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**A Review of Crangoid Shrimps of the Genus
Paracrangon found in Japan.**

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**A Review of Crangoid Shrimps of the Genus *Paracrangon*
found in Japan.***

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Of the crangoid genus *Paracrangon*, a single species, *P. echinata* Dana, has been known from the Japanese waters. An examination of the material obtained off NAGASIMA, Mie Prefecture at a depth of about 170 fathoms as well as the collection deposited in the Fishery Institute, Faculty of Agriculture, Tokyo Imperial University has added two new species to this genus, *P. abei* and *P. furcata*, which are described in the present paper.

The author takes this opportunity of expressing his warmest thanks to Professor A. TERAO for kindly supervising the present work. He is greatly obliged to Dr. Y. YOKOYA, of the Tokyo Imperial University, for placing valuable material at his disposal. Heartly thanks are also due to Mr. H. SATÔ, of the Tôhoku Imperial University, in the matters of important literature and to Mr. G. ABE for the collection of the material off Mie Prefecture.

Genus *Paracrangon* DANA.

Dana, 1852, p. 533; Ortmann, 1895, p. 189.

***Paracrangon echinata* DANA.**

Paracrangon echinata DANA, 1852, p. 538, 1855, pl. 33, fig. 6; MIERS, 1879, p. 52; BALSS, 1914, p. 72; SCHMITT, 1921, p. 103, fig. 72; YOKOYA, 1933, p. 44.

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Body small and robust. Rostrum compressed, long, slightly ascending, upper border usually with one spine in proximal one-third, lower border with one small spine near its tip and a long curved one near the base. Carapace with 4 unequal (mostly strong) spines on dorsal median carina, and 5 weak spines on intersecting points of low ridges which run on the lateral surfaces of the carapace. Antennal spine present, rather small. Pterigostomial angle ends in a large acute spine. Branchiostegal spine large, situated a little above the pterigostomial spine, dorso-ventrally depressed, furnished with a median shallow groove, and directed obliquely outwards.

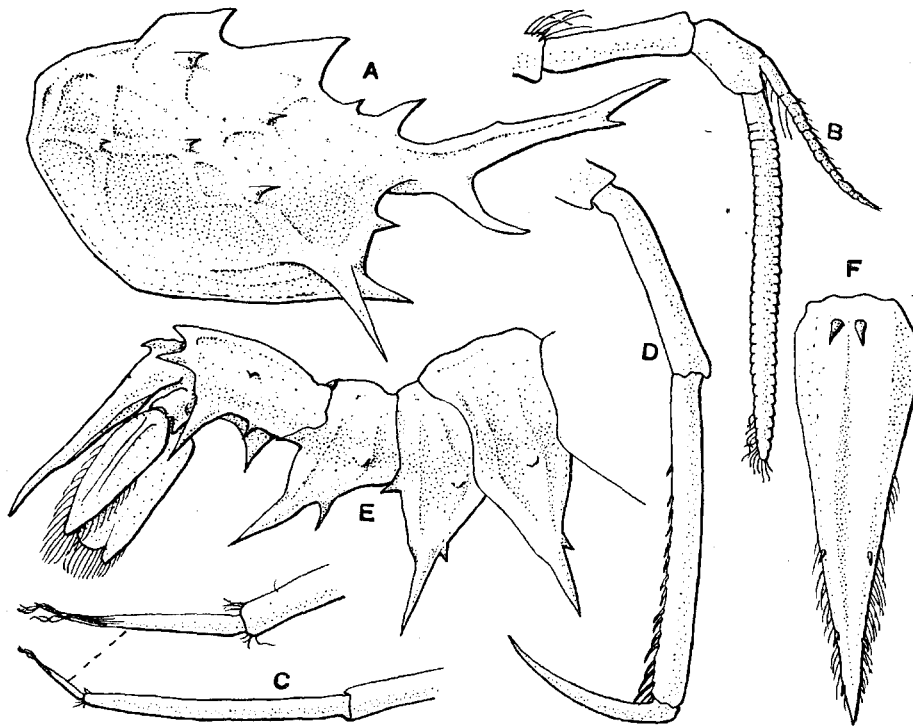


Fig. 1. A. Carapace with rostrum, $\times 5\frac{1}{2}$.
 B. Antennule, $\times 7\frac{1}{2}$.
 C. Distal two segments of third thoracic leg, $\times 15$.
 D. Distal three segments of fifth leg, $\times 6$. E. distal five segments of abdomen, $\times 5\frac{1}{2}$. F. Telson, $\times 6$.

