occupying all of tip. Epistome broadly triangular, surface deeply 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 very convex with a few scattered granules. A groove (pleural suture) begins near base of 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 first anterolateral tooth before dividing into two branches, one curving towards postorbital corner and the other curving beneath second anterolateral tooth. Third maxillipeds operculiform, bases widely separated by tip of sternum. Crista dentata has seven or eight well developed, distally placed teeth on each side. 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 or epipod on last pereopod. Gill structure is variable. In cross section the anterior of each pair of arthrobranchs show maximum development of epibranchial lobes: there are a series of six elongate lobes developed above afferent vessel, two narrow, short median lobes flanked by longer lobes, with wider and longer lobes on the outside. The short median lobes are lost towards the tip of gill. At base of outer lobes there is a deep notch on each side dividing off the hypobranchial plate containing the efferent vessel. On posterior arthrobranchs, and all pleurobranchs, there are only four epibranchial lobes and the median lobes are lost towards tip of gill. Hypobranchial setae at posterior end of branchial chamber poorly developed. Posterior margin of scaphognathite with two long setae. Hypobranchial margin of podobranchs bear same setae as on epipod.

Cheliped stout, slightly longer than first leg. Merus trigonal; inner face smooth fitting closely against pterygostomial region of carapace, borders granulate; outer face has a subterminal broad, restriction which separates a thickened distal ridge, on which there are three spines, from a pair of similar spines preceded by a row of six smaller granules on superior border. Inner inferior margin of merus has a small blunt lateral spine. Outer face of carpus convex with six small blunt granules, two more prominent blunt spines on distal margin; inner superior border with a distomedially directed, but dorsally curved, blunt spur 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: inner face very narrow and outer face much broader. Outer and superior faces of propodus with about a dozen small blunt granules, inner and inferior faces smooth, except that there is a small proximal granule on inner propodal face. Fixed finger almost straight with four or five teeth increasing in size distally, second tooth placed midway and prominent, last three teeth dividing up tip of finger; moveable finger strongly curved bearing four teeth, first blunt, second more acute directed towards tip and last two interlocking with teeth of fixed finger. Both fingers, thick, hollowed out internally, touching only at tips; a group of stiff setae inserted proximally on each finger and these curve towards tips filling gap between fingers.

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 a row of three or four small spines increasing in size distally, separated by a gap from two small distal spines; no spines on distal posterior margin; length of merus of second leg about 1.2 x its width and equal to about 0.4 x CL. Dorsal surface of carpi armed with seven or eight small spines not arranged in rows, and produced distally to overhang base of propodi. Dorsal surface of propodi armed with four or five small spines. Dactyli curved, inferior margin armed with 4-5 small spines, tip brown (in some cases whole dactyl is black) and subacute.

Last pair of legs greatly reduced, lying along posterolateral border of carapace, reaching only as far as half way 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 ten, unequal, stout, hooked, acute, spines with lateral rows of 8-10 tiny, flattened teeth proximally, separated by a striated ridge. Distally the striae of this ridge grade into a surface that is densely convoluted. Female dactyl as long as propodal extension, bearing thirteen unequal, stout, hooked spines (arranged asymmetrically around perimeter of dactyl) whose concave inner surface is wrinkled or convoluted and mostly devoid of tiny teeth except for a few small blunt marginal teeth on distal

two-thirds. Male propodal extension bearing six unequal curved spines which have tiny scattered marginal teeth. These spines are not arranged in the typical manner for dynomenids: instead of lying in an asymmetrical row around the perimeter, they are very disorganized, facing in different directions and leaning at different angles. Male dactyl longer than propodal extension and ending in a single acute claw.

All segments of abdomen freely moveable, surface smooth, margins unarmed but fringed with long setae. Second segment narrowest; anterior margin sinuous, medial region convex, lateral margins produced as a flange which fits over posterior margin of first segment (which is shortest) preventing forward slippage of abdomen. Subsequent segments increasing in length and breadth distally, not overlapping with preceding segments. Telson much wider than long, anterior margin angled to accommodate uropod, posterior margin broadly rounded. In female uropod plates are large, filling about ninety percent 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 three quarters of peripheral margin. No effective abdominal locking mechanism: abdomen only loosely held against sternum in both sexes, sideways movement restricted by small sternal tubercle beside telson or uropods. In mature females sternal tubercles absent; abdomen occupies all of ventral surface, covering coxae of all pereopods with telson covering proximal half of third maxillipeds. Male abdomen 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 twenty prominent, straight, acute, spines and ending in two larger curved spines. Subterminal spines unevenly spaced, seventh, eighth, and ninth spines form an overlapping group as do thirteenth and fourteenth spines, and follow a sinuous path. Third to fifth male pleopods rudimentary and biramous, exopod longer and jointed with basal article.

COLOUR. — In his original description STIMPSON (1860) noted that the color of *Hirsutodynomene ursula* is more or less reddish or crimson, the setae a light golden color, and the ambulatory legs have sharp, black, curved unguiles (claws). A. MILNE EDWARDS (1879) gave the colour as being crimson, and in places carmine. RATHBUN (1937) noted that the dactyli of the last pair of legs are without pigment.

GEOGRAPHIC DISTRIBUTION. — The type locality for *Hirsutodynomene ursula* is Cape San Lucas, Baja California. RATHBUN (1937) states that the type specimen is not extant. The range extends from the Gulf of California in the north to La Plata Id, Ecuador in the south, and offshore it occurs on the Galapagos Ids and Clipperton Id. Thus *H. ursula* is an eastern Pacific species.

DEPTH. — The depth range for *Hirsutodynomene ursula* is 0-99 m (rarely 125 m). Most specimens have been collected from rocks and dead coral, and some have been recorded as coming from *Porites* sp. and *Pocillopora* sp. but it is not clear whether these were living or dead colonies. There is no strong evidence of dependence on living corals. *H. ursula* has a much greater depth range than *H. spinosa* which has not been recorded deeper than 15 m.

