COLOUR. — Light yellowish-brown body and limbs, fingers white. Antennae same colour as the body, not light blue as in *Dynomene hispida.*

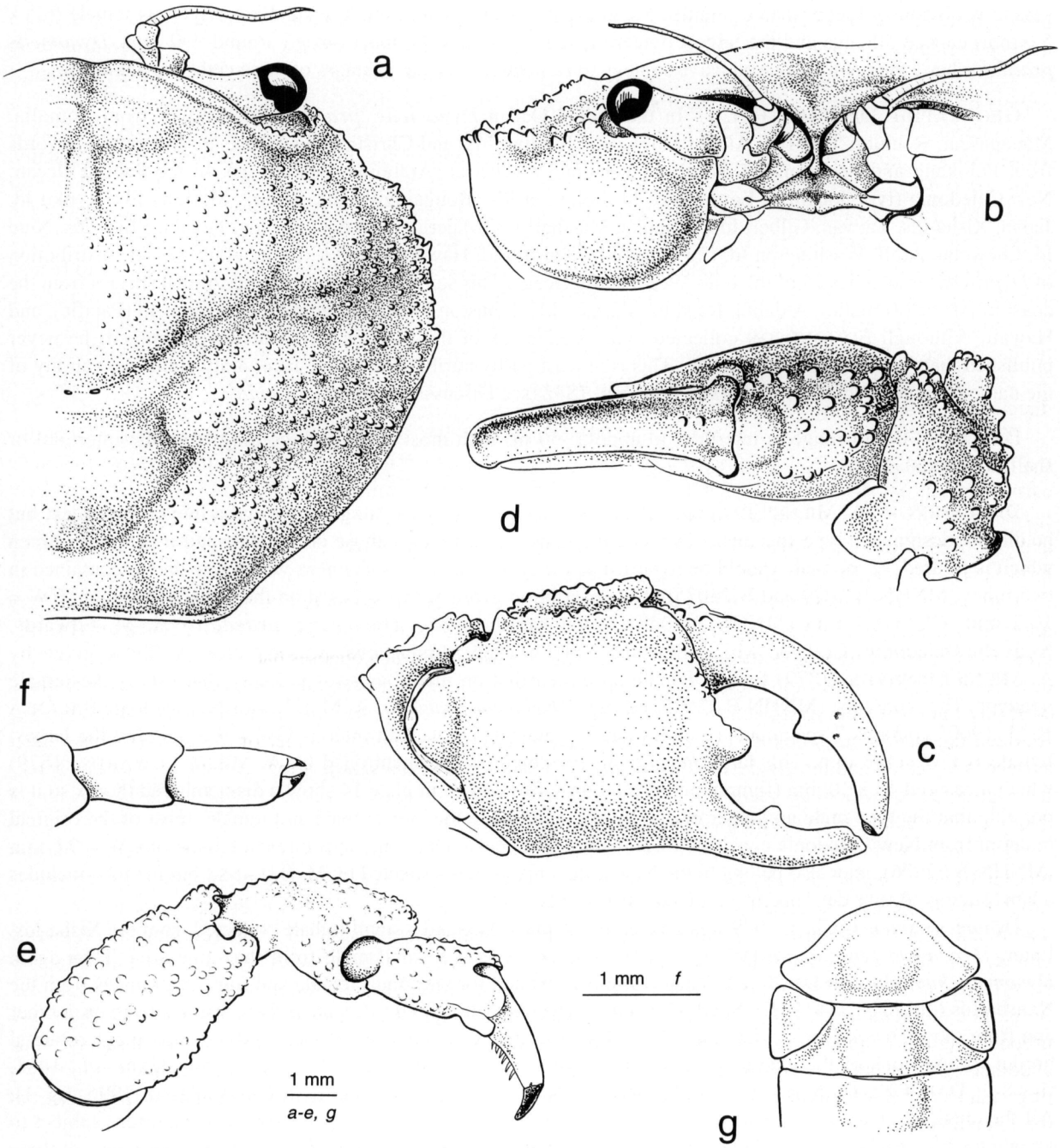

FIG. 19. — *Dynomene praedator* A. Milne Edwards, 1879: **a-g**, ♂ 13.5 x 10.7 mm, Nosy Be, Madagascar, A. CROSNIER coll.: **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, dorsal view of right cheliped; **e**, posterior view of terminal articles of right fourth pereopod; **f**, posterior view of terminal articles of right fifth pereopod; **g**, ventral view of telson and terminal segments of male abdomen.

SIZE. — The maximum size for males is 13.5 x 10.7 mm, for females 12.0 x 9.6 mm, while the smallest ovigerous female is 6.5 x 5.0 mm. SAKAI (1976) gives the maximum size for males as 16.0 x 13.0 mm, but this is probably based on the misidentification of *Metadynomene tanensis* (Yokoya, 1933). Ovigerous females have been recorded from January to June with eggs ready to hatch in January and new eggs in June so the breeding season is obviously longer than 6 months. Mean egg diameter = 0.46 mm. The smallest ovigerous female (6.5 x 5.0 mm) carried 50 eggs and the largest ovigerous female (12.3 x 9.6 mm) carried around 900 eggs. *Dynomene praedator* has a very similar reproductive strategy to *D. hispida*. The larval stages of these crabs are unknown.

GEOGRAPHIC DISTRIBUTION. — In the Indian Ocean *Dynomene praedator* is known from Somalia, Madagascar, Reunion, Coetivy, Aldabra Id, Cocos Keeling Ids, and Christmas Id. There are Indonesian records from Pelokang and Postiljon Ids, North Celebes and Moluccas (Amboina, Obilatu Id). In the Pacific Ocean: New Caledonia (type locality), Lord Howe Id, Solomon Ids (Bougainville Id), Samoa, Mariana Ids, Ryuku Id, Japan, Xisha Ids, Taiwan, Gilbert Ids, Aranuka, Marshall Ids, Majeru, Viti Levu, Fiji Ids, Tuvalu, Ellice Ids, Niue Id, Enewetak Atoll, Washington Id, Christmas Id, Johnston Id, Hawaii, Moorea, Tahiti, Rapa Id. The distribution of *D. praedator* includes all of the Indo-West Pacific Ocean. This study reports new records of this species from the coast of Africa (Somalia), Aldabra, Rapa Id, Mariana Ids, Johnston Id, Washington Id, Christmas Id (Pacific), and Hawaii. Although EDMONDSON collected many specimens of this species (see Material Examined) he never published their occurrence from Hawaii. This is at least partly attributable to the uncertainty about the validity of the name *Dynomene latreillii* Eydoux & Souleyet, 1842 (see Discussion under *D. hispida*).

DEPTH. — Depth range is intertidal to approx. 50 m, with most specimens coming from the intertidal or shallow subtidal depths.

DISCUSSION. — A. MILNE EDWARDS (1879) described this species using a male and a female specimen, but he did not designate a type specimen. The measurements given first are those of the male and it is this specimen which is figured, so the male should be regarded as the type. The eight specimens which remain are contained in two tubes (MNHN-B 7029 and B 22075). The description given above is based on the female specimen, CW = 10.2 mm, CL = 8.1 mm (MNHN-B.7029) which has the label "*Dynomene praedator* A. M. Edwards, Nouvelle Caledonie. Coll. A. Milne Edwards, 1903". These dimensions are very close to those given by A. MILNE EDWARDS (1879) for the female specimen that he mentions so it is likely that this is the female paratype. The other tube (MNHN-B 22075) labeled "*Dynomene praedator* A. M. Edwards N. Caledonie BALANSA 1873. 1900" contains 7 specimens (5 males and 2 females). The largest male is CW = 9.6 mm and the largest female is CW = 9.8 mm. This large male is smaller than the one mentioned by A. MILNE EDWARDS (1879) which measured 13 x 10 mm (figured on his plate 14). The figures in plate 14 show a dismembered thorax so it is possible that the type male no longer exists. In fact, apart from the largest male and female, most of the original material from New Caledonia consisted of immature specimens. One other specimen, a female of CW = 9.6 mm (MNHN-B 22076), may also belong to the New Caledonian series collected by M. BALANSA but the tube includes a label stating "BALSS det." and there are no other details available.

