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REPORTS ON THE DREDGING OPERATIONS OFF THE WEST COAST OF  
CENTRAL AMERICA TO THE GALAPAGOS, TO THE WEST COAST  
OF MEXICO, AND IN THE GULF OF CALIFORNIA, IN CHARGE OF  
ALEXANDER AGASSIZ, CARRIED ON BY THE U. S. FISH COMMISS-  
SION STEAMER "ALBATROSS," DURING 1891, LIEUT. COMMANDER  
Z. L. TANNER, U. S. N., COMMANDING.

XXII.

THE ISOPODA.

By H. J. HANSEN.

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U. S. Fish Commissioners.]

WITH SIX PLATES,  
AND A CHART OF THE ROUTE OF THE "ALBATROSS."

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No. 5.— *Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West Coast of Mexico, and in the Gulf of California, in charge of ALEXANDER AGASSIZ, carried on by the U. S. Fish Commission Steamer "Albatross," during 1891, Lieut.-Commander Z. L. TANNER, U. S. N., Commanding.*

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XXII.

*The Isopoda.* By H. J. HANSEN.

The collection contains in all fifteen species, fourteen of which, all marine, I have considered new to science, while one form—belonging to the Oniscidæ—is terrestrial in habit, and proves to be a well known species. Of the fourteen marine species, eight are free-living forms, and one is parasitic on fishes; these nine species are easily referred to genera established many years ago. The remaining five species belong to the subfamily Bopyrinæ, of the very extensive family Epicaridea; they present several peculiarities in structure, and moreover they are rather interesting since no form of the Bopyrinæ has heretofore been found on truly deep-sea animals. For particulars, however, the reader must be referred to the special description later on.

Besides my special account a few remarks must suffice.<sup>1</sup> Since each

<sup>1</sup> The Director of the Entomological Department of the Zoölogical Museum in Copenhagen, Inspector Dr. F. Meinert, had commenced to deal with the material, but being engaged in other work, he transferred to me the preparation of this report. Only the following particulars are of interest. He had recognized the two species of Asellota and all the species of Cymothoidæ as new to science; furthermore, he had furnished them with names, and on the labels briefly mentioned the species already published to which each of the new forms was most closely allied. Some of the names and most of these hints on affinity are adopted in the report, which otherwise is wholly a work of my own. Yet it must finally be mentioned that Mr. G. Budde-Lund has determined the single species of Oniscidæ.

Hansen 1897

of the families is represented by only a few species, I am unable to attempt improvements in the classification of any of them. In a previous paper — Isopoden, Cumaceen und Stomatopoden der Plankton-Expedition (Ergebnisse der Plankton-Expedition der Humboldt-Stiftung, Bd. II. G. c) — I have proposed a partly new arrangement of the Isopoda, with observations on some of the families, and to this treatise the reader must be referred for several particulars. I have thought it useful to illustrate all the species rather fully, and to describe them in some detail, taking into consideration the best representations in the literature, yet altering and adding where it seemed advisable.

### ASELLOTA.

Of this large tribe only two species were secured. Both belong to the Munnopsidæ G. O. Sars, a family rather badly limited, and both must be referred to the genus *Eurycope* G. O. Sars. Unfortunately, the material is rather scanty and all the specimens are much mutilated, yet I am able to draw attention to a point of significance, namely, that the genus with the limits still adopted presents startling differences in the structure and shape of the mandibles of some of the species. In the two species here described the mandibles possess distally a cutting portion, behind this a "lacinia mobilis"<sup>1</sup> with a row of setæ on each mandible and a strong "cuspis lacinia" on the left one, and farther backward a well developed molar process. In the small Norwegian species the mandibles seem to be of similar structure,<sup>2</sup> but in the large *Eurycope gigantea* G. O. Sars they are very different. In this species each mandible has a very long oblique edge on the inner side, the molar process is very short and badly defined, no lacinia mobilis is found, etc. It may be added that the two pairs of jaws also present differences from those in the species to be described here. (The mouth organs of *Eurycope gigantea* were first described by G. O. Sars in the Norwegian North-Atlantic Expedition, Zoöl., Crustacea, Vol. I. pp. 132, 133, Plate XI. Fig. 10-14, and shortly afterwards by the present author in his account of the Crustacea in *Dijmphla-Togtets zool.-bot. Udbytte*, 1877, pp. 199-201, Tab. XX. Fig. 3c-3g.) It is interesting to observe that great differences in the structure and armature of

<sup>1</sup> This and the following term are set forth and explained in my paper: *Cirranidæ et Fam. nonn. prop. Musei Haun. (K. Danske Vidensk. Selsk. Skrifter, 6 Række, naturv.-math. Afdeling, V. pp. 239-426, Tab. I.-X.)*

<sup>2</sup> At my request, Prof. G. O. Sars very kindly sent me the proof-sheets containing the account of the Munnopsidæ, in his new leading work on the Isopoda. He has divided the family into two families, etc., but he still maintains the genus *Eurycope* in its old and very wide extension, yet remarking that some of the species established by Beddard "ought perhaps more properly to be separated as types of nearly allied genera."

the mouth organs are found in species which in general shape and other structural features seem to be rather closely allied. Unfortunately, the mouth parts in several of the species described by Beddard in the "Challenger" Isopoda are entirely unknown.