SIZE. — The maximum sizes for *Hirsutodynomene ursula* are 27.2 x 20.4 mm for males, and 21.8 x 16.5 mm for females. The smallest ovigerous female examined was 9.5 x 7.5 mm, carrying around 120 eggs, and the largest ovigerous female, 19.4 x 14.7 mm, carrying around 2800 eggs. Mean egg diameter was 0.45 mm. This egg size suggests that this species has planktotrophic larvae. Ovigerous females have been mainly collected during December to April with one female from Clipperton Id collected in August (GARTH, 1965). Concentration of breeding in the early part of the calendar year is similar to the *Dynomene* species.

DISCUSSION. — GARTH (1946) remarked upon the remarkable similarity of *Hirsutodynomene ursula* to the xanthids: "With no other Galapagos species of Brachyura is the field collector so likely to be misled as to identity as with *D. ursula.* Unless he notices that the fourth pair of walking legs are reduced to minute size and carried dorsally, he will believe himself to have found a species of *Pilumnus*." Indeed, initial sorting of the Galapagos collections resulted in all the dynomenid specimens being placed with the Xanthidae. An untrained observer would be easily misled by the black pereopod dactyli. (It should be noted here that dynomenids do not in fact carry their last pereopods "dorsally". They are carried horizontally).

The main differences between the two species in this genus (see Table 2) are that in *Hirsutodynomene spinosa* there are about 12 spines (and associated areolae) on the carapace (only about 6 in *H. ursula*), the suborbital margin has 5 short acute spines (only blunt granules), the carpal projection on the cheliped is a sharp spine (a blunt lobe), the carapace is densely covered with setae (sparsely covered), and the short setae are bent at right angles near the tip (short setae not bent).

Other differences between *Hirsutodynomene spinosa* and *H. ursula* are seen in the last pair of legs: both have a similar number of propodal spines in the female but those of *H. spinosa* are densely covered with teeth while in *H. ursula* the teeth are confined to the proximal lateral margins and the rest of the spine has a roughened, convoluted surface. In both species these spines are opposed by concave, wrinkled dactylar spines with a few small teeth but *H. spinosa* has more spines. The males have a similar number of propodal spines but in *H. ursula* these spines are very disorganized and arranged irregularly around the distal perimeter. There are no differences in the male dactyli. Commenting about the last pair of legs of *H. ursula*, STIMPSON (1860) said they are "... not prehensile, since the animal does not cover itself with a foreign body like the Dromiae; and they fill, apparently no office in the economy of the animal, except when in place, they fill up neatly the chink between the carapax and the stouter walking feet." This is the earliest speculation about the role of the last leg of a dynomenid. STIMPSON clearly believed that this limb is vestigial and redundant.

RATHBUN (1937) describes the two kinds of setae on the surface of *Hirsutodynomene ursula*: "...the first kind very short, clavate, or even pedicellate, and densely crowded; the second long and nearly as thick as the first, but fusiform, with pointed extremities, and sparsely distributed over the surface, generally in groups of three or four, of unequal lengths." The short erect setae are in fact plumose with a dense distal zone of long setules and most of the shaft only sparsely covered with short setules. The long setae are mostly covered with short setules. These long setae are very similar in *H. ursula* and *H. spinosa* but the short setae show several differences in their shape and setule ornamentation.

The gill structure of *Hirsutodynomene ursula* is similar to that of *H. spinosa* but shows more variation between gills. The anterior arthrobranchs of *H. ursula* are the same, but the other large gills show a reduced number of median lobes. These are more phyllobranchiate-like because more of the gill consists of flattened plates. The gills of *H. spinosa* are more trichobranchiate-like in having a large number of elongate epibranchial lobes. Both species show the pattern seen in other dynomenids of a tendency to lose epibranchial lobes towards the tip of the gills. Hypobranchial setae at the back of the gill chamber are poorly developed and there are two long setae on the posterior margin of the scaphognathite. Setae on the hypobranchial margin of each podobranch aid the cleaning role of the epipods.

The second male pleopod of *Hirsutodynomene ursula* has a larger number of subterminal spines than *H. spinosa* and these spines are longer, and not inset into the surface of the pleopod. In both species these spines are unevenly distributed along the pleopod, but more so in *H. ursula*, where there are two overlapping groups. Both species have the last three pairs of pleopods biramous and rudimentary but in *H. ursula* the articles are of similar length, whereas in *H. spinosa* the exopod is longer. The junction of the exopod and basal article is marked by a joint in both species.

The two species have mutually exclusive distributions: *Hirsutodynomene ursula* in the Eastern Pacific and along the coast of the Americas, and *H. spinosa* across the Western Pacific and the Indian Ocean. The western-most locality for *H. ursula* is Clipperton Id (109°W), while the eastern-most locality for *H. spinosa* is the Tuamotu Ids (142°W).

The stomach of a male *Hirsutodynomene ursula*, 13.4 x 10.3 mm, from Espiritu Santo Id, was almost en tirely filled with sand grains and some amorphous aggregates of organic material. There were no recognizable plant or animal fragments present. Food is probably obtained by using the spooned cheliped fingers and their stiff setae to sift out fine particulate organic material from coral sediments. The contents are identical to those found in *H. spinosa* (see above). In the body cavity, beside the stomach, two encysted nematodes were observed.

On the Galapagos Ids, GARTH (1991) found that in a sample (n = 169) of 20 species of rocky shore Brachyura from Sullivan Bay, Isla Santiago, *Hirsutodynomene ursula* was common, making up 5.3% of the total. This species is the only dynomenid known from the Galapagos Ids.