Dynomene sinensis Chen, 1979 was erected for a small male and a small female collected from the Xisha Ids. Later, *Dynomene tenuilobata* Dai *et al.*, 1981 was erected for a small male from the same area. Then again *Dynomene huangluensis* Dai, Cai & Yang, 1996 was created for one small female and four small males from the Nansha Ids (10°50'N, 114°10'E), South China Sea. The characters used to separate these species from each other and from other *Dynomene* species, especially *D. praedator*, were number of lobes on the carapace anterolateral border, proportions of the cheliped manus and male pleopods (see CHEN, 1979, fig. 1, 5-6; DAI *et al.*, 1981, figs 8-9; DAI *et al.*, 1986, fig. 12, 3-4; DAI & YANG, 1991, fig. 12, 3-4 and DAI, CAI & YANG, 1996, fig. 1). All the cheliped characters are sexually dimorphic and allometric, changing with size, and therefore subject to variation within each species and therefore clearly unsuitable for species definition. The overall appearance of these three species is very close to that of *D. praedator* and the male pleopods of *D. tenuilobata* and *D. huangluensis* are identical to those described above. Furthermore, the development of lobes or granules on the anterolateral margin of *D. praedator* is variable and, as noted above, it is the absence of distinct teeth on the anterolateral margin that

separates this species from *D. hispida*. All three species from the Xisha and Nansha Ids must be regarded as synonyms of *D. praedator*.

When studying the dynomenids from the Palau Ids, TAKEDA (1973) recorded both *Dynomene hispida* and *D. praedator*. He noted that in *D. hispida* ".. the anterolateral teeth are more prominent, regular and equidistant,..." than in *D. praedator*, where "..the anterolateral border is provided with five obtuse teeth...". Furthermore, he mentions that "In the smaller specimens from the Ryukyu Ids those teeth are spine-tipped". It is likely that these small specimens may be *D. hispida* rather than *D. praedator*.

In identifying *Dynomene praedator* it is important to realize that the tomentum does not completely obscure the body surface. SAKAI (1976) synonymized *Metadynomene tanensis* (Yokoya, 1933) with *D. praedator* but this was based on a misinterpretation of the nature of the tomentum. Further problems have arisen because of the somewhat inaccurate description and figures given by A. MILNE EDWARDS. This led CHEN (1979) to describe a new species, *Dynomene sinensis*, from the Xisha Ids, China. CHEN recognized the similarity of her specimens to *D. praedator* but believed that there were differences in the anterolateral margin, merus of the third walking leg, and dentition of the cheliped fingers. A close examination of a series of eight specimens from the type locality of *D. praedator* shows that the arrangement of tubercles on the anterolateral carapace margin is variable on the two sides of the carapace and also between specimens. It is not easy to ascertain the supposed differences in respect of the merus of the third walking leg, but cheliped dentition is variable: in the female, the dactyl typically has two teeth and the fixed finger only one, but these may be located proximally or distally; in males, the dactyl usually has one tooth, but the fixed finger can have either one or two teeth (these can be different between left and right limbs) and these may be located proximally or distally. The basal tooth on the fixed finger (well illustrated by A. MILNE EDWARDS, 1879, pl. 14, fig. 3) only occurs in males and does not develop until the size reaches about CW = 10.0 mm. The redescription given above, based on the same material as used by A. MILNE EDWARDS (1879), shows that there are in fact no significant differences between the Chinese and the original specimens from New Caledonia. The cheliped dentition characters are variable and in some cases attributable to ontogenetic variation. Therefore *D. sinensis* must be regarded as a synonym of *D. praedator*.

The branchial formula is the same and the gill structure of *Dynomene praedator* is very similar to that of *D. hispida* with most of each arthrobranch and pleurobranch consisting of violin-shaped plates on each side of the gill axis but with epibranchial lobes separating the plates proximally. For other features of *D. praedator* not illustrated here, see ORTMANN (1892, pl. 26, fig. 3i) for the second maxilliped and CHEN (1979, fig. 1, 4) and DAI, CAI & YANG (1996, fig. 1,1) for the third maxilliped (as *D. sinensis* and *D. huangluensis* respectively). As in *D. hispida*, the posterior margin of the scaphognathite bears two long setae which extend back over the epibranchial surface of the gills, and the hypobranchial margin of each podobranch is setose.

The original description of *Dynomene praedator* by A. MILNE EDWARDS (1879) did not include a comparison with the setae of *D. hispida*. The setae of *D. praedator* differ in several ways: there is no proximal smooth region at the base of the setae and the distal "dense band" consists of only a dozen or so long stout setules directed almost at right angles. In other respects the two species are similar.

There are some differences in the male pleopods between *Dynomene praedator* and *D. hispida*: both species have five inset subterminal spines on the second pleopod but in *D. praedator* these spines are curved instead of straight; there are three larger curved, terminal spines in *D. praedator*, with the last two forming a "pince-like" structure, but in *D. hispida* there are only two hooked spines which do not form a "pince"; finally, the rudimentary last three pairs of pleopods are uniramous in *D. praedator* but biramous in *D. hispida*.

Detailed illustrations of sexual dimorphism of the last leg of *Dynomene praedator* have not previously been published. In most respects the structure of the obsolete subchelate mechanism in *D. praedator* is similar to that of *D. hispida* except that the female has a much larger number of spines on the dactyl while in the male the teeth on the propodal spines are better developed and the area of rasp-like teeth near the base of the propodal extension is absent. Observations of living *D. praedator* from Hawaii (see below) suggest that the last leg is carried horizontally above the bases of the preceding legs and is only capable of a very restricted range of movements. The limb cannot be placed in a subdorsal position over the posterolateral corner of the carapace and cannot reach under the legs or under the abdomen. When the other legs move the last legs also move in an anterior-posterior direction

to a very limited extent. There is no evidence that the last legs are capable of carrying pieces of camouflage or that they could be used for grooming or cleaning.

Dynomene praedator has been collected from reefs on corals such as *Pocillopora damicornis*, *P. elegans*, *Pocillopora* sp., *Acropora* sp., *Porites* sp., and from the crustose alga *Amphiroa foliacea*. The specimens collected by B. RICHER DE FORGES from the McDonald volcanic seamount came from near the top of this active volcano where there are no corals and only fresh volcanic rocks and gravels. For discussion of the co-occurrence of *D. praedator* and *D. hispida* in *Pocillopora* corals see Discussion under the latter species.

A male specimen from Somalia contained a bopyrid parasite which is a new species of *Gigantione* (Daniel ADKISON, pers. comm.). It is similar to the bopyrid specimens from *Petalomera pulchra* Miers, 1884 (from the Chesterfield Ids, see McLAY, 1993: 166) which are being described by John MARKHAM as a new species of the same genus. Both these new species are similar to *G. mortenseni* Adkison, 1984 which is known from *Cryptodromiopsis antillensis*, *Hypoconcha sabulosa*, and *H. spinosissima*.

With the help of Ron HOLCOM, who video-taped *Dynomene praedator* in its natural habitat and in an aquarium in Hawaii, I have been able to study the feeding behaviour of this dynomenid. During feeding the antennules are especially active and are periodically cleaned by the third maxillipeds. There are two modes of feeding: firstly, grazing algal covered rocks using the chelipeds to pick up food items, and secondly sifting through sand to remove organic material. The latter feeding method is performed while the crab hangs upside-down from a rock or coral with its third maxillipeds very close to the sand. One cheliped is used to shovel sand to the outer maxillipeds which pick it up and sift out organic material using the setose palps and inner margins. Then the sand is pushed aside using the other cheliped. In this way sand is moved across the mouth-field and the food extracted from it. Examination of the stomach contents of four *Dynomene praedator* from Hawaii, ranging in size from 8.6 x 7.3 to 12.0 x 9.8 mm (two males and two females, BPBM 3780 and 4312), revealed unidentifiable soft organic material and sand grains. The stomach contents of crabs, caught at a different time, confirm the observed feeding behaviour and suggest that separation of organic material from sand (deposit feeding) is the main mode of feeding.

Dynomene filholi Bouvier, 1894

Figs 3 e, 5 c, 8 c, 11, 17 c, 20 a-g

Dynomene filholi Bouvier, 1894: 6; 1896: 57, figs 22-23. — A. MILNE EDWARDS & BOUVIER, 1900: 5, pl. 3 (col.), fig. 3, pl. 8, figs 1-18. — ALCOCK, 1901: 75 (list). — ORTMANN, 1899, pl. 119, fig. 11. — IHLE, 1913: 92 (list). — BALSS, 1921: 47. — BOUVIER, 1922: 50. — MONOD, 1956: 76, figs 84-88, 873. — FOREST & GUINOT, 1966: 48. — MANNING & HOLTHUIS, 1981: 23. — FRANSEN, 1991: 93.