### 1. *Eurycope pulchra*, n. sp.

#### Plate I. Fig. 1-14.

One much mutilated male and six females, three of them with the marsupium well developed, the others much more than half grown or almost fully grown, were captured.

*Head.* The dorsal surface with three acute processes, the two anterior of which are rather small, each lying a little behind the antennula, while the third odd process is rather good-sized and separated from the two others by a deep and rather broad furrow. On each side this furrow runs down the lateral surface of the head, above it bends obliquely forward, converging with the furrow from the other side, and finally terminating in a median impression between the two anterior processes. The labrum is very large and prominent, anteriorly rounded.

*Antennulae.* The basal joint of the peduncle is oblong, anteriorly cut off; the most distal part of the interior side, where the second joint is articulated, is incised; the upper side is irregularly arched, the distal part of the under side longitudinally somewhat excavated. The second joint is as usual short, the next slender and of about the same breadth at both ends; the anterior inner angle somewhat produced, acute. Third joint somewhat shorter and much more slender than the second. The flagellum somewhat exceeding one third of the length of the body, with innumerable joints.

*Antenna.* In no specimen are more than the four proximal short joints and sometimes the basal part of the very elongated fifth joint preserved. Third joint anteriorly on the limit between the exterior and the lower side produced into a very conspicuous acute process; the exopod (squama) very small and quite fused with the third joint, not even set off by a transverse suture (compare the following species).

*Mandibles* (Fig. 1 b and 1 c). Of about the same shape as in *Janira* and allied genera. The cutting portion (a) compressed, much higher (when seen from in front) than broad, ending with three teeth. Pars molaris (b) moderately long, somewhat compressed, so that it is broader when seen from in front than when seen from below as in the figure; distally it is cut off obliquely, with some setae, and as usual the terminal face of the two molar processes is somewhat differently shaped. Lacinia mobilis (l) with numerous setae, and the cuspis lacinia on the left mandible strongly developed, compressed and much higher than broad, ending in four teeth. The palpus stout, three-jointed, second joint almost double as long as the first; third joint of a peculiar aspect, curved, rather broad, with a conspicuous incision on the anterior margin.

*Maxillulæ* (Fig. 1 *d*). The lobe ( $l^1$ ) of the first joint (1) in its distal half rather narrow and curved, with numerous hairs at the rounded apex, but without any spine-like seta. The oblique terminal margin of the lobe ( $l^2$ ) of the third joint, as in other species, with numerous long spines.

*Maxille* (Fig. 1 *e*). The lobe ( $l^2$ ) of the second joint proportionally rather narrow, with hairs along the interior margin and on the rounded terminal margin; the two lobes ( $l^3$ ) of the third joint with some long and robust setae at the apex.

*Maxillipeds* (Fig. 1 *f*). Second joint (2) rather long, with about sixteen coupling hooks (*h*) at the inner margin; the terminal margin of its lobe ( $l^2$ ) coarsely serrated and hairy. Fourth and fifth joints, as in other species, much expanded, but not to such a degree as, for instance, in the following species; the fourth joint conspicuously narrower than the second, and considerably larger than the fifth. Sixth and seventh (7) joints small and slender. The epipod (*ep*) with a somewhat produced acute angle at the middle of the exterior margin.

*Thorax*. As usual in this genus, the thorax is divided into two parts, the first of which, consisting of four segments, in this species equals in length the second part. The first segment considerably narrower than the second, the fifth nearly twice as broad as the first. The four anterior segments with a transverse depression in a considerable part of the breadth. The first segment with a single small dorsal process. Second, third, and fourth segments each with a median, very high, laterally compressed, acute dorsal process, turning obliquely forward and rising just behind the anterior margin; besides, the second and third segments with a short rounded protuberance in the median line a little in advance of the posterior margin. The third and the fourth segment with the antero-lateral angle produced into an acute, almost spine-like process; on the first two segments the same angle is rounded. The three posterior segments with a median, longitudinal, rather broad impression, on each side limited by a low keel, anteriorly produced into an acute process, which is long on the fifth and short on the seventh segment. The antero-lateral angle of the three last named segments produced into an acute process, turning forward and somewhat outward, the process being long on the fifth segment, shorter, but almost broader on the last two segments; finally, on the lateral margin a little in advance of the posterior angle, a protuberant rounded process, which is very low on the fifth segment, somewhat larger on the two others, especially on the last one. The whole dorsal surface of the trunk, as of the abdomen, closely set with very small granulations, giving it a faintly scabrous appearance. While the first segment is movably jointed with the head, and the articulation between the four anterior segments, and especially between the fourth and the fifth segment, is very well developed, the three posterior segments are immovably connected with one another and with the abdomen.

*Thoracic Legs*. The basal joint of the four anterior pairs with the antero-lateral angle produced into a rather good-sized, distally almost spine-like acute process, and laterally with a shorter projecting process; the basal joint of the three posterior pairs smooth. The first pair (Fig. 1 *g*) scarcely of medium

length, very slender; the fifth joint almost as long as the second, somewhat curved, very slender, and not expanded on its under side. Of the second, third, and fourth pairs only the two proximal joints are not broken off. In the three last pairs the fifth joint is almost twice as long as broad (Fig. 1*h*), the seventh joint (7) as long as the fourth, and very slender (in Figure 1*h* all the hairs are omitted).