Character	*H. spinosa*	*H. ursula*
Density of setae	Very dense over most of carapace	Some areas of sparse setae on carapace
Short setae	Bent at right angles	Not bent at right angles
Carapace surface	Areolate and bearing about 12 spines	Areolate and bearing about 6 spines
Suborbital margin	Armed with about 5 short, acute spines	Armed with only a few blunt granules
Inner carpal margin of cheliped	Bearing a sharp spine	Bearing a blunt lobe
P5 ♀ Propodus	8 spines with numerous teeth on inner margin	10 spines with marginal rows of teeth
P5 ♀ Dactyl	16 spines	13 spines
P5 ♂ Propodus	5 spines arranged around distal perimeter	6 spines not arranged around perimeter
Second ♂ Pleopod	16 short, inset subterminal spines	20 long subterminal spines, not inset

TABLE 2. — Comparison of the two species of *Hirsutodynomene*.

Genus ***METADYNOMENE*** nov.

DIAGNOSIS. — Carapace as wide as long or slightly wider than long, moderately convex, subcircular; surface smooth. Tomentum composed of uniformly short, soft setae, which accentuate unevenness of carapace forming transverse troughs. Lateral carapace margin well defined and marked by indentations or armed with distinct teeth. Frontal groove well marked, split in two posteriorly; cervical, postcervical and branchial grooves usually evident. Frontal carapace margin broadly triangular, continuous, no rostrum or teeth Eyestalks short; eyes protected by well defined orbits. Sternal sutures 7/8 of female end well apart on low tubercles behind bases of second walking legs.

Antennule can be concealed inside orbit at base of eyestalk. Antennal flagella shorter than carapace width. All articles of antenna moveable; first article (urinal) always beaked medially; second article has an exopod firmly fixed. Third maxillipeds opercular, completely covering buccal cavern, separated at their bases by a plate at same level as sternum; basis and ischium of endopod fused but joint always marked by a shallow groove. Crista dentata present. Chelipeds equal, stouter than walking legs; fingers not strongly curved and touching for at least half their length. Last pair of legs sexually dimorphic, very reduced; dactyl rudimentary, forming an obsolete subchelate mechanism with an extension of propodus. Gill structure basically phyllobranchiate but plates have a variable number of epibranchial lobes.

Abdomen of six segments and telson folded loosely under thorax; uropods large, no effective abdominal locking mechanism. Sideways movement restricted by small spines or ridges on coxae of second and third pereopods, adjacent to the margins of telson and penultimate abdominal segments. Both sexes have five pairs of pleopods; first pair vestigial in female; last three pairs rudimentary in male. Male pleopods uniform in structure; first pair consist of a stout, setose semi-rolled tube with an apical plate; second pair needle-like, bearing a row of curved spines on anterior surface.

TYPE SPECIES. — *Dynomene devaneyi* Takeda, 1977.

OTHER SPECIES. — *Dynomene tanensis* Yokoya, 1933, *Metadynomene crosnieri* sp. nov.

ETYMOLOGY. — *Metadynomene* is a combination of *meta*, meaning *after*, and the genus *Dynomene*. Gender is feminine.

DISCUSSION. — This new genus is erected for a group of three species, two of which were originally assigned to *Dynomene*. The third species is newly described herein. All of these species are characterized by having a

carapace about as wide as long, or only slightly wider than long, densely covered with short, soft setae which give the surface an uneven, undulating appearance with transverse troughs, and chelipeds with fingers not strongly down-curved and touching for about half their length. All the known species are substantially larger than the other dynomenids and occur in deeper waters. *Metadynomene crosnieri* sp. nov. is known only from the type locality, *M. devaneyi* (Takeda, 1977) from the type locality and Marquesas Islands, whereas the third species, *M. tanensis* (Yokoya, 1933), is widespread in the Pacific.