Antennular peduncle consists of three segments, with a small lateral plate on proximal outer margin of basal segment and two unequal flagella at distal end of terminal segment. Outer flagellum with 35 joints, much thicker than

inner one which is composed of 14 joints (Fig. 1, B). Antennal peduncle long, its tip reaching to the distal margin of antennular peduncle, flagellum about 1.5 times as long as body length without rostrum. Third maxilliped reaching beyond antennal peduncle by the entire ultimate segment, ultimate one a little longer than penultimate one. First thoracic leg robust, carpus very short, about three-fourths the length of propodus. Third leg very slender, its dactylus about one-third the length of propodus, ending in a tuft of slender hairs (Fig. 1, C). Fourth and fifth legs much alike in appearance; fifth a little longer than fourth, its dactylus about half as long as propodus, and furnished with serrated spines on its posterior border. An acute spine in the middle of each of fifth to seventh of thoracic sterna, the one on the sixth the longest and the one on the seventh the shortest.

Third to sixth abdominal terga carinated, carina of third being especially high. A median groove on sixth and telson; abdominal pleura spiniform in both sexes; all pleura except sixth have a small lateral spine near the middle of anterior margin; a spine on the basal posterior margin of fourth and fifth; sixth with a stout lateral spine at anterior one-third; all abdominal somites, except sixth, have a long sharp pointed spine in middle region of each sternum, paired ones in the sixth; these spines smaller in female.

Second abdominal appendage has a stylumbrus on the inner side of the endopodite in male.

Telson tapering, pointed and longer than uropods; a pair of prominent spines are situated in proximal region of dorsal surface; distal one-third armed with three pairs of small spines (Fig. 1, F).

Based on a male specimen measuring 46.5 mm in body length without rostrum.

Distributions: Alaska, Bare Islands, Vancouver (Lenz); Ochotsk Sea, Wladiwostok (Brashnikow); Sagami Bay (Miers); Todo-zaki, Kyōga-saki, Husan, Sado Islands (Yokoya).

Paracrangon abei, sp. nov.

Rostrum long, straight, pointed, laterally compressed and shallowly sulcate; in female, directed obliquely upwards, provided with a small spine in the middle portion of anterior margin and a long curved one at base; on posterior border a small one situated in the middle of it; in male, directed obliquely forwards; the lower margin presenting entirely the same aspects in female but the upper margin armed with two spines, basal one with a very minute

additional spine in posterior basal region. Carapace carinated on dorsal median line, and armed with three spines, of these three, anterior two broad, laterally compressed and trifold at the apex (Fig. 2); sides traversed with carinae bordering larger or smaller areas; intersecting points of the carinae mostly provided with a spine. Antennular spine short but well developed. Pterigostomian angle ends in an acute spine. Branchiostegal spine long, directed obliquely forward.