*Abdomen.* As long as the four posterior thoracic segments together, narrower than the seventh segment, and decreasing in breadth from the anterior angle, which is produced into a triangular acute process, turned forward and especially outward. It consists of at least two visible segments — the posterior, of course, consisting of fused segments — fused together, the anterior of which is short; besides, there is seen across the anterior part of the second segment a curved transverse furrow, perhaps indicating a rudiment of a second articulation. In the median line, just behind the furrow between the first segment and the rest of the abdomen, is a small tubercle, especially obvious in a lateral view as a rudimentary process. On the dorsal side are two deep longitudinal furrows, at a considerable distance from each other, and anteriorly curving outward. The posterior margin with three acute processes, the median one curved considerably downward and much larger than the two others, each of which is situated close inside the point where the dorsal furrow reaches the posterior margin. The oblique terminal face of the abdomen is quite similar in both sexes and rather peculiar (Fig. 1*a* and 1*i*): the hind margin with the three processes just mentioned, the oblique lateral margin a little arcuate, while the infero-anterior margin is short and concave, the infero-lateral angle being produced into a shorter process; on the upper half of the terminal face are seen the two oblong-triangular anal doors (Fig. 1*i*, *d*), and just outside each door the uropod is attached. In the female the ventral operculum (the first pair of abdominal limbs) has an impression along with and somewhat inside of the lateral margin and close to the posterior margin; in the median line it possesses a keel, which somewhat before the middle is produced into a rather long, moderately compressed acute process. In the male the operculum (the first and second pairs of abdominal limbs together) is represented in Figure 1*i*, and scarcely needs a special description. (Having but one male specimen, I omit the description of the "appendix masculina" on the second limb.)

*Uropods* (Fig. 1*i*). Each consists of a moderately short and very slender peduncle and two 1-jointed rami, the interior of which is about as long as the peduncle and still more slender, the exterior one somewhat shorter.

*Size.* A female specimen whose marsupium is still rudimentary (consisting only of small plates on the second and fourth pairs of legs) is 28 mm. long and 11.2 mm. broad. Of the three females with the marsupium completely developed (in two specimens filled with eggs) the largest is a little smaller than the specimen with rudimentary marsupium; the smallest is 23.3 mm. long and 9.8 mm. broad. The youngest female is 20.3 mm. long; the male is about 24.5 mm. long and 10 mm. broad.

*Habitat.* Station 3361 (Lat. 6° 10' N., Long. 83° 6' W.), 1471 fathoms, 2 specimens; Station 3413 (Lat. 2° 34' N., Long. 92° 6' W.), 1360 fathoms, 5 specimens.

*Remarks.* This species is closely allied to *Eurycope fragilis* Bedd. ("Challenger" Isopoda, p. 63, Plate XI. Fig. 8-12); but if the drawings of Beddard are trustworthy in detail, my species is easily distinguished from *E. fragilis* by the processes on the dorsal surface of the head, by the shape of the lateral margin of the three posterior thoracic segments, by the direction of the postero-lateral abdominal processes, etc. However, a thorough revision of many of the "Challenger" Isopoda, especially of the Asellota (sens. lat.), is very much needed.

## 2. *Eurycope scabra*, n. sp.

Plate I. Fig. 2-2 d; Plate II. Fig. 1.

Only one single and ill-handled female specimen is present; yet I hope that the species can be easily recognized, especially by the aid of my figures.

*Head, thorax, and abdomen* without any processes, and scarcely with sharp angles; but with the exception of a transverse belt across each of the four anterior thoracic segments, the dorsal surface of the body is almost wholly covered with numerous granulations, so that it becomes scabrous in a much higher degree than the preceding species.

*Antennulæ.* Absent.

*Antennæ.* Only the four proximal joints are present. The third joint without any process, but above at the exterior side is seen a small triangular and rounded exopod, well set off by a suture.

*Mandibles.* Only the left mandible (Fig. 2 a) has been examined. The cutting portion well developed, ending in five teeth; the lacinia with about six setæ, and the cuspis lacinia large, with teeth of very different magnitude. The molar process rather long and proportionally slender, seen from below (as in Fig. 2 a) almost conical with the end cut off very obliquely; seen from in front the distal part is somewhat broader, and the terminal face is vertical, with sharp serrulation and a few broad hairs; but in the lower end of the face a triangular process is seen, and it is this process which in Figure 2 a overlaps the greater part of the end. The palp is very slender; second joint but a little longer than the first; the third very slender.

*Maxillulæ* (Fig. 2 b). The distal part of the lobe of the first joint broader and less curved than in the preceding species, hairy and without spine-like setæ; the lobe of the third joint about as in *Eurycope pulchra*.

*Maxillæ* (Fig. 2 c). The lobe of the second joint distally proportionally narrow and tapering towards the rounded apex, which is furnished with normal hairs.

