

Coral-inhabiting Crabs of the Family Hapalocarcinidae from Japan. VIII. Genus *Pseudocryptochirus* and Two New Genera

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Abstract

The genus *Pseudocryptochirus* is now considered to be represented by eight heterogenous species, of which five were recorded in the present paper from Japanese waters. On the detailed examination of them the eight known species were divided into three groups which are defined as the distinct genera, *Pseudocryptochirus* Hiro, *Hiroia* nov. and *Utinomia* nov.

Up to date the following eleven species listed chronologically were assigned to the genus *Pseudocryptochirus* Hiro, 1938; *dimorphus* (Henderson, 1906), *crescentus* (Edmondson, 1925), *hongkongensis* (Shen, 1936), *granulatus* (Shen, 1936), *viridis* Hiro, 1938 (type-species), *sheni* (Fize et Serène, 1955), *boissoni* (Fize et Serène, 1955), *kremphi* (Fize et Serène, 1955), *hypostegus* Shaw et Hopkins, 1977, *kahe* McCain et Coles, 1979, and *ishigakiensis* Takeda et Tamura, 1979. Among them *Ps. granulatus* is generally treated as a synonym of *Ps. crescentus*, and *Ps. kahe* was considered by Takeda and Tamura (1980b) as a synonym of *Ps. dimorphus*, which was originally referred to *Cryptochirus* with question and has been left unconfirmed so long. In the present paper, otherwise, *Ps. viridis* was decidedly synonymized with *Ps. hongkongensis*, the identity of which has become a subject of discussion.

As suggested by Fize and Serène (1957) and Serène (1966), the genus *Pseudocryptochirus* is quite heterogenous and must be subdivided. Of eight valid species, *Ps. crescentus* from the Indo-West Pacific and *Ps. hypostegus* from the West Atlantic are without doubt congeneric with the type-species, and it is also reasonable that *Ps. dimorphus* represents a group distinct from it by having some peculiar features such as the slender chelae of female, the absence of the exopod in the third maxilliped and the subtriangular abdomen of male. The remaining four species may belong to the third group. In the present paper these three groups are defined as the genera distinct from each other.

Genus *Pseudocryptochirus* Hiro, 1938

Pseudocryptochirus Hiro, 1938, p. 149; Utinomi, 1944, pp. 687-731 (in part); Serène, 1966, p. 396; Sakai, 1976, p. 685.

Troglocarcinus (*Troglocarcinus*): Fize and Serène, 1957, p. 56 (in part).

Diagnosis. Carapace suboval, a little longer than broad, and moderately depressed; anterior one-third or one-fourth declivous obliquely downward. Ambulatory legs stout and compressed; merus of first pair with distal end of inner border prominently protruded. Female abdominal appendages with three pairs; first pair with rudimentary exopod. Male abdomen suboval.

Type-species: Pseudocryptochirus viridis Hiro, 1938

= *Cryptochirus hongkongensis* Shen, 1936

Remarks. As briefly discussed on the historical circumstances by Takeda and Tamura (1980b), the generic name *Pseudocryptochirus* was resurrected by Serène (1966). In the present paper the type-species was synonymized with the species reported from Hongkong two years earlier. The present genus is composed of *Ps. crescentus* (Edmondson) and *hongkongensis* (Shen) from the Indo-West Pacific and *Ps. hypostegus* Shaw et Hopkins from the West Atlantic.

***Pseudocryptochirus hongkongensis* (Shen, 1936)**

[Jap. name: Ashibiro-sangoyadorigani]

(Pl. 1)

Cryptochirus hongkongensis Shen, 1936, p. 23, pl. 1.

Pseudocryptochirus viridis Hiro, 1938, p. 150, Utinomi, 1944, p. 689, figs. 1-3, 5(C), 6(C), 7(B, E), 11(C-F), 12(B), 14(C), 15 (B, F), 16 (E, F), pls. 4 (3-6), 5 (1, 2); Serène, 1966, p. 396 (in list); Sakai, 1976, p. 685, fig. 375.

Troglocarcinus (*Troglocarcinus*) *viridis*: Fize and Serène, 1957, p. 58, figs. 11(A, B), 12(A), pls. 3(1-3), 5(1), 11(D).

Material examined. Six ovigerous females (NSMT-Cr 7795-1, 2, 7796-1, 7797, 7798-1, 2; 1.8 × 2.2 mm ~ 2.9 × 3.6 mm), one female (NSMT-Cr 7794; 2.0 × 2.5 mm), one young female (NSMT-Cr 7799-1; 1.5 × 1.8 mm), and three males (NSMT-Cr 7799-2, 7796-2, 7795-3; 1.7 × 2.1 mm, 2.3 × 2.8 mm, 2.4 × 3.1 mm) were collected from the Yaeyama Group of the Ryukyu Islands. The specimens with same stem number were obtained from one coral block.

Host. The host coral recorded by the original author is *Turbinaria contorta* Bernard [Jap. name: Nezire-suribachisango]. Fize and Serène (1957) added six species of the same genus, *T. pustulosa* Bernard [Hime-suribachisango], *T. edwardsi* Bernard, *T. mollis* Bernard, *T. crater* (Pallas), *T. veluta* Bernard and *T. agaricia* Bernard. In the study of the obligate commensals of branching corals at the Eniwetok Atoll of the Marshall Islands, Garth (1964) collected the specimens from *T. danae* Bernard. The specimens from the Ryukyu Islands were also collected from some unidentified species of *Turbinaria*.

Remarks. Shen (1936) recorded two males and two females from Hongkong, but unfortunately the females were neither described nor figured at all. Three males at hand were closely compared with the description and figures, and the following short notes are presented. In the figures given by Shen, which are somewhat diagrammatic, the anterior one-third of the carapace is more distinctly demarcated from the posterior part of the carapace, the median projection of the front is rather distinct, and the palm is comparatively longer. The direct comparison of the specimens would be highly desirable, but as the late Dr. Utinomi himself once considered, these discrepancies are too small to warrant the validity of *Ps. viridis*.

