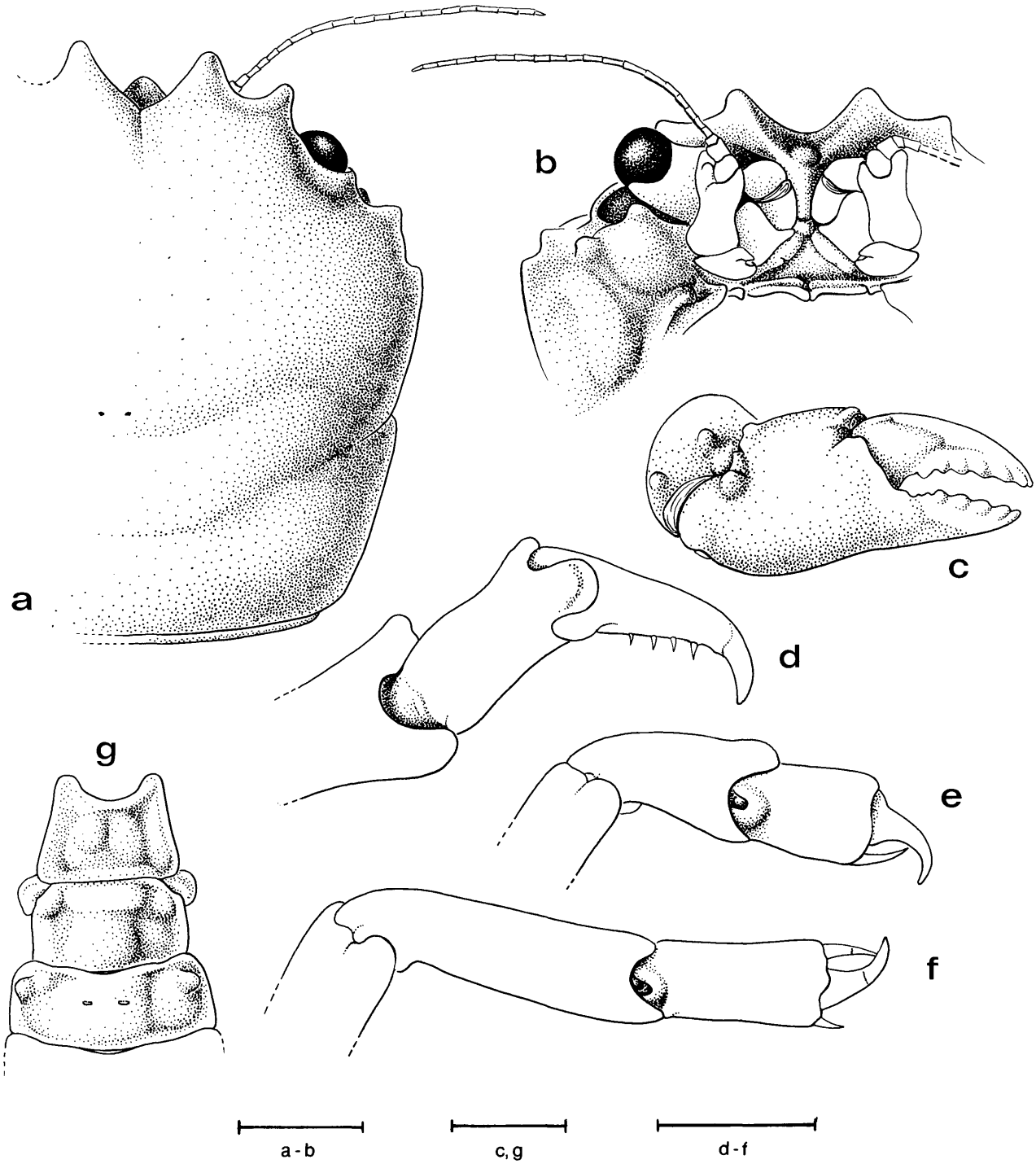


FIG. 8. — *Cryptodromia longipes* sp. nov., ♂, holotype, 4.4 x 4.6 mm, Chesterfield Islands, CORAIL 2, stn CP 111, 70-65 m (MNHN-B 22569) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area and anterolateral margin; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, ventral view of telson and terminal segments of male abdomen.

Scale bars represent 1.0 mm.

SIZE. — The three small male specimens had CW = 3.9 and 4.4 mm.

DEPTH. — Depth range is from 52-70 m.

DISTRIBUTION. — *C. longipes* sp. nov. is known from only three male specimens collected near the Chesterfield Islands and Bellona Plateau.

Genus *TAKEDROMIA* nov.

Cryptodromia - RATHBUN, 1911 : 194 (in part). — IHLE, 1913 : 32 (in part). — SAKAI, 1976 : 12 (in part).

Carapace distinctly wider than long, surface moderately to strongly convex, granulated or tuberculated, may be areolated. Rostrum tridentate, projecting, may be truncated, lateral teeth usually thin and eave-like. Anterolateral teeth well developed, lacinated or tuberculated, posterolateral borders dentate or tuberculate. Coxae of third maxillipeds separated by a wide gap and inserted well forward of tip of sternum on a triangular plate. Female sternal grooves end apart between bases of first legs. Antennal exopod well developed, prominent median distal spine on second segment, all antennal segments minutely denticulated. Cheliped without an epipod, male chelipeds much larger than those of female. First two pairs of legs tuberculated and granulated, inner margins of dactyli armed with up to five small spines. Last two pairs of legs very small, third pair shortest, dactyli of both pairs opposed by single propodal spines, none on outer propodal margin. Abdomen of six free segments. Uropod plates well developed, visible externally, used in abdominal locking mechanism by fitting in front of serrated flange on bases of first legs. Male telson rounded or subtruncate. Abdominal segments adorned with granules and or tubercules.

TYPE SPECIES. — *Cryptodromia cristatipes* Sakai, 1969, by present designation.

OTHER SPECIES. — *Takedromia longispina* sp. nov., *Cryptodromia ornata* Rathbun, 1911, *Cryptodromia yoshidai* Takeda & Kurata, 1976.

ETYMOLOGY. — This generic name *Takedromia* is formed by combining the name of Masatsune TAKEDA, Department of Zoology, National Science Museum, Tokyo, with *Dromia*. M. TAKEDA has made a very important contribution to the study of Pacific Brachyura in general, and Dromiidae in particular.

DISCUSSION. — Apart from the new species, all species in this new genus were previously in *Cryptodromia*. They do share the characters of no epipod on the cheliped, and the same abdominal locking mechanism, but they differ in having a very ornate carapace, always much wider than long, anterolateral teeth acute and lacinated, very small last two pairs of legs, with reduced number of propodal spines, and strong sexual dimorphism in the chelipeds (see Table 7).

DISTRIBUTION. — The above species have been recorded from the Seychelle Islands, Japan and New Caledonia, so that *Takedromia* is an Indo-West Pacific genus.

Key to the species of *Takedromia*

(Species studied in this paper are in bold)

1. Rostrum scarcely tridentate, rostral teeth blunt ..... ***Takedromia cristatipes*** (Sakai, 1969) nov. comb.
— Rostrum distinctly tridentate, projecting, rostral teeth triangular or acute **2**
2. Lateral rostral teeth acute, carapace sparsely granular ..... ***Takedromia longispina*** sp.nov.
— Lateral rostral teeth triangular, carapace granulate and areolate **3**

3. Anterolateral teeth lacinated ... *Takedromia yoshidai* (Takeda & Kurata, 1976) nov. comb.
— Anterolateral teeth flange-like ..... *Takedromia ornata* (Rathbun, 1911) nov. comb.

Takedromia cristatipes (Sakai, 1969) nov. comb.

Figs 9 a-b, 19 a-b

Cryptodromia cristatipes Sakai, 1969 : 245, pl. 1, fig. 1; 1976 : 18, text fig. 10.

MATERIAL EXAMINED. — **New Caledonia.** MUSORSTOM 4 : stn DW 181 (d'Entrecasteaux Reefs), 18°57.20'S, 163°22.40'E, 355 m, 18.09.1985 : 1 ♂ 14.0 x 12.8 mm; 1 ♀ 9.9 x 9.7 mm, parasitized by sacculinid barnacle, externa evident under abdomen. — Stn CP 193, 18°56.30'S, 163°23.20'E, 430 m, 19.09.1985 : 1 ♀ 13.0 x 11.9 mm.

LAGON : stn DW 1158, 19°10.0'S, 163°6.5'E, 48 m, 30.10.1989 : 1 ♀ (ovig.) 15.5 x 13.8 mm.

SMIB 6 : stn DW 126, 18°59.1'S, 163°22.7'E, 320-330 m, 3.03.1990 : 1 ♂ 6.5 x 6.5 mm.

Loyalty Islands. MUSORSTOM 6 : stn DW 459, 21°01.39'S, 167°31.47'E, 425 m, 20.02.1989 : 1 ♂ 10.8 x 9.9 mm.

Chesterfield Islands. MUSORSTOM 5 : stn DW 337, 19°53.80'S, 158°38.00'E, 412-430 m, 15.10.1986 : 1 ♀ 8.2 x 7.4 mm. — Stn DC 372, 19°52.96'S, 158°38.63'E, 400 m, 20.10.1986 : 1 ♂ 14.4 x 13.3 mm.

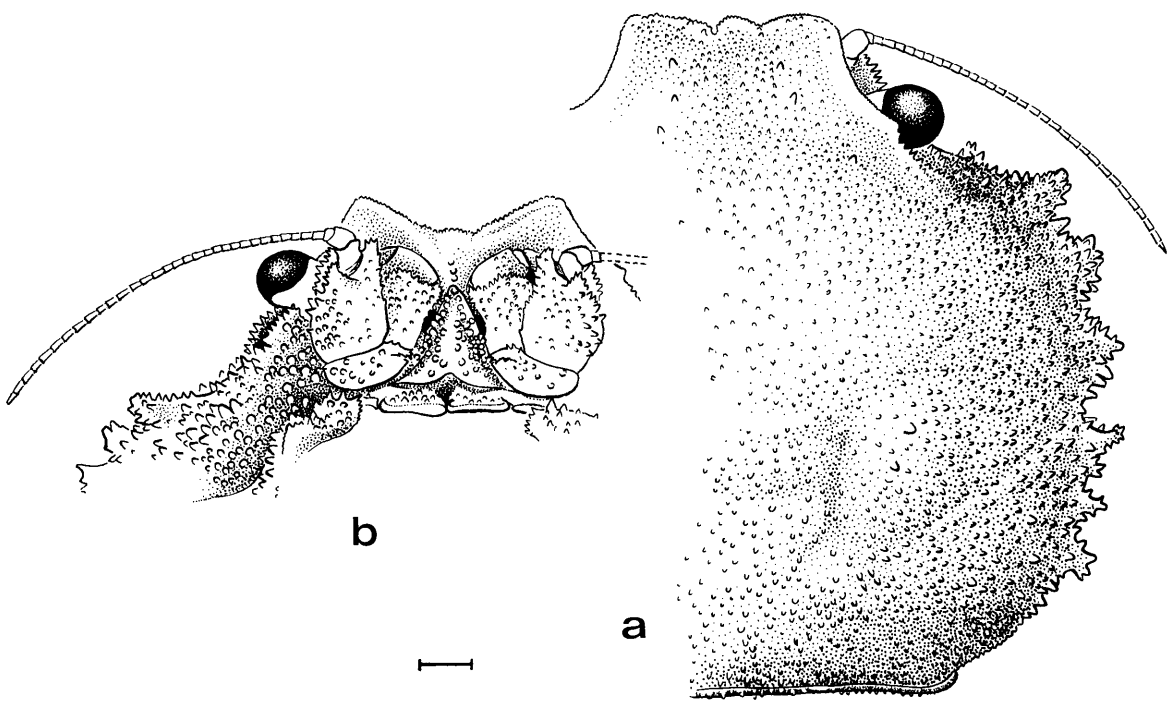


FIG. 9. — *Takedromia cristatipes* (Sakai, 1936), nov. comb., ♂ 14.0 x 12.8 mm, New Caledonia (d'Entrecasteaux Reefs), MUSORSTOM 4, stn 181, 355 m (MNHN-B 22571) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area.

Scale bar represents 1.0 mm.

DESCRIPTION. — Carapace subquadrangular, wider than long, surface moderately convex, regions ill-defined, covered with fine granules and sparse tufts of long plumose setae. Median frontal groove, branchial and lateral cardiac grooves faint. Rostrum truncate, well forward of rest of carapace, forming an almost continuous, upturned margin not clearly divided into teeth. Anterolateral margins of carapace subparallel, beginning at level of suborbital tooth, three-four lacinated teeth in front of branchial groove, behind which is a strong posterolateral tooth followed by two lacinated teeth.

Supraorbital eave continuous with rostral margin, bearing a small blunt tooth, postorbital margin smooth, not produced. Small fissure separates suborbital margin which has a blunt tooth at medial corner.

All segments of antenna finely granulated. First segment much wider than long, beaked medially but not gaping. Second segment much longer than wide, stout distal median spine, distomedial corner produced as a spine on which third segment is inserted on an angle. Exopod firmly fixed, tip slightly bilobed, extending as far as joint between third and fourth segments. Ratio of length of antennal flagella to CW = 0.53. Epistome triangular, wider than long, and granulated.

Subhepatic region convex, finely granulated, with two small tubercles, one beneath suborbital tooth and the other lower down. An acute tooth at anterior corner of buccal frame, above which begins a shallow groove passing under anterolateral margin to beginning of branchial groove. Female sternal grooves end wide apart on small raised tubercles between bases of first legs.

Male chelipeds robust, length more than 1.5 x CL. Merus triangular in section, all borders have small granules, distal superior border has three broad tubercles. Carpus granulate, upper distal border armed with two large, sharp tubercles. Upper and outer faces of propodus granulate, two small tubercles at base of dactyl, which is granular. Fingers strongly downcurved, armed with seven-eight teeth, only the five most distal teeth interlocking.

First two pairs of legs much shorter than chelipeds. Upper surface of carpus sulcate, margins granulated, carpi and propodi have large distal tubercles. Dactyli as long as propodi, curved, with five small equal spines on inner margin.

Last two pairs of legs very reduced, third pair shortest, fourth more slender, both have single propodal spines opposing dactyli.

Abdomen of six free segments. Telson in both sexes much wider than long, posterior margin rounded. Uropod plates large, visible externally. Abdominal locking mechanism in male consists of uropods fitting in front of serrated flange on bases of first legs. Abdominal segments finely granulated, a pair of small median granules near posterior margins of third and fourth segments.