*Maxillipeds* (Fig. 2 d). Second joint rather elongate, its lobe with the terminal margin closely serrated and with about twelve coupling-hooks at the inner margin. Fourth and fifth joints more expanded than in *Eurycope*



*pulchra*, the fifth almost as large as the fourth, and its inner margin partly serrated; sixth and seventh joints much broader than in the preceding species. The epipod with the exterior margin evenly curved.

*Thorax.* It was badly preserved, and therefore the relative breadth of the segments could not be drawn with so much certainty as could be wished. The want of processes and the scabrous surface are mentioned above. The three posterior segments, without any median dorsal impression not connected immovably with each other, and somewhat shorter than the four others together; the last segment seems to be movably united with the abdomen.

*Thoracic Legs.* The basal joint of the four anterior pairs anteriorly or exteriorly produced into an angle or short scabrous process. The first pair (Plate II, Fig. 1) rather short and stout; the fifth joint conspicuously shorter than the second, compressed and somewhat expanded on the under side, the margin of which is hairy. Of the six other pairs of legs only the basal joint is preserved.

*Abdomen.* It is nearly ovate and proportionally large compared with the thorax, but neither shape nor magnitude could be drawn with absolute certainty, as the abdomen was roughly handled. The basal segment is very short; for the rest only a pair of very faint somewhat curved longitudinal impressions are seen on the scabrous dorsal surface. The operculum in the female without any keel.

*Uropods.* Somewhat longer than in the preceding species, but of about the same shape.

*Size.* The specimen described is about 25.6 mm. long, and 8.4 mm. broad.

*Habitat.* Station 3413 (Lat. 2° 34' N., Long. 92° 6' W.), 1360 fathoms, 1 specimen.

*Remarks.* It is easily distinguished from all other large species hitherto known by the general shape of thorax and abdomen, and the want of processes.

### CYMOTHOIDÆ.

As to the limitation and the constituent elements of this family I refer to the above named report on the Isopoda of the German Plankton Expedition. Of its six sub-families only two, namely, *Æginæ* and *Cymothoinæ*, are represented in the collection, the first sub-family by six, the second by one species. The leading work on these two sub-families is Shiödte and Meinert: *Symbolæ et Monogr. Cymothoarum, Crust. Isopod. Familia* (Naturh. Tidsskr., 3 R., Bl. XII.-XIV., 1879-84), and further remarks on the structure of the mouth and the classification are found in my above named work, *Cirolanidæ*, etc.

In the large genus *Æga* Leach, not rarely several species are closely allied to one another, and three of the four species established here differ only in small features from species living in the most northern part of the Atlantic (in Norway, Greenland, etc.). In the following, some characters derived from the structure of the thoracic legs, and partly overlooked by earlier authors, will be used; besides, the shape of the posterior angles of the thoracic "epimera," of

the sixth abdominal segment, and especially of the uropods, furnish us with more distinguishing marks than are generally recognized, but as most of these details are more easily apprehended from figures, I will direct the attention of future students to these facts, believing that proportionally rather large and very accurate drawings of the parts mentioned will be extremely useful.

In specimens of *Æginæ* taken on fishes, the ventral side of the thorax is often, nay almost generally, vaulted, and sometimes very considerably so, owing to the fact that the alimentary canal is greatly distended by blood sucked from the host; another result of this swollen condition is that the segments of the thorax very often become drawn out from each other. In specimens taken on the bottom of the sea by trawl or dredge, the ventral side is not vaulted, and the thoracic segments are not drawn out; it follows that such specimens are comparatively shorter in proportion to their breadth than most of the specimens taken on fishes, and therefore present a somewhat different aspect. No specimen of the *Æginæ* in this collection has the ventral side vaulted, and all seem to be taken on the bottom.

Schödte and Meinert divide the species of the genus *Æga* into two groups. The first of them is thus diagnosed: "Scapi antennarum infra plani vel concavi, invicem accommodati. Lamina frontalis plana vel concava," and to this group the two first described species, *Æ. maxima*, n. sp., and *Æ. acuminata*, n. sp., must be referred. To the other group the two authors ascribe the following characters: "Scapi antennarum teretiusculi vel compressi, invicem liberi. Lamina frontalis convexa vel compressa elevata," and to this belong the two other species, *Æ. plebeia*, n. sp., and *Æ. longicornis*, n. sp.

### 3. *Æga maxima*, n. sp.

Plate II. Fig. 2-2c.

Only one specimen, a female without marsupium.

*Head.* The frontal margin rather concave on each side; the median elongation acute, reaching to about the middle of the interior margin of the first joint of the antennulæ. The frontal plate "lamina frontalis" (on the ventral side of the head), about as long as broad, seen as much as possible from the side considerably convex, and seen from in front with a low and rather broad sublateral carina, and somewhat excavated in the middle. The eyes ovate, the shortest distance between them only a little less than the basal joints of both antennulæ together.

*Antennulæ.* Reaching very little beyond the end of the peduncle of the antennæ, and a little beyond the anterior angle of the first thoracic segment. The peduncle very little longer than the flagellum; its basal joint as long as broad, with the upper side flatly convex, and the antero-interior angle rectangular. The flagellum 17-jointed.