As already pointed by Fize and Serène (1957), the shape of the carapace and ambulatory legs are unexpectedly close to those of *Neotroglocarcinus monodi* (Fize et Serène) and *N. dawydoffi* (Fize et Serène) which also inhabit the same host corals as this species. In the previous paper (1980a), the present authors reported that *N. monodi* inhabits the dome with a low entrance, while the present species fills up the lunate or rather triangular shallow depression with the carapace, chelipeds, and ambulatory legs. The habitat is thus slightly different from each other, but their morphological similarity may be due to the so-called convergence. It is pointed that the similar, more advanced case is observed in *Cryptochirus caralliodytes* Heller and *Favicola rugosa* (Edmondson). Although these two species are generically differentiated, the pits bored in the faviid corals are quite indistinguishable and the general formation of the carapace, chelipeds and ambulatory legs is also in the same situation (cf. Takeda and Tamura, 1980b).

Distribution. This species is known from Tanabe Bay, Central Japan (Hiro, 1938), the Yaeyama Group, the Ryukyu Islands (Utinomi, 1944), the Penghu Islands (=the Pescadores), Taiwan (Utinomi, 1944), Hongkong (Shen, 1936), Nhatrang, Viet

Nam (Fize and Serène, 1957), the Eniwetok Atoll, the Marshall Islands (Garth, 1964; Garth and Hopkins, 1968), and the Moluccas, Indonesia (Serène *et al.*, 1974).

Pseudocryptochirus crescentus (Edmondson, 1925)

[New Jap. name: Mikazuki-ashibiro-sangoyadorigani]

(Fig. 1; Pl. 2)

Cryptochirus crescentus Edmondson, 1925, p. 33, fig. 6, pl. 1 (B, C); Edmondson, 1933, p. 16, pl. 4 (C, D).

Cryptochirus granulatus Shen, 1936, p. 23, pl. 2.

Pseudocryptochirus crescentus: Utinomi, 1944, pp. 697-729, figs. 5 (D), 6 (D), 7 (C, F), 10, 11 (H), 12 (C), 14 (B), 15 (C, G), 16 (C, D), pls. 4 (7-10), 5 (3); Serène, 1966, p. 396 (in list).

Troglocarcinus (Troglocarcinus) crescentus: Fize and Serène, 1957, p. 62, figs. 10, 11 (C, D), 12 (B), pls. 3 (4-7), 5 (2), 11 (B).

Description. Female: Carapace a little longer than broad and suboval; anterior one-fourth of carapace declivous obliquely downward to form an opeculum closing the lunate entrance of pit; dorsum modelately depressed and covered with conical granules which are smaller on posterior part; gastric region restricted anteriorly by two depressions, each of which extends obliquely backward toward lateral border of carapace to separate hepatic region from branchial region. Gastric, branchial, cardiac, and intestinal regions not distinct.

Front weakly concave and fringed with spinules and setae, bearing a low median projection; front-orbital breadth nearly as long as posterior border of carapace, and a little longer than half the greatest breadth of carapace. Internal orbital angle scarcely going beyond external orbital angle. Eyestalk short and its proximal part withdrawn in orbital fossa. Basal segment of antennule well developed and protruded far beyond antenna and eyestalk, being armed with several spinules along margin and on upper surface. Third maxilliped as figured.

Both chelipeds equal in size and shape, not stout; upper border of palm longer than fingers and also its height; fingers entire on cutting edges, with tips scarcely crossing each other. First ambulatory leg longer and stouter than cheliped; merus distinctly compressed and not longer than twice its height; upper and lower borders of merus fringed with spiniform granules and longish setae; inner distal end of