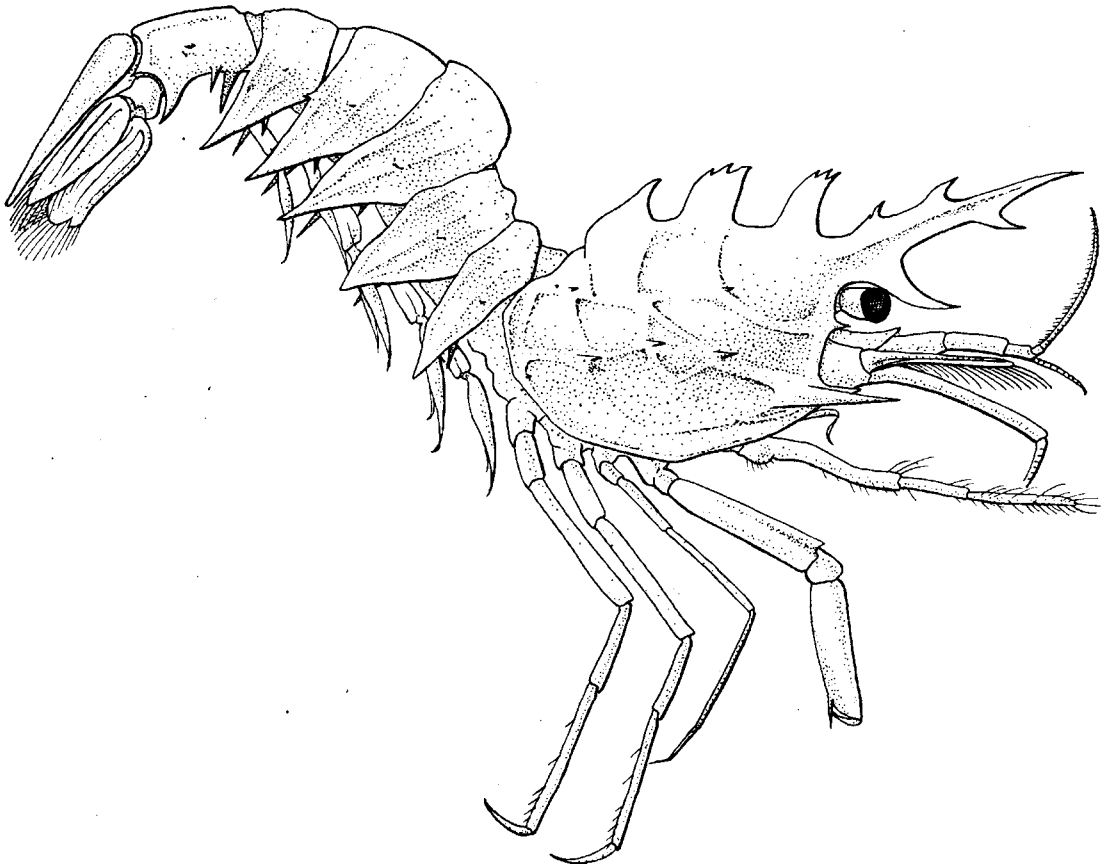


Fig. 2. *Paracrangon abei*, sp. nov. ♂, $\times 7/2$.

Antennular peduncle consists of three segments, proximal one bearing a small lateral plate on the proximal outer side; distal segment carrying two rami; outer one with 31 segments, and inner one which is very smaller than

outer one, consists of 12 segments (Fig. 3, A). Distal end of scaphocerite reaching slightly beyond the distal end of second segment of stylocerite. Carapocerite long and a little beyond the distal end of stylocerite. Third maxilliped long, subcylindrical, surpassing carapocerite; pro-dactylopodite about 1.5 times as long as carpopodite. First pair of thoracic leg robust, slightly laterally compressed and shortest of all legs; propodus and merus subequal in length, but the latter somewhat longer than the former; carpus very short. Third leg very slender and longer than the preceding ones; tip of the dactylus torn into a large number of thread-like structures in both sexes (Fig. 3, C and D). Following two legs having close resemblance in all respects, though the hinder-most one is somewhat longer than the just former one; dactylus slightly curved inwards; propodus about 2.5 times as long as dactylus; posterior margin furnished with serrated spines (Fig. 3, E); carpus longer than $\frac{1}{2}$ times as long as propodus, merus subequal in length of propodus.