First male pleopod a stout, semi-rolled setose, tube with a sharp horny tip; second pleopod simple, needle-like.

DISCUSSION. — Although SAKAI (1969) had female specimens he did not describe the sternal grooves : they end apart on small raised tubercles between the bases of the first pair of legs. The smallest female in the present collection, CW = 8.2 mm, is immature with a small abdomen and the abdominal locking mechanism still functional, while the female with CW = 13.0 mm, has a mature-sized abdomen, non-functional abdominal locking mechanism, and the sternal grooves plugged, indicating that it had already mated. Thus the size at maturity for females is somewhere within this size range.

In addition, the nature of the male pleopods can be included : they are typical of most dromiid crabs. Sexual dimorphism of the chelipeds is particularly apparent in this species with males having very robust limbs, much larger than those of females.

A female specimen from stn DW 181 is parasitized by a sacculinid barnacle with an externa evident under the abdomen.

CAMOUFLAGE. — *T. cristatipes* is not known to carry any camouflage, indeed the last two pairs of legs may be too small to be functional.

SIZE. — The size range of male New Caledonian specimens does not exceed the largest (CW = 22.0 mm) of the Japanese specimens reported by SAKAI (1969, 1976). The size of females ranged from CW = 8.2-15.5 mm. The largest female, from stn DW 1158, is ovigerous, carrying 140 eggs (diam. = 0.8 mm), a comparatively small clutch size considering the size of the crab.

DEPTH. — The Japanese records range from 50-150 m depth, while those from New Caledonia range from 48-430 m, considerably extending the maximum known depth.

DISTRIBUTION. — SAKAI (1969) described this species from Tosa Bay, Japan, and besides several other records from Japan it has not been reported elsewhere. The New Caledonian material is therefore of special interest.

Takedromia longispina sp. nov.

Figs 10 a-j, 19 c-d

MATERIAL EXAMINED. — **New Caledonia.** MUSORSTOM 4 : stn DW 183, 19°01.80'S, 163°25.80'E, 280 m, 18.09.1985 : 1 ♂ 13.2 x 11.2 mm. — Stn DW 184, 19°04.00'S, 163°27.50'E, 260 m, 18.09.1985 : 1 ♀ 4.6 x 4.7 m. — Stn DW 234, 22°15.50'S, 167°08.30'E, 350-365 m, 2.10.1985 : 1 ♂ 11.0 x 10.7 mm.

LAGON : stn DW 1151, 19°01.2'S, 163°27.3'E, 280 m, 28.10.1989 : 1 ♂ 8.4 x 7.5 mm.

Chesterfield Islands. CHALCAL 1 : stn DC 31, 19°33.30'S, 158°30.30'E, 230 m, 19.07.1984 : 2 ♀♀ (ovig.) 9.9 x 9.7, 10.0 x 11.0 mm.

MUSORSTOM 5 : stn DW 348, 19°36.00'S, 158°31.70'E, 260 m, 17.10.1986 : 1 ♀ 11.9 x 11.1 mm.

TYPES . — Holotype : 1 ♂ 13.2 x 11.2 mm from MUSORSTOM 4, stn DW 183 (MNHN-B 22572). Paratype : 1 ♀ (ovig.) 10.0 x 11.0 mm, from CHALCAL 1, stn DC 31 (MNHN-B 22573).

DESCRIPTION. — Carapace generally wider than long, convex, rising steeply from orbital and anterolateral margins. Surface smooth under short, sparse setae except for small patches of low rounded tubercles behind rostral and orbital margins, above anterolateral and posterolateral margins and a crescentic line in inner branchial area. Frontal and branchial grooves well marked, lateral cardiac grooves faint. Rostrum tridentate, teeth prominent, narrow, acute, median tooth projecting horizontally, lateral teeth directed anterovertically. Anterolateral margin begins close to the subhepatic tooth, below level of suborbital tooth and has three long, acute teeth. First two teeth more widely separated, there may be small tubercles between them. Second tooth has two small tubercles near its base and third tooth has two-three small tubercles on posterior margin. Posterolateral tooth similar to third tooth except that tip may be bifid. Remaining carapace margin has two-three small tubercles. Anterolateral teeth are much more strongly developed in male.

Supraorbital margin adorned with small tubercles, supraorbital tooth prominent, no postorbital tooth. Narrow fissure separates suborbital margin which is also tuberculate with prominent tooth at inner corner which is visible dorsally.

First segment of antenna much wider than long, wedge-shaped, beaked medially. Second segment much longer than wide, surface sparsely granulated, convex, distomedial corner produced as an acute spine on which third segment is inserted at an angle. A well developed, acute spine, directed anterolaterally, just beneath point of insertion of third segment. Exopod extending as far as joint between third and fourth segments, tip slightly bilobed, inner lobe curving over base of eyestalk. Epistome triangular with scattered small tubercles, especially near apex.

Distinct tooth at corner of buccal frame, and well marked groove extending around under anterolateral margin towards posterolateral tooth. Subhepatic area small, inflated, bearing one prominent acute tooth, visible dorsally. Subhepatic tooth much more strongly developed in male. Female sternal grooves end wide apart on low tubercles between bases of first legs.

Chelipeds especially long in male. Merus trigonal with tuberculate margins. Carpus with scattered small tubercles and two especially prominent and acute distal tubercles. Propodus very elongate, with scattered small tubercles. Fingers long, downcurved, hollowed out internally, gaping, armed with seven-eight small teeth, upper margin of dactyl also tuberculate. Female chelipeds similar, but much shorter.

First two pairs of legs shorter than chelipeds. Distal borders of carpi and propodi produced as spines. Dactyli as long as propodi, inner margins armed with four-five small spines.

Last two pairs of legs very reduced, both subdorsal. Fourth pair longer than third, dactyli opposed by single propodal spines.

Abdomen of six free segments. Telson wider than long, tip rounded, four small central tubercles and another tubercle in each proximal corner. Uropod plates well developed and visible externally, fitting in front of serrated plate on bases of first walking legs to create the abdominal locking mechanism. Sixth segment of abdomen with a single small tubercle beside base of each uropod, and second to fifth segments each have a row of four distal tubercles evenly spaced across the breadth.

First male pleopod a semi-rolled, setose tube with a sharp tip; second pleopod simple needle-like.

ETYMOLOGY. — The specific name is a combination of the latin *longus* and *spina* and refers to the long, acute anterolateral teeth.

DISCUSSION. — *T. longispina* shares with *T. cristatipes*, and the other two species in this genus, the characters of having large male chelipeds and the last two pairs of legs very reduced. However, *T. longispina* differs in having only a sparsely tuberculate carapace.

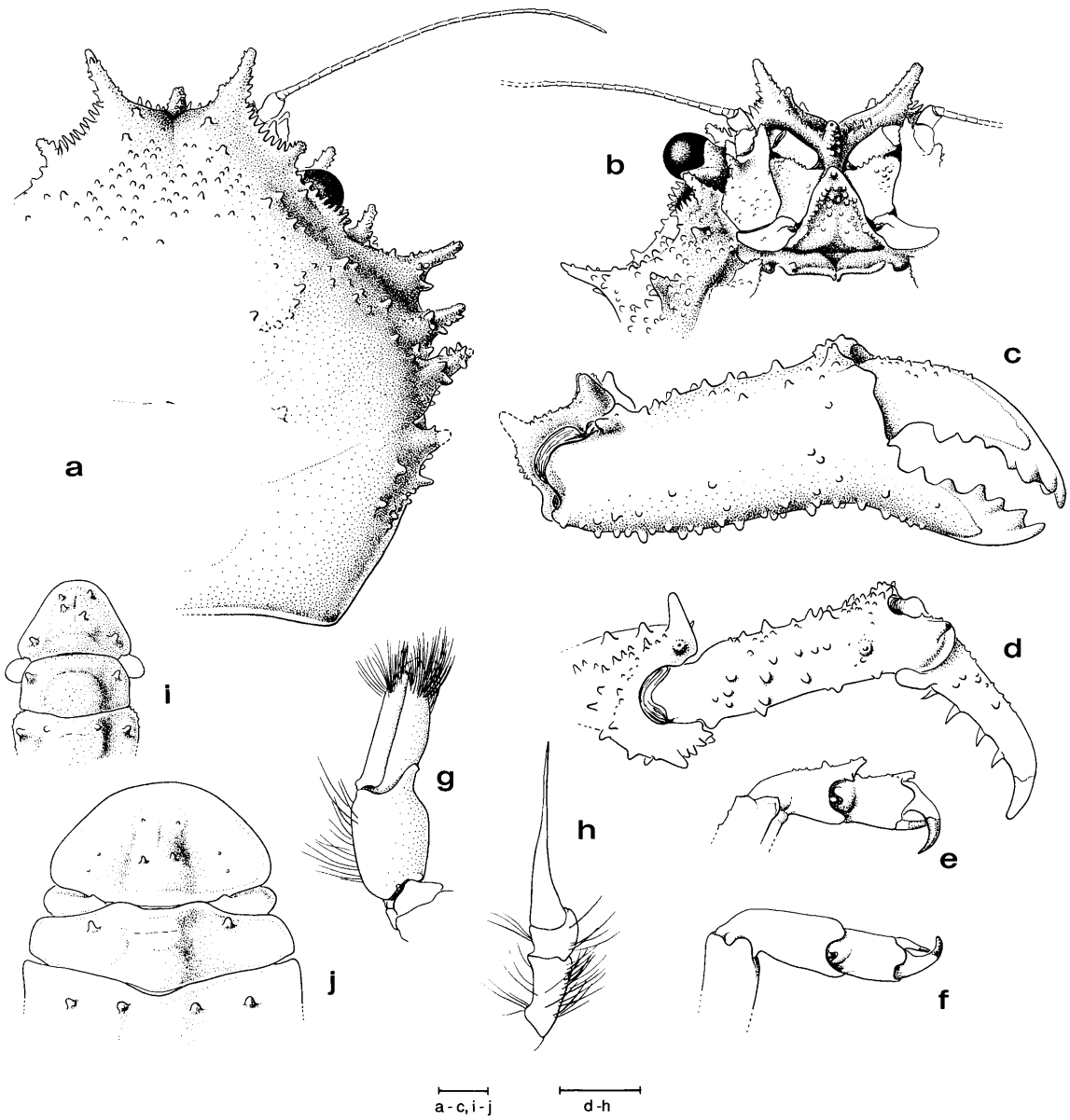


FIG. 10. — *Takedromia longispina* gen. nov., sp. nov. : **a-i**, ♂, holotype, 13.2 x 11.2 mm, New Caledonia, MUSORSTOM 4, stn DW 183, 280 m (MNHN-B 22572) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area and anterolateral margin; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, first pleopod of male; **h**, second pleopod of male; **i**, ventral view of telson and terminal segments of male abdomen. — **j**, ♀, paratype, 10.0 x 11.0 mm, Chesterfield Islands, CHALCAL 1, stn DC 31, 230 m (MNHN-B 22573) : ventral view of telson and terminal segments of female abdomen.

Scale bars represent 1.0 mm.

CAMOUFLAGE. — None of the specimens were carrying pieces of camouflage. It may be that the last two pairs of legs are too small to be functional. An ornate carapace and use of camouflage seem to be mutually exclusive among dromiid crabs.

SIZE. — The maximum sizes recorded for this new species are males CW = 15.7 mm and females CW = 11.9 mm. The New Caledonian collection included two ovigerous females both around CW = 10.0 mm. Unfortunately, their condition precluded an accurate estimate of egg size and numbers.

DEPTH. — The depth range is 230-365 m, which is within the range of 48-430 m recorded for the other species of *Takedromia.*

DISTRIBUTION. — *Takedromia longispina* sp. nov. is only known from New Caledonia and Chesterfield Islands.

Genus *EPIGODROMIA* nov.

Epidromia Kossmann, 1878 : 256; 1880 : 69 (name preoccupied).
Cryptodromia - BORRADAILE, 1903a : 299 (in part). — IHLE, 1913 : 32 (in part). — BALSS, 1922 : 106 (in part). — SAKAI, 1936 : 15 (in part); 1976 : 12 (in part). — SERÈNE & LOHAVANIJAYA, 1973 : 13 (in part).
Petalomera - SAKAI, 1936 : 28 (in part); 1965 : 9 (in part); 1976 : 20 (in part).

Carapace may be wider than long or longer than wide, surface convex, granular and usually areolate. Rostrum tridentate, projecting, no postorbital tooth. Anterolateral teeth usually broad granulated lobes, but may be absent. Coxae of third maxillipeds separated by a gap and inserted on a triangular shaped plate well forward of tip of sternum. Sternal grooves end apart on small tubercles between bases of first legs. Cheliped usually without an epipod, but it may be present. First two pairs of legs tuberculate and granular, inner margins of dactyli armed with up to seven small spines. Last two pairs of legs very reduced, fourth pair sometimes slightly longer, dactyli of both legs opposed by single propodal spines. Abdomen of six free segments, whose surface is usually sculptured and granulate. Uropod plates well developed, used in abdominal locking mechanism by fitting in front of serrated flange on bases of first legs. Tip of male telson truncate or produced as two small lobes, female telson rounded.

TYPE SPECIES. — *Epidromia granulata* Kossmann, 1878, by present designation.

OTHER SPECIES. — *Cryptodromia areolata* Ihle, 1913, *Dromia (Cryptodromia) ebalioides* Alcock, 1899, *Dromia (Cryptodromia) gilesii* Alcock, 1899, *Cryptodromia globosa* Lewinsohn, 1977, *Petalomera nodosa* Sakai, 1936, *Epigodromia rotunda* sp. nov., *Epigodromia rugosa* sp. nov., *Dromia sculpta* Haswell, 1882.

ETYMOLOGY. — Since the name *Epidromia* Kossmann, 1878, is preoccupied by *Epidromia* Guenee, 1852, used for a genus of Lepidoptera, I propose the replacement name *Epigodromia.* This name is formed by combining the noun "epigone" meaning 'one of a later generation' (from the Greek *epigonoi* - those born afterwards) with *Dromia.* The name indicates the advanced nature of some characters of the species included in this genus.