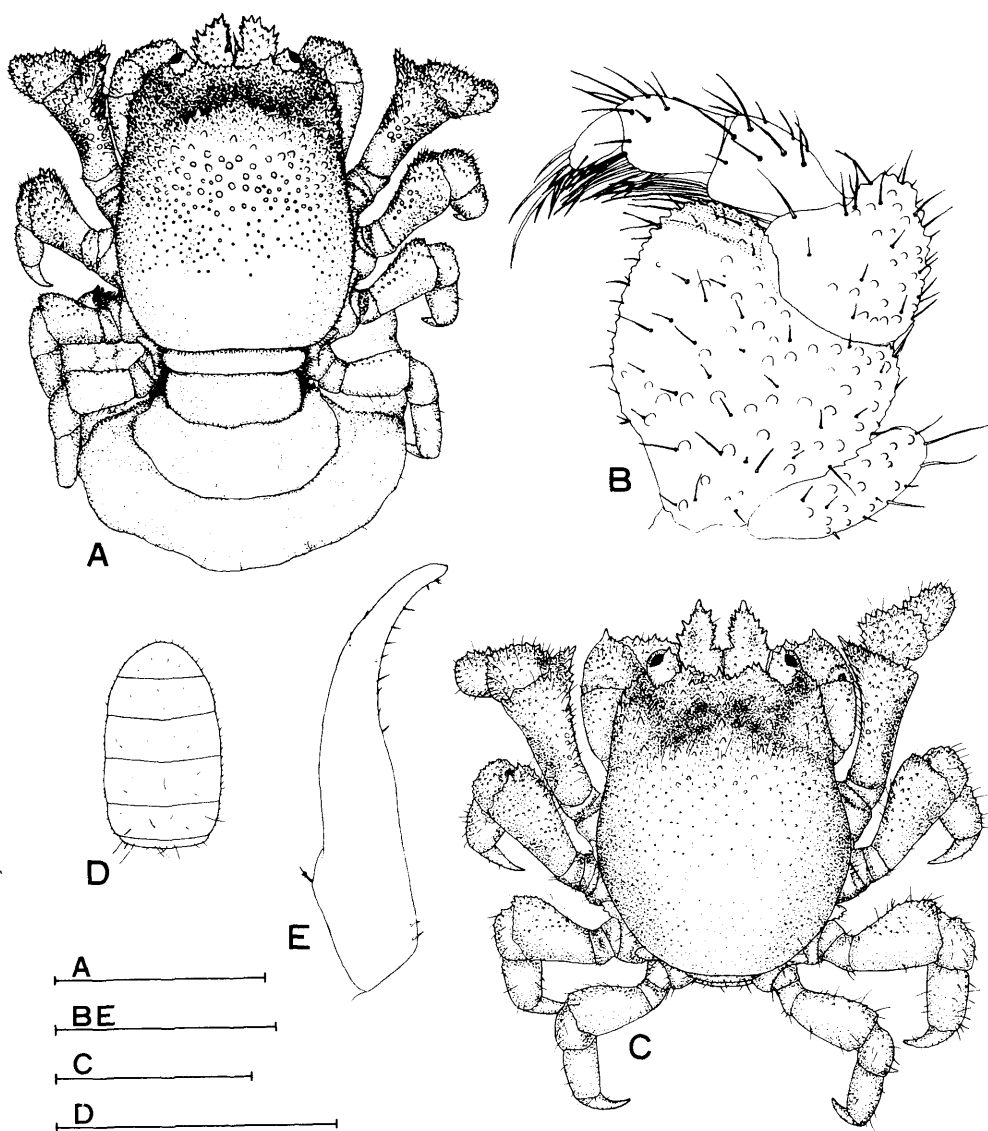


Fig. 1. *Pseudocryptochirus crescentus* (Edmondson), ovig. ♀, NSMT-Cr 7800-1 (figs. A, B) and ♂, NSMT-Cr 7800-3 (figs. C-E). — A, C, entire animal; B, left third maxilliped; D, distal six segments of abdomen; E, left first pleopod in abdominal view. Scales for A=3 mm, B and E=0.5 mm, C=2 mm, D=2 mm.

merus prominently protruded inward; carpus and propodus short, and their combined length along upper borders nearly as long as upper border or merus; carpus

and propodus also covered with granules and setae. Second ambulatory leg a little shorter than the first; inner distal end of merus not protruded. Third leg resembles the second, but a little shorter. Fourth leg slenderer than the preceding. A small lobe on upper surface of each coxa from second to fourth pairs.

Male: Much smaller than female. Carapace suboval, with convex branchial margins, dorsum being more flattened than that of female. Both chelipeds equal in size and comparatively stouter than those of female. Abdomen suboval and composed of seven segments, first and second segments being visible in dorsal view. First pleopod rather short, its distal part being prominently curved outward.

Material examined. Many specimens were obtained from the Yaeyama Group of the Ryukyu Islands. In addition, three ovigerous females and one male were collected from Sagami Bay at the Cape Manazuru by the junior author in September and November, 1979.

The largest female and male specimens at hand are 4.4×5.4 mm and 2.8×3.6 mm in width and length of carapace, respectively.

Host. The host coral recorded by the original author is *Pavona duerdeni* Vaughan. The known hosts recorded subsequently are *P. varians* Verrill [Jap. name: Shiwa-shikorosango], *frondifera* Lamarck [Konoha-shikorosango], *cactus* (Forskål) [Saboten-shikorosango], *decussata* Dana [Shikorosango], *praetorta* Dana [Saotome-shikorosango], *lata* Dana and *venusta* (Dana) (Fize and Serène, 1957) and *P. clivosa* Verrill and *P. gigantia* Verrill (Garth and Hopkins, 1968). The specimens at hand were also collected from some unidentified species of *Pavona*.

The opening of the pit is lunate, and the crab closes it just like an operculum by the anterior part of the carapace, the chelipeds and the first pair of the ambulatory legs. The pit is not very deep, and the deepest pit observed in the present study is ca. 23 mm, about five times as long as the carapace of the inhabitant.

Color. The color pattern was observed on a female from Sagami Bay. The basic color of the carapace is yellowish white; four stripes of reddish brown extend from the anterior gastric region obliquely backward to the lateral and posterolateral borders of the carapace; the posterior median part of the carapace is white; the chelipeds and ambulatory legs are semitransparent with speckles of white and reddish brown. The coloration of this specimen is somewhat different from the notes given by Fize and Serène (1957).

Remarks. This species is readily distinguished from *Ps. hongkongensis* by the different nature of the carapace. In this species the anterior part of the carapace is declivous obliquely downward with two large depressions, but in that species the part is without any distinct depression.

The Atlantic species, *Ps. hypostegus*, is closely related to this species, and in reality it is rather difficult to indicate the distinctive difference.

Distribution. The late Dr. Edmondson reported this species from Johnston Island in 1925, and from Christmas Island in the Central Pacific in 1933. Subsequently this species was collected from Viet Nam (Fize and Serène, 1957), Sumatra and the Moluccas, Indonesia (Serène, 1966; Serène *et al.*, 1974), Clipperton Island and Baja California (Garth and Hopkins, 1968).

Genus *Hiroia* Takeda et Tamura, nov.

Troglocarcinus (*Troglocarcinus*): Fize and Serène, 1957, p. 56 (in part).

Diagnosis. Carapace suboval or subquadrangular, longer than broad and moderately depressed. Front rather developed and fringed with several spinules. Ambulatory legs more or less compressed and rather slender. Female abdominal appendages with three pairs; first pair biramous with a rudimentary exopod at its base. Male abdomen suboval.

Type-species: Troglocarcinus krempfi Fize et Serène, 1955

Remarks. In addition to the type-species, the following three species from the West Pacific are referred to this new genus; *H. sheni* (Fize et Serène, 1955), *boissoni* (Fize et Serène, 1955), and *ishigakiensis* (Takeda et Tamura, 1979). They are not always quite compact, and the carapaces are suboval and more or less convex dorsally in *boissoni* and *sheni*, and subquadrangular and rather flattened in *krempfi* and *ishigakiensis*. This genus is without doubt close to the genus *Pseudocryptochirus* Hiro, from which it was distinguished at present, but differentiated most remarkably by having the rather slender ambulatory legs instead of the stout, compressed ones with a protuberance at distal end of the merus of first pair.

***Hiroia krempfi* (Fize et Serène, 1955), comb. nov.**

[New Jap. name: Hiro-sangoyadorigani]

(Fig. 2; Pl. 3)

Troglocarcinus krempfi Fize and Serène, 1955 a, p. 378, fig. 2(G).

Troglocarcinus (*Troglocarcinus*) *krempfi*: Fize and Serène, 1957, p. 79, figs. 11 (F), 18, 19, 20 (E, F), pls. 3 (8-10), 5 (3), 12 (A), 15 (E, F).

Pseudocryptochirus krempfi: Serène, 1966, p. 396 (in list).

Description. Female: Carapace longer than broad and subquadrangular; dorsum depressed and covered with granules and longish setae; anterior part of gastric region A-shaped, separated from front-orbital border by a large depression; gastric region separated from each branchial region by a shallow furrow which extends to lateral border of carapace; posterior part of gastric region, cardio-intestinal region and posterior part of branchial region divided by a rather deep H-shaped furrow.