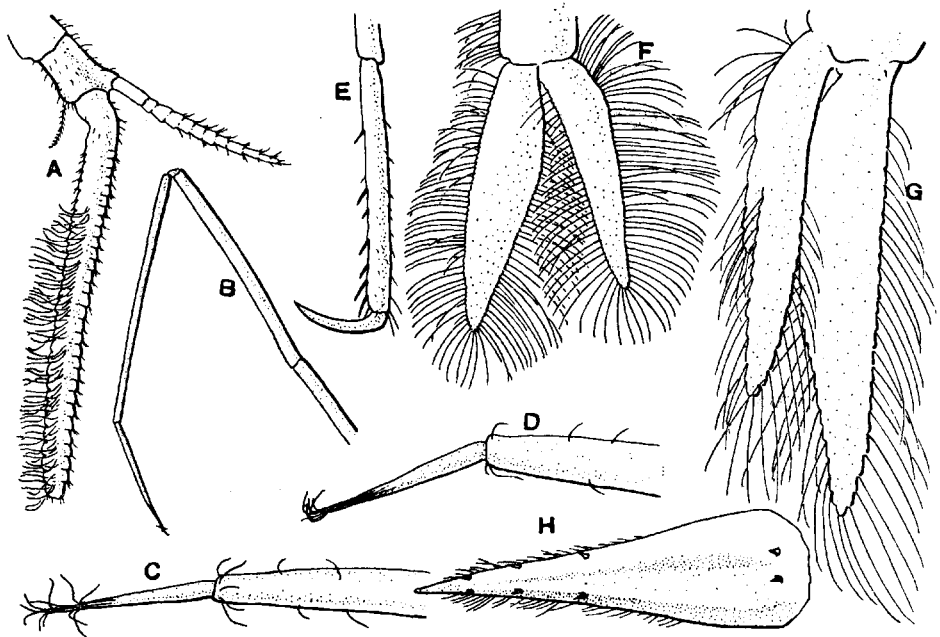


Fig. 3. A. Antennule, ca. $\times 10$.
 B. Distal three segments of third leg, δ , $\times 7\frac{1}{2}$.
 C. Dactylus of third leg of male, $\times 50$.
 D. Dactylus of third leg of female, $\times 50$.
 E. Distal two segments of fifth leg, $\times 6$.
 F. Second abdominal appendage of female, $\times 6$.
 G. Second abdominal appendage of male, $\times 15$.
 H. Telson, δ , $\times 7\frac{1}{2}$.

Sterna of fifth and sixth thoracic segments bear a spinous median tooth in female, but in male specimen, each of posterior four somites carrying a spine in the middle region of sternum.

Tergum of abdominal segments carinated excepting the foremost one; carina of third abdominal segment especially developed, it is sulcate along its median line in sixth and telson. Except sixth abdominal somite, all pleura ornamented with three transverse low carinae as shown in Fig. 2; the end sharply pointed but laterally flattened.

From first to fifth abdominal sterna armed with a long stout spine, while sixth segment is provided with a pair of smaller one on the anterior margin of sternum in male, but much smaller in female especially in first and second.

Endopodite of second abdominal appendage bears a stylumbrus in male but not in female (Fig. 3, F and G).

Telson longer than uropods, distally tapering, provided with a pair of small spine on upper surface of proximal region and three pairs of spinules in distal half (Fig. 3, H).

Branchial formula runs as follows:—

	<i>h</i>	<i>i</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>	<i>o</i>
Pleurobranchiae	—	1	1	...	1	1	1
Arthrobranchiae	—	—	—	...	—	—	—
Podobranchiae	—	—	—	...	—	—	—
Mastigobranchiae	1	—	—	...	—	—	—

Described from a male specimen 34.0 mm in body length from posterior margin of orbit to the tip of telson, and a female 38.0 mm in body length.

Three ovigerous female and two male specimens have come under my examination.

Difference: *Paracrangon abei* closely resembles the former species but it may be separated from it by the following points:—(1) Dorsal carina of carapace provided with three spines and anterior two of it trifold. (2) Branchiostegal spine smaller and directed obliquely forwards a little outwards. (3) About 10 spines present on posterior border of propodus of last two pairs of legs (about 20 in *P. echinata*). (4) Pleura end in less prominent spines. (5) A pair of dorsal spines in proximal region of telson, smaller.

Type locality: Kumano-nada off NAGASIMA, Mie Prefecture (about 170 fathoms).