MATERIAL EXAMINED. — **Cape Verde Islands**. *"Talisman"*: no stn number, îlot Branco, 60 m, July 1883: 1 ♂ 14.6 x 12.0 mm (used as the basis for the description and illustrated by A. MILNE EDWARDS and BOUVIER, 1900, see Discussion below); 2 ♀ 6.3 x 5.1, 7.2 x 5.9 mm (one of these specimens was listed as a male by A. MILNE EDWARDS and BOUVIER, 1900) (MNHN-B 22080); 1 ♀ 4.0 x 3.6 mm (ZMUC). — Stn 103, near la Praya, red coral banks, 275-150 m, 23.07.1883: 1 ♀ 8.7 x 7.0 mm (used for describing the color) (MNHN-B 22087). — Stn 107, about 16°56'N, channel between Saint Vincent and Saint Antoine, 75 m, 29.07.1883: 6 ♂ 3.6 x 3.3 - 9.4 x 7.8 mm; 1 ♀ 4.9 x 4.0 mm; 1 ♀ ovig. 5.8 x 4.9 mm (MNHN-B 22081); 2 ♂ 5.4 x 4.8, 6.8 x 5.0 mm (MNHN-B 22083); 1 ♀ 6.4 x 5.2 mm (ZMUC).

IFAN (Institut Français d'Afrique Noire): N Maio Id, 42 m, J. CADENAT coll., 11.06.1955: 1 ♀ 3.8 x 3.6 mm. (MNHN-B 22079).

CANCAP: stn 6.069, 15°52'N, 13°00'W, 76-90 m, 13.06.1982: 1 ♂ 7.5 x 5.8 mm. — Stn 7.125, 16°36'N, 24°36'W, 85-130 m, 1.09.1986: 1 ♀ 10.0 x 8.7 mm (RMNH) (see FRANSEN, 1991).

Guinea Bissau. *"Gazelle"*: 10°60'N, 17°16'W, 274 m, 1.08.1874: 1 ♂ 8.5 x 7.0 mm (ZMB 16722).

Gulf of Guinea, Annobon Island. *"Calypso"*: stn 52, 1°27.5'S, 5°36.5'E, 35 m, 13-06-1956: 1 ♂ 6.8 x 5.9 mm (MNHN-B 22085) (reported as a female by FOREST & GUINOT, 1966). — Stn 107, 1°26.15'S, 5°35.40'E, 60 m, 4.07.1956: 1 ♀ 5.6 x 4.5 mm (MNHN-B 22082) (see FOREST & GUINOT, 1966: 48).

ANNOBON 3: Dragué 2, 1°28.40'S, 5°35.50'E, 40 m, A. CROSNIER coll., 11.12.1965: 1 megalopa 3.2 x 3.2 mm (MNHN-B 22090). — Dragué 3, 1°25.30'S, 5°39.00'E, 52 m, A. CROSNIER coll., 11.12.1965: 2 ♂ 8.4 x 7.0, 8.6 x 6.8 mm; 2 ♀ 8.0 x 6.6, 9.2 x 7.6 mm; 1 ♀ ovig. 10.5 x 8.2 mm. (MNHN-B 22092).

ANNOBON 5: chalutage au sud de l'île Annobon, 1°28.50'S, 5°37.50'E, 35-55 m, F. POINSARD coll., 16.06.1967: 3 ♂ 6.0 x 5.0 - 10.2 x 7.7 mm; 1 ♀ 8.0 x 6.5 mm; 1 ♀ ovig. 10.4 x 8.0 mm. (MNHN-B 22093)

Gulf of Guinea, Principe Island. *"Calypso"*: stn 86, 1°35'N, 7°28'E, 45 m, 26-06-1956: 2 ♂ 9.4 x 7.3, 10.9 x 8.6 mm; 3 ♀ 6.9 x 5.4 - 9.2 x 7.0 mm (MNHN-B 7028). — Stn 95, 1°38.35'S, 7°21.35'E, 35 m, 1956: 1 ♂ 12.3 x 9.9 mm (MNHN-B.22084) (see FOREST & GUINOT, 1966: 48).

TYPES. — The specimen dissected by BOUVIER in 1894 for describing the gills cannot be found and very likely has disappeared. So I designate as neotype the male 14.6 x 12.0 mm collected near îlot Branco, Cape Verde Islands, 60 m, in July 1883, registered at the Paris Museum under MNHN-B 22080, which was chosen by A. MILNE EDWARDS and BOUVIER amongst the 28 specimens collected by the *"Talisman"* at the Cape Verde Islands, as the basis of the first complete description of the species.

DESCRIPTION. — Carapace wider than long (CW/CL = 1.2 approx.), broadly rounded in outline but frontal and posterior margins truncated, surface smooth and quite convex. Carapace surface and pereopods covered with coarse, plumose setae of two lengths: short setae clothing surface, but interspersed with slightly longer setae (0.07 x CW) which also fringe limbs and tend to be arranged in clumps, especially on carapace where there are about twenty distinct tufts. Density of setae is not sufficient to completely obscure body surface. Structure of short and long setae is different. In short setae the proximal 35% of shaft has very short setules, then a region occupying about 25% where long, stout setules are directed almost at right angles to shaft, forming a dense bunch, then the next 30% which bears a brush of long fine setules on only one side, and finally the distal 10% which is smooth, slightly curved, and narrows to an acute tip. In long setae the proximal 25% is sparsely setose, 70% is covered with small setules which distally increase in density, but not in size, and last 5% is smooth, slightly curved and narrows to an acute tip.

A shallow frontal carapace groove separates a pair of low rounded protuberances, and then divides into separate grooves which gradually become more faint. Just in front of cardiac region two laterally-directed grooves originate: the first groove (cervical) arises separately from small pits curving (slightly sinuously) anteriorly on to branchial region, while the second groove extends across mid-line and initially runs almost directly towards lateral margin but then splits into an anterior portion which follows the first groove for a short distance, while the second portion curves posterolaterally, bordering anterior cardiac region. In effect the groove crossing the mid-line, connects two crescent-shaped grooves. Mid-way along cardiac groove begins a faint branchial groove which runs towards base of last tooth on lateral margin. Posterior cardiac area is outlined by a faint groove. Anterolateral carapace margin begins at level of postorbital corner, evenly convex and bears four distinct, broad-based, equidistant teeth, each ending in a short spine; first two teeth directed anteriorly and last two directed more laterally. Near beginning of posterolateral border there is another smaller tooth without a terminal spine. Posterior carapace margin is recessed in order to accommodate first segment of abdomen which is visible dorsally.

Frontal margin continuous, V-shaped, ventrally-directed, joined to epistome (which separates the orbits). Supraorbital margin not projecting, continuous above orbits with a small notch closer to postorbital corner, without granules; suborbital margin essentially straight, but terminating as a subacute tooth. Orbits clearly exposed dorsally.

First article of antennule large, filling a large part of ventral region; distal margin obliquely angled and not continuous with distal margin of second antennal article. Remainder of antennule folded into orbit. First article of antenna moveable, wider than long, medially beaked; inferior tooth well developed, blunt; superior tooth above opening of antennal gland is smaller. Second article wider than long; distal margin widest, to which is fixed the exopod curving over base of eyestalk and becoming broader and terminating bluntly. Third antennal article is longer than wide, and attached to remaining distal border of second article, slotting in behind exopod, and together with small fourth article just matches length of the exopod. Remaining antennal articles are directed laterally, extending well beyond postorbital corner, and can be partially folded under supra-orbital margin. Ratio of length of antennal flagella to CW = 0.45. Eyestalk can be completely folded into orbit, and cornea is well developed, occupying all of tip. Epistome broadly triangular, surface concave; dorsal arm, joined to tip of carapace, very elongate and narrow; lateral arms shorter and thicker. Joint between epistome and carapace marked by a narrow suture.

Subhepatic area slightly convex. A groove begins near base of the antenna, curving round under branchial region, giving off a cervical groove which passes under base of second anterolateral tooth, and meeting lateral

carapace margin just anterior to tooth on posterolateral border and connecting with branchial groove. Third maxillipeds operculiform; bases widely separated by tip of sternum. Crista dentata has six or seven well developed, distally placed teeth on each side. [BOUVIER (1896, fig. 23) and A. MILNE EDWARDS and BOUVIER (1902, pl. 8, figs 1-18) figure some of mouthparts.] Female sternal sutures 7/8 short, ending wide apart on low tubercles just behind bases of second walking legs.