Front concave and fringed with spinules and setae; front-orbital breadth a little longer than half the greatest breadth of carapace, but shorter than posterior border of carapace. External orbital angle going far beyond internal orbital angle. Eyestalk not long and its proximal part hidden under carapace in dorsal view. Basal segment of antennule developed and protruded beyond eyestalk, being armed with several spinules along margin and on upper surface. Third maxilliped as figured.

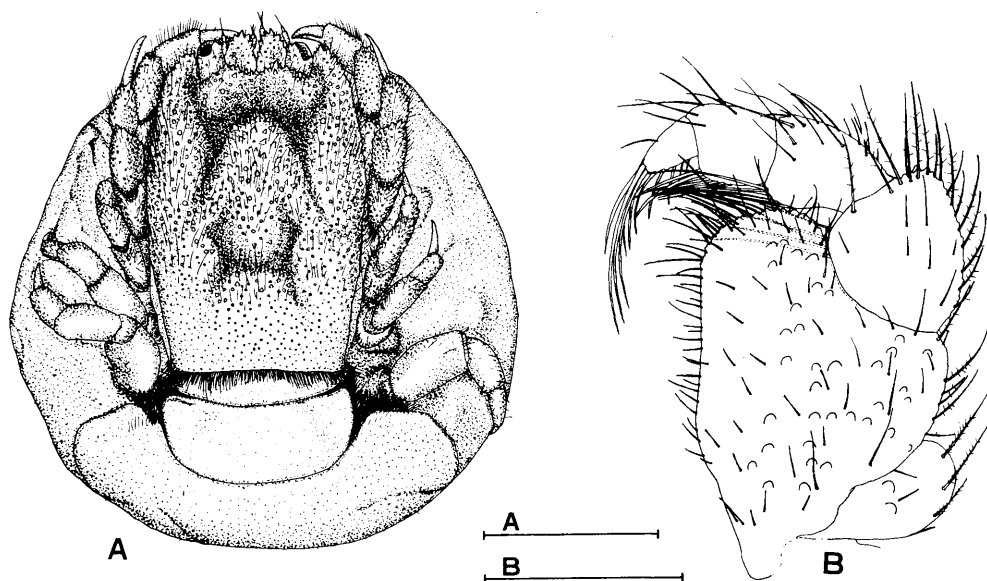


Fig. 2. *Hiroia krempfi* (Fize et Serène), ovig. ♀, NSMT-Cr 7803. — A, entire animal; B, left third maxilliped. Scales for A = 2 mm, B = 0.5 mm.

Both chelipeds equal in size and shape, not stout; upper border of palm nearly as long as its height, but shorter than movable finger; cutting edges of fingers entire, with tips scarcely crossing each other. First ambulatory leg nearly as long as, and a little stouter than cheliped; merus slightly compressed and fringed with spiniform granules and longish setae at upper and lower surfaces, its length along upper border being about one and half times as long as its height; carpus and propodus short and covered with granules and setae, and their combined length along upper borders nearly as long as upper border of merus. Second and third ambulatory legs shorter than the first. Fourth leg longer than the preceding.

Material examined. One ovigerous female (NSMT-Cr 7803; 2.5×3.8 mm) and two females (NSMT-Cr 7804-1, 2; 2.1×2.9 mm, 1.6×2.1 mm) were collected from the Yaeyama Group of the Ryukyu Islands. The specimens with the same stem number were collected from one coral block.

Host. The host corals recorded by the original authors are *Merulina laxa* Dana [Jap. name: Eda-sazanamisango] of the Merulinidae, *Hydnophora microconos* (Lamarck) [Ryukyu-ibosango] and *H. rigida* (Dana) of the Faviidae. The specimens from the Ryukyu Islands were also collected from *Merulina laxa*. The opening of the pit is elliptical and its major axis is nearly as long as the breadth of the carapace of the inhabitant. The pit is not deep and occupied by the crab along its whole length.

Distribution. Hitherto known only from Nhatrang, Viet Nam (Fize and Serène, 1955a, 1957).

Hiroia ishigakiensis (Takeda et Tamura, 1979), comb. nov.

[Jap. name: Ashibiro-sangoyadorigani-modoki]

Pseudocryptochirus ishigakiensis Takeda and Tamura, 1979, p. 188, figs. 3, 4, pl. 7.

Material examined. One male, holotype (NSMT-Cr 5898; 3.4×4.7 mm) was re-examined. It was obtained from *Fungia repanda* Dana [Jap. name: Nokogiri-kusabiraishi] of the Fungiidae.

Remarks. The male specimen was obtained from the mushroom coral, but generically distinct from the two representatives of *Fungicola* Fize et Serène. It is generally close to the three species of the new genus, especially to the type-species, *H. kremphi* (Fize et Serène), but readily distinguished from them by the flat

carapace.

Distribution. Known only by the holotype from Ishigaki-jima Island, the Ryukyu Islands (Takeda and Tamura, 1979).

Genus *Utinomia* Takeda et Tamura, nov.

Diagnosis. Carapace of female suboval and much longer than broad; anterior part of dorsum rather flat and posterior part convex dorsally and laterally. Chelipeds of female very slender. Third maxilliped without exopod. Abdominal appendages of female with three pairs; the first biramous with a rudimentary exopod, and the second and third uniramous. Male much smaller than female. Abdomen of male subtriangular.

Type-species: Cryptochirus dimorphus Henderson, 1906

Remarks. The new genus is unique in having the long suboval carapace and the slender chelipeds in female, the subtriangular abdomen in male, and the third maxilliped without exopod in both sexes. The sexual dimorphism is just like in the case of *Hapalocarcinus* which is monotypically represented by *H. marsupialis* Stimpson. The nature of the female pleopods belongs to the most common type in this family.

***Utinomia dimorpha* (Henderson, 1906), comb. nov.**

[New Jap. name: Tenaga-sangoyadorigani]

(Fig. 3; Pl. 4)

Cryptochirus dimorphus Henderson, 1906, p. 214, pl. 8.

Pseudocryptochirus kahe McCain and Coles, 1979, p. 81, figs. 1, 2, pl. 1.

Description. Female: Carapace much longer than broad, suboval, and widest at posterior one-third. Anterior part of carapace rather depressed and posterior part moderately convex in both directions. Regions only slightly demarcated; anterior part of gastric region separated from front, supraorbital border and hepatic regions by a shallow Λ -shaped depression which extends obliquely backward to lateral border; gastric and cardio-intestinal regions separated from each branchial region by a shallow longitudinal furrow; posterior end of gastric region indistinctly marked by very shallow depression.