DISCUSSION. — The genus *Epidromia* (= *Epigodromia*) was erected by KOSSMANN for a new species, *E. granulata*, from the Red Sea, but beginning with BORRADAILE (1903a) subsequent authors included it in *Cryptodromia* Stimpson, 1858. This may have been appropriate at the time but we now know that there are many more species, resembling *Epidromia granulata*, which form a natural group. They are small dromiids usually without an epipod on the cheliped, with a projecting rostrum and a granulate and areolate carapace. I propose that this generic name should be resurrected for this group of *Cryptodromia* species. SERÈNE and LOHAVANIJAYA (1973) noted the existence of this group of species but did not choose to place them in a separate genus.

KOSSMANN'S original definition of the genus was exceedingly brief : "Cephalothorax, praesertim dimidio anteriore valde convexus. Margo anterolateralis usque ad angulum labialem productus est. Palatum colliculo instructum. Feminae sulci sternales ? Pedes Cryptodromiae similes". Therefore the more detailed definition given above is necessary (see Table 7).

The major innovation with this genus is to include a species which does have an epipod on the cheliped. *Petalomera nodosa* shows greatest affinity with *Epigodromia areolata* (Ihle, 1913), *E. gilesii* (Alcock, 1899), and *E. granulata* (Kossmann, 1878). SAKAI (1936, 1976) commented on the similarity of this species to *Cryptodromia areolata* and *C. gilesii*. However, *P. nodosa* has an epipod on the cheliped (see LEWINSOHN, 1984) while this is absent in all other species of *Epigodromia*. A similar problem can be found with *Cryptodromia*. Amongst the larger dromiid crabs, for e.g. *Dromia* and *Dromidia*, use of the cheliped epipod as a fundamental character to separate genera causes no problems but in these genera of smaller crabs it seems that the epipod may be lost in some species. The extreme similarity of *Petalomera nodosa* to the other species of *Epigodromia* makes unlikely the assumption that the distinctive areolate carapace evolved independently in two different groups.

The species of *Epigodromia* may be distinguished from those of *Takedromia* because the carapace is usually areolate, anterolateral teeth not well developed, or lacinated, and male telson is truncate or bilobed. In addition, strongly dimorphic chelipeds are not found in *Epigodromia*.

DISTRIBUTION. — Apart from the new species dealt with below, which are from New Caledonia, the other seven species are all small dromiids known from the Red Sea, Indian Ocean, Indonesia, Australia and Japan.

Key to the species of *Epigodromia*

(Species studied in this paper are in bold)

1. Carapace significantly wider than long **2**
— Carapace as wide as long or longer than wide **7**

2. Anterolateral carapace margins granular, but without distinct teeth .....
..... *Epigodromia ebalioides* (Alcock, 1899) nov. comb.
— Anterolateral carapace margins with distinct teeth **3**

3. Two granulated anterolateral teeth **4**
— Three granulated anterolateral teeth **5**

4. Suborbital tooth prominent, visible dorsally .....
..... *Epigodromia granulata* (Kossmann, 1878) nov. comb.
— Suborbital tooth not visible dorsally ..... *Epigodromia gilesii* (Alcock, 1899) nov. comb.

5. Carapace distinctly areolate ..... *Epigodromia nodosa* (Sakai, 1936) nov. comb.
— Carapace not areolate **6**

6. Carapace covered with large granulated tubercles .....
..... *Epigodromia sculpta* (Haswell, 1882) nov. comb.
— Carapace with a few small, scattered granules ..... ***Epigodromia rugosa*** sp. nov.

7. Rostrum tridentate, lateral teeth bluntly rounded.....
..... *Epigodromia globosa* (Lewinsohn, 1977) nov. comb.
— Rostrum tridentate, lateral teeth broadly triangular **8**

8. Inner margins of dactyli of first two pairs of legs armed with 7-8 small spines .....
..... ***Epigodromia areolata*** (Ihle, 1913) nov. comb.
— Inner margins of dactyli of first two pairs of legs armed with four small spines .....
..... ***Epigodromia rotunda*** sp. nov.

Epigodromia areolata (Ihle, 1913) nov. comb.

Fig. 19 e-f

Cryptodromia areolata Ihle, 1913 : 47, pl. 2, figs 10-11. — SAKAI, 1936 : 26, pl. 1, fig. 1; 1965 : 8, pl. 3, fig. 4; 1976 : 17, pl. 4, fig. 2. — MIYAKE, 1961 : 13. — TAKEDA & MIYAKE, 1970 : 202; 1972 : 66. — CAMPBELL, 1971 : 29. —

SERÈNE & LOHAVANIJAYA, 1973 : 18, pl . 2A, figs 5-7. — TAKEDA, 1982 : 18 (list). — DAI & YANG, 1991 : 25, pl. 1 (8).

Cryptodromia ihlei Balss, 1921 : 177; 1922 : 107, text fig. 2. — YOKOYA, 1933 : 98.

MATERIAL EXAMINED. — **New Caledonia**. LAGON : stn 387, 22°39.1'S, 167°07.3'E, 225 m, 22.01.1985 : 1 ♀ 7.2 x 7.1 mm.

MUSORSTOM 4 : stn CC 173, 19°02.50'S, 163°18.80'E, 250-290 m, 17.09.1985 : 1 ♂ 8.4 x 7.7 mm. — Stn 204, 22°37.00'S, 167°05.70'E, 120 m, 27.09.1985 : 1 ♀ (ovig.) 7.9 x 7.6 mm.

"*Kandjar*": no stn, dredged between 22°40'-22°50'S, 167°10'-167°30'E, 200-350 m, 7-10.10.1986 : 1 ♂ 8.8 x 7.8 mm.

SMIB 6 : stn DW 108, 19°06.9'S, 163°30.1'E, 210-220 m, 2.03.1990 : 1 ♂ 12.3 x 11.4 mm. — Stn DW 112, 19°05.6'S, 163°30.2'E, 220-225 m, 2.03.1990 : 1 ♂ 12.1 x 10.3 mm. — Stn DW 127, 19°6.8'S, 163°22.6'E, 190-205 m, 4.03.1990 : 1 ♂ 7.8 x 7.5 mm.

"Alis" : stn 1147, 19°07.50'S, 163°330.40'E, 205-210 m, 28.10.1989 : 1 ♀ (ovig.) 9.0 x 8.8 mm.

Loyalty Islands. MUSORSTOM 6: stn DW 443, 20°53.27'S, 167°17.46'E, 250 m, 19.02.1989 : 1 ♀ (ovig.) 7.2 x 7.0 mm. — Stn DW 451, 20°59.00'S, 167°24.50'E, 330 m, 20.02.1989 : 1 ♂ 7.8 x 7.4 mm. — Stn 462, 21°05.10'S, 167°26.85'E, 200 m, 21.02.1989 : 1 ♀ 4.0 x 4.3 mm.

Chesterfield Islands. CHALCAL 1 : stn DC 31, 19°33.30'S, 158°30.30'E, 230 m, 19.07.1984 : 1 ♀ (ovig.) 10.0 x 9.9 mm.

MUSORSTOM 5 : stn DW 290, 23°6.20'S, 159°26.30'E, 300 m, 11.10.1986 : 1 ♂ 14.4 x 12.3 mm. — Stn DW 334, 20°06.27'S, 158°47.62'E, 315-320 m, 15.10.1986 : 1 ♂ 11.1 x 10.3 mm. — Stn 347, 19°38.61'S, 158°28.03'E, 260 m, 17.10.1986 : 1 ♀ 7.1 x 7.0 mm. — Stn DW 349, 19°34.45'S, 158°34.48'E, 275 m, 17.10.1986 : 1 ♀ 6.6 x 6.4 mm. — Stn DW 353, 19°26.50'S, 158°40.40'E, 290 m, 18.10.1986 : 1 ♂ 8.0 x 8.0 mm.

DESCRIPTION. — Carapace slightly wider than long, convex, areolate, covered with sharp granules which are small in frontal region and also along posterior area of carapace, elsewhere comparatively large and dense. A few short setae, especially in grooves between areolae. Regions of carapace well defined. Short frontal groove extending back between lateral rostral teeth. Branchial and cervical grooves distinct. Mesogastric region convex with three poorly defined protuberances, anterior one smallest, followed by two larger protuberances, behind these are a pair of small protuberances arranged side by side in urogastric region. Cardiac area broadly convex, granulated, well defined by grooves. Branchial areas have five protuberances, two anterior, large, most lateral one being just behind postorbital corner, and three protuberances further back, which decrease in size laterally. Posterior branchial areas convex, evenly covered with large granules. Rostrum tridentate, teeth separated by a broad U-shaped sinus. Borders of rostral teeth granulated, median tooth deflexed but visible dorsally, lateral teeth prominent, slightly curved out at tips, slightly longer than median tooth. Anterolateral margin evenly convex, bearing two granulated lobes, first on same level as anterior corner of buccal frame. Each anterolateral lobe ornamented with five-six sharp granules. A distinct branchial notch, posterolateral margins convergent, covered in sharp granules. Posterior carapace margin distinctly concave.

Supraorbital border strongly concave, granulated. A small supraorbital tooth followed by postorbital corner which is flush with carapace surface. No orbital fissure, suborbital margin very eroded, although there is a small tooth at inner corner, visible dorsally.

First segment of antenna much wider than long, tuberculate, medially beaked, superior lobe longest. Second segment longer than wide, convex, tuberculate, distomedial corner produced as a blunt curved lobe on which third segment is inserted at an angle. Exopod firmly fixed to second segment, tuberculate, tip not bilobed, reaching joint between third and fourth segments, inner border curved over base of eyestalk. Ratio of length of antennal flagella/CW = 0.50.

Subhepatic area convex with two small granulated tubercles. Most dorsal tubercle visible dorsally, lower tubercle on same level as anterior corner of buccal frame where there is an elongate, obliquely oriented lobe. Above this begins a shallow groove extending around under anterolateral margin to branchial groove. Female sternal grooves end close together, but apart on a raised, curved, transverse ridge between bases of first legs.

Chelipeds well developed, much larger in male (length about twice CL), covered in sharp granules. Merus especially long in male. Carpus has two obtuse, distal tubercles. Propodus especially long in male, outer face granulated as are bases of fingers. Fingers strongly downcurved, cutting edges armed with five-six teeth, meeting at tips.

First two pairs of legs smaller than chelipeds, sharply granulated except anterior faces which are smooth. Distal corners of meri and propodi have large, rounded nodules. Dactyli as long as propodi, inner margins have seven-eight very small spines, all of similar size.

Last two pairs of legs very reduced, both subdorsal, of similar length although third pair are thicker. Dactyli of both legs very reduced and opposed by single minute propodal spines.

Abdomen of six free segments. Telson much wider than long, posterior margin rounded. Uropod plates very large, visible externally. Abdominal locking mechanism consists of uropods fitting in front of serrated flanges on bases of first legs. Median ridge of abdomen strongly developed, covered in small granules. On second-sixth segments, granules tend to be arranged into two transverse rows : posterior row continuous while anterior row is divided into two lobes.

First male pleopod a semi-rolled, setose tube with sharp tip; second pleopod simple, needle-like.

DISCUSSION. — *Cryptodromia ihlei* Balss, 1921, was synonymized with *C. areolata* Ihle, 1913, by SAKAI (1936). He obtained several specimens from the type locality of *C. ihlei* and identified them as *C. areolata*. Dr BALSS was able to confirm that these two species are in fact the same. Excellent figures of this species have been provided by IHLE (1913) and SAKAI (1976), and the male pleopods have been figured by SERÈNE and LOHVANIJAYA (1973). *Epigodromia areolata* males have much larger chelipeds than similar sized females, a feature also seen amongst the species of *Takedromia* gen. nov. which must be regarded as being closely related.

CAMOUFLAGE. — None of the *Epigodromia areolata* specimens was accompanied by a piece of camouflage and it may well be that the very small last two pairs of legs are not able to hold a camouflage cap.

SIZE. — The largest specimen known until now was the male type, CL = 10 mm, and the largest female is CL = 9.5 mm (TAKEDA & MIYAKE, 1972a). The New Caledonian collection included a male CL = 12.3 mm and an ovigerous female CL = 9.9 mm. The size range of ovigerous females is CL = 7.0-9.9 mm, but TAKEDA and MIYAKE (1970) recorded an ovigerous female of CL = 6.3 mm. In the New Caledonian material a female, CW = 7.1 mm, is immature while one of CW = 7.2 mm is mature. Thus maturation occurs over the approximate range CW = 6-7.5 mm. Until now no other information about the reproduction of *E. areolata* has been reported. Mean egg diameter for the three females was 0.7 mm and clutch size ranged from 40-108 eggs, a small number for a dromiid crab of this size.

DEPTH. — Previous specimens have come from depths of 30-150 m while those from New Caledonia were found from 120-350 m, greatly extending the depth range.

DISTRIBUTION. — *Epigodromia areolata* (Ihle, 1913) was first described from Timor Island, and has proved to be abundant in collections from Japan and the south China Sea. CAMPBELL (1971) recorded it from south Queensland and so it is not surprising to find it amongst the fauna of New Caledonia.

Epigodromia rotunda sp. nov.

Figs 11 a-h, 18 f.

MATERIAL EXAMINED. — **New Caledonia**. MUSORSTOM 4 : stn DW 207, 22°39.00'S, 167°07.40'E, 220-235 m, 28.09.1985 : 1 ♀ 4.2 x 4.8 mm.

TYPE. — Holotype : 1 ♀, 4.2 x 4.8 mm from MUSORSTOM 4, stn DW 207 (MNHN-B 22576).

DESCRIPTION. — Carapace longer than wide, very convex, almost semi-circular in lateral cross-section. Regions well defined, covered in many small rounded granules and a few tubercles. A shallow frontal groove extends back towards a well-defined urogastric area which has a single median tubercle, followed by a well-defined mesogastric area and cardiac area which is surrounded (except anteriorly) by an agranulate surface. On each side of medial area is a prominent tubercle, opposite the urogastric tubercle, making a line of three together. Branchial region has three separate granulated humps, first behind postorbital corner, the others increasing in size as they

curve around posteriorly. Front tridentate, median tooth small, deflexed, lateral teeth prominent, bluntly rounded, granulated. It is difficult to recognize a distinct anterolateral margin, but extending from near the smaller subhepatic tubercle are two larger tubercles which might be counted as teeth. These are followed by a gap marking branchial groove, behind which is a larger, granulate posterolateral tooth. Posterolateral margins granulated, convergent.

Eave-like supraorbital margin which is unevenly granulate so that a distinct supraorbital tooth is not evident (left and right margins of the only known specimen are different). Postorbital corner granulate although flush with carapace surface. No fissure separates suborbital margin which has a strong blunt tooth, not visible dorsally.