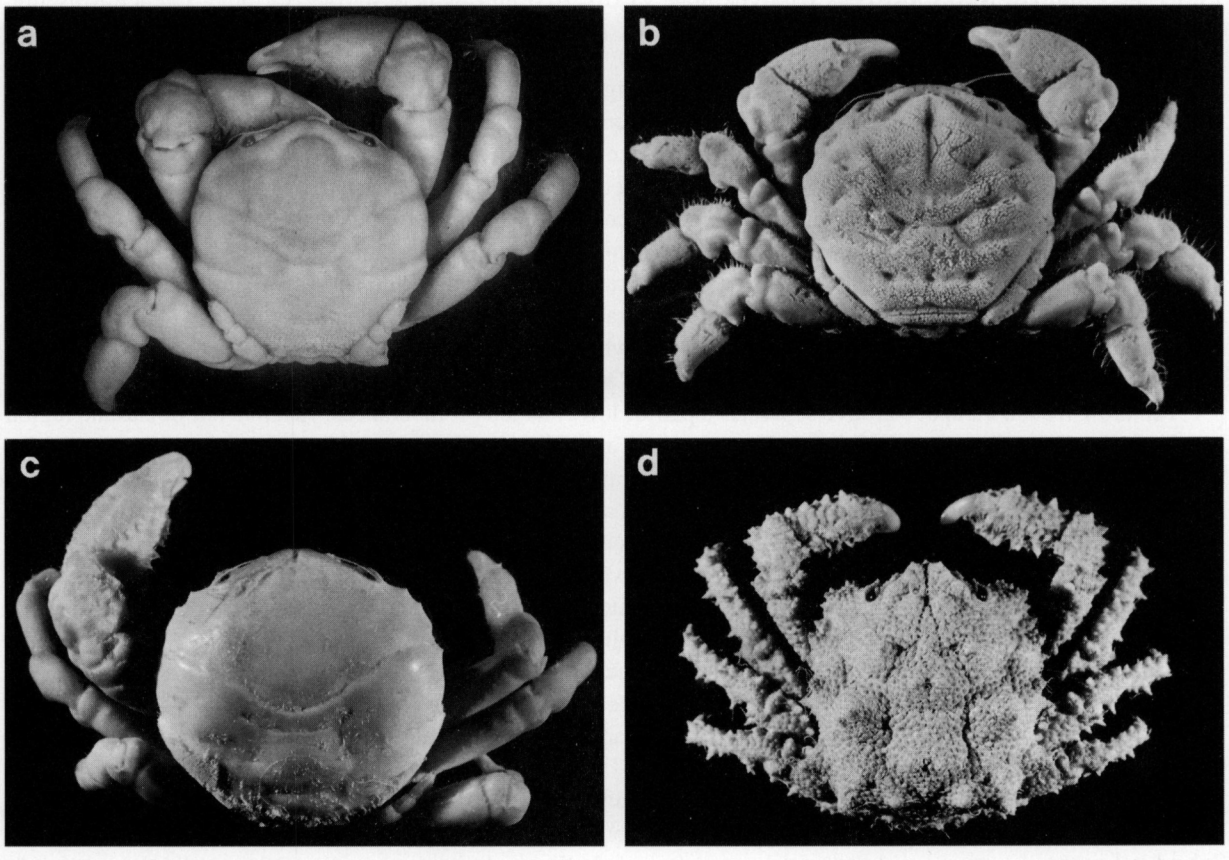

FIG. 25. — **a**, *Metadynomene devaneyi* (Takeda, 1977) ♂ 21.2 x 20.1 mm, holotype, S. E. Oahu, Hawaii, *"Star II"*, 367 m (BPBM-S 8509): dorsal view of whole crab, left second pereopod and right fourth pereopod not shown. — **b**, *Metadynomene tanensis* (Yokoya, 1933), ♀ 13.5 x 12.5 mm, New Caledonia, SMIB 8, 305-355 m: dorsal view of whole crab. — **c**, *Metadynomene crosnieri* sp. nov., ♂ 23.2 x 22.7 mm, Glorieuses Ids, BENTHEDI, 330-440 m (MNHN-B 22510): dorsal view of whole crab, setae removed from right half of carapace, right cheliped, left third pereopod and left fifth pereopod are missing. — **d**, *Paradynomene tuberculata* Sakai, 1963, ♂ 21.5 x 22.3 mm, Loyalty Ids, MUSORSTOM 6, stn DW 406, 373 m: dorsal view of whole crab.

Metadynomene devaneyi (Takeda, 1977)

Figs 11, 25 a, 26 a-c

Dynomene devaneyi Takeda, 1977: 31, figs 1-3; 1978, fig. 1. — McLAY, 1991: 465, fig. 4b.
Not *Dynomene devaneyi* - GUINOT, 1993: 1227 (= *Metadynomene crosnieri* sp. nov.).

MATERIAL EXAMINED. — **Hawaii**. *"Star II Submersible"*: S.E Oahu, off Makapuu Point, Kaiwi Channel, 21°18'N, 157°39'W, 367 m, 28.02.1974, collected from precious coral (*Corallium* sp.) beds: 1 ♂ 21.2 x 20.1 mm, holotype (BPBM-S 8509); 1 ♀ 15.6 x 15.2 mm, allotype (BPBM-S 8510).

Marquesas Islands. MUSORSTOM 9: stn CP 1290, Ua Huka, 8°53'S, 139°38'W, 341-344 m, 8.09.1997: 1 ♀ 18.4 x 18.3 mm. — Stn CP 1306, Nuka Hiva, 8°55.2'S, 140°14'W, 283-448 m, 10.09.1997: 1 ♂ 29.0 x 28.3 mm; 1 ♀ ovig. 25.0 x 25.3 mm.

TYPES. — *Dynomene devaneyi* Takeda, 1977: holotype is a male 21.2 x 20.1 mm, collected by the submersible *"Star II"* from 21°18'N, 157°39'W, Southeastern Oahu, off Makapuu Point, Kaiwi Channel, Hawaii, 367 m, 28.02.1974, held by the Bernice P. Bishop Museum, Honolulu, registration number BPBM-S 8509. The same institution holds a paratype male 22.7 x 21.6 mm (BPBM 1975.77, lot no. 2), and an allotype female 15.6 x 15.2 mm (BPBM-S 8510). A paratype male 21.0 x 20.0 mm, is held by the National Science Museum, Tokyo, registration number NSMT Cr. 5075 (ex BPBM 1974.04, lot no. 4).

DESCRIPTION. — Carapace slightly wider than long, ratio of CW/CL = 1.03-1.05, rectangular in outline; surface mostly flat, convexity greater in anterior-posterior direction than laterally, smooth, except for deeply marked grooves (see below). Carapace surface densely covered with setae of only one kind: very short, soft setae, clothing entire surface. Pereopods covered with short setae as well as a few longer filiform setae (5 x length of short setae and 0.10 x CW) which fringe limbs, locally concentrated on dactyli. Density of short setae completely obscures body surface and on carapace they present a symmetrical undulating aspect, reflecting gentle undulations in carapace surface: one oblique trough lies behind supraorbital margin, with a short median longitudinal trough extending posteriorly, then a trough curving anterolaterally which marks cervical groove, followed by a trough running across midline, just in front of cardiac area, which splits into two lateral troughs, and finally a short trough crossing cardiac area. Microscopic details of setae not investigated.

A shallow frontal carapace groove separates a pair of low rounded protuberances. Just in front of cardiac region two laterally-directed grooves originate: first groove (cervical) arises separately (but very close together) from small gastric pits curving (slightly sinuously) anterolaterally on to branchial region towards a faint notch mid-way along anterolateral margin, while second groove extends across mid-line and initially runs almost directly towards lateral margin but then splits into an anterior portion which follows posterior to the first groove but does not reach lateral carapace margin, while second portion curves posterolaterally, bordering anterior cardiac region, to become branchial groove, meeting margin at posterolateral tooth. Posterior cardiac area marked by a shallow groove crossing mid-line. Anterolateral carapace margin begins at level of postorbital corner, evenly convex, without teeth, and interrupted by a shallow notch where cervical groove meets the edge, midway towards branchial notch which marks beginning of posterolateral border. Reduced last leg lies alongside posterolateral border which angles obliquely towards rear of carapace. Posterior carapace margin recessed in order to accommodate distal section of first segment of abdomen which is visible dorsally.