*Antennæ.* Each antenna, when bent backward, nearly attains the posterior margin of the second thoracic segment. The proportion between the peduncle and the flagellum is about that of 3 to 5; the flagellum 23-jointed.

*Thorax* (Fig. 2 a). The posterior angle of the first segment rectangular, scarcely produced. For practical reasons, the "epimera" of the six following segments, though in reality constituting the first joint of the legs, are here treated as belonging to the thorax; the epimera of the second thoracic segment with the posterior free angle nearly rectangular, those of the third segment somewhat obtuse-angular. The epimera of the four posterior segments posteriorly considerably produced; those of the fourth and fifth segments posteriorly obliquely rounded; the last two pairs with the triangular apex a little rounded.

*Thoracic Legs.* All clumsy. In the three anterior pairs the fourth joint (the epimeron considered as the first joint) is shorter than the third, considerably incrassated, in the first pair with only one spine, in the second with six or seven (Fig. 2 b), in the third with nine short spines at the interior margin; the fifth joint only in the third pair with a spine at the antero-interior angle; the sixth joint short, without keel on the inner side; the claw (consisting of the seventh joint fused with the real claw) short and robust. The four posterior pairs (Fig. 2 c) with numerous, comparatively short spines.

*Abdomen.* The first segment partly free, a little broader than the fourth. The sixth segment about  $1\frac{1}{2}$  times broader than long; the dorsal surface feebly convex, very slightly keeled in the median line, and between this keel and the base of the uropod is seen a large, but shallow depression; as the posterior apex unfortunately is broken off, nothing can be said about its shape, but most likely it was acute, and the posterior margin probably with about five spines on each side.

*Uropods.* They reach a little beyond the end of the abdomen; both rami are proportionally narrow, of the same breadth and the same length, the inner ramus therefore posteriorly surpassing the outer one. The inner ramus more than three times longer than broad; the interior margin from a point a little behind the apex of the very long and narrow process from the peduncle turning obliquely outward, thus forming a posterior margin, with five or six small spines; the exterior margin somewhat convex, but at a short distance from the rounded tip of the branch it changes its direction, bending somewhat outward, thus forming a low incision. The outer ramus with the tip rounded; the distal part of both margins faintly serrated with a smaller number of spines.

*Color.* The whole dorsal surface yellowish white, the eyes grayish.

*Size.* The single specimen measures 55 mm. in length and 26 mm. in breadth.

*Habitat.* Station 3362 (Lat.  $5^{\circ} 56' N.$ , Long.  $85^{\circ} 10' 30'' W.$ ), 1175 fathoms, 1 specimen.

*Remarks.* The species is closely allied to *Æ. psora* (L.), but is easily distinguished by its enormous size, and the following characters: a different shape of the frontal plate; the eyes smaller and more distant from each other; the dorsal surface of the last abdominal segment slightly convex, with two large depressions.

4. *Æga acuminata*, n. sp.

Plate II. Fig. 3-3 b.

Only one specimen, a female without marsupium.

*Head.* The frontal margin scarcely as concave on each side as in *Æ. maxima*, the median elongation not reaching the middle of the interior margin of the first joint of the antennulæ. The frontal plate conspicuously broader than long, seen from the side shaped as in the preceding species, seen from in front somewhat concave with projecting lateral margins. The eyes as in the preceding species.

*Antennulæ* (Fig. 3). Reaching considerably beyond the peduncle of the antennæ, to the middle of the first thoracic segment. The peduncle slightly shorter than the flagellum; the basal joint, seen from in front, quite as broad as long; the dorsal surface somewhat convex; the antero-interior angle a little produced, acute-angled. The flagellum 18-jointed.

*Antennæ.* When reflexed, reaching to the posterior margin of the second thoracic segment. The relation of the peduncle to the flagellum is about that of 2 to 3; the flagellum 19-20-jointed.

*Thorax* (Fig. 3 a). The posterior margin of the epimera of the second to the fifth segment and the corresponding margin of the first segment sinuate, being directed a little forward just inside the somewhat produced postero-lateral angle, which is scarcely rectangular, but a little acute-angled. The epimera of the sixth segment forming a transition between those of the fifth and of the seventh segment, the last named pair posteriorly and laterally considerably produced and acute.

*Thoracic Legs.* They are robust, though scarcely as clumsy as in *Æ. maxima*, but very similar in shape and armature. In the three anterior pairs the claw is somewhat longer; the thick fourth joint in the first pair with one spine, in the second with five, in the third with six to eight spines. The spines on the four posterior pairs scarcely as numerous as in the preceding species, but somewhat longer.

*Abdomen.* The first segment almost totally covered, very conspicuously broader than the fourth. The last segment scarcely  $1\frac{1}{2}$  times broader than long (in Fig. 3 b it seems to be proportionally broader, owing to the circumstance that the figure presents the projection of the posterior segments); posteriorly it is considerably produced, acute, with about three spines on each side of the tip; the dorsal surface is rather convex, median keel and sublateral depressions scarcely visible.

*Uropods* (Fig. 3 b). Much as in *Æ. maxima*, so that only the more essential differences will be pointed out. The outer ramus reaching a little beyond the inner one; the inner ramus is more deeply incised on the exterior side, and the posterior margin is somewhat longer: thus we obtain a distal part forming an obtuse angle with the larger proximal part.