First segment of antenna much wider than long, wedge-shaped, lateral margin narrow, medial margin wider, beaked, not gaping, upper lobe serrated and overhanging lower lobe. Second segment slightly longer than wide, granulate, a row of larger granules along centre, distomedial corner produced as a blunt spine on which third segment is inserted at an angle. Exopod firmly fixed to second segment, granulate, broad in side view, tip not bilobed but sloping and reaching as far as joint between third and fourth segments. Epistome triangular, flat, adorned by eight-nine small granules.

Subhepatic region inflated, granulate, two, unequal, granulated tubercles low down near corner of buccal frame which is marked by a prominent blunt tooth beside a distinct groove. Female sternal grooves end apart between bases of second legs, but the present specimen is immature.

Chelipeds small, merus trigonal, borders granulated, two prominent distal tubercles. Carpus with granules which tend to be arranged in four longitudinal rows and two large distal tubercles. Propodus decorated with similar rows of granules. Fingers downcurved, hollowed out internally, armed with five-six small teeth which close along entire length.

First two pairs of legs similar in size to chelipeds. Meri, carpi, and propodi have several large distal tubercles. Dactyli longer than propodi, inner margins armed with four small spines, increasing in size distally.

Last two pairs of legs not especially tuberculated, reduced. Third pair shortest, dactyl opposed by a single propodal spine. Fourth pair subdorsal, extending across posterolateral corner of carapace, dactyl also opposed by a single propodal spine.

Abdomen of six free granulated segments. Female telson wider than long, tip rounded. Uropod plates large and visible externally. Abdominal locking mechanism consists of uropod plate fitting in front of serrated flange on bases of first legs. A prominent feature of abdomen is presence of a pair of large submedial, pearl-like, tubercles on fourth abdominal segment.

Male characters unknown.

ETYMOLOGY. — The specific name of this species refers to the rotund shape of the carapace.

DISCUSSION. — *Epigodromia rotunda* sp. nov. can be distinguished from *E. areolata* by the almost straight supraorbital margin without a supraorbital tooth, an indistinct anterolateral margin without distinct teeth and the presence of a granular posterolateral tooth. Similarly, it may be distinguished from *E. rugosa* sp. nov. by the inflated, more heavily granular carapace which is longer than wide, the absence of distinct anterolateral teeth, and absence of a supraorbital tooth. Only a single immature female specimen is available and thus the male characters are unknown.

CAMOUFLAGE. — The only known specimen was not accompanied by a camouflage cap but it seems likely that *E. rotunda* may, like the other species in this genus, not usually carry concealment.

DEPTH. — The type specimen came from a depth of 235 m which is considerably deeper than most of the material of the other species in this genus : *E. granulata* seems to only occur in shallow water (0-? 3 m), *E. rugosa* sp. nov. (38-45 m), *E. globosa* (50 m), *E. gilesii* (30-80 m), *E. nodosa* (65-100 m), *E. areolata* (30-350 m), while the depth of *E. ebalioides* is unknown. Only *E. areolata* is found as deep as *E. rotunda*.

DISTRIBUTION. — *Epigodromia rotunda* sp. nov. is only known from New Caledonia.

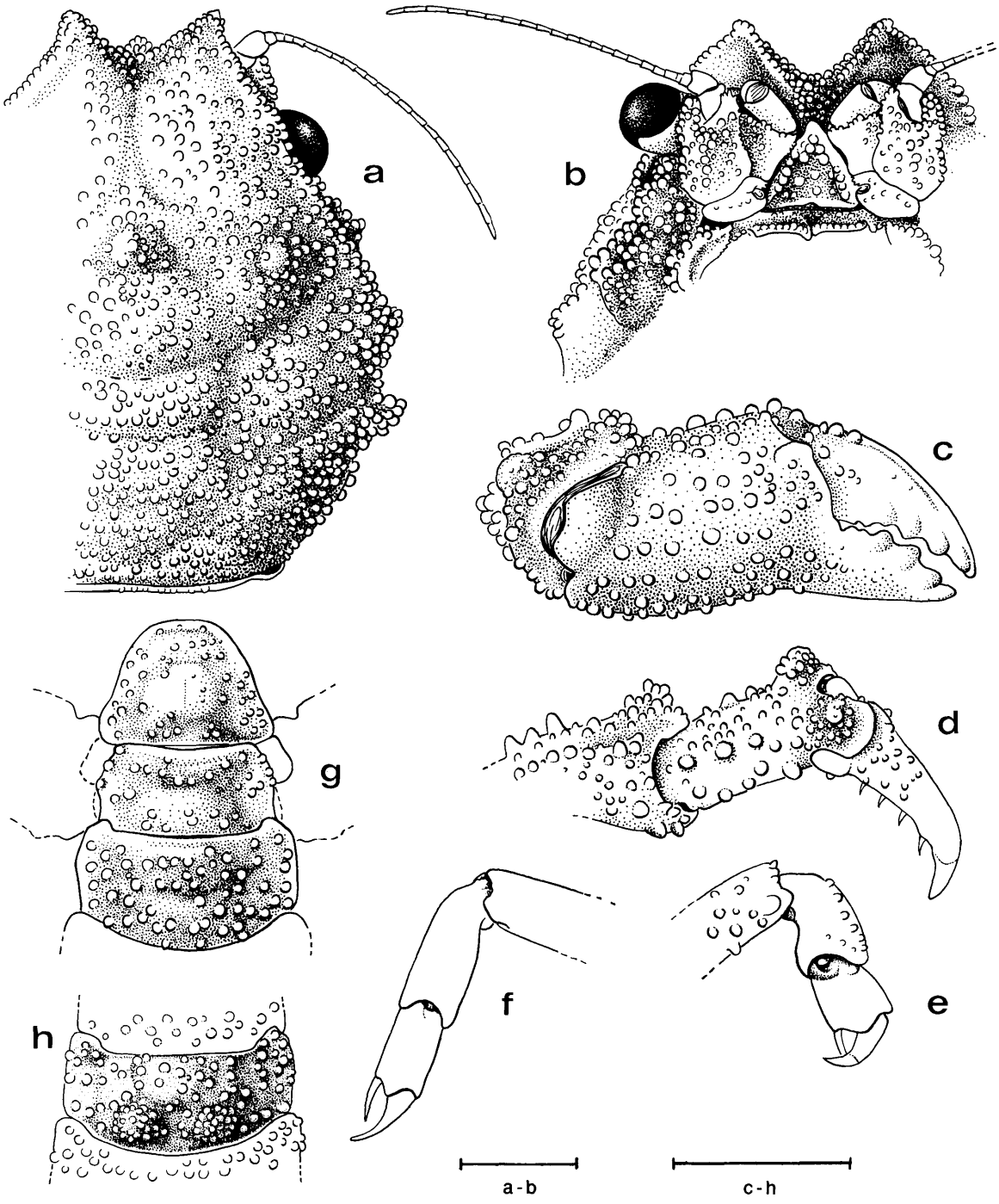


FIG. 11. — *Epigodromia rotunda* sp. nov., ♀, holotype, 4.2 x 4.8 mm, New Caledonia, MUSORSTOM 4, stn 207, 220-235 m (MNHN-B 22576) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area and anterolateral margin; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of left fourth leg; **g**, ventral view of telson and terminal segments of female abdomen; **h**, ventral view of detail of fourth segment of female abdomen.

Scale bars represent 1.0 mm.

Epigodromia rugosa sp. nov.

Fig. 12 a-h

MATERIAL EXAMINED. — **New Caledonia.** LAGON : stn 723, 21°21.6'S, 165°56.7'E, 45 m, 12.08.1986 : 1 ♂ 9.7 x 8.5 mm. — Stn 736, 22°06.7'S, 166°58.4'E, 44-45 m, 12.08.1986 : 1 ♀ 7.4 x 6.5 mm. — Stn 850, 20°42.1'S, 165°09.5'E, 38 m, 11.01.1987 : 1 ♀ 11.2 x 9.8 mm.

TYPE.— Holotype : 1 ♀, 11.2 x 9.8 mm from LAGON, stn 850 (MNHN-B 22578). Paratype : 1 ♂ , 9.7 x 8.5 mm from LAGON, stn 723 (MNHN-B 22577).

DESCRIPTION. — Carapace wider than long, convex, surface sculptured with some raised granulated areas, intervening areas smooth. Sculpturing somewhat concealed by a thin covering of short, fine setae. Regions well marked, frontal groove evident, as are cervical and branchial grooves. Cervical groove separates a pair of prominent tubercles on either side. Urogastric region well marked, containing a pair of protuberances. Cardiac region also well marked. A line of small granules runs along behind branchial groove on to posterolateral tooth. Rostrum tridentate, teeth short, blunt. Median tooth on a lower level, horizontally directed. Lateral teeth verticolaterally directed. Anterolateral margin begins at a level just below suborbital tooth, with three teeth. First anterolateral tooth, granulated, lateral to orbit, separated by a larger distance from two other similar teeth. Posterolateral tooth, behind branchial notch, is largest and directed laterally, as is third anterolateral tooth.

A distinct blunt supraorbital tooth. Small orbital fissure separates suborbital margin which has a single blunt tooth near medial corner. Close by this tooth is a similar subhepatic tubercle, lateral and slightly below, with another subhepatic tubercle even lower. All three, i.e. suborbital, and two subhepatic tubercles, are all visible dorsally.

First segment of antenna wider than long, beaked medially, upper lobe of beak downcurved and overhanging lower lobe. Second segment much longer than wide, sparsely granulated, in central distal region is a cluster of three granules forming a raised area, distomedial corner produced as curved acute spine on which third segment is inserted at an angle. Exopod firmly fixed, union marked by a distinct groove, tip shelf-like with inner margin produced and curving over base of eyestalk, extending as far as joint between third and fourth antennal segments. Ratio of length of antennal flagella to CW = 0.46.

A blunt lobe at corner of buccal frame and a distinct groove running from beside this lobe around under anterolateral margin towards posterolateral tooth. The female specimens are immature, but faint sternal grooves end apart between bases of second legs.

Chelipeds well developed. Merus trigonal, borders armed with small granules. Carpus with small granules which tend to be arranged in longitudinal rows, one prominent proximolateral tubercle, two similar distal tubercles and a pair of small granules at superior, inner distal corner. Upper face of propodus granulated, outer face largely smooth. Fingers downcurved, hollowed out internally, fixed finger armed with seven blunt teeth, dactyl with a large proximal tooth followed by a gap and then five teeth increasing in size distally.

First two pairs of legs smaller than chelipeds. Carpi with three longitudinal rows of granules on superior face and distal margin bluntly lobed. Propodi with scattered granules, distal margin lobed. Dactyli as long as propodi, strongly curved at tip, inner margins with four-five small spines increasing in size distally and a distinctive proximal pearl-like knob on posterior face, articulating with penultimate segment.

Last two pairs of legs very reduced, third pair smallest, fourth pair subdorsal. Dactyli on both legs opposed by single propodal spines.

Abdomen of six free segments. Male telson distinctly wider than long, tip rounded with lateral corners bluntly produced. Female telson also wider than long, but tip broadly rounded. Uropod plates well developed, visible externally. Abdominal segments with a broad rounded median ridge. Abdominal locking mechanism consists of concave margins of penultimate abdominal segment against serrated flange on bases of first legs and uropod plate locking in front of flanges.

First male pleopod a semi-rolled, setose tube with sharp, horny tip; second pleopod simple, needle-like.

ETYMOLOGY. — The specific name of this species is derived from the Latin *rugosus* and refers to the sculptured surface of the carapace.

DISCUSSION. — Compared to the other species of *Epigodromia*, *E. rugosa* has a CW/CL ratio which is larger, the carapace surface is only sparsely granular, the anterolateral margin has three distinct teeth, and segments of the abdomen are without granules.

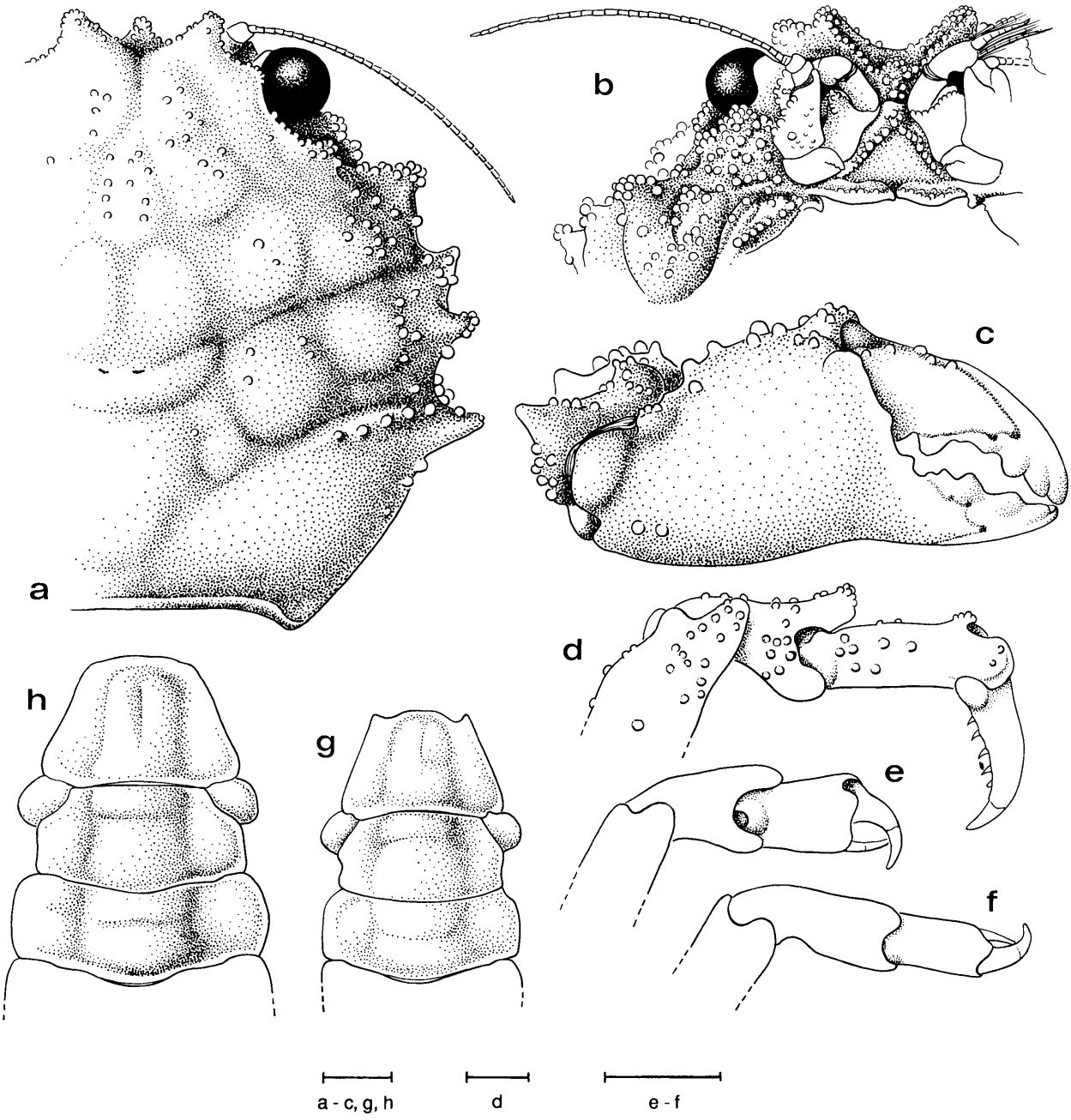


FIG. 12. — *Epigodromia rugosa* sp. nov. : **a-g**, ♂, paratype, 9.7 x 8.5 mm, New Caledonia, LAGON, stn 723, 45 m (MNHN-B 22577) : **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area and anterolateral margin; **c**, outer face of right cheliped; **d**, posterior view of terminal segments of right second leg; **e**, posterior view of terminal segments of right third leg; **f**, posterior view of terminal segments of right fourth leg; **g**, ventral view of telson and terminal segments of male abdomen. — **h**, ♀, holotype, 11.2 x 9.8 mm, New Caledonia, LAGON, stn 850, 38 m (MNHN-B 22578) : ventral view of telson and terminal segments of female abdomen.