Branchial formula 19 gills + 7 epipods on each side. There is no podobranch on fifth pereopod. In cross section gills have the lateral margin deeply notched, dividing gill into a hypobranchial plate (containing efferent vessel) and an epibranchial lobe (anterior lobe longer). Between these marginal lobes are two pairs of lobes, first similar and second much shorter than marginal lobes. Thus the epibranchial surface shows six rows of blunt lobes, decreasing in size medially, which are arranged above the afferent blood vessel.

Cheliped stout (especially in male) only slightly longer than first leg; merus trigonal, inner face smooth and fitting closely against pterygostomial region of carapace, borders with a few small granules, outer face has a subterminal broad, restriction which separates a thickened ridge on which there are three small blunt granules. Outer face of carpus convex with three small granules, two more prominent tubercles on distal margin, inner superior border with a flattened, distomedially directed, spur which abuts against proximal inner surface of propodus thereby restricting closure of cheliped against frontal area. In a similar way, the inferior carpal margin is produced as a smooth obtuse flange fitting against merus when limb is withdrawn. These two structures give the carpal article an unusual and distinctive shape. Transverse section of propodus decreases in area distally; outer and superior faces with very small granules which tend to be arranged in two or three longitudinal rows; inner and inferior faces smooth. Fixed finger almost straight with six teeth increasing in size distally; moveable finger curved with four teeth, first mid-way and separated from the remainder which are on tip; both fingers, thick, hollowed out internally, touching only at tips where teeth interlock. Just below proximal teeth on fixed finger are two distinct pits in which several long setae are inserted with a group of similar setae on inner margin. Groups of long stiff setae, inserted near base of dactyl and fixed finger, are directed across space between the two fingers. Collectively, these setae form a sieving screen.

First three pairs of walking legs decreasing in length posteriorly. Meri elongate, both faces of meri of first two legs and anterior face third leg merus smooth and nacreous, inferior distal margin hollowed out to accommodate carpal article. Superior border of meri of these legs with two or three small granules, length of merus of second leg about 1.7 times its width and equal to almost a half of CL. Dorsal surface of carpi bearing three small granules on anterior margin and two on posterior margin, and produced distally to overhang base of propodi. Dorsal surface of propodi smooth. Dactyli curved, inferior margin armed with 5-6 small spines, tip brown and subacute.

Last pair of legs greatly reduced, lying along posterolateral border of carapace, reaching only as far as two-thirds along meral article of preceding limb; borders of articles unarmed. Last pair of legs subchelate, sexually dimorphic: female with well developed distal extension of propodus which opposes dactyl, male with only weakly developed propodal extension. Female propodal extension bearing four, unequal, stout, acute, spines each lined with tiny flattened teeth along almost the entire inner surface. Female dactyl as long as propodal extension, bearing eight unequal, stout, hooked spines (arranged asymmetrically around perimeter of dactyl) whose inner surface is concave, wrinkled and devoid of teeth. Male propodal extension bearing two unequal hooked spines without teeth. Male dactyl longer than propodal extension, bearing a single spine on lateral margin and ending in an acute claw.

All segments of abdomen freely moveable, increasing in length and breadth distally; surface smooth; margins unarmed but fringed with long setae. Telson much wider than long, anterior margin angled to accommodate uropod, posterior margin broadly rounded. In female uropod plates are large, filling about two thirds of space between last abdominal segment and telson, excluding most of last abdominal segment and telson from reaching lateral margin of abdomen. In male last abdominal segment occupies about a half of length. No effective abdominal locking mechanism: abdomen only loosely held against sternum in all sizes of both sexes. In mature female it occupies all the ventral surface, covering coxae of all pereopods with telson covering proximal half of third maxillipeds. In male the abdomen is not quite so broad and telson only extends as far as bases of third maxillipeds.

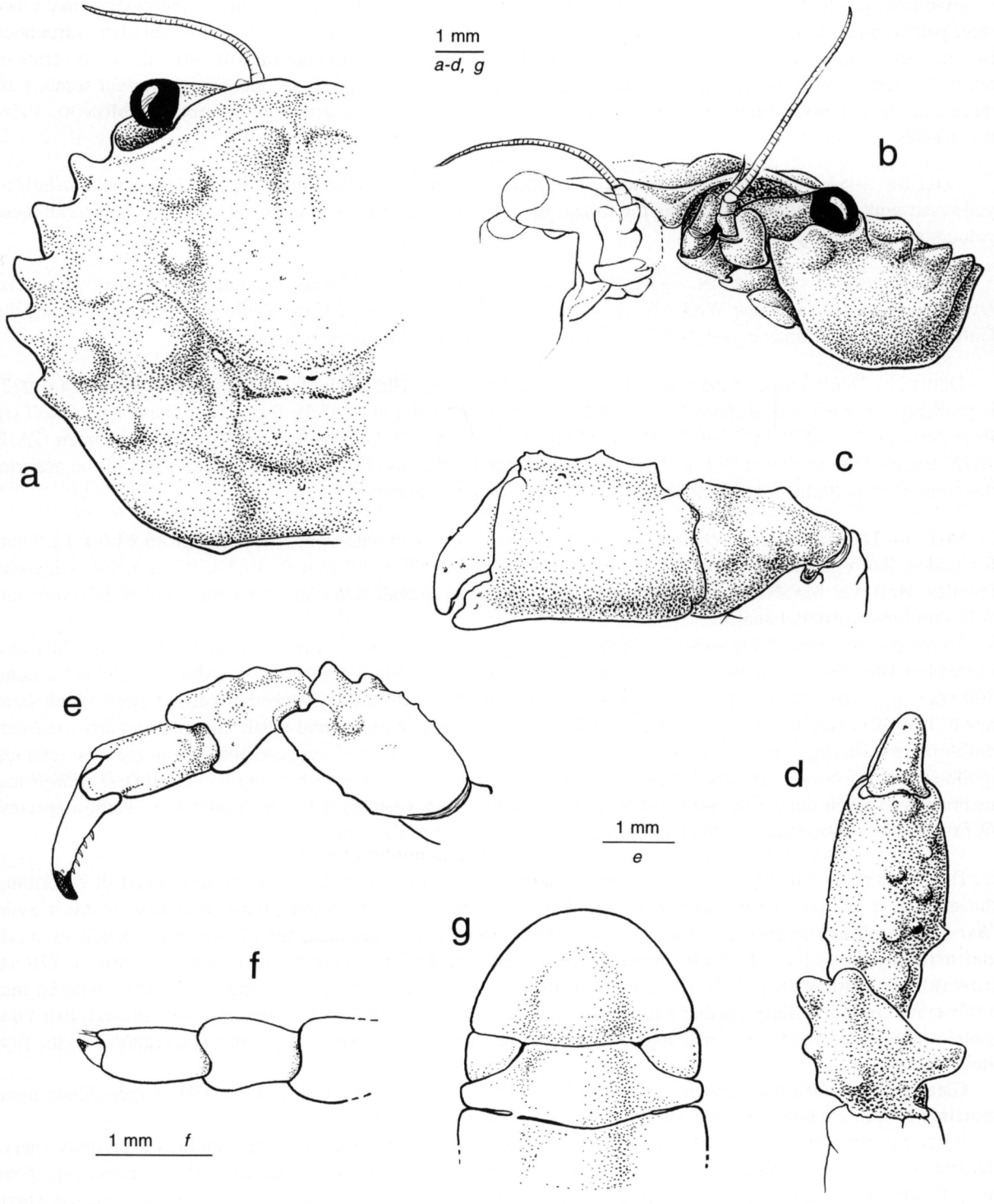

FIG. 20. — *Dynomene filholi* Bouvier, 1894: **a-g**, ♂ 12.3 x 9.9 mm, Principe Island, Gulf of Guinea, *"Calypso"* (MNHN-B 22084): **a**, dorsal view of left half of carapace; **b**, ventral view of left orbital area; **c**, outer face of left cheliped; **d**, dorsal view of left cheliped; **e**, posterior view of terminal articles of left fourth pereopod; **f**, posterior view of terminal articles of left fifth pereopod; **g**, ventral view of telson and terminal segments of male abdomen.

Five pairs of pleopods in female, first pair vestigial, remainder biramous. Five pairs of pleopods in male, last three pairs rudimentary. First pleopod a semi-rolled tube ending in a well developed, curved apical plate surrounded by long setae. Second male pleopod with an exopod on the basis, needle-like distally, armed with a series of ten tiny, acute, closely spaced spines decreasing in size distally, and ending in one larger terminal spine. Last three pairs of pleopods biramous, exopod longer and connected to basal article by a joint (see MONOD, 1956, figs 84-88).

COLOUR. — A. MILNE EDWARDS and BOUVIER (1900) describe the colour of live *Dynomene filholi* as yellowish-pink with red, notably along the frontal border and on certain parts of the anterior legs. In alcohol these colours are completely lost.