Frontal margin continuous, V-shaped, ventrally-directed, joined to epistome (which separates orbits). Supraorbital margin not projecting, continuous above orbits, not interrupted by a notch, and without granules. Suborbital margin, convex, without teeth, projecting, shelf-like and visible dorsally. Orbits oblique and 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 the opening of antennal gland, smaller but more acute and directed ventrally. Second article wider than long, distal margin widest, to which is fixed the exopod curving over base of eyestalk, 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 just matching length of exopod. Fourth antennal article smaller, as long as wide; remainder of the antennal articles directed laterally, extending well beyond postorbital corner, and can be partially folded under the supra-orbital margin. Ratio of length of antennal flagella to CW = 0.33. Eyestalk can be completely folded into orbit; cornea well developed, occupying all of tip. Epistome broadly triangular, surface slightly concave; dorsal arm, joined to tip of carapace, narrow; lateral arms longer and thicker. Joint between epistome and carapace is marked by a narrow suture.

Subhepatic area smooth, very convex. A groove begins near base of antenna, curving round under branchial region and meets branchial groove at posterolateral notch. A short continuation of cervical groove bends anteriorly

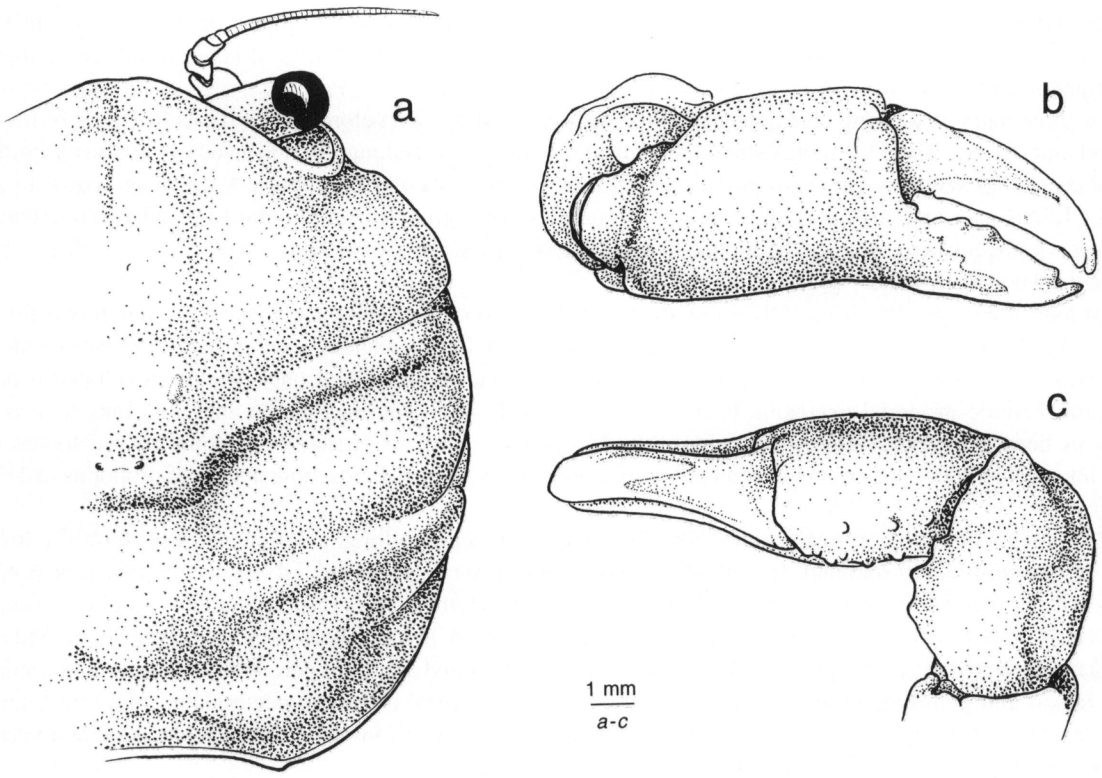

FIG. 26. — *Metadynomene devaneyi* (Takeda, 1977): **a-c**, ♀ 15.6 x 15.2 mm, allotype, S. E. Oahu, Hawaii, *"Star II"*, 367 m (BPBM-S 8510): **a**, dorsal view of right half of carapace; **b**, outer face of right cheliped; **c**, dorsal view of right cheliped.

to meet groove at margin of branchial area. Third maxillipeds operculiform, bases widely separated by tip of sternum. Crista dentata has twelve teeth increasing in size distally. Female sternal grooves short, ending wide apart in a V-shaped groove created by a low medial parallel ridge, just behind bases of second walking legs. Sternal sutures 7/8 concealed by a dense layer of long soft setae from adjacent coxa of third walking leg.

Branchial formula same as *M. tanensis*, except than there is no podobranch on last pereopod. A cross section of an arthrobranch shows lateral margin deeply notched, dividing gill into a hypobranchial plate (containing efferent vessel) and an epibranchial lobe. Between these marginal lobes are a pair of shorter lobes. Thus the epibranchial surface shows four rows of blunt lobes, which are arranged above afferent blood vessel. Towards tip of gill the length and number of lobes is gradually reduced. Hypobranchial setae in posterior region of branchial chamber well developed.