Scale bars represent 1.0 mm.

CAMOUFLAGE. — None of New Caledonian specimens were accompanied by pieces of camouflage.

SIZE. — The size of *E. rugosa* is within the range (maximum CW = 19 mm) of the other species in this genus. Both female specimens, CW = 7.4-11.2 mm, are immature perhaps indicating that females do not mature until they are larger, but some may still mature within this size range. If this is true, *E. rugosa* may have a larger maximum body size than the other species.

DEPTH. — The depth range, 38-45 m, of *E. rugosa* is similar to other *Epigodromia* species.

DISTRIBUTION. — *Epigodromia rugosa* sp. nov. is only known from New Caledonia.

CHARACTER	*Epipedodromia*	*Homalodromia*
Ratio CW/CL	Carapace as wide as long.	Carapace width less than length.
Carapace surface	Minutely granulate.	Smooth.
Rostrum	Bidentate, eave-like.	Bidentate, teeth subacute, on broad, prominent eaves.
Anterolateral margin	Teeth absent.	Teeth very small, not visible dorsally.
Antenna	Distomedial corner of second segment produced. Exopod as long as third segment.	Distomedial corner of second segment strongly produced. Exopod as long as third segment.
Sternal grooves	End apart between chelipeds on a sinuous raised ridge.	End apart on tube-like structures behind chelipeds.
Epipod/Podobranchs	No epipods or podobranchs on pereiopods.	No epipods or podobranchs on pereiopods.
First two pairs of legs	Longer than chelipeds, segments smooth.	Longer than chelipeds, segments smooth.
Last two pairs of legs	Third leg shortest, dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg shorter than first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.	Third leg dactyl opposed by one propodal spine, no spine on outer propodal margin. Fourth leg about as long as first leg, dactyl opposed by one propodal spine, no spine on outer propodal margin.
Abdominal segments	No segments fused, surface smooth.	No segments fused, surface smooth.
Uropods	Absent.	Small, visible externally. Abdominal locking mechanism used.
Telson	Rounded.	Rounded.
Male pleopods	First sharply tipped, second without exopod on basis.	First sharply tipped, second without exopod on basis.

TABLE 8 — Comparison of the key characteristics of the genera *Epipedodromia* André, 1932, and *Homalodromia* Miers, 1884.

Genus ***EPIPEDODROMIA*** André, 1932

Platydromia Fulton & Grant, 1902a : 57.
Epipedodromia André, 1932 : 180.

Carapace as wide as long, flattened, subpentagonal in outline, margins with short stiff setae, surface minutely granulate. Rostrum bidentate, frontal margin strongly deflexed, above and behind the front is a prominent arcuate ridge divided into four equal parts by deep grooves. No anterolateral teeth. Epistome almost entirely fused to rostrum. Female sternal grooves end apart behind chelipeds. Chelipeds without an epipod, smaller than first two

pairs of legs which are fringed with short setae. Last two pairs of legs reduced, third pair shortest, merus of fourth leg almost as long as lateral margin of carapace. Dactyli of both legs opposed by single propodal spines. Abdomen of six free segments, telson rounded, uropod plates absent. Abdominal locking mechanism involves raised knob on bases of first legs.

TYPE SPECIES.— *Platydromia thomsoni* Fulton & Grant, 1902, by monotypy. *Epipedodromia* being a replacement name for *Platydromia* Fulton & Grant, 1902, has the same type species.

DISCUSSION. — The replacement generic name of *Epipedodromia* was necessary because *Platydromia* was preoccupied by *Platydromia depressa*, Brocchi, 1877. *Epipedodromia thomsoni* is most closely related to *Homalodromia* (see Table 8).

Epipedodromia thomsoni is known only from southern Australia and is a small, maximum CW = 11.5 mm, shallow water species with a maximum depth of 60 m. The camouflage material used by this species is unknown.

Genus ***HOMALODROMIA*** Miers, 1884

Homalodromia Miers, 1884 : 553.
Lasiodromia Alcock, 1901 : 56. — IHLE, 1913 : 51. — SAKAI, 1976 : 27.
Pseudodromia Alcock, 1900 : 149 (in part).

Carapace longer than wide, flattened, but rising steeply at front, little convex behind, smooth but remarkably tomentose. Rostrum bidentate, two prominent lobes, each of which is broadly bifid. Epistome triangular united with front. Coxae of third maxillipeds separated by a narrow gap and inserted under tip of sternum. Female sternal grooves end apart on tubular prominences, nearly in contact at their bases, just behind chelipeds. Cheliped without an epipod, little more massive than first two pairs of legs. None of these limbs verrucose or dilated. Inner margins of dactyli of first two pairs of legs armed with several small spines. Last two pairs of legs very unequal. Third pair of legs shortest, dactyl opposed by a single propodal spine. Fourth pair almost as long as either of first two pairs, dactyl opposed by a single propodal spine. Abdomen of six free segments. Uropod plates well developed, visible externally, used in male abdominal locking mechanism by locking in front of serrated ridge on bases of first legs.

TYPE SPECIES. — *Homalodromia coppingeri* Miers, 1884, by monotypy. *Lasiodromia* Alcock, 1901, being a replacement name for *Homalodromia* Miers, 1884, has the same type species.

DISCUSSION. — This generic definition is based on MIERS (1884) and ALCOCK (1901) with the addition of details about the uropods and abdominal locking mechanism (see Table 8).

Most authors have used the generic name *Lasiodromia* Alcock, 1901. This name was created because ALCOCK believed that *Homalodromia* was too similar to *Homolodromia* A. Milne Edwards, 1880, and would therefore be confusing. Although *Lasiodromia* was a very apt name, alluding to the long, shaggy fringe across the anterior border of the carapace, *Homalodromia* has priority. *Homalodromia* Miers, 1884, is not a junior homonym of *Homolodromia* A. Milne Edwards, 1880, because of Art. 56c of the Code (the one-letter difference clause).

Epipedodromia André, 1932, is a monotypic genus whose only species, *E. thomsoni* (Fulton & Grant, 1902), is most closely related to *Homalodromia*. In addition, there is undescribed material from Australia which includes additional species, belonging to new, related genera. All of these species come from shallow coastal waters.

Epipedodromia thomsoni may be distinguished from *Homalodromia coppingeri* because the lateral rostral teeth form a continuous eave over the eyes, behind which the carapace rises to a prominent, arcuate, ridge divided into four lobes. Furthermore, uropod plates are absent from the abdomen and the female sternal grooves end apart on a sinuous raised ridge behind the chelipeds.

DISTRIBUTION. — *H. coppingeri* was originally described using an adult female from Providence Reef, Seychelles, collected by H.M.S. "*Alert*". Subsequent records are from the Indo-West Pacific.

Homalodromia coppingeri Miers, 1884

Fig. 13

Homalodromia coppingeri Miers, 1884 : 554, pl. 50, fig. 8. — RATHBUN, 1911 : 195.
Lasiodromia coppingeri - ALCOCK, 1901 : 57, pl. 3, figs 15, 15a.
Lasiodromia coppingeri var. *unidentata* Ihle, 1913 : 51. — ODAWARA, 1963 : 18, text fig. 1. — SUZUKI & KURATA, 1967 : 89, 95, pl. 8, fig. 1. — SAKAI, 1976 : 27, text fig. 15.
Lasiodromia unidentata - TAKEDA, 1977 : 73.
Pseudodromia quadricornis Alcock, 1900 : 149.

MATERIAL EXAMINED. — **New Caledonia**. LAGON : stn 65, 22°29.2'S, 166°26.3'E, 24 m, 20.08.1984 : 1 ♀ 5.0 x 6.1 mm. — Stn 556, 22°48.0'S, 166°51.9'E, 24-31 m, 16.07.1985 : 1 ♀ 7.8 x 9.0 mm.

Chesterfield Islands. CHALCAL 1 : stn DC 37, 19°54.00'S, 158°46.30'E, 50 m, 22.07.1984 : 1 ♀ (ovig.) 6.1 x 7.5 mm, carrying a sponge cap.

Hawaiian Islands. "*Albatross*" : stn 3847, South Coast of Molokai Island, 42 m, 8.04.1902 : 1 ♂ 4.5 x 5.8 mm, carrying a sponge cap (USNM 55983).

DESCRIPTION. — Carapace longer than wide, rising steeply at front, convex laterally, smooth when denuded of long, coarse setae. A dense fringe of long setae atop the swollen anterior half of the carapace is characteristic. Frontal groove separates two low gibbosities, branchial groove distinct. Rostrum bidentate, no median rostral tooth. Lateral teeth very prominent, acute and fused with acute supraorbital tooth to form a broad eave over bases of antennae and antennules, and base of eyes. This arrangement makes the front appear as though it consists of four similar teeth. Lateral rostral teeth directed anteriorly but supraorbital teeth curved upward. Anterolateral margins subparallel, beginning at level just above orbit, bearing a single small tooth which is directed anterolaterally but downward and therefore not visible dorsally. Posterolateral tooth small, blunt. Posterolateral carapace margins converging. Posterior carapace margin straight.

Entire orbit not overhung by eave, postorbital corner produced as an acute laterally directed tooth. Narrow fissure separates suborbital lobe which is armed with an acute deflexed tooth.

First segment of antenna wider than long, beaked medially, gaping, upper lobe shortest. Second segment much longer than wide, distomedial corner produced as a blunt spine on which third segment is inserted at an angle. Exopod firmly fixed, tip bilobed, reaching joint of third and fourth segments, inner lobe curving over base of eyestalk. Epistome triangular, smooth.

Subhepatic area inflated and smooth except for a small tubercle medial to the anterolateral tooth. In an immature female specimen the sternal grooves are faint and end apart between bases of second legs, but in mature females the sternal grooves converge and run parallel between bases of first legs, diverging a little, and ending on the underside of prominent tubular structures just behind chelipeds.

Chelipeds small, borders of merus minutely granulated. Carpus with one small central, blunt tubercle and two large acute tubercles. Propodus with a few minute granules on superior border. Propodus curves upwards from its joint with carpus and fingers are curved downward, giving a peculiar angular appearance to the limb. Fingers have four-five obsolete teeth which all interlock.

First two pairs of legs covered with long coarse setae, limbs as long as chelipeds, smooth. Dactyli shorter than propodi, slightly curved, inner margin armed with three small spines, increasing in size distally.

Last two pairs of legs, covered with long coarse setae, limbs very unequal. Third pair shortest, dactyl long, curved, opposed by a single propodal spine. Fourth pair dorsally placed, when extended forward they reach orbit, dactyl long, curved, opposed by single propodal spine.

Abdomen of six free segments. Male abdomen with a weak medial ridge, telson as wide as long, tapered, posterior margin rounded. Uropod plates well developed, attached to anterior border of telson, elongate, with truncate margins and directed anteriorly. Uropod plates lock male abdomen by fitting in front of serrated ridge on bases of first legs. Female telson wider than long, narrowing near tip, strong median ridge along length of abdomen.

First male pleopod a semi-rolled tube with sharp, horny tip; second pleopod simple, needle-like.

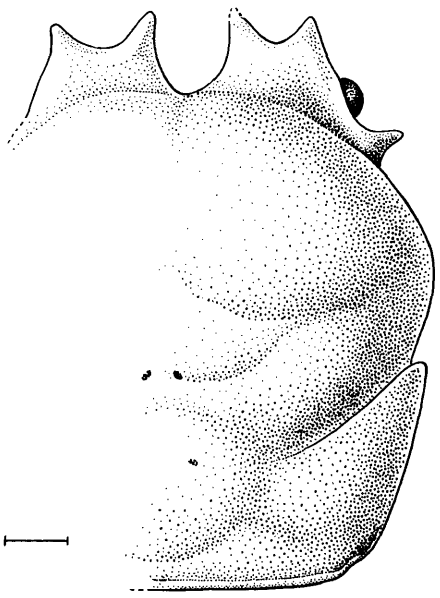


FIG 13. — *Homalodromia coppingeri* Miers, 1884, ♀ 7.8 x 9.0 mm , New Caledonia, LAGON, stn 556, 24-31 m (MNHN-B 22528) : dorsal view of frontal region and right half of carapace.
Scale bar represents 1.0 mm.