***Paracrangon furcata*, sp. nov.**

Body small. Rostrum laterally compressed, projected obliquely forwards

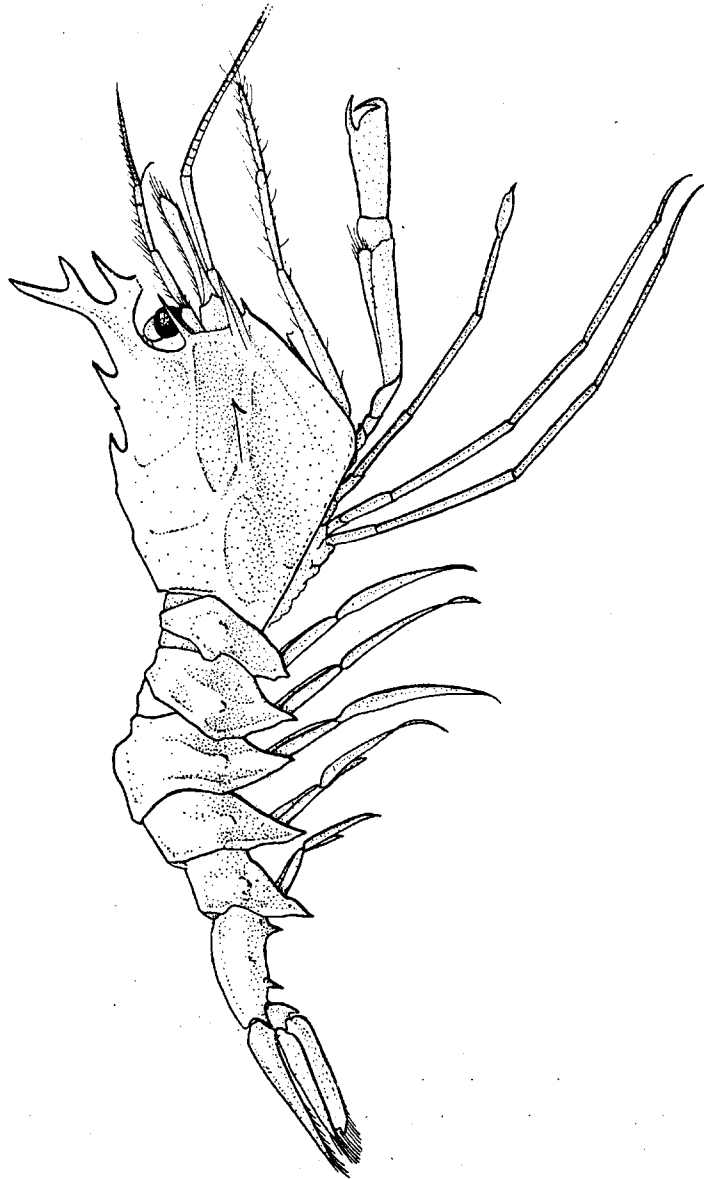


Fig. 4. *Paracrangon furcata*, sp. nov. ♀, $\times 5\frac{1}{2}$.

and curved upwards in distal half; anterior margin bears a spine in distal one third and a forked one in proximal one third (Fig. 4); posterior margin without spine. Carapace carinated along dorsal median line. Carina armed with three spines; intermediate one, rudimentary. Sides of carapace sub-pentagonal in lateral view and ornamented with low ridges in such a way as shown in Fig. 4. Antennal spine very long, directed obliquely forwards. Pterigostomian spine small. Branchiostegal spine situated just behind pterigostomian one. A prominent spine planted near hepatic region.

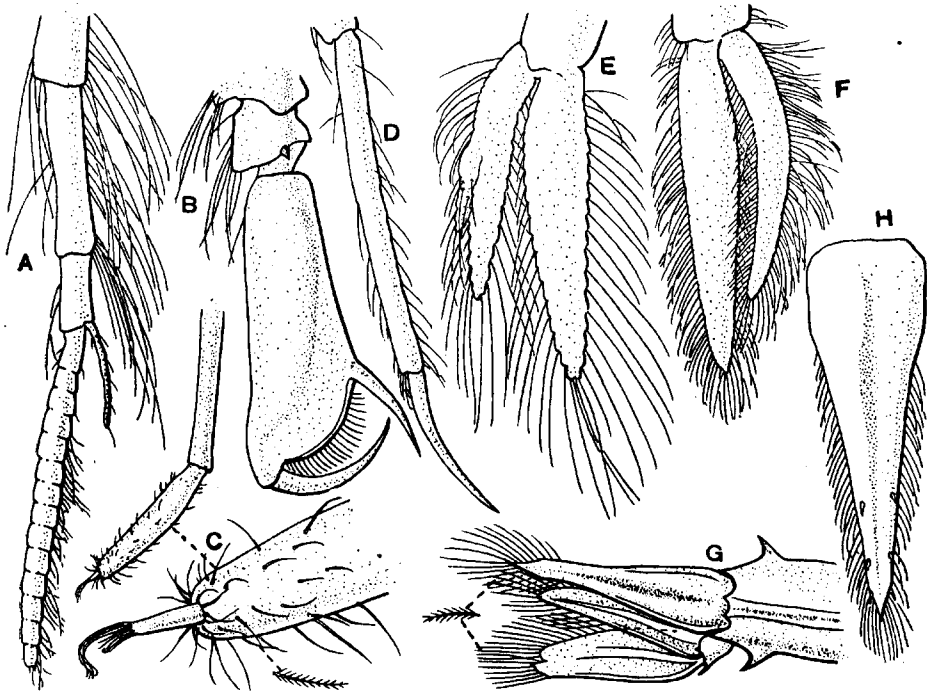


Fig. 5. A. Antennule, ca. $\times 10$.
 B. Distal three segments of cheliped.
 C. Distal two segments of third leg, $7\frac{1}{2}$ and $\times 35$.
 D. Distal two segments of fifth leg, ca. $\times 10$.
 E. Second abdominal appendage of male, $\times 15$.
 F. Second abdominal appendage of ovigerous female, $\times 6$.
 G. Tail-fan, $\times 7\frac{1}{2}$.
 H. Telson, $\times 6$.