Cheliped stout, much longer and stouter than first leg. 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, smooth distal ridge, from a row of three small granules; inferior face has three subdistal, blunt tubercles. Outer face of carpus convex, smooth, no longitudinal channel, two prominent blunt tubercles on distal margin; inner superior border with three blunt tubercles, distal one largest which abuts against the 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. Outer face of propodus smooth, superior face with three small granules, inner and inferior faces smooth, except that there is a small proximal tubercle on inner propodal face. Fixed finger almost straight with seven or eight almost obsolete teeth increasing in size distally; moveable finger not strongly curved, with one small proximal tooth and three teeth at tip, interlocking with opposing teeth. A narrowing band of setae extend on to outer face of

moveable finger. Just below proximal teeth of fixed finger are two small pits in which several long setae are inserted. Both fingers, thick, hollowed out internally, with a small proximal gape, touching for about three-quarters their length. In hollowed out interior of each finger there are small tufts of setae which come together when fingers are closed.

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. Superior border of meri of these legs with several small granules, length of merus of second leg about 2 x width and equal to about half of CL. Anterior and posterior dorsal margins of carpi without granules, and produced distally to overhang the base of propodi. Surface of propodi smooth. Dactyli curved, inferior margin armed with 2-3 small distal spines, tip pale brown and subacute.

Last pair of legs greatly reduced, lying along posterolateral border of carapace, reaching to about two-thirds of meral article of preceding pereopod; borders of articles unarmed. 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 several, small, stout, spines. Female dactyl as long as propodal extension, bearing several, small, stout, spines. Male propodal extension bearing five unequal curved spines. Male dactyl longer than propodal extension and ending in a single acute claw. Microscopic details of propodus and dactyl unknown.

All segments of abdomen freely moveable. Telson much wider than long, anterior margin essentially straight, posterior margin broadly rounded. In both sexes uropod plates are large, filling all of space between penultimate abdominal segment and telson, excluding all of last abdominal segment from reaching lateral margin of abdomen. No effective abdominal locking mechanism: abdomen only loosely held against sternum in both sexes. Sideways movement restricted by small spines (can be bifid) on coxae of second and third pereopods, adjacent to the margins of the telson and penultimate abdominal segments. In mature female abdomen occupies all of ventral surface, covering coxae of all pereopods with telson covering proximal third of third maxillipeds. In male abdomen not quite so broad and telson only extends as far as bases of third maxillipeds.

Five pairs of pleopods in female, first pair vestigial and uniramous, remainder biramous. Five pairs of pleopods in male; first pleopod a semi-rolled tube ending in a curved apical plate surrounded by long setae; second pleopod needle-like with an exopod on basis (as illustrated by TAKEDA, 1977, fig. 1A-C). Microscopic details of second pleopod unavailable. Remaining pleopods rudimentary. Third pleopod comparatively well developed, fourth and fifth pleopods smaller, all are biramous.

COLOUR. — Covered in a pale tan velvet tomentum.

GEOGRAPHIC DISTRIBUTION. — *Metadynomene devaneyi* is known from Oahu Id, Hawaii (type locality) where it was collected from precious coral (*Corallium* sp.) beds, and the Marquesas Islands (new record).

DEPTH. — The depth off southeast Oahu was 367 m, and at the Marquesas Islands 283-448 m and 341-344 m.

SIZE. — Seven specimens of *Metadynomene devaneyi* (4 males and 3 females) are known: maximum size for males is 29.0 x 27.3 mm and for females is 25.0 x 25.3 mm. An ovigerous female has been collected from the Marquesas in September. It carried approximately 2200 eggs, diameter 0.7 mm, a smaller number than comparable *M. tanensis* females.

DISCUSSION. — Some details can be added to the original description. TAKEDA (1977, fig. 1A-C) figured the first two male pleopods of *Metadynomene devaneyi* but did not show any details, especially of the second pleopods, which are only visible under high magnification. The male type specimen has three pairs rudimentary biramous pleopods. The dactyli of the walking legs are armed with two or three small distal spines. The major differences between the three species of this genus are discussed below (see Table 3) under *M. crosnieri* sp. nov.

The branchial formula of *Metadynomene devaneyi* (19 gills + 7 epipods) is very similar to *M. tanensis* except that there is no podobranch on the last pereopod. McLAY (1991, fig. 4b, as *Dynomene devaneyi*) described the structure of the gills of *M. devaneyi* showing several asymmetrical epibranchial lobes. The number of lobes is

dependent upon where, along the gill, the cross section is made. The epibranchial lobes and hypobranchial plates do not always correspond exactly. Whereas the plates are clearly arranged in sequence, the lobes tend to arise independently so that in one section there may be as many as five lobes, and in another section there may be only three. Furthermore, the number of lobes decreases towards the ends of the gill. In a scanning electron microscope picture the lobes are sometimes clumped and it is difficult to see the exact relationship between the lobes and the hypobranchial plates. However, the multi-lobed gill structure is similar to that found in the species of *Hirsutodynomene* (see above). Hypobranchial setae at the back of the gill chamber are much better developed in *M. devaneyi*.

McLAY (1991) compared some features of *Metadynomene devaneyi* with those of the primitive dromiid *Sphaerodromia*, contrasting the shape of the front of the carapace, the structure of the antenna, female sternal sutures 7/8, and male pleopods - all of which are very similar. However, *M. devaneyi* has a large number of pereopodal epipods and podobranchs, the gills are multi-lobed, trichobranchiate-like, rather than phyllobranchiate. In *Sphaerodromia* the abdomen is held in place by denticulate ridges on coxae of first two walking legs against the lateral margins, while in *M. devaneyi* there is no effective abdominal locking mechanism.

The gut of a female, 18.4 x 18.3 mm, from the Marquesas Islands contained amorphous organic material and sand grains.