GEOGRAPHIC DISTRIBUTION. — MANNING and HOLTHUIS (1981) make the interesting observation that *Dynomene filholi* is an insular West African species, known so far from the Cape Verde Ids (type locality) and the Gulf of Guinea Ids, Principe, and Annobon. It has not been recorded from the mainland.

DEPTH. — Depth range of the material examined is 35-275 m. The depth of 1477 m given by BOUVIER (1922) is probably incorrect and MANNING and HOLTHUIS (1981) note that most of the records for *Dynomene filholi* are from between 23 and 75 m. They doubt the *"Talisman"* record of 275-150 m but the *"Gazelle"* specimen (ZMB 1672) apparently came from 274 m. Thus the depth range for this species is from 35-275 m. Most of the material has come from bottoms of coralline algae and red coral with sand and rock.

SIZE. — The size range of *Dynomene filholi* material examined was from 3.6 x 3.3 mm to 14.6 x 12.0 mm for males, 3.8 x 3.6 mm to 10.5 x 8.2 mm for females and 5.8 x 4.9 mm to 10.5 x 8.2 mm for ovigerous females. However MANNING and HOLTHUIS (1981) report an overall size range for both sexes of 3-16 mm and 7-12 mm for ovigerous females.

Ovigerous females of *Dynomene filholi* have been reported in May (*"Pillsbury"* material), June, July and December (herein). A female 5.8 x 4.9 mm carried 30 eggs while a female 10.4 x 8.0 mm carried around 300 eggs. Egg size was 0.5 mm diameter. Ovigerous females collected in December carried eggs which were newly laid. The small size of ovigerous females suggests early maturity and small egg size indicates indirect development. Having a planktonic larval stage and an insular distribution suggests that larvae must be retained in the system of ocean currents surrounding these Atlantic islands. It is interesting to note that *D. filholi* has its breeding season during the second half of the calendar year whereas the very similar Indo-Pacific species, *D. hispida* and *D. praedator*, both carry eggs during the first half of the year.

DISCUSSION. — The name *Dynomene filholi* was first used by BOUVIER (1894) in the context of describing the gills to a Séance (10 November 1894) of the Société Philomathique de Paris, and then in his classic "*Sur l'origine Homarienne des crabes...*" paper (1896) where the carapace (his fig. 22), mouth appendages, a gill and male pleopod of the fifth abdominal segment (his fig. 23) are figured. But it was not until A. MILNE EDWARDS and BOUVIER (1900) published their monograph on the *"Travailleur"* and *"Talisman"* material that a substantial formal description and a list of material examined was published. However, even although BOUVIER (1894) only described the branchial apparatus, his use of the name *Dynomene filholi* must be regarded as the first valid example.

Clearly BOUVIER dissected the specimen (or the specimens) that he used for his 1894 paper. Since none remain, no types are now available and it was necessary to designate a neotype.

In their paper published in 1900, A. MILNE EDWARDS and BOUVIER refer to "..le grand mâle qui nous a servi de type,..." and again on page 9 they state "Ce dernier, qui est représenté dans la planche VIII, a servi de type pour notre description;..". These authors mention the measurements of this male (14.6 x 12.0 mm) and the place where it was collected (Cape Verde Islands, îlot Branco, 60 m). This male specimen is registered under MNHN-B 22080, along with two females. It is this male that I designate as neotype.

According to the list published by A. MILNE EDWARDS and BOUVIER, 28 specimens of *D. filholi* were collected by the *"Talisman"* from 4 stations. Only 14 remain at the Paris Museum. One from the station 107 (not

examined by me) is held by the Museum of Comparative Zoology, Harvard, registration number MCZ 6559 and 2 others are held by the Zoologisk Museum at Copenhagen. Of the original 28 specimens, 11 are missing. But it may be these were dissected by BOUVIER for his 1894 and 1896 papers and discarded.

A. MILNE EDWARDS and BOUVIER (1900, pl. 8, figs 16-17) figure examples of the short setae, covering the surface, and the long setae arranged in "bouquets" on the carapace as well as fringing the abdomen. The electron microscope pictures confirm their results and add some more precise detail to the description and figures. *D. filholi* differs from the two preceding species in having dissimilar short and long setae. The short setae are unique amongst the dynomenids in having a subterminal brush of fine setules. Presumably these are specialized sensory setae.

BOUVIER (1896, fig. 23) and A. MILNE EDWARDS and BOUVIER (1900, pl. 7, figs 1-18) describe and illustrate the second maxilla, and all three maxillipeds of *D. filholi*. They also show an important feature of the second maxilla: the presence of three long denticulate setae on the posterior margin of the scaphognathite which probably have a role in cleaning the epibranchial surface of the gills. The presence of these setae is a primitive character because they are absent in the more derived Brachyura where gill cleaning is carried out by the long setose epipods of the maxillipeds. In *D. filholi* these epipods are well developed and their cleaning role is supplemented by the epipods on the pereopods. Three long scaphognathite setae are also found in *D. pilumnoides* but in *D. hispida* and *D. praedator*, there are only two setae.

A. MILNE EDWARDS and BOUVIER (1900) state that the branchial formula of *D. filholi* is the same as in *Dicranodromia mayheuxii* A. Milne Edwards, 1883 (the correct spelling is *D. mahieuxii*, see GUINOT, 1995, 236) with the addition of an epipod and podobranch on the fourth pereopod. However this is incorrect: in *Dynomene filholi* there are no gills on the fifth pereopod and there is only one arthrobranch on the third maxilliped. The branchial formula is 19 gills + 7 epipods. The gill structure of *D. filholi* is very different from the preceding species. A. MILNE EDWARDS & BOUVIER (1900, pl. 8, fig 18) provide an accurate cross section of the middle region of an anterior arthrobranch. The gill can be divided into two halves: a phyllobranchiate-like hypobranchial half, containing the efferent vessel, and a trichobranchiate-like epibranchial half, with six lobes arranged above the afferent vessel. As noted by BOUVIER (1896) the shorter epibranchial lobes tend to disappear towards the tip of the gill. A. MILNE EDWARDS & BOUVIER (1900) state that, in cross section, there are eight lobes but they counted the corners of the hypobranchial plate as "filaments".

A. MILNE EDWARDS & BOUVIER (1900) were the first to recognize, in a dynomenid species, that the subcheliform last pair of legs are sexually dimorphic: the extension of the propodus is much better developed in the female than in the male. In *Dynomene filholi* the last leg of the male is scarcely subcheliform. All other dynomenids also show this dimorphism. A small number (four) of spines, bearing many flattened teeth, on the female propodus is in keeping with the other species of *Dynomene*. However, the male shows some differences: there are only two spines on the propodus and these do not bear any teeth (in *D. hispida* and *D. praedator* there are five spines with many flattened teeth), while there is a lateral spine on the side of the dactyl which is unarmed in the other species of this genus. A similar dactyl spine is found in male *Metadynomene tanensis* and male *Paradynomene tuberculata* have a spine on the dorsal margin of the dactyl. These dactylar spines are reminiscent of those found in certain genera of the Dromiidae such as *Dromidiopsis* Borradaile, 1900, *Tunedromia* McLay, 1993, and *Lauridromia* McLay, 1993 where they are used, along with other spines, to assist in securing the sponge carried by the last two pairs of legs over the crab. However, in these dynomenids the spines are closely flattened against the surface of the dactyl so that they could not function in the same way as in the dromiids. These spines indicate a common ancestral relationship.

The figures of the first two male pleopods of *Dynomene filholi* by A. MILNE EDWARDS and BOUVIER (1900, pl. 7, 13-14) lack detail, but these pleopods are figured again by MONOD (1956, figs 84-88). The tip of the first male pleopod bears a curved apical plate surrounded by long setae as is found in most other dynomenids. However, MONOD's figures show that the second pleopod is armed with twice the number of subterminal spines seen in *D. hispida* and *D. praedator*, but there is only one long terminal spine. MONOD (1956, fig. 88) is inaccurate in the number of subterminal spines because it shows more than are there. BOUVIER (1896, fig. 23, V) includes a figure of one of the fifth pair of rudimentary male pleopods showing that it is biramous. There are two unequal lobes shown but one lobe (endopod) is an extension of the penultimate article while the other lobe (exopod) is

separated by a joint. If the shorter inner lobe is regarded as the endopod then it must be assumed that fusion has occurred and the joint has been lost. The same situation is found in *D. hispida* and *D. pilumnoides*.