*Color.* The dorsal surface is light yellowish gray with a faint purple tone on a part of the three anterior thoracic segments, and the last abdominal segment yellowish white; the eyes dark grayish, almost black.

*Size.* The single specimen is 31 mm. long, 16.2 mm. broad.

*Habitat.* Station 3403 (Lat.  $0^{\circ} 58' 30''$  S., Long.  $89^{\circ} 17'$  W.), 384 fathoms, 1 specimen.

*Remarks.* The species is very closely allied to *A. psora* (L.), but is distinguished especially by smaller eyes, longer antennulae, and the last abdominal segment being posteriorly more produced. From *A. maxima* it is distinguished especially by longer antennulae, and by a different shape of the last abdominal segment and of the uropods.

### 5. *Aega plebeia*, n. sp.

Plate II. Fig. 4-4 d.

Six specimens, one male and five females, three of the latter with well developed marsupium.

*Head.* The frontal margin with the sub-median curves rather indistinct; the median process extends a little below the inferior edge of the antennulae, its apex almost or quite reaching the frontal plate. The frontal plate about twice as broad as long and strongly compressed, forming a high transverse keel, which, seen from in front, shows the shape of the half of an oval. The eyes (Fig. 4) are very large; the distance between them considerably shorter than the breadth of the frontal process.

*Antennulae.* Much longer than the peduncle of the antennae (Fig. 4), and bent backwards, reaching almost to or even beyond the posterior angle of the first thoracic segment. The peduncle is somewhat shorter than the flagellum, and almost attains the distal end of the penultimate joint of the peduncle of the antennae; the first joint is about as long as broad, with the antero-interior angle broadly rounded; the third joint of the peduncle as long as, or a little longer than, the two proximal joints together. The flagellum with twenty-one to twenty-three joints.

*Antennae.* They reach a little beyond the posterior margin of the second, or almost to the posterior margin of the third thoracic segment. The flagellum  $1\frac{1}{2}$  or  $1\frac{1}{2}$  times longer than the peduncle, with seventeen or eighteen joints.

*Thorax* (Fig. 4 a). The postero-lateral angle of the first segment rectangular or a little acute, that of the epimera of the second and generally of the third segment conspicuously produced and acute; the angle of the fifth and sixth epimera almost or quite rectangular. The epimera of the seventh segment somewhat produced and acute.

*Thoracic Legs.* The three anterior pairs slender and rather long: the fourth joint not incrassated, with concave interior margin (Fig. 4 b), and with a couple of small spines at the distal inner angle; the sixth joint rather long, with a strong spine on the interior margin near the end; the claw very long, and

longer than the sixth joint. The four posterior pairs are slender; the fourth joint elongate, and considerably longer than the fifth.

*Abdomen.* The first segment partly covered, very conspicuously broader than the fourth. The last segment (Fig. 4 *d*)  $1\frac{1}{4}$  times broader than long; the tip acute, but scarcely produced; the posterior margin with six to eight small serratures, with scarcely visible spines on each side of the apex; the dorsal surface slightly convex, the faint median keel and the sub-lateral impressions almost as in *Æ. maxima* (see *supra*).

*Uropods* (Fig. 4 *d*). They reach somewhat beyond the apex of the abdomen, the outer ramus almost or quite attaining the end of the inner one. The inner ramus relatively broad, scarcely half as broad as long, of a somewhat triangular shape; the posterior margin considerably shorter than the antero-interior one, with seven or eight rather fine serratures; the exterior margin with a break at some distance from the acute tip, and two or three serratures between the tip and the break, the rest of the margin almost straight and smooth. The outer ramus is conspicuously narrower than the inner, yet rather broad, the apex acute, not produced.

*Color.* The dorsal surface yellowish white, the eyes gray, somewhat blackish.

*Size.* The largest specimen, a female with marsupium, is 37 mm. long and 17 mm. broad; the smallest female with marsupium is but 22 mm. long; the single male is 23.4 mm. long and 10.5 mm. broad.

*Habitat.* Station 3363 (Lat.  $5^{\circ} 43' N.$ , Long.  $85^{\circ} 50' W.$ ), 978 fathoms, 4 specimens; Station 3371 (Lat.  $5^{\circ} 26' 20'' N.$ , Long.  $86^{\circ} 55' W.$ ), 770 fathoms, 1 specimen; Station 3402 (Lat.  $0^{\circ} 57' 30'' S.$ , Long.  $89^{\circ} 3' 30'' W.$ ), 421 fathoms, 1 specimen.

*Remarks.* The species is closely allied to *Æ. ventrosa* M. Sars, but in the last named species the frontal plate is lower and of another shape, the eyes are more narrow, not occupying so much of the dorsal surface of the head, the epimera of the sixth, and especially those of the seventh segment are considerably more produced, and the outer ramus of the uropods is somewhat broader.

## 6. *Æga longicornis*, n. sp.

Plate II. Fig. 5-5*b*; Plate III. Fig. 1-1*a*.

Only one specimen, a female without marsupium.