DISCUSSION. — ALCOCK (1900) described *Pseudodromia quadricornis* Alcock, 1900, on the basis of five specimens from the coast of Ceylon (Sri Lanka) but added the caveat that perhaps it was the same as *Homalodromia coppingeri* Miers, 1884. At the same time he synonymized *Homalodromia* Miers, 1884, with *Pseudodromia* Stimpson, 1858. However, ALCOCK (1901) later synonymized his species with *Homalodromia coppingeri* Miers, 1884, but erected the new genus *Lasiodromia* Alcock, 1901, for this species. MIERS (1884) described *Homalodromia coppingeri* from the Seychelle Islands, the type specimen being a small (6.7 x 7.3 mm), damaged female. Later IHLE (1913) described a separate variety, *H. coppingeri unidentata*, because of the presence of a small tooth on the anterolateral margin and a posterolateral tooth. I have compared the New Caledonian specimens with MIERS' type specimen (British Museum) and established that they are almost identical. In fact, MIERS overlooked the presence of the small anterolateral tooth and a nearby small sub-hepatic tubercle. Because they were omitted from his description, IHLE (1913) erected a new variety for the *"Siboga"* material. TAKEDA (1977) clearly recognized the presence of a small anterolateral tooth on his specimens from southwest Japan, and believed that IHLE's varietal name should be elevated to a full species and known as *Lasiodromia unidentata*. It is now clear that in fact only one species is involved and no separate variety is necessary. The only difference between the New Caledonian specimens and the type is the presence of a small posterolateral tooth. This structure only seems to be present in larger specimens.

SIZE. — A total of eighteen specimens (six males, seven females and five of unknown sex) have been reported. Maximum size for males is CW = 11.5 mm and for females CW = 11.6 mm but none of the New Caledonian specimens are larger. There have been no records of size at sexual maturity : the two largest females, CW = 6.1 and 7.8 mm, were mature but the smallest female (CW = 5.0 mm) did not have a mature sized abdomen, suggesting that size at maturation is around CW = 5-6.0 mm.

CAMOUFLAGE. — There have been no records of the type of camouflage material used by *H. coppingeri* but one specimen from New Caledonia and the Hawaiian specimen carried a piece of sponge.

DEPTH. — Previous records indicate a depth range of 35-50 m. The depth range for the New Caledonian material, 24-50 m, does not extend the maximum depth.

DISTRIBUTION. — Previous records of *H. coppingeri* are from the Seychelles, Sri Lanka, Laccadives, Indonesia, and Japan. TITGEN (1987) reported *Lasiodromia* sp. from Hawaii and, given the *Albatross* specimen reported here, his specimen may well belong to the present species. The New Caledonian specimens and the one from Hawaii, considerably extend the range of *H. coppingeri* southward and eastward, indicating that it is probably a widespread Indo-Pacific species.

DISCUSSION

Evolution of the Dromiidae

Some explanation should be given here of the ideas about evolutionary radiation within the family Dromiidae and the relationships between the genera. In his review of the dromiid genera, using a limited range of characters, BORRADAILE (1903a) suggested that *Hypoconcha*, *Conchoecetes*, and *Sphaerodromia* were the most primitive genera, with all the other genera being derived from them. He arranged these into three groups consisting of firstly, *Dromidiopsis*, *Dromides*, *Eudromia*, and *Dromidia*, secondly, *Lasiodromia*, and *Cryptodromiopsis*, and thirdly, *Dromia*, *Petalomera*, and *Cryptodromia*. However he added the caveat that this was a good example of a "kaleidoscopic shuffling of characters" and that it did not resolve the genera into unified groups. It is difficult to ascertain the basis of this arrangement but it seems to be aimed at separating genera with broad well-regioned bodies, and legs which are knobbed and ridged, from those with simple legs, and narrow bodies without trace of regions. BORRADAILE'S arrangement of genera does not seem to reflect any particular hypothesis about dromiid evolution but more an arrangement of convenience.

In my revision of the dromiid genera, I have had in mind a particular hypothesis about their evolution and this is reflected in the generic rearrangements made here. Elsewhere (McLAY, 1991), I have argued that *Sphaerodromia* is the most primitive genus not only because of the presence of podobranchs on the limbs and vestigial pleopods on the male abdomen but also because of the structure of spines around and on the dactyli of the legs. A key feature of dromiid crabs is the presence of spines opposed to the dactyli which can be used to form a sub-chelate mechanism on the last two pairs of legs for grasping pieces of camouflage. In *Sphaerodromia*, distal propodal spines and spines along the inner margins of the dactyli can be found on all four legs. My hypothesis is that this set of characters represents the ancestral condition from which the combinations of characters found in all other genera can be derived. In any one species of *Sphaerodromia*, we can see the gradual reduction in spines on the inner margin of the dactyl from the first to the last leg. This is accompanied by shortening of the propodus, curving of the dactyl, and increase in the number of spines opposing the dactyl. The first two pairs of legs are used for walking while the last two pairs are reduced, placed sub-dorsally and used for carrying pieces of camouflage. I suggest that the ancestral dromiid had four legs, used for walking, each similar to the first or second walking legs of *Sphaerodromia* with strong dactyli carrying numerous spines on the inner margin and with one or more distal propodal spines overlapping the base of the dactyl. From this one can derive any of the spine arrangements found in other dromiids, whether they are used for grasping sponges, ascidians or shells.

The primitive arrangement of propodal spines on the pereiopods can also be found in the Homolodromiidae Alcock, 1899 (see BAEZ & MARTIN, 1989). In these crabs the spines are much more numerous, and this along with other features (e.g. carapace shape, antennal structure, and pereiopodal podobranchs) perhaps indicates that they are a more primitive group than the Dromiidae. Radically different structures are found on the last pair of legs of the Homolidae De Haan, 1839, where the more proximal region of the propodal segment has been greatly elaborated to form an amazing variety of sub-chelate mechanisms (GUINOT & RICHER DE FORGES, 1981). Much greater use could be made of the structure of the last two pairs of legs of the primitive Brachyura to separate these families.

The direction of evolution in the Dromiidae has been towards loss of the habit of carrying camouflage, involving reduction of propodal and dactyl spines on all legs, further reduction in the size of the last two pairs of legs to the point where they are almost vestigial, and the development of a strongly ornamented carapace. In the two latter respects, they resemble the dynomenids except that both of the hind limbs are reduced instead of only the last limb. The relationships amongst the genera are complex, involving specialization, but they fall into two groups : a) species usually with and b) species usually without an epipod on the cheliped. In the first group the

most primitive genera are *Sphaerodromia*, and *Eodromia*, with the more advanced genera *Tunedromia*, *Lauridromia*, and *Dromidiopsis*, forming a cluster of larger crabs. Near to these is *Dromia*, and a group of smaller crabs including *Fultodromia*, and *Stimdromia*, with *Petalomera*, *Paradromia* and *Frodromia* being the most advanced in this group. Also there are two specialized genera, *Hypoconcha* and *Conchoecetes*, which are shell-carrying dromiids, whose relationships with the others is difficult to establish. While *Conchoecetes* probably belongs in the Dromiidae, the placement of *Hypoconcha* is doubtful (see below). Of the dromiids in the second group the most primitive genera are *Cryptodromiopsis*, *Dromidia*, *Exodromidia*, and *Austrodromidia*. The two genera, *Cryptodromia* and *Lasiodromia*, include small crabs which are more advanced, and a cluster including *Epigodromia*, *Barnardromia*, *Speodromia*, and *Takedromia* represent the most advanced genera in this group. *Pseudodromia* also lacks an epipod but is a group of species specialized for an intimate association with ascidians.

This briefly outlines my ideas on relationships amongst the dromiid genera but the hypothesis is based on morphology of the adults. Larval studies have provided information about development of the larvae or juveniles of ten genera : *Dromia* (LAUGHLIN, RODRIGUEZ & MARVAL, 1982, RICE, INGLE & ALLEN, 1970, WEAR, 1970, 1977, TERADA, 1983), *Lauridromia* (TERADA, 1983), *Dromidiopsis* (HALE, 1941), *Stimdromia* (MONTGOMERY, 1922, HALE, 1925), *Paradromia* (HONG & WILLIAMSON, 1986, TERADA, 1983), *Cryptodromiopsis* (RICE & PROVENZANO, 1966), *Austrodromidia* (HALE, 1925), *Cryptodromia* (TAN, LIM & NG, 1986), *Conchoecetes* (SANKOLLI & SHENOY, 1968), and *Hypoconcha* (KIRCHER, 1970, LANG & YOUNG, 1980). This information should be included in a more detailed future analysis of this family, but at the moment it is not particularly useful for determining the grouping of species into genera. Intensive studies of adult morphology have provided a sound basis for generic restructuring, but for the larval information to be used for this purpose, requires that this be equally well known. It is no use giving special emphasis to what appear to be unusual larval features unless the extent of variation of these features is known for other dromiid larvae.

Evolutionary relationships are also evident in the geographic distribution of the dromiids. It is clear that there have been four "theatres" of evolution in the radiation of dromiid crabs : these are a) the Atlantic, b) South Africa, c) southern Australia, and finally d) the remainder of the whole Indo-Pacific region. In the Indo-Pacific we find the greatest diversity including the most primitive genus, *Sphaerodromia*, along with *Dromidiopsis*, *Lauridromia*, *Dromia*, *Stimdromia*, *Cryptodromiopsis*, *Cryptodromia*, *Petalomera*, *Takedromia*, *Epigodromia* and *Conchoecetes*. All of these genera are very widespread, having some species which occur in the other regions. This region contains not only the most primitive genera, but also the more advanced genera such as *Stimdromia*, *Cryptodromia*, *Takedromia* and *Epigodromia*. These genera represent a relatively recent tropical radiation. The other three regions are characterized by some unique groups of genera. Besides several undescribed genera, Australia has *Haledromia*, *Fultodromia*, *Epipedodromia*, and *Austrodromidia* which is probably derived from *Cryptodromiopsis*. Several Australian species have direct development and many have very large eggs. South Africa has six endemic genera including *Pseudodromia*, *Exodromidia*, *Eudromidia*, *Dromidia*, *Barnardromia*, and *Speodromia* whose occurrence supports the hypothesis by KENSLEY (1981) of a "cool water stenothermic radiation" in this area. Like Australia, the South African fauna includes many species with very large eggs although none are known to have direct development. Both the South African and Australian unique genera seem to be of more ancient origin. In the Atlantic we find the major radiation of *Dromia* most of whose species are endemic to this sea. This radiation probably dates from the origin of the Atlantic ocean. Two other genera, not closely related to *Dromia*, are present in this area. *Cryptodromiopsis antillensis* undoubtedly shared a common ancestor with *C. larraburei* which originated from the Indo-Pacific. The other genus, *Hypoconcha*, is restricted to the east and west coasts of North and South America.

In order to examine the question of the unity of the Brachyura, SPEARS *et al.* (1992) carried out a phylogenetic study based on 18s rRNA and rDNA sequences found in, among others, *Hypoconcha arcuata* and *Cryptodromiopsis antillensis* (reported as *Dromidia antillensis*). The most important result, which is relevant to the question of inclusion or exclusion of the genus *Hypoconcha* from the Dromiidae, is that *H. arcuata* and *Cryptodromiopsis antillensis* are not closely related. This led SPEARS *et al.* to question whether the Dromiidae is a monophyletic group. There certainly are significant morphological differences between the adults of *Hypoconcha* and other dromiid genera particularly in the structure of the last two pairs of legs and the sternum. It may be justifiable to place this genus in a separate sub-family or family. The level could be influenced by whether or not the genus *Conchoecetes* is included along with *Hypoconcha*. The main features of the shape of the carapace of *Conchoecetes*

[redacted] are more like those found in other dromiids than is the case with *Hypoconcha*. It seems to me that this problem can only be solved by comparing all these crabs on a common basis of molecular data.

Relative Abundance and Depth Distribution

Almost two-thirds of the New Caledonian and Philippine specimens belong to five species : by far the most common species is *Lauridromia intermedia* (Laurie, 1906), followed by *Petalomera pulchra* Miers, 1884, *Cryptodromia* ? *coronata* Stimpson, 1858, *Dromidiopsis dubia* Lewinsohn, 1984, and *Epigodromia areolata* (Ihle, 1913). *L. intermedia* occurs from 7-150 m, *P. pulchra* 25-86 m (with one specimen from 240 m), *C. coronata* 15-47 m, *D. dubia* 14-75 m, and *E. areolata* 120-350 m. Thus most of the dromiids come from water shallower than 100 m (see Fig. 14). The maximum number of species occurs in the depth interval 20-60 m where up to 14 species are found, and in shallower or deeper water, the number of species declines. Six species are found in the interval 0-10 m, and one species, *Frodromia atypica*, was found at the maximum depth of 437 m. A similar pattern is found with the depth distribution of genera. The largest dromiid crab in this fauna, *Dromia dormia*, is a shallow water species.

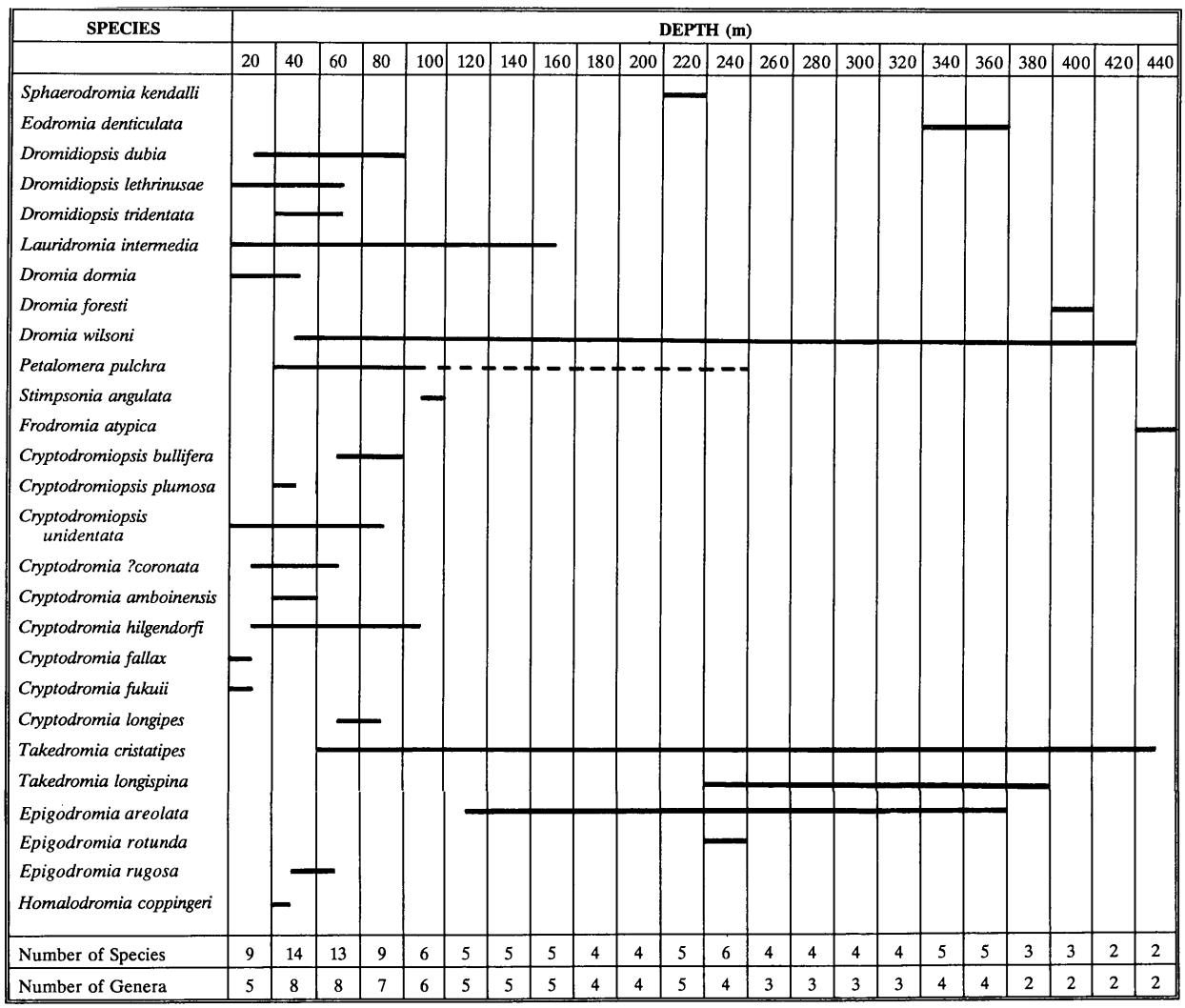


FIG. 14. — Depth distribution of the dromiids from New Caledonia and the Philippine Islands.