Examination of the stomach of a *Dynomene filholi* male 10.9 x 8.6 mm (MNHN-B 7028) from Principe Id, Guinea Gulf, revealed unidentifiable soft particulate organic fragments and some soft calcareous granules. The groups of stiff setae on the cheliped fingers may act as a sieving device for collecting food particles.

Dynomene filholi is most similar to *D. pilumnoides* (see Discussion below under the latter species). Since *D. filholi* is the only species of this genus inhabiting the Atlantic it is interesting to speculate about its origins. It seems to be a reasonable assumption that species of the genus *Dynomene* originated in the Tethys Sea so that the ancestors of *D. filholi* were Tethyan crabs. A southern colonization route for these crabs could have been available as early as the Upper Cretaceous (90-80 mybp) or sometime thereafter. *D. pilumnoides* has been recorded from the coast of Natal although no further south than this. At least at present there does not seem to be a dispersal route via the Cape because it is blocked by the local oceanic circulation pattern. This self-contained circulation pattern seems to have been in existence for a considerable time because there is a suite of endemic South African dromiid genera and species (see McLAY, 1993) which have been isolated perhaps since the Upper Cretaceous or Palaeocene (65 mybp). This interpretation requires that the Atlantic colonization by *Dynomene* must have been during the late Mesozoic or very Early Tertiary.

Dynomene pilumnoides Alcock, 1900

Figs 3 c-d, 8 d-e, 11, 12 e-f, 14 c, 17 d, 21 a-g

Dynomene pilumnoides Alcock, 1900: 133; 1901: 35, pl. 1, fig. 2. — STEBBING, 1905: 58 (list). — BARNARD, 1947: 371; 1950: 337, fig. 65 a-c. — SAKAI, 1965: 12, pl. 6, fig. 2; 1976: 29, pl. 6, fig. 3. — GUINOT, 1967: 242 (list). — SERÈNE, 1968: 37 (list). — PEYROT-CLAUSADE & SERÈNE, 1976: 1344 (key). — TAKEDA, 1977: 35 (list). — SERÈNE & VADON, 1981: 121. — KENSLEY, 1981: 37 (list). — MIYAKE, 1983: 11, pl. 4, fig. 2, 195 (list). — BABA, HAYASHI, & TORIYAMA, 1986: 310, fig. 163. — GARTH, HAIG & KNUDSEN, 1987: 241. — NAGAI, 1989: 43.
Maxillothrix actaeiformis Stebbing, 1921: 457, pl. 14 (Crust. pl. 109).
Dynomene hispida - YOKOYA, 1933: 95, text-fig. 37. Non Guérin-Méneville, 1832.
Dynomene actaeiformis - SERÈNE, 1968: 37 (list). — TAKEDA, 1977: 35 (list).

MATERIAL EXAMINED. — **Madagascar**. *"Vauban"* (A. CROSNIER coll.). *N.W. coast*: 12°41.50'S, 48°17.00'E, dredge, 160-170 m, 1.08.1973: 1 ♀ 14.6 x 12.0 mm; 1 ♀ ovig. 13.7 x 12.0 mm (MNHN-B 6913). — *W coast*: Dredge, about 18°50'S, no depth, 24.02.1973: 1 ♂ 10.0 x 8.2 mm (MNHN-B 6914). — *S.E. coast*: stn 72, 25°09.0'S, 17°14.2'E, 80-85 m, 3.03.1973: 1 ♀ 8.7 x 7.4 mm; 1 ♀ ovig. 10.0 x 8.3 mm. (MNHN-B 6904). — Fort-Dauphin, 90 m, no date: 1 ♂ 8.1 x 6.8 mm; 1 ♀ 6.9 x 6.2 mm (MNHN-B 6858).

Reunion. No locality, no depth, S. RIBES coll., no date: 1 ♂ 11.8 x 10.1 mm (MNHN).

Australia. *New South Wales*: Port Stephens, 32°42'S, 152°6'E, no depth, no date: 1 ♂ 17.2 x 14.1 mm (small balanomorph barnacle on dorsal surface of carapace); 1 ♀ ovig. 14.8 x 12.0 mm (AMS-P 42233). — Crowdy Head, 31°54'S, 153°00'E, 100 m, K. J. GRAHAM coll., 17.08.1977: 3 ♂ 8.0 x 6.5 - 22.8 x 17.4 mm; 1 ♀ 14.4 x 11.4 mm (AMS-P 26583).

Indonesia. DANISH EXPEDITION KEI ISLANDS: stn 3, 5°32'S, 132°36'E, 245 m, Th. MORTENSEN coll., 31.03.1922: 1 ♂ 10.0 x 8.9 mm (ZMUC).

Philippines. *"Pele"* (B. R. WILSON coll.). *Sulu Archipelago*. Pearl Bank: 3.2 km and 349° from Zal Id, 18 m, 22.02.1964: 1 ♀ ovig. 9.5 x 7.5 mm (MNHN-B 10376). — 6.4 km and 212° from Zal Id, 90 m, 22.02.1964: 1 ♀ 7.8 x 6.6 mm (MNHN-B 10375). — 14.4 km and 242° from Zal Id, 99-108 m, 22.02.1964: 1 ♀ 14.6 x 11.7 mm; 1 ♀ ovig. 12.7 x 10.6 mm (MNHN-B 10374). — 4 km and 182° from Zal Id, 90 m, 22.02.1964: 1 ♂ 9.2 x 7.8 mm (MNHN-B 10483).

MUSORSTOM 1: stn 57, 13°53.10'N, 120°13.20'E, 107-96 m, 26.03.1976: 1 ♂ 7.2 x 5.8 mm (see SERÈNE & VADON, 1981 who reported the specimen as a female).

Japan. Honshu Mie-Ken Wagu: 34°04.00'N, 136°51.30'E, no depth, no date: 2 ♂ 24.4 x 19.6, 28.5 x 22.1 mm (SMF 17127).

East of Toshima: 34°59.5'N, 139°36.3'E, 93-95 m, 1991: 1 ♂ 6.4 x 5.6 mm. — 34°19.79'N, 139°01.37'E, 134 m, coll. M. OSAWA, 1993: 1 ♀ 7.1 x 6.0 mm.

Hawaii Islands. *"Albatross"*: stn 3823, south coast of Molokai, Lae-O Ka Laau Light, 21°02'10"N, 157°15'45"W, 142-406 m, 1.04.1902: 1 ♂ 6.9 x 5.7 mm (USNM).

New Caledonia. LAGON: stn 393 bis, 22°46.00'S, 167°4.00'E, 284 m, 22.01.1985: 1 ♂ 8.0 x 6.6 mm.

MUSORSTOM 4: stn 164, 18°33.2'S, 163°13.0'E, 255 m, 16.09.1985: 1 ♀ 19.2 x 15.5 mm. — Stn 227, 22°46.00'S, 167°20.00'E, 300 m, 30.09.1985: 1 ♀ 5.0 x 4.5 mm.

CHALCAL 2: stn DW 69, 24°43.70'S, 168°07.90'E, 260 m, 27.10.1986: 1 ♀ 4.8 x 4.0 mm. — Stn DW 70, 24°46.00'S, 168°09.00'E, 232 m, 27.10.1986: 1 juv. 5.4 x 4.5 mm; 1 ♂ 5.6 x 4.6 mm. — Stn DW 84, 23°23.80'S, 168°07.00'E, 170 m, 31.10.1986: 2 ♂ 6.3 x 5.2, 7.2 x 6.0 mm.

SMIB 3: stn 18, 23°41.50'S, 167°59.40'E, 338 m, 23.05.1987: 1 ♂ 23.5 x 19.0 mm.

SMIB 4: stn DW 40, 24°46.20'S, 168°8.70'E, 260 m, 7.03.1989: 1 juv. 4.2 x 3.8 mm.

VOLSMAR: stn DW 7, 22°26.00'S, 171°44.10'E, 400 m, 1.06.1989: 2 ♀ 4.6 x 4.2, 12.4 x 10.3 mm.

SMIB 5: stn DW 94, 22°19.60'S, 168°42.80'E, 275 m, 12.09.1989: 1 ♀ ovig. 20.7 x 17.6 mm.

SMIB 8: stn DW 163, 24°49.10'S, 168°08.90'E, 310-460 m, 28.01.1993: 1 ♂ 13.2 x 10.6 mm; 1 ♀ 7.8 x 6.5 mm. — Stn DW 175, 23°14.10'S, 168°00.40'E, 235-240 m, 29.01.1993: 1 ♀ 10.3 x 9.0 mm.