*Head.* The frontal margin with the sub-median curves rather faint; the median process as in the preceding species. The frontal plate forms a very high transverse keel, which, when the head is seen from in front, protrudes strongly beyond the basal parts of the antennulæ and the antennæ, and has a straight inferior margin and rounded lateral angles. The eyes (Fig. 5) comparatively narrow, the shortest distance between them a little shorter than the basal joint of both antennulæ and the breadth of the frontal process together.

*Antennule.* They reach considerably beyond the peduncle of the antenna, and almost to the postero-lateral angle of the first thoracic segment. The peduncle a little shorter than the flagellum; its basal joint about as long as broad, with the antero-interior angle broadly rounded, the third joint scarcely shorter than the two proximal joints together. The flagellum with about fifteen joints.

*Antennæ.* They are unusually long, reaching to the middle of the fifth thoracic segment. The flagellum more than twice as long as the peduncle, with twenty-two joints.

*Thorax.* The postero-lateral angle of the first segment and of the epimera of all the other segments acute and more or less acute-angled (Fig. 5 a).

*Thoracic Legs.* The three anterior pairs are slender and rather long (Plate III. Fig. 1); their fourth joint scarcely incrassated, with concave inner margin, and in the second and third pairs with a couple of spines at the distal inner angle; the sixth joint rather long and without spines; the claw rather long, but scarcely longer than the sixth joint. The four posterior pairs rather long and slender (Plate III. Fig. 1 a); the fourth joint a little shorter, or at all events not longer, than the fifth.

*Abdomen.* The first segment almost covered, and very conspicuously broader than the fourth. The last segment (Fig. 5 b) about  $1\frac{1}{2}$  times broader than long; the apex acute but very little produced; the posterior margin on each side of the apex with four or five comparatively coarse serratures, and a conspicuous spine in each incision; the dorsal surface very flatly convex, with a transverse depression near the base and the median keel not discernible.

*Uropods* (Fig. 5 b). They reach far beyond the apex of the abdomen, the inner ramus scarcely attaining the end of the outer one. The inner ramus is relatively broad, but yet more than twice as long as broad, triangular, the triangle being almost isosceles, with rounded vertex, as the posterior margin is almost as long as the antero-interior one; the exterior margin almost straight, with about five coarse serratures in the distal half, and the posterior margin is also serrated; the apex is acute. The outer ramus much narrower than the inner one, about four times longer than broad; the apex much produced, acute.

*Color.* The dorsal surface is yellowish white, the eyes black.

*Size.* The single specimen is 14.5 mm. long and 7.5 mm. broad.

*Habitat.* Station 3402 (Lat.  $0^{\circ} 57' 30''$  S., Long.  $89^{\circ} 3' 30''$  W.), 421 fathoms, 1 specimen.

*Remarks.* The species is easily distinguished by the following characters together: the long distance between the eyes, the long antennæ, and the relative length of the rami of the uropods.

7. *Rocinela laticauda*, n. sp.

Plate III. Fig. 2-2c.

Three specimens of very different size, one a large and in all probability adult male; no female with marsupium.

*Head.*<sup>1</sup> The eyes of medium size, the shortest distance between them about as long as the last joint of the peduncle of the antennæ; the distance in the smallest specimen is comparatively a little shorter than in the largest one.

*Antennulæ.* They surpass a little the middle of the last joint of the peduncle of the antennæ (Fig. 2a); the peduncle reaching a little beyond the extero-anterior angle of the third joint of the peduncle of the antennæ; the flagellum in the small specimen with five, in the large specimens with six joints.

*Antennæ.* They reach a little beyond the middle of the third thoracic segment; the flagellum in the small specimen with fifteen, in the two other specimens with sixteen joints.

*Thorax.* The epimera (Fig. 2b) of second and third thoracic segments posteriorly rounded and not produced, those of the fourth segment somewhat produced with rounded apex, those of the three posterior segments considerably produced and almost acute.

*Thoracic Legs.* The three anterior pairs (Fig. 2c) tolerably stout: the fourth joint with about four acute spines, some of them rather long; the sixth joint quite as broad as the fourth, its large and broad expansion on the inner side with six spines. The four posterior pairs (Fig. 2d) with numerous slender spines.

*Abdomen* (Fig. 2e). The first segment is entirely concealed under the last thoracic one. The abdomen increases very conspicuously in breadth from the second to the fourth segment. The last segment is large and broad, posteriorly very broadly rounded; the dorsal surface is keeled anteriorly in the middle, and from the keel towards the lateral margin it is rather deeply, or, in the two smaller specimens, deeply and broadly depressed, the depression not reaching the lateral margin; the posterior margin with a number of very small spines.

*Uropods* (Fig. 2e). They surpass a little the last abdominal segment. The outer ramus reaches very little beyond the inner one, is considerably, but not  $1\frac{1}{2}$  times, broader than this, and is furnished with a number of spines on a larger part of its exterior margin. The inner ramus with spines on the terminal margin, and on the larger part of the outer margin.