Reproductive Biology

Almost all the dromiid species recorded here reach sexual maturity at CW less than 8.0. mm. The smallest mature females, CW = 4.5 mm, were found in *Cryptodromia amboinensis* and *C. ? coronata* both of which probably do not grow to a very large size, perhaps only CW = 15.0 mm. Egg size ranged from 0.4 mm, (*Eodromia denticulata*) to 1.1 mm diameter (*Stimdromia angulata*) with the modal size class being 0.7-0.8 mm. While some species may have abbreviated development, there is no evidence of direct development amongst the dromiids from this region, unlike Australia where several dromiids without larval stages are known. The dromiids of New Caledonia and the Philippines are widely distributed species typical of an island, rather than continental, fauna. Egg number is largely explained by body size and ranged from only eight per clutch for *C. ? coronata* to approximately 24,000 for *Dromia dormia* which is by far the largest (CW = 200 mm) dromiid found in this region. There tends to be an inverse correlation between egg size and egg numbers but there is no clear relationship between egg size or egg number and depth. The data on reproductive biology will be analyzed in more detail in a subsequent publication.

Biogeography of New Caledonian and Philippine Dromiidae

Prior to the present study the only dromiid known from New Caledonia was *Cryptodromia fallax* (as *C. canaliculata*) recorded by TAKEDA and NUNOMURA (1976). This species is included in the present collection, along with the following species : *Eodromia denticulata*, *Dromidiopsis dubia*, *D. lethrinusae*, *D. tridentata*, *Lauridromia intermedia*, *Dromia dormia*, *D. foresti*, *D. wilsoni*, *Petalomera pulchra*, *Frodromia atypica*, *Cryptodromiopsis bullifera*, *C. plumosa*, *C. unidentata*, *Cryptodromia ? coronata*, *C. amboinensis*, *C. fukuii*, *C. hilgendorfi*, *C. longipes*, *Takedromia cristatipes*, *T. longispina*, *Epigodromia areolata*, *E. rotunda*, *E. rugosa*, and *Homalodromia coppingeri*. The New Caledonian dromiid fauna includes 25 species.

Excluding the six new species, known only from New Caledonia, the fauna has its greatest affinity with Japan (68% species in common), the Indian Ocean region (63%), Indonesia (58%), the Philippine Islands (47%), Australia (32%) and the Pacific eastward of New Caledonia (32%). Only two species, *Cryptodromiopsis unidentata* and *Dromia wilsoni* occur south of New Caledonia.

The only species previously known from the Philippine Islands were *Cryptodromia tuberculata*, *C. tumida*, *C. fallax* (as *C. canaliculata*), *Cryptodromiopsis bullifera*, *Dromia dormia* and *Stimdromia* sp. (see ALCALA, 1974, ESTAMPADOR, 1937, and WARD, 1941). To these can now be added *Sphaerodromia kendalli*, *Dromidiopsis lethrinusae*, *Lauridromia intermedia*, *Dromia wilsoni*, *Stimdromia angulata*, *Cryptodromiopsis unidentata*, *Cryptodromia amboinensis*, and *C. hilgendorfi* to make a total of 14 species.

The affinities of the Philippine dromiid fauna are with Japan (83% species in common), the Indian Ocean region (83%), Indonesia (58%) and Australia (42%). These are essentially the same relationships as for New Caledonia. There are only three species, *Dromia dormia*, *D. wilsoni*, and *Cryptodromiopsis unidentata*, shared eastward with the Pacific.

It must be pointed out that the apparent strong affinities of both the New Caledonian and Philippine dromiid faunas with Japan, and not with closer areas, must be tempered with the fact that the Japanese fauna is much better known than any other areas. Much remains to be discovered about the distribution of dromiids.

The most wide ranging of the New Caledonian and Philippine dromiids are *Lauridromia intermedia*, *Dromia dormia*, *D. wilsoni*, *Cryptodromiopsis unidentata*, *Cryptodromia hilgendorfi*, *C. fallax* and *C. tuberculata*. Of these all except *C. tuberculata* are shared. The only endemic dromiid species are the six new species described herein from New Caledonia.

At the generic level a similar picture of affinities emerges for both New Caledonia and the Philippines, with the most widely distributed genera being *Dromidiopsis*, *Lauridromia*, *Dromia*, *Stimdromia*, *Cryptodromiopsis*, and *Cryptodromia*.

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FIG. 15 a. — *Sphaerodromia kendalli* (Alcock & Anderson, 1894), ♀ 40.6 x 39.7 mm, Philippine Islands, MUSORSTOM 3, stn CP 143, 205-214 m (MNHN-B 22543) : dorsal view of the whole crab, setae removed from the right half of the carapace and terminal segments of the right cheliped and last three legs.

FIG. 15 b. — *Eodromia denticulata* gen. nov., sp. nov., ♀, holotype, 5.7 x 5.8 mm, New Caledonia - Norfolk Ridge, SMIB 5, stn DW 98, 335 m (MNHN-B 22544) : dorsal view of the whole crab.

FIG. 15 c. — *Dromidiopsis dubia* Lewinsohn, 1984, ♂ 13.2 x 16.2 mm, New Caledonia, LAGON, stn 619, 27-42 m (MNHN-B 22546) : dorsal view of the whole crab, setae removed from right half of carapace.

FIG. 15 d. — *Lauridromia intermedia* (Laurie, 1906), nov. comb., ♀ 44.4 x 44.3 mm, New Caledonia, "*Vauban*", St. Vincent Bay, 16 m (MNHN-B 22551) : dorsal view of whole crab, setae removed from right half of carapace and last leg.

FIG. 15 e-f. — *Dromidiopsis lethrinusae* (Takeda & Kurata, 1976), nov. comb., Chesterfield Islands, CORAIL 2, stn CP 127, 45 m, dorsal view of whole crab, setae removed from right half of carapace : **e**, ♀ 17.2 x 18.1 mm (MNHN-B 22547); **f**, ♂ 11.9 x 12.5 mm (MNHN-B 22548).

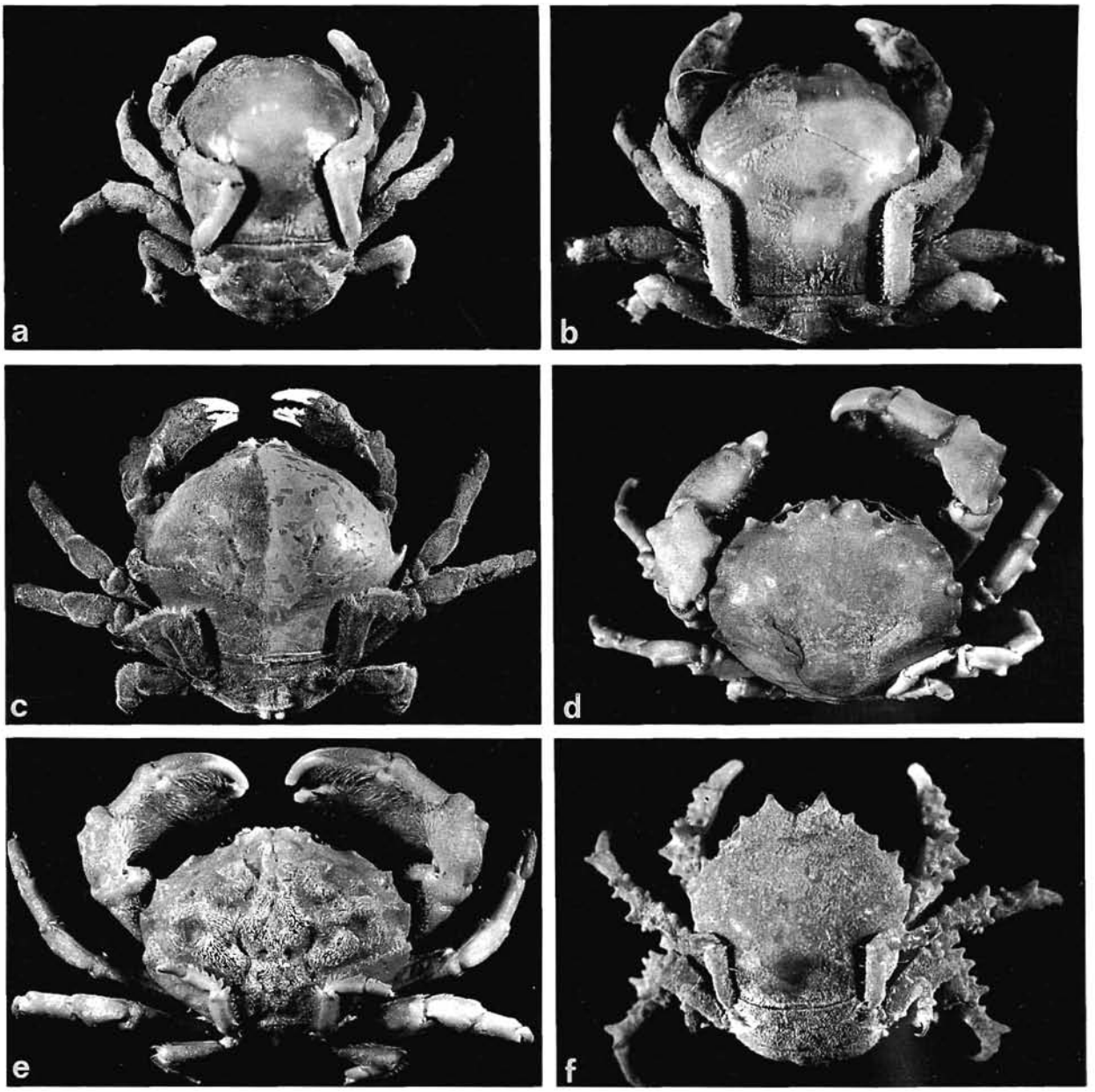

FIG. 16 a-b. — *Dromidiopsis tridentata* Borradaile, 1903, New Caledonia, LAGON, stn 554, dorsal view of whole crab, setae removed from the right half of the carapace which is cracked in the male : **a**, ♀ (ovig.) 12.0 x 12.7 mm (MNHN-B 22549); **b**, ♂ 12.0 x 12.7 mm (MNHN-B 22550).

FIG. 16 c. — *Dromia dormia* (Linnaeus, 1763), ♀ (ovig.) 112.2 x 95.6 mm, New Caledonia, Barrier Reef, 27.11.1986, 10-30 m (MNHN-B 22552) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 16 d. — *Dromia foresti* sp. nov., ♂, holotype, 27.3 x 23.0 mm, Chesterfield Islands (Bellona Reefs), MUSORSTOM 5, stn 299, 360-390 m (MNHN-B 22553) : dorsal view of whole crab.

FIG. 16 e. — *Dromia wilsoni* (Fulton & Grant, 1902), nov. comb., ♂ 47.7 x 34.8 mm, Loyalty Islands, MUSORSTOM 6, stn DW 460, 420 m (MNHN-B 22554) : dorsal view of the whole crab.

FIG 16 f. — *Stimdromia angulata* (Sakai, 1936) nov. comb., ♀ (ovig.) 7.8 x 7.6 mm, Philippine Islands, MUSORSTOM 3, stn CP 134, 92-95 m (MNHN-B 22557) : dorsal view of whole crab.