Metadynomene tanensis (Yokoya, 1933)

Figs 4 d, 6 c, 7 f, 9 d-e, 11, 13 c, e-f, 14 e, 25 b, 27, 28

Dynomene tanensis Yokoya, 1933: 96, text-fig. 38. — SAKAI, 1936: 45; 1940: 54 (list). — SERÈNE, 1968: 36 (list). — TAKEDA, 1977: 35 (list). — POUPIN, 1996b: 26, pl. 12f (colour photo).

Dynomene praedator - SAKAI, 1976: 30, text-fig. 17. — NAGA & TSUCHIDA, 1995: 108, pl. 1, fig. 2. Not *Dynomene praedator* A. Milne Edwards, 1879.

MATERIAL EXAMINED. — **Taiwan**. Nan-Fan-Auo Fishing Harbour, from a boat, no locality, no depth, no date, coll. J. F. HUANG : 1 ♂ 9.0 x 8.0 mm. (only colour photo seen) (NTOU).

Indonesia. DANISH EXPEDITION KEI ISLANDS: stn 12, 5°31'S, 132°35'E, 325 m, coll. T. MORTENSEN, 9.04.1922: 1 ♀ 5.5 x 5.0 mm (ZMUC).

KARUBAR: stn DW 18, 5°18'S, 133°01'E, 205-212 m, 24.10.1991: 1 ♂ 9.0 x 8.2 mm; 1 ♀ 10.9 x 10.0 mm.

New Caledonia. Dragage du *"Vauban"*: stn D 15, 22°49'S, 167°12'E, 390-395 m, 10.04.1978: 1 ♀ 6.4 x 6.0 mm. — Stn D 24, 22°48'S, 167°12'E, 355-360 m, 13.04.1978: 3 ♀ 11.2 x 10.5 - 13.4 x 12.6 mm.

BIOCAL: stn DW 50, 23°06.50'S, 167°53.74'E, 240-260 m, 31.08.1985: 1 ♀ 22.8 x 20.5 mm.

MUSORSTOM 4: stn 193, 18°56.30'S, 163°23.20'E, 415 m, 19.09.1985: 1 ♀ 15.9 x 14.6 mm. — Stn 212, 22°47.40'S, 167°10.50'E, 375-380 m, 28.09.1985: 1 ♂ 7.2 x 6.8 mm; 1 ♀ 13.0 x 12.1 mm. — Stn 213, 22°51.30'S, 167°12.00'E, 405-430 m, 28.09.1985: 1 ♂ 18.9 x 18.1 mm. — Stn 214, 22°53.80'S, 167°13.90'E, 425-440 m, 28.09.1985: 1 ♂ 13.6 x 12.6 mm; 1 ♀ 13.0 x 12.2 mm. — Stn 215, 22°57.70'S, 167°17.00'E, 485-520 m, 28.09.1985: 3 ♂ 7.2 x 7.0 - 16.9 x 16.0 mm; 4 ♀ 14.4 x 13.9 - 19.2 x 18.9 mm. — Stn 230, 22°52.50'S, 167°11.80'E, 390-420 m, 30.09.1985: 1 ♂ 22.8 x 21.6 mm; 1 ♀ 15.8 x 14.6 mm.

SMIB 2: stn DW 1, 22°52.7'S, 167°12.6'E, 438-444 m, 17.09.1986: 2 ♂ 13.5 x 12.5, 17.8 x 16.6 mm. — Stn DW 3, 22°56.0'S, 167°18.8'E, 412-428 m, 17.09.1986: 1 ♂ 13.1 x 12.3 mm. — Stn DW 5, 22°56.3'S, 167°14.4'E, 398-410 m, 17.09.1986: 2 ♀ 11.0 x 10.4, 13.1 x 12.6 mm. — Stn DW 6, 22°56.2'S, 167°15.9'E, 442-460 m, 17.09.1986: 1 ♀ 16.7 x 15.2 mm. — Stn DW 16, 22°51.2'S, 167°11.7'E, 390 m, 19.09.1986: 1 ♀ 19.6 x 17.5 mm. — Stn DW 17, 22°55.1'S, 167°14.5'E, 428-448 m, 19.09.1986: 2 ♂ 12.9 x 12.0, 18.4 x 17.5 mm; 1 ♀ 13.7 x 12.6 mm.

SMIB 3: stn DW 25, 22°56.1'S, 167°16.2'E, 437 m, 24.05.1987: 1 ♂ 16.5 x 15.8 mm. — Stn DW 27, 22°55.2'S, 167°16.2'E, 457 m, 24.05.1987: 1 ♀ ovig. 17.6 x 16.3 mm.

SMIB 4: stn DW 65, 22°55.3'S, 167°14.5'E, 420 m, 10.03.1989: 1 ♀ 15.6 x 14.4 mm.

SMIB 6: stn DW 125, 18°57.4'S, 163°23.5'E, 335-350 m, 3.03.1990: 1 ♂ 19.8 x 18.0 mm.

BERYX 11: stn CP 46, 23°42'S, 168°01'E, 300-350 m, 20.10.1992: 2 ♀ 11.2 x 10.0, 20.0 x 18.0 mm.

SMIB 8: stn DW 163, 24°49'S, 168°09'E, 310-460 m, 28.01.1993: 1 ♂ 11.9 x 11.0 mm. — Stn DW 185, 23°16'S, 168°04'E, 311-355 m, 31.01.1993: 3 ♀ 4.8 x 4.8 - 16.0 x 15.4 mm. — Stn DW 190, 23°18'S, 168°05'E, 305-310 m, 31.01.1993: 1 ♀ 16.2 x 14.8 mm. — Stn DW 193, 22°59'S, 168°19'E, 500-508 m, 1.02.1993: 1 ♂ 7.4 x 6.8 mm. — Stn DW 197, 22°51'S, 168°12'E, 414-436 m, 1.02.1993: 1 ♂ 22.1 x 21.2 mm; 4 ♀ 8.6. x 7.5 - 19.0 x 18.4 mm. — Stn DW 198, 22°52'S, 168°12'E, 414-430 m, 1.02.1993: 2 ♀ 5.0 x 4.8, 16.2 x 15.3 mm. — Stn DW 199, 22°52'S, 168°12'E, 408-410 m, 1.02.1993: 2 ♀ 11.3 x 10.6, 21.0 x 19.8 mm.