Lagon, récif Laregnère, 12-16 m, 3.05.1993: 1 ♀ 7.5 x 6.2 mm.

BATHUS 3: stn CH 801, 23°39.00'S, 168°00'E, 270-300 m, 27.11.1993: 1 ♀ 9.8 x 8.9 mm. — Stn DW 836, 23°02'S, 166°59'E, 295-306 m, 30.11.1993: 1 ♀ 6.7 x 5.9 mm.

BATHUS 4: stn DW 943, 20°12.28'S, 164°30.58'E, 347-316 m, 09.08.1994: 1 ♀ 8.2 x 6.8 mm.

SMIB 10: stn DW 209, 24°49'S, 168°09'E, 329-560 m, 10.01.1995: 1 ♂ 27.0 x 22.0 mm.

Loyalty Islands. MUSORSTOM 6: stn DW 423, 20°20.85'S, 166°40.50'E, 280 m, 16.02.1989: 2 ♀ 10.1 x 8.6, 10.3 x 8.7 mm. — Stn DW 451, 20°59.60'S, 167°24.50'E, 330 m, 20.02.1989: 1 ♂ 9.7 x 8.2 mm. — Stn DW 472, 21°8.60'S, 167°54.70'E, 300 m, 22.02.1989: 1 ♂ 8.1 x 7.0 mm.

TYPES. — *Dynomene pilumnoides* Alcock, 1900: holotype is a male 11.0 x 10.0 mm, collected by the *"Investigator"*, from 11°27'N, 73°1.00'E, off Kiltan Id, Laccadive Ids, 90-54 m, held by the Indian Museum, Calcutta, registration number 9000/6.

Maxillothrix actaeiformis Stebbing, 1921: holotype not designated from amongst the four specimens, based on the number of carapaces in the container (at least two males and one female according to STEBBING, 1921), collected by the SS *"Pieter Faure"* from off the coast of Natal, located NW by N 12.6 km from the Umhlangakulu River, north of Durban (approximate coordinates 29°44'S, 31°5'E), stn PF-12348, 90 m, 4.04.1901, held by the South African Museum, registration number SAM-A839. This type material is in poor condition (Liz HOENSON pers. comm.). Two syntypes are held by the British Museum, registration number 1928. 12. 1. 10. According to the index card there is one specimen and fragments of another but the material in the container is just a lot of fragments (Miranda LOWE, pers. comm.). Thus all of the original material is in very poor condition.

DESCRIPTION. — Carapace wider than long, ratio of CW/CL 1.20-1.25, broadly rounded in outline but frontal and posterior margins truncated, surface smooth, quite convex, with a few minute granules in branchial area. Carapace surface and pereopods densely covered with setae of two kinds: short plumose setae, bent at right angles near the tip, clothing surface, but interspersed with longer filiform setae (6 x length of short setae and 0.20-0.25 x CW) which also fringe limbs and arranged in clumps on carapace where there are about fifteen to seventeen distinct groups (each with up to about four setae) which tend to be associated with rounded surface elevations. Density of setae completely obscures body surface but most of this is attributable to short rather than long setae. Structure of short and long setae is different. In short setae proximal 45% of shaft has very short setules (at end of which setae are sharply angled), then a region occupying about 45% where long, stout setules are directed almost at right angles to shaft, forming a dense bunch, and finally the distal 10% of setae which is smooth, slightly curved, and narrows to an acute tip. In long setae almost entire length is covered with small dendritic setules, all about same size, and setae are acutely tipped.

A shallow frontal carapace groove separates a pair of low rounded protuberances, and then divides into separate grooves which gradually become more faint. Just in front of cardiac region two laterally-directed grooves originate: first groove (cervical) arises separately from small pits curving (slightly sinuously) anteriorly on to branchial region, while second shallower groove extends across mid-line and initially runs almost directly towards lateral margin but then splits into an anterior portion which follows the first groove for a short distance, while the second portion curves posterolaterally, bordering anterior cardiac region. In effect the groove crossing the mid-line, connects two crescent-shaped grooves. Branchial groove not evident. Posterior cardiac area not defined. Anterolateral carapace margin begins just below level of postorbital corner, is evenly convex and bears four distinct, broad-based, equidistant teeth, each ending in a small, acute spine, and accompanied by a tuft of long

setae. First two teeth directed anteriorly, third directed anterolaterally, and last directed more laterally. A posterolateral tooth, smaller than preceding anterolateral teeth, marks beginning of convergent posterolateral border alongside which lies the reduced last leg. Posterior carapace margin is recessed in order to accommodate first segment of abdomen which is visible dorsally.

Frontal margin continuous, V-shaped, ventrally-directed, joined to epistome (which separates orbits). Supra-orbital margin not projecting, continuous above orbits, interrupted by a distinct notch closer to postorbital corner which is without granules; suborbital margin has a few small granules and angles towards an acute tooth (visible dorsally when setae are removed) then drops sharply into a notch before ending in a much smaller, blunt tooth at its inner corner. This tooth abuts second article of antenna. Orbits clearly exposed dorsally.

First article of antennule large, filling a large part of ventral orbital region; distal margin obliquely angled and not continuous with distal margin of second antennal article. Remainder of antennule folded into orbit. First article of antenna moveable, wider than long, medially beaked; inferior tooth well developed, blunt; superior tooth, above opening of antennal gland, is smaller. Second article wider than long; distal margin widest, to which is fixed the exopod curving over base of eyestalk and becoming broader and terminating bluntly. Exopod has a tuft of setae on its lateral margin. Third antennal article longer than wide, and attached to remaining distal border of second article, slotting in behind exopod, and just matching length of exopod. Fourth antennal article smaller, as long as wide; remaining antennal articles directed laterally, extending well beyond postorbital corner, and can be partially folded under supra-orbital margin. Ratio of length of antennal flagella to CW = 0.33. Eyestalk can be completely folded into orbit, and cornea is well developed, occupying all of tip. Epistome broadly triangular, surface slightly concave; dorsal arm, joined to tip of carapace, very elongate and narrow; lateral arms shorter and thicker. Joint between epistome and carapace marked by a narrow suture.

Subhepatic area smooth, very convex. A groove begins near base of the antenna, curving round under branchial region and meeting lateral carapace margin just anterior to last tooth at beginning of posterolateral border. A short cervical groove branches off and ascends towards gap between first and second anterolateral teeth, branching, with one branch meeting first anterolateral tooth ventrally and the other passing around behind second tooth. Third maxillipeds operculiform, bases widely separated by tip of sternum. Crista dentata has six or seven well developed, distally placed teeth on each side and a granulated border on outer margin. Female sternal sutures 7/8 short, ending wide apart on low tubercles just behind bases of second walking legs.

Gill formula 19 gills + 7 epipods on each side, as found in *Dynomene hispida*. There is no podobranch on last pereopod. In cross section gills have the lateral margin deeply notched, dividing it into a hypobranchial plate (containing efferent vessel) and an epibranchial lobe (anterior lobe longer). Between these marginal lobes are a pair of lobes, similar to marginal lobes. Thus the epibranchial surface shows four rows of blunt lobes, decreasing in size from anterior to posterior side, which are arranged above afferent blood vessel. Hypobranchial setae poorly developed. Posterior margin of scaphognathite with three long setae. Hypobranchial margin of podobranchs bears same setae as on epipod.