Front V-shaped and about one-third as broad as front-orbital border, being

fringed with spinules and hairs; internal orbital angle protruded beyond external orbital angle; supraorbital border also V-shaped and fringed with spinules and hairs; front-orbital breadth nearly as long as posterior border of carapace and a little longer than half the greatest breadth of carapace. Eyestalk protruded beyond basal segment of antennule; proximal end of eyestalk hidden under carapace in dorsal view. Basal segment of antennule narrower than eyestalk, and its most part hidden under carapace, being armed with several spinules. Exopod of third maxilliped absent; outer border of carpus of third maxilliped longer than the same part of merus.

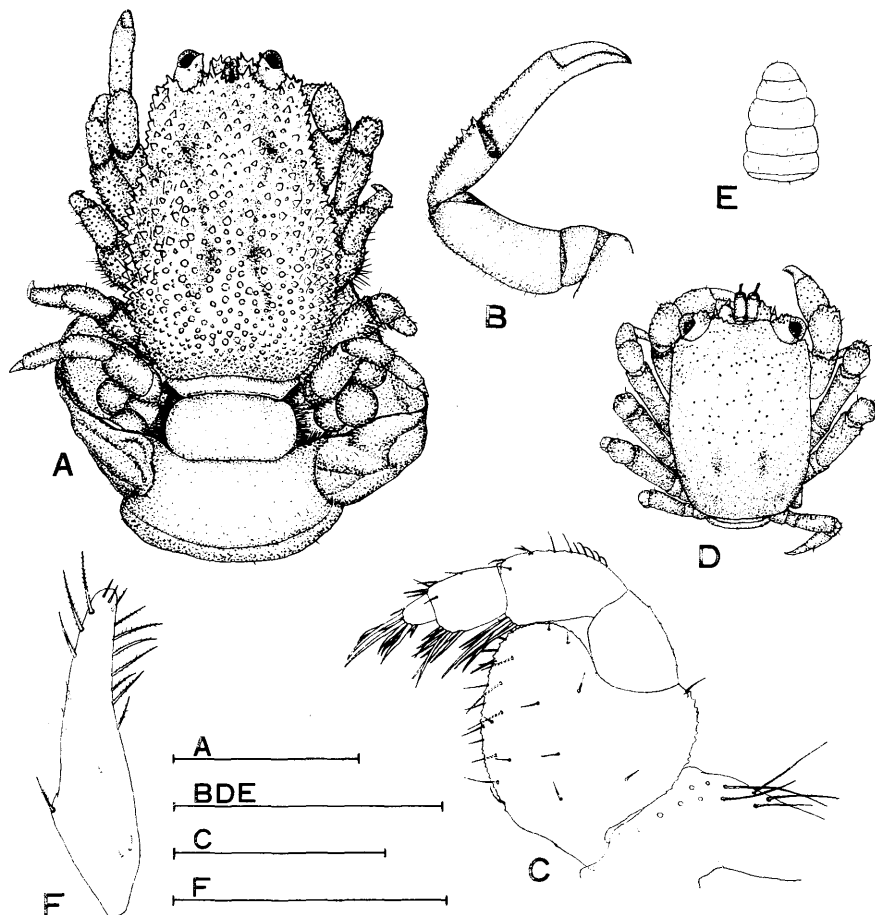


Fig. 3. *Utinomia dimorpha* (Henderson), ovig. ♀, NSMT-Cr 7811-3 (figs. A-C) and ♂, NSMT-Cr 7811-2 (figs. D-F). — A and D, entire animal; B, left cheliped; C, left third maxilliped; E, distal six segments of abdomen; F, left first pleopod in abdominal view. Scales for A and B, D, E=2mm, C and F=0.5mm.

Both chelipeds very slender and equal in size and shape; coxa moderately stout and protruded downward from sternal plate; merus along its upper border about twice as long as its height; upper border of merus fringed with sparse minute granules and short hairs; upper border of palm longer than movable finger and also longer than thrice its height; fingers abruptly curved inward, and entire on cutting edges.

First ambulatory leg shorter than cheliped; merus compressed and its length along upper border about twice as long as its height, being fringed with spiniform granules and longish setae at upper and lower borders; carpus and propodus also covered with granules and setae. Second and third ambulatory legs nearly equal in length and shorter than the first. Fourth leg a little shorter than the preceding; upper border of merus covered with granules and longish setae.

Male: Much smaller than, and morphologically different from female. Carapace subquadrangular and longer than broad; dorsum slightly convex in both directions and regions almost untracable. Front slightly concave and a little shorter than half as long as front-orbital border. Both chelipeds equal in size and shape, and comparatively shorter than those of female. Fourth ambulatory leg much shorter than the preceding. Abdomen subtriangular and composed of seven segments, first and second segments being visible in dorsal view. First pleopod rather short and wide, its distal half being fringed with sparse longish setae.

Material examined. Eleven ovigerous females (NSMT-Cr 7805-1, 7806-1, 2, 7807-1, 3, 7, 7808-1, 7809, 7810, 7811-1, 3; 1.9×2.8 mm \sim 3.1×4.3 mm), six females (NSMT-Cr 7805-3, 7807-5, 8, 7808-3, 7811-4, 5; 2.0×2.8 mm \sim 3.2×4.5 mm), and eight males (NSMT-Cr 7805-2, 4, 7807-2, 4, 6, 7808-2, 4, 7811-2; 1.0×1.4 mm \sim 1.1×1.6 mm) were collected from the Yaeyama Group of the Ryukyu Islands.

Host. The original author wrote about the host corals only as "a large branching Madreporae". McCain and Coles (1979) reported *Pocillopora meandrina* Dana as the host coral. The specimens from the Ryukyu Islands were obtained from some unidentified species of *Pocillopora*.

The opening of the pit is circular, but more or less deformed in the most cases. The pits are shallow and occupied each by the inhabitant along its whole length. All the male crabs examined were found each in the pouch made by the

female abdomen.

Distribution. Hitherto known from the Andaman Islands (Henderson, 1906) and Oahu Island in the Hawaiian Islands (McCain and Coles, 1979, as *Pseudocryptochirus kahe*).