BATHUS 2: stn CP 736, 23°03'S, 166°58'E, 452-464 m, 13.05.1993: 1 ♀ ovig. 16.3 x 15.4 mm.

BATHUS 3: stn CP 805, 33°41'S, 168°01'E, 278-310 m, 27.11.1993: 1 ♂ 23.7 x 21.4 mm. — Stn CP 811, 23°41'S, 168°15'E, 383-408 m, 28.11.1993: 1 ♀ 24.8 x 22.4 mm. — Stn DW 829, 23°21'S, 168°02'E, 386-390 m, 29.11.1993: 1 ♂ 17.4 x 16.1 mm. — Stn DW 830, 23°20'S, 168°01'E, 361-365 m, 29.11.1993: 1 ♂ 8.7 x 8.2 mm, 7 ♀ 4.6 x 4.5 - 17.3 x 16.3 mm.

HALICAL 1: stn DW 01, 18°56'S, 163°24'E, 380-400 m, 23.11.1994: 1 ♂ 12.9 x 12.0 mm. — Stn DW 04, 18°55'S, 163°24'E, 350-365 m, 26.11.1994: 1 ♀ 14.5 x 13.7 mm.

Loyalty Islands. MUSORSTOM 6: stn DW 459, 21°01.39'S, 167°31.45'E, 420 m, 20.02.1989: 1 ♀ 16.8 x 15.4 mm. — Stn 460, 21°01.72'S, 167°31.45'E, 420 m, 20.02.1989: 1 ♂ 16.4 x 15.2 mm. — Stn 464, 21°02.30'S, 167°31.60'E, 430 m, 21.02.1989: 2 ♀ 15.5 x 14.6, 16.9 x 15.8 mm.

Chesterfield Islands. CHALCAL 1: stn CP 8, 19°43.80'S, 158°35.25'E, 348 m, 19.07.1984: 1 ♀ ovig. 16.0 x 14.3 mm.

MUSORSTOM 5: stn 361, 19°52.50'S, 158°38.10'E, 400 m, 19.10.1986: 1 ♂ 19.8 x 17.9 mm.

Vanuatu. MUSORSTOM 8: stn DW 965, 20°20'S, 169°51'E, 361-377 m, 21.09.1994: 1 ♀ 9.0 x 8.4 mm. — Stn CP 982, 19°22'S, 169°26'E, 408-410 m, 23.09.1994: 1 ♂ 7.7 x 7.2 mm.

French Polynesia (coll. SMSRB and J. POUPIN). *Tuamotu Archipelago*, Fangatafu: stn 487, 22°14.1'S, 138°47.2'W, 310 m, 25.04.1995: 1 ♂ 29.1 x 27.6 mm.

TYPES. — *Dynomene tanensis* Yokoya, 1933: holotype is an ovigerous female 23.5 x 22.2 mm, collected by the S.S. *"Soyo-Maru"*, from 30°06'N, 130°50'E (approximate coordinates), east of Tanegasima Id, Japan, 219 m, between 1923 and 1930. I have been unable to trace the specimen so I assume that the specimen no longer exists.

DESCRIPTION. — Carapace slightly wider than long, ratio of CW/CL 1.05-1.10, rectangular in outline, surface smooth, quite convex, with a few minute granules in branchial area. Carapace surface densely covered with setae of only one kind: very short, soft setae, which are minutely serrated, clothing entire surface. Pereopods covered with short setae as well as a few longer filiform setae (5 x length of short setae and 0.10 x CW) which fringe limbs. Density of short setae completely obscures body surface and on carapace they present a symmetrical undulating aspect reflecting gentle undulations in carapace surface: one oblique trough lies behind supraorbital margin, with a short median longitudinal trough extending posteriorly, then a trough curving anterolaterally which marks cervical groove, followed by a trough running across midline, just in front of cardiac area, which splits into two lateral troughs, and finally a short trough crossing cardiac area. All setae have same structure: proximal 20% of shaft smooth, followed by a region covered in long setules which increase in size distally, projecting almost at right angles to shaft, and finally an unornamented region, slightly curved and narrowing to an acute tip.

A shallow frontal carapace groove separates a pair of low rounded protuberances, and then divides into two separate, short, faint grooves on a flattened area. Just in front of cardiac region two laterally-directed grooves originate: first groove (cervical) arises separately (but very close together) from small gastric pits curving (slightly sinuously) anterolaterally on to branchial region towards gap between second and third anterolateral teeth, 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 first groove but does not reach lateral carapace margin, while second portion curves posterolaterally, bordering anterior cardiac region, meeting a branchial groove running to base of last anterolateral tooth. Posterior cardiac area marked by a distinct groove crossing mid-line. Anterolateral carapace margin begins at level of postorbital corner, slightly convex and bears three distinct, broad-based blunt teeth. First tooth smallest and close to postorbital corner followed closely by second tooth, both directed almost anteriorly. Third tooth (largest) more distant and directed laterally. A posterolateral tooth marks beginning of convergent posterolateral border alongside which lies reduced last leg. Posterior carapace margin recessed in order to accommodate distal section of first segment of abdomen which is visible dorsally.

Frontal margin continuous, V-shaped, minutely granulated, ventrally-directed, joined to epistome (which separates orbits). Supraorbital margin not projecting, continuous above orbits, not interrupted by a notch, and without granules. Suborbital margin, convex, without teeth, projecting, shelf-like and easily visible dorsally. Orbits oblique and 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 the opening of antennal gland, smaller but more acute and directed ventrally. Second article wider than long, distal