Antennular peduncle consists of 3 segments, upper margin of these segments densely fringed with long feathered hairs; basal segment bears a small lateral plate on proximal outer border; ultimate one shortest, about $\frac{2}{5}$

times as long as second segment, bearing two rami. Outer ramus composed of 14 joints and much thicker than inner one; inner one rudimentary, with 5 joints (Fig. 5, A). Antennal peduncle long, distal end terminated at the same level of the distal end of antennular peduncle. Third maxilliped slender, reaching beyond distal end of antennal peduncle by the entire ultimate segment; ultimate and penultimate ones same in length. First thoracic leg robust. Third leg slender; dactylus ends in a tuft of bristles (Fig. 5, C); propodus cylindrical and enlarged (Fig. 5, C). Last two pairs of legs very similar in all respects; propodus two times as long as dactylus in fifth leg; posterior margin fringed with long hairs instead of spinules (Fig. 5, D). All thoracic somites without median spine on sternum.

Abdomen except anterior two somites carinated, especially in third abdominal somite; sixth and telson with median groove on dorsal surface. Transversal median and two marginal low carinae (as shown in Fig. 4) on the lateral sides of first to five abdominal somites. Sternum of anterior five segments has a long spine in its middle region in male, but it is rudimentary in female. Anterior margin of sternum of sixth abdominal segment armed with a pair of tubercles in both sexes.

Second abdominal appendage has a stylumbrs on inner side of endopodite in male specimen, but without in female (Fig. 5, E and F).

Telson tapering, a little longer than uropods (Fig. 5, G); furnished with three pairs of spinules in distal one-third (Fig. 5, H).

Branchial arrangements are the same as in previous species.

Above mentioned description is based on a male specimen, 26.0 mm and ovigerous female, 38.0 mm in body length without rostrum. One male and 9 ovigerous female specimens were used for this study.

Type locality: Kumano-nada off NAGASIMA, Mie Prefecture at a depth of about 170 fathoms.

Difference: *Paracrangon furcata* is closely allied to the already described two species, but should be separated from them as shown in the following table:—

<i>P. echinata</i>	<i>P. abei</i>	<i>P. furcata</i>
1. Rostrum straight, anterior margin with two simple spines, lower one curved.	” ”	Curved upwards in distal half, anterior margin with a simple spine and a forked one in basal region.
2. Dorsal carina of carapace with usually unequal 4 spines.	With usually three spines, anterior two are trid at tip.	With usually two large and one small spines.

<i>P. echinata</i>	<i>P. abei</i>	<i>P. furcata</i>
3. Antennal spine short.	" "	Very long.
4. Branchiostegal spine very long, directed obliquely outwards.	Moderately long, directed obliquely forwards.	" "
5. Outer antennular ramus consists of 35 segments, inner one about $\frac{1}{2}$ times as long as outer one and composed of 14 segments.	Outer ramus composed of 31 segments, inner one about $\frac{1}{2}$ times or more as long as outer one and consists of 12 segments.	Outer ramus short and consists of 14 segments, inner one rudimentary, bearing 5 segments.
6. Propodus of 3rd leg slender, viz., normal in shape.	" "	Enlarged, viz., abnormal in shape.
7. Posterior margin of last two pairs of leg armed with about 20 spinules.	Provided with about 10 spinules.	Fringed with hairs, instead of spinules.
8. Pleura spiniform, anterior margin bears a marginal spine, 4th and 5th armed with one posterior marginal one.	Pleura acuminate but not spiniform, anterior marginal spine and posterior one present, but smaller than those of the former species.	Pleurae acuminate but not spiniform, without both marginal spines.
9. With a pair of spines on dorsal surface of telson in proximal region.	" "	Without.

*Key to all the hitherto known species, belonging
to the genus Paracrangon.*

- a. Rostrum straight, obliquely directed upwards, anterior margin with two simple spines, posterior margin with one or two spines.
- b. Dorsal carina of carapace with three flattened spines and anterior two trifold at tip. *P. abei*, sp. nov.
- bb. Dorsal carina of carapace with 3~4 unequal spines and its apex does not trifold.
- c. outer antennular ramus comprising about 22 segments. Pleura of abdominal segments acuminate but not spiniform. *P. areolata*.
- cc. outer antennular flagellum composed of about 35 segments. Pleurae of abdominal segments pointed and spiniform. *P. echinata*.
- aa. Rostrum curved upwards in distal half; anterior margin with simple spine near its tip and a forked one near basal portion; posterior margin with no spine. Outer antennular ramus consists of about 14 segments; inner one rudimentary composed of 5 segments. *P. furcata*, sp. nov.

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