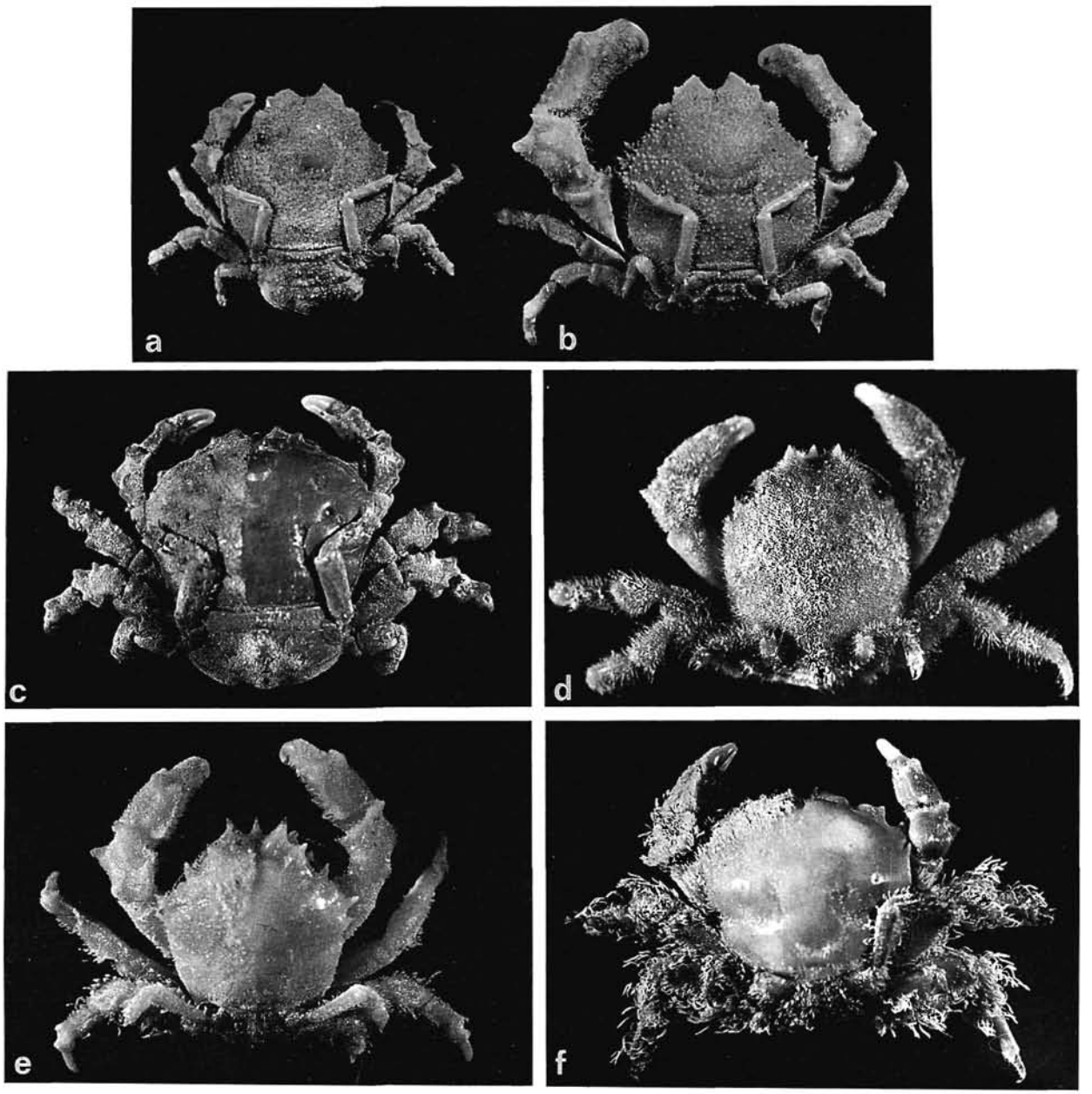

FIG. 17 a-b. — *Petalomera pulchra* Miers, 1884, Chesterfield Islands, CHALCAL 1, stn CP 12, 67 m, dorsal view of whole crab : **a**, ♀ 17.3 x 18.0 mm (MNHN-B 22555); **b**, ♂ 20.8 x 22.5 mm (MNHN-B 22556).

FIG. 17 c. — *Cryptodromia fukuii* (Sakai, 1936), nov. comb., ♀ 14.5 x 12.3 mm, New Caledonia (MNHN B-22094) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 17 d. — *Frodromia atypica* (Sakai, 1936) nov. comb., ♂ 8.2 x 9.7 mm, Loyalty Islands, MUSORSTOM 6, stn CP 464, 430 m (MNHN-B 22558) : dorsal view of whole crab.

FIG. 17 e. — *Cryptodromiopsis bullifera* (Alcock, 1900), nov. comb., ♂ 8.2 x 7.7 mm, Chesterfield Islands, CORAIL 2, stn DW 106, 62 m (MNHN-B 22561) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 17 f. — *Cryptodromiopsis plumosa* (Lewinsohn, 1984) nov. comb., ♂ 13.3 x 11.7 mm, Chesterfield Islands, CORAIL 2, stn DW 84, 16-26 m (MNHN-B 22562) : dorsal view of whole crab, setae removed from right half of carapace.

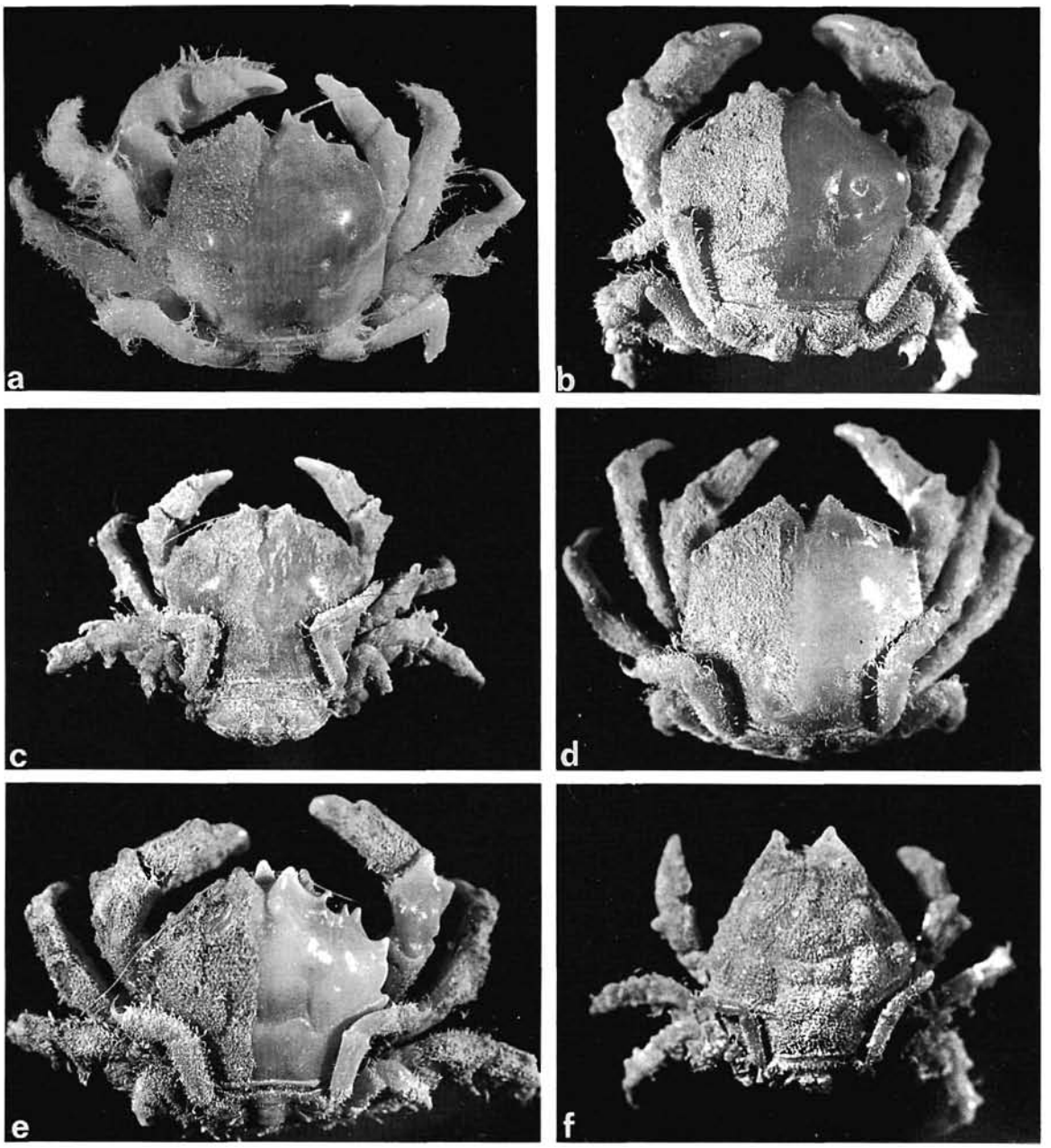

FIG. 18 a. — *Cryptodromiopsis unidentata* (Rüppell, 1830) nov. comb., 13.0 x 13.9 mm, New Caledonia, LAGON, stn 553, 35-40 m (MNHN-B 22563) : dorsal view of whole crab, setae removed from right half of carapace and limbs.

FIG. 18 b. — *Cryptodromia ? coronata* Stimpson, 1858, ♂ 11.5 x 10.7 mm, New Caledonia, LAGON, stn 405, 27 m (MNHN-B 22565) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 18 c. — *Cryptodromia amboinensis* De Man, 1888, ♀ (ovig.) 6.2 x 5.3 mm, New Caledonia, LAGON, stn 481, 33 m (MNHN-B 22566) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 18 d. — *Cryptodromia hilgendorfi* De Man, 1888, ♂ 9.2 x 8.9 mm, New Caledonia, LAGON, stn 48, 28 m (MNHN-B 22567) : dorsal view of whole crab, setae removed from right half of carapace.

FIG. 18 e. — *Cryptodromia fallax* (Lamarck, 1818), ♂ 10.2 x 9.0 mm, New Caledonia, Port Brise, intertidal (MNHN-B 22568) : dorsal view of whole crab, setae removed from right half of carapace, carpus of right cheliped, and last two pairs of legs.

FIG. 18 f. — *Epigodromia rotunda* sp. nov., ♀, holotype, 4.2 x 4.8 mm, New Caledonia, MUSORSTOM 4, stn 207, 220-235 m (MNHN-B 22576) : dorsal view of whole crab.

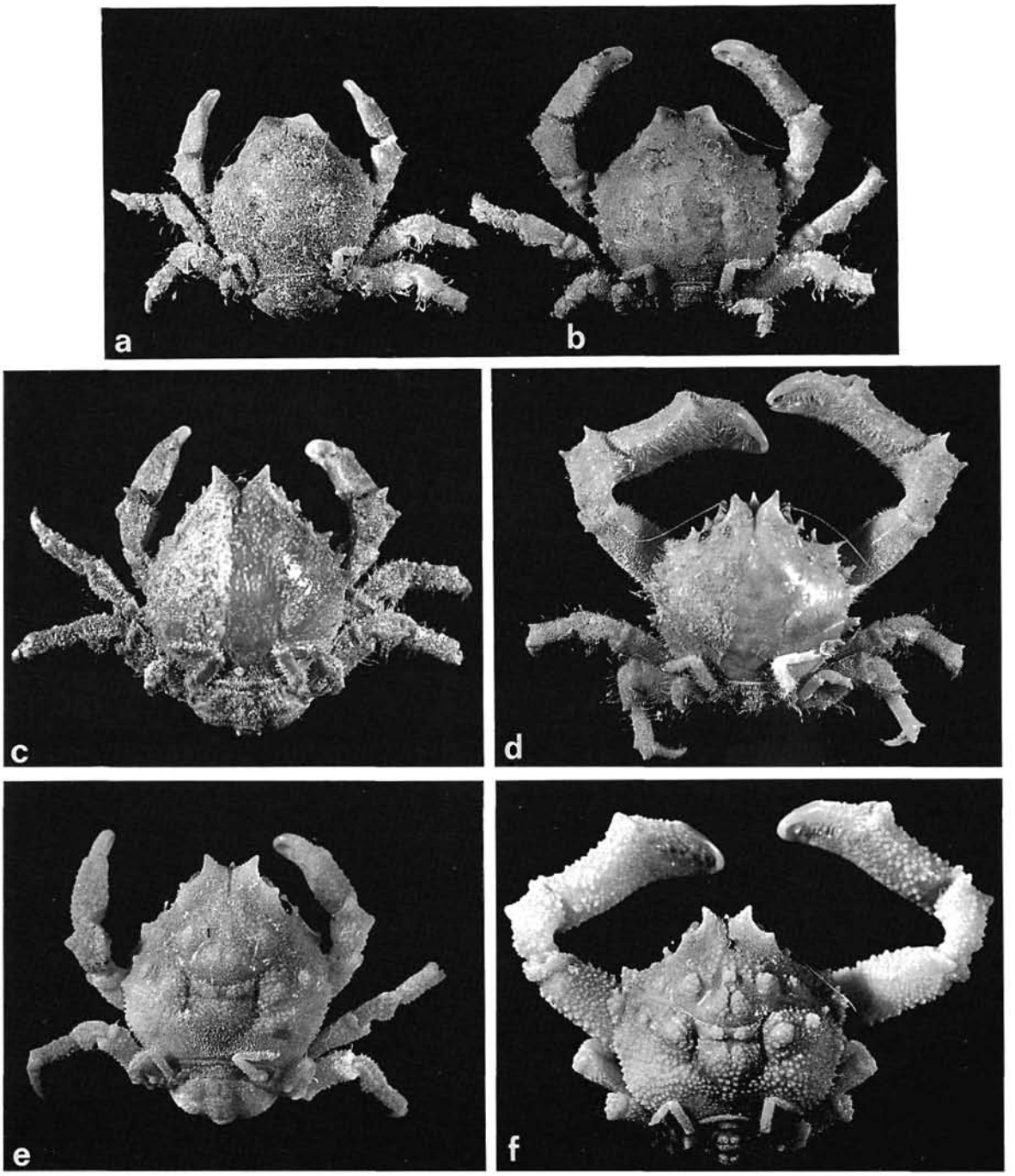

FIG. 19 a-b. — *Takedromia cristatipes* (Sakai, 1969) nov. comb., dorsal view of whole crab : **a**, ♀ 13.0 x 11.9 mm, New Caledonia, MUSORSTOM 4, stn CP 193, 430 m (MNHN-B 22570); **b**, ♂ 14.0 x 12.8 mm, d'Entrecasteaux Reefs, MUSORSTOM 4, stn 181, 355 m (MNHN-B 22571).

FIG. 19 c-d. — *Takedromia longispina* gen. nov., sp. nov., dorsal view of whole crab, setae removed from right half of carapace : **c**, ♀, paratype, 10.0 x 11.0 mm, Chesterfield Islands, CHALCAL 1, stn DC 31, 230 m (MNHN-B 22573); **d**, ♂, holotype, 13.2 x 11.2 mm, New Caledonia, MUSORSTOM 4, stn DW 183, 280 m. (MNHN-B 22572)

FIG. 19 e-f. — *Epigodromia areolata* (Ihle, 1913) nov. comb., dorsal view of whole crab : **e**, ♀ 7.2 x 7.1 mm, New Caledonia, LAGON, stn 387, 225 m (MNHN-B 22574); **f**, ♂ 14.4 x 12.3 mm, Chesterfield, MUSORSTOM 5, stn 290, 300 m (MNHN-B 22575).

INDEX

Family and genus names are given in capital letters, species names in italics. Bold species names indicate that the species are treated in detail.

Bold numbers indicate the pages where the subject is treated in detail.