Cheliped stout, much longer than first leg and stouter in the male, only slightly longer and stouter than first leg in the female; merus trigonal, inner face smooth and fitting closely against pterygostomial region of carapace, borders granulate, superior border has a subterminal broad, restriction which separates a thickened distal ridge, on which there are three small granules, from a row of three to five similar granules on superior border. Inner inferior margin of merus has an acute lateral spine distally which is especially prominent in large (CW > 20 mm) males where the spine forms a tooth which may itself be granulated. Outer face of carpus convex with six small granules, two more prominent acute tubercles on distal margin, inner superior border with a flattened, distomedially directed, spur (granulated in large males) which abuts against proximal inner surface of propodus thereby restricting closure of cheliped against frontal area. In a similar way, inferior carpal margin is produced as a smooth obtuse flange fitting against merus when limb is withdrawn. These two structures give carpal article an unusual and distinctive shape. Outer face of propodus with two or three very small granules; superior face with three parallel rows of small granules; inner and inferior faces smooth, except that there is a small proximal spur on the inner propodal face. Fixed finger almost straight with six teeth increasing in size distally (large males have an additional basal tooth and some of the other teeth can be rudimentary); moveable

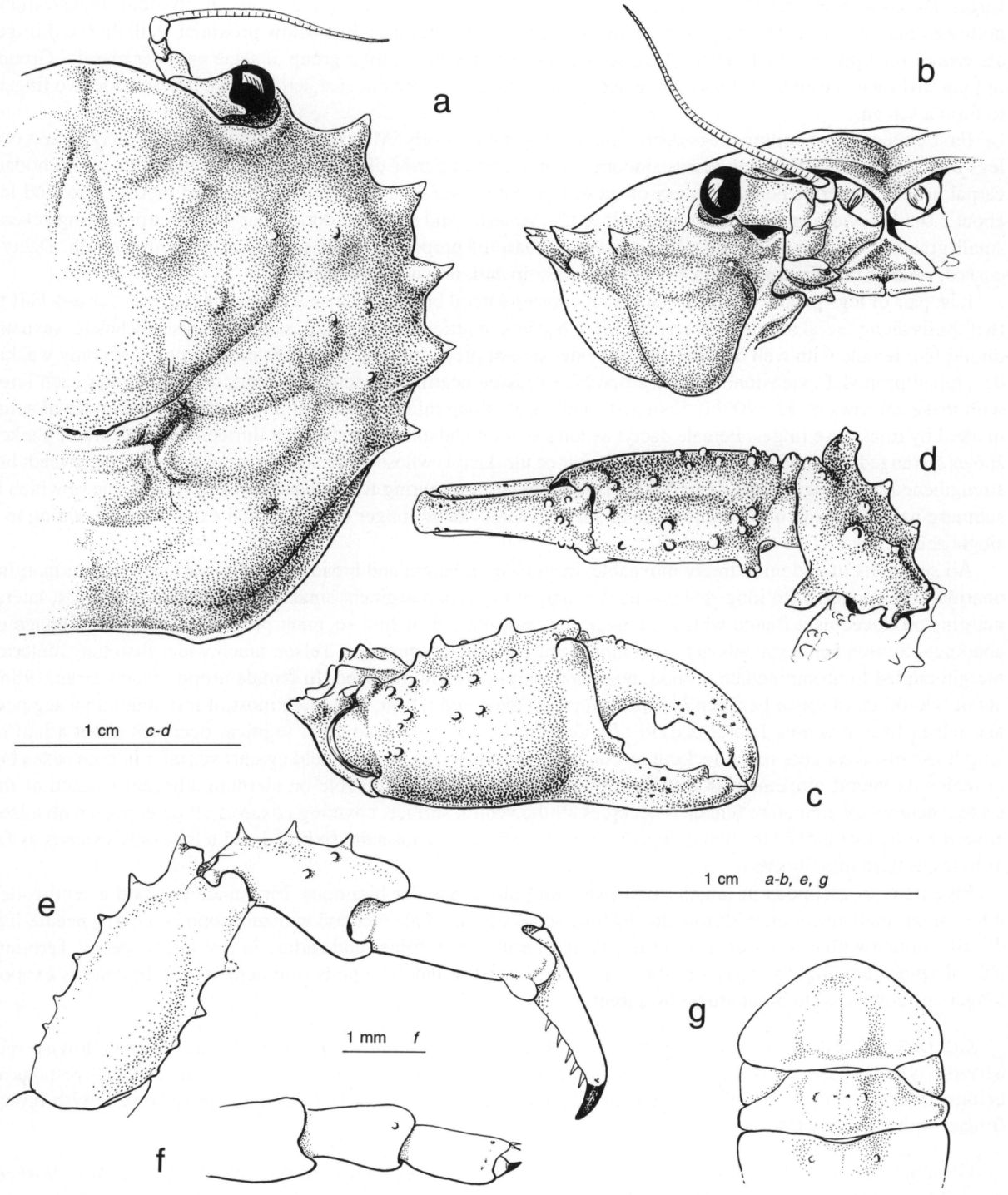

FIG. 21. — *Dynomene pilumnoides* Alcock, 1900: **a-g**, ♀ 14.6 x 11.7 mm, Sulu Archipelago, B. R. WILSON coll. (MNHN-B 10374): **a**, dorsal view of right half of carapace; **b**, ventral view of right orbital area; **c**, outer face of right cheliped; **d**, dorsal view of right cheliped; **e**, posterior view of terminal articles of right fourth pereopod; **f**, posterior view of terminal articles of right fifth pereopod; **g**, ventral view of telson and terminal segments of female abdomen.

finger curved with four teeth, first mid-way and separated from remainder which are on tip; both fingers, thick, hollowed out internally, touching only at tips where the teeth interlock. Just below proximal teeth on fixed finger are two distinct pits in which several long setae are inserted with a similar group of setae on inner margin. Groups of long stiff setae, inserted mid-way along dactyl and fixed finger, are directed across space between the two fingers to form a screen.

First three pairs of walking legs decreasing in length posteriorly. Meri elongate, both faces of meri of first two legs and anterior face third leg merus smooth and nacreous, inferior distal margin hollowed out to accommodate carpal article. Superior border of meri of these legs with several small granules, length of merus of second leg about 2.0-3.0 x width and equal to about half of CL. Anterior and posterior dorsal margins of carpi bearing several small granules, and produced distally to overhang base of propodi. Dorsal surface of propodi smooth. Dactyli curved, inferior margin armed with 4-5 small spines, tip dark brown and subacute.

Last pair of legs greatly reduced, lying along posterolateral border of carapace, reaching only as far as a half to two-thirds along meral article of preceding limb; borders of articles unarmed. Last pair of legs subchelate, sexually dimorphic: female with well developed distal extension of propodus which opposes dactyl, male with only weakly developed propodal extension. Female propodal extension bearing six, unequal, stout, hooked, spines each lined with marginal rows of 12 - 20 tiny flattened, acute teeth along middle region of inner surface, remainder of spine marked by transverse ridges. Female dactyl as long as propodal extension, bearing thirteen unequal, stout, hooked spines (arranged asymmetrically around perimeter of the dactyl) whose inner surface is smooth, devoid of teeth but strengthened by a longitudinal ridge. Male propodal extension bearing five unequal hooked spines, one of which is submarginal, all devoid of teeth along inner surface. Male dactyl longer than propodal extension and ending in a single acute claw.

All segments of abdomen freely moveable, increasing in length and breadth distally; surface smooth; margins unarmed but fringed with long setae. Anterior margin of second segment sinuous, medial region convex, lateral margins produced as a flange which fits over posterior margin of first segment preventing forward slippage of abdomen. Subsequent segments not overlapping with preceding segments. Telson much wider than long, anterior margin angled to accommodate uropod, posterior margin broadly rounded. In female uropod plates large, filling about two-thirds of space between last abdominal segment and telson, excluding most of last abdominal segment and telson from reaching lateral margin of abdomen. In male last abdominal segment occupies about a half of length. No effective abdominal locking mechanism: abdomen only loosely held against sternum in both sexes but in males its lateral movement is restricted by presence of a small tubercle on sternum adjacent to each of the second pereopods. In mature female it occupies all the ventral surface, covering coxae of all pereopods with telson covering proximal half of third maxillipeds. In male abdomen is not quite so broad and telson only extends as far as bases of third maxillipeds.

Five pairs of pleopods in female, first pair vestigial, remainder biramous. First male pleopod a semi-rolled tube with a small apical plate surrounded by long setae. Second male pleopod with an exopod on basis, needle-like distally, armed with a series of fifteen tiny, straight, acute, inset spines and ending in two larger spines. Terminal pair of spines are slightly curved at their tips. Third to fifth male pleopods rudimentary and biramous, exopod longer and connected to basal article by a joint.

COLOUR. — SAKAI (1965a) described the colouration of *Dynomene pilumnoides* as being yellowish red. MIYAKE (1983) shows the body and legs as light reddish-orange fringed with yellowish setae, and the eyestalks as being red. The picture of BABA, HAYASHI, and TORIYAMA (1986) shows the body and legs to be yellowish-brown fringed with dark brown setae.

GEOGRAPHIC DISTRIBUTION. — *Dynomene pilumnoides* has been recorded from Natal (as *Maxillothrix actaeiformis* Stebbing, 1921), Madagascar, Laccadive Ids, Philippine Ids, Japan, Australia, New Caledonia, Loyalty Id, Norfolk Ids, Enewetak Atoll, Marshall Ids and Hawaii. The material reported here from Australia, Norfolk Id, New Caledonia and Loyalty Ids represent new records and the specimen collected by the USFC Steamer *"Albatross"* in 1902, from Hawaii, has languished unrecognized in the collection of the U. S. National Museum for more than 90 years. This is a widespread Indo-Pacific species.