Acknowledgements

The authors wish to thank Drs. John C. McCain and Stephen L. Coles of the Hawaiian Electric Company for the comparative specimens from Oahu Island, the Hawaiian Islands, and Messrs. Kazushi Okamoto and Teruo Fukuda of the Marine Park Research Center for their help in collecting the samples. Mr. Kôji Takeuchi, the professional photographer in Tokyo, kindly sent us some interesting specimens for study. The junior author's cordial thanks are due to Dr. Ryôsuke Ishikawa of the Tokyo Metropolitan University for giving him an opportunity for study.

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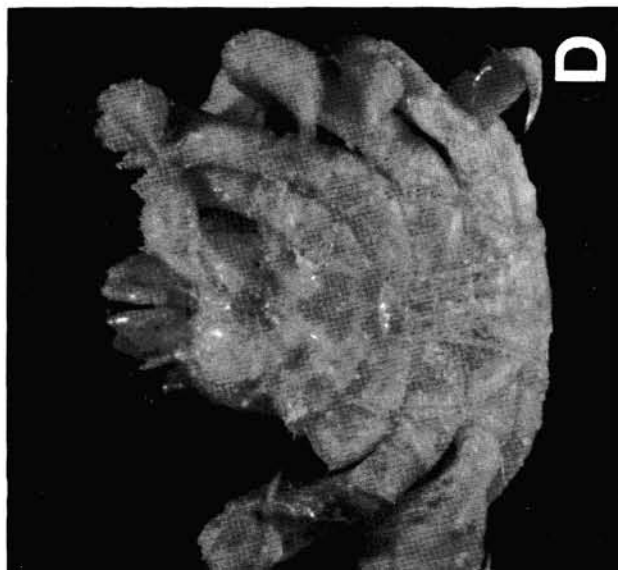
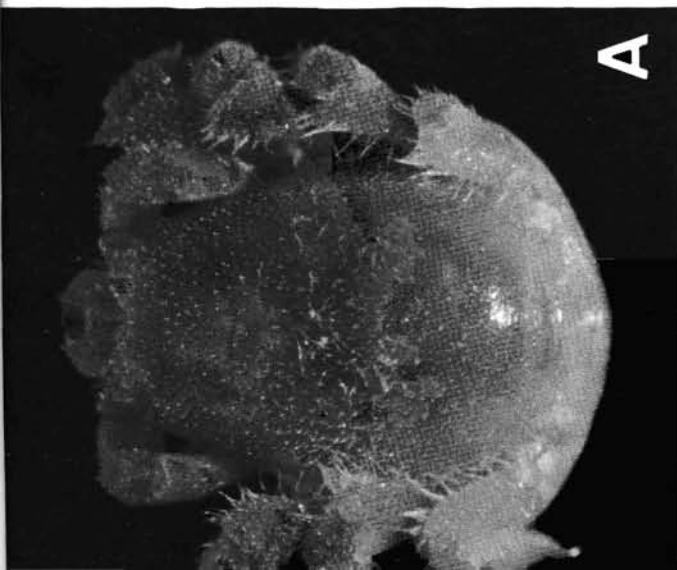
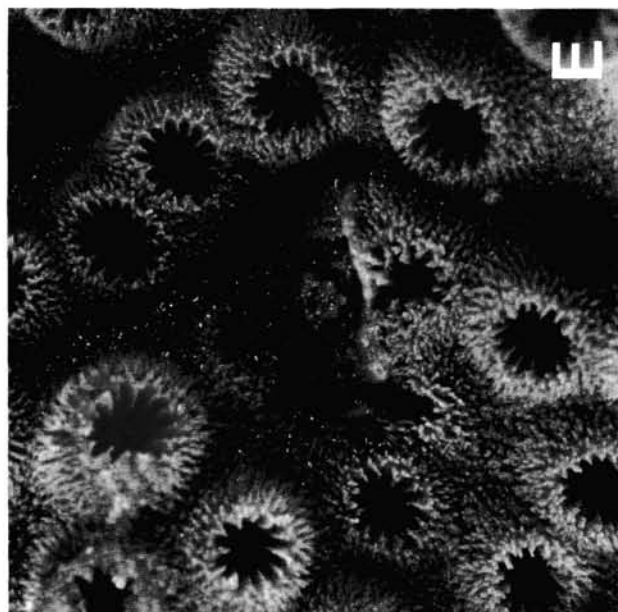
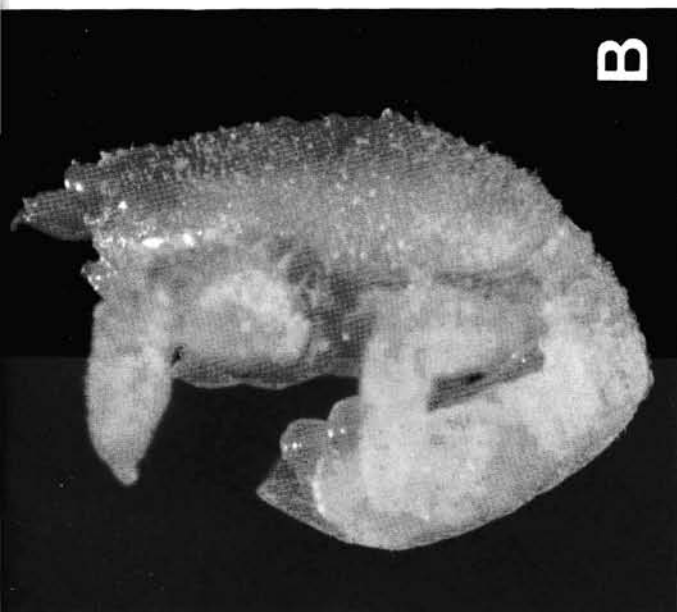
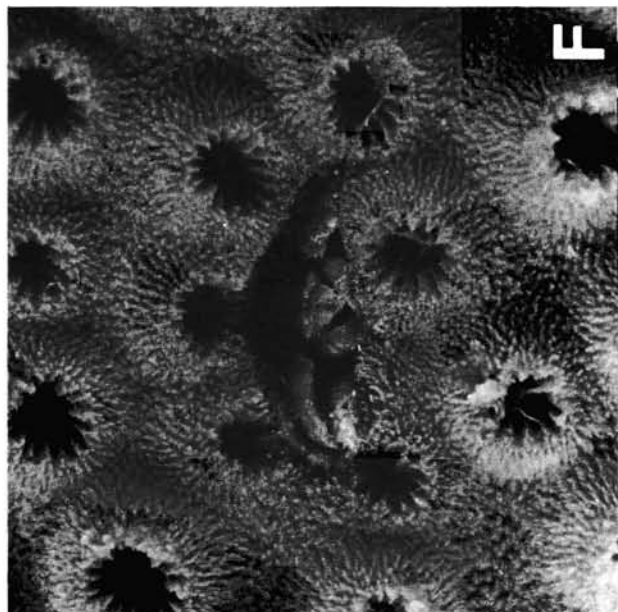
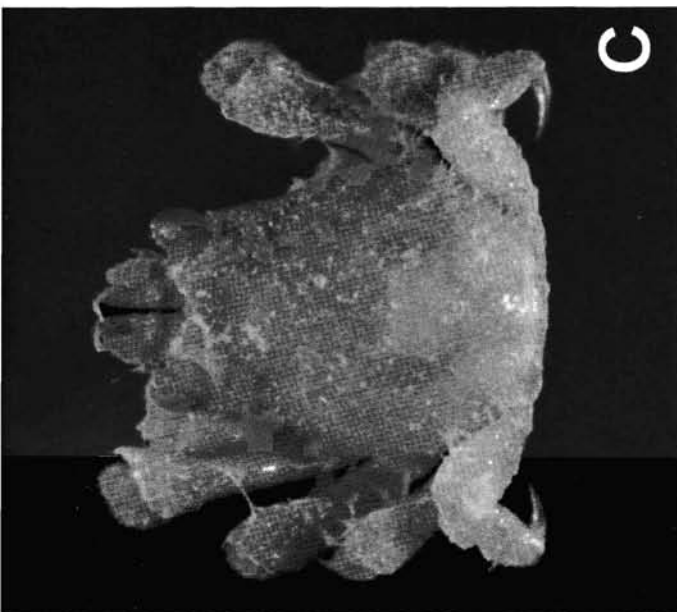
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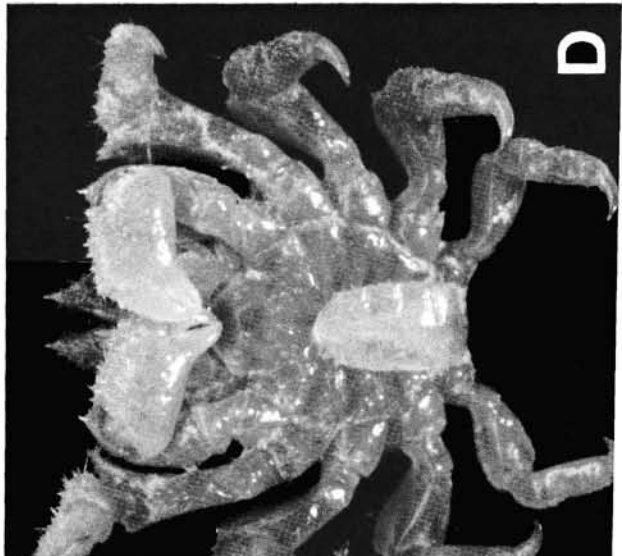
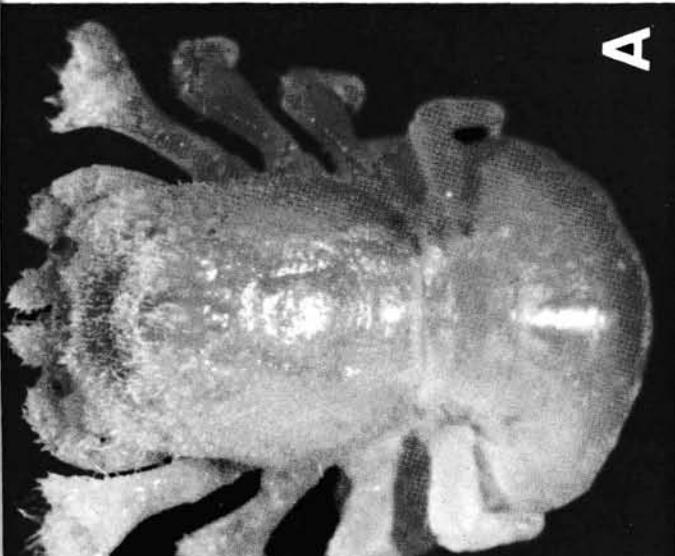
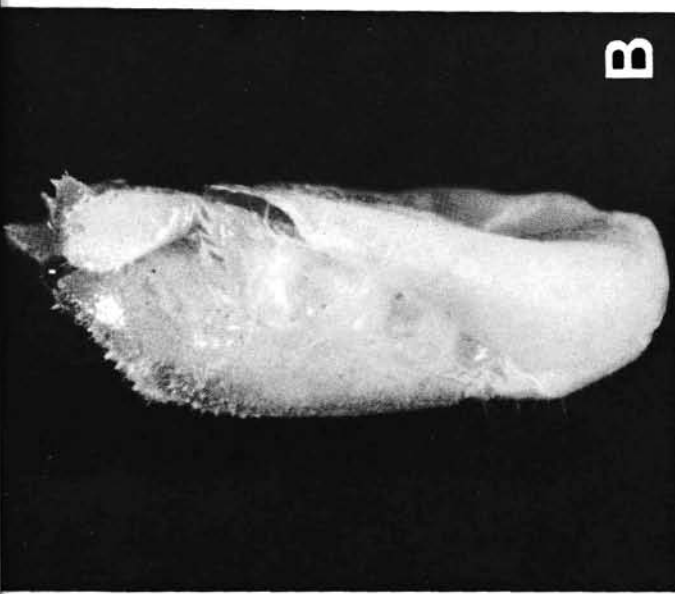
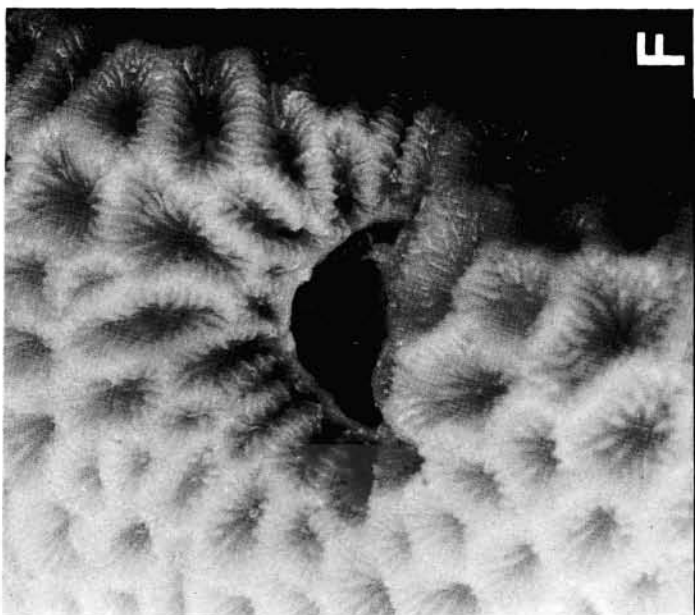
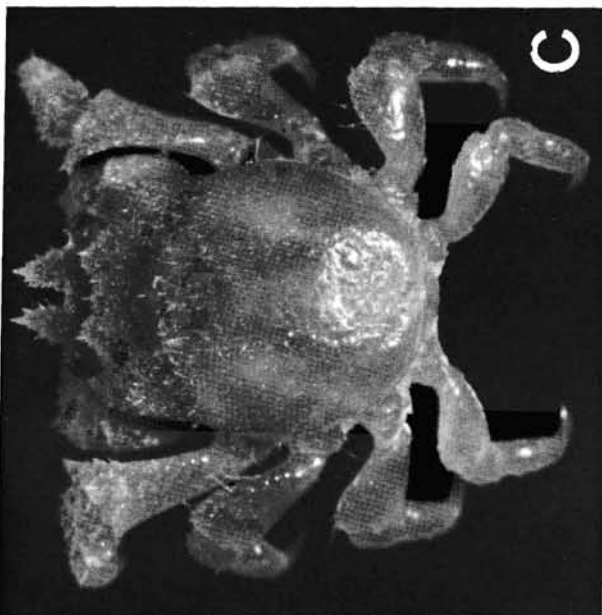
日本産サンゴヤドリガニ類 VIII. アシビロサンゴヤドリガニ属と近縁の2新属

武田正倫・田村洋一

アシビロサンゴヤドリガニ属 *Pseudocryptochirus* にはインド西太平洋海域から10種、大西洋西部から1種が記載されているが、文献を精密に検討した結果、それらは8種にまとめられることが明らかとなった。主として八重山群島で採集された標本は5種に分類され、本報文中に記録されているが、すべて同属とは考えられず、ヒロサンゴヤドリガニ属 *Hiroia* とテナガサンゴヤドリガニ属 *Utinomia* を創設した。

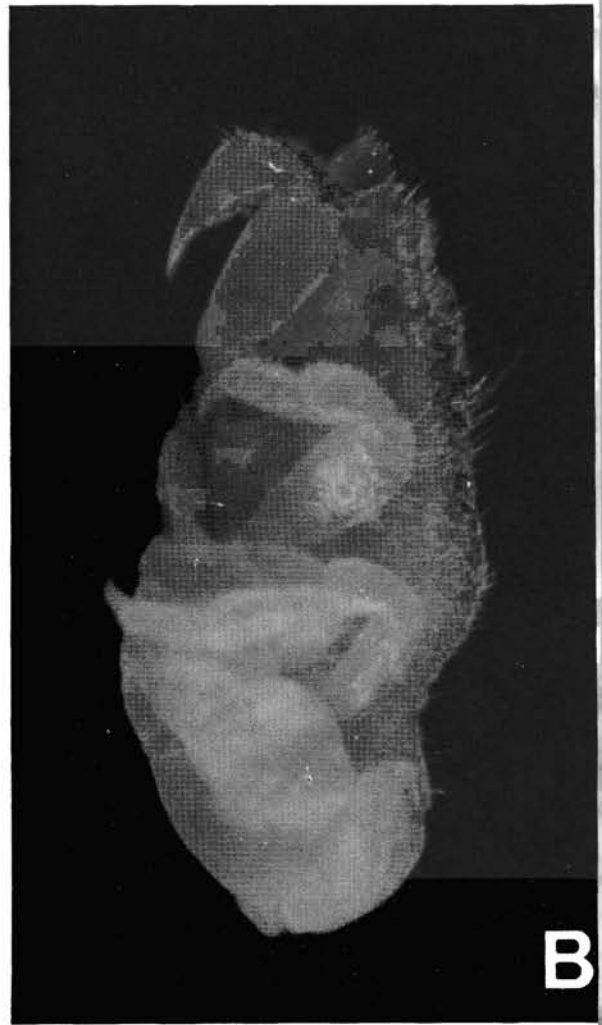
(武田正倫・田村洋一 国立科学博物館分館 160 東京都新宿区百人町3-23-1)







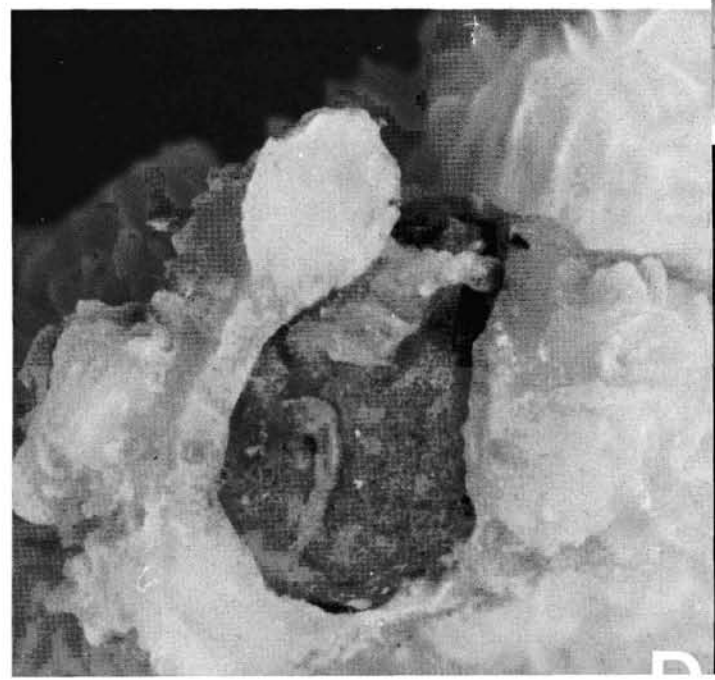
A



B



C



D