<sup>1</sup> Schiödte and Meinert write (Nat. Tidsskr., 3 R., Bd. XII. p. 383) on the species of the genus *Rocinela*: "Bene recordari debet, discrimen, quod individua speciei unius ejusdemque quoad figuram frontis atque sculpturam partis prioris trunci præbent, non sexum, sed ætatem diversam notare." This observation is a very valuable one, as the differences in the front sometimes lead to great confusion. The frontal plate seems to be very small in all species; the thoracic epimera show much smaller differences in the various species than in the species of *Æga*.



*Color.* The two smaller specimens yellowish white, with a reddish tone on a part of the three anterior segments, and the eyes blackish; the large specimen is more grayish, posteriorly on the dorsal surface of the last abdominal segment and on a part of the uropods reddish brown, the eyes black.

*Size.* The largest specimen, a male, is 40.5 mm. long, and 16 mm. broad; the two other specimens are immature females, the smallest of them 21 mm. long.

*Habitat.* Station 3418 (Lat. 16° 33' N., Long. 99° 52' 30" W.), 660 fathoms, 1 specimen; Station 3425 (Lat. 21° 19' N., Long. 106° 24' W.), 680 fathoms, 1 specimen; Station 3430 (Lat. 23° 16' N., Long. 107° 31' W.), 852 fathoms, 1 specimen.

*Remarks.* The species is closely allied to *R. australis* Sch. & Mein., but in this last species the eyes are very conspicuously larger and the distance between them considerably shorter than the last joint of the peduncle of the antennæ, the abdomen does not increase in breadth from the base to the fourth segment, the last abdominal segment is somewhat smaller and the outer ramus of the uropods much broader, about  $1\frac{2}{3}$  times broader than the inner ramus.

### 8. *Rocinela modesta*, n. sp.

Plate III. Fig. 3-3 c.

Only one somewhat mutilated specimen, a female with marsupium.

*Head.* The eyes are rather small, occupying only about half of the lateral margin of the head, and the distance between them considerably longer than the last joint of the peduncle of the antennæ.

*Antennulæ* (Fig. 3). Comparatively long, reaching very little beyond the peduncle of the antennæ. The peduncle surpasses the middle of the penultimate joint of the peduncle of the antennæ. The flagellum with six joints.

*Antennæ.* In my single specimen only the peduncles are present.

*Thorax.* The epimera essentially as in the preceding species, yet posteriorly a little more produced.

*Thoracic Legs.* The first three pairs (Fig. 3 a) of medium size, rather slender: the fourth joint with from three to four blunt spines; the sixth joint not as broad as the fourth, the expansion on the inner side rather low and short, with four feeble spines. The four posterior pairs (Fig. 3 b) nearly as in the preceding species, but the spines are less numerous.

*Abdomen* (Fig. 3 c). The first segment is completely covered; the second quite as broad as the fourth. The last segment is smaller than in the preceding species, decreasing considerably in breadth from before the middle backward; posteriorly it is comparatively rather narrow and rounded, with some few fine spines on each side of the median line; the dorsal surface is somewhat convex, keeled anteriorly in the median line and with a rather deep but not broad depression from that keel outwards almost to the lateral margin.

*Uropods* (Fig. 3 c). The inner ramus surpasses a little the abdomen and very little the outer ramus, which is somewhat broader than the other; both

rami with rather feeble spines on the major part of the exterior margin; the inner ramus with some spines on the obliquely rounded terminal margin.

*Color.* The dorsal surface is whitish, the eyes dark.

*Size.* The single specimen, a female with marsupium, is 23.5 mm. long, and 10.7 mm. broad.

*Habitat.* Station 3384 (Lat. 7° 31' 30" N., Long. 79° 14' W.), 458 fathoms, 1 specimen.

*Remarks.* This species is closely allied to *R. maculata* Sch. & Mein., but it totally lacks the four large black spots; furthermore, in the last named species the uropods are a little shorter and broader, and the two rami of equal breadth, while the outer ramus is conspicuously shorter than the inner one; the three anterior pairs of legs are relatively shorter and more clumsy, etc.

### 9. *Irona foveolata*, n. sp.

Plate III. Fig. 4-4 b.

Seven specimens, all females with marsupium, were secured. The species certainly must be referred to the genus *Irona* Sch. & Mein., but as in my opinion it would be of little value to work out a long and very detailed account, I prefer to give a shorter description, especially pointing out the features by which it is distinguished from the four species described by Schiödte and Meinert in their monograph (Nat. Tidsskr., 3 R., Bd. XIV. pp. 383-395), and more particularly from *Irona melanosticta* Sch. & Mein., to which it is rather closely allied. As in adult females of other species belonging to *Irona*, *Lironeca*, etc., the body is unsymmetrical and somewhat variable in shape, in some specimens being contorted to the right, in others to the left side; furthermore, the last abdominal segment is sometimes as large as shown in the drawing (Fig. 4), sometimes a little larger or smaller, in the smallest specimen even conspicuously smaller.

The body is about twice as long as broad, in the smallest specimen a little shorter and broader, much depressed, but the dorsal surface of the thorax and the median part of the five anterior abdominal segments yet more or less but never strongly vaulted, while the lateral part of the abdominal segments mentioned and the whole sixth abdominal segment are nearly or quite flat, but sometimes obviously contorted.

*Thorax.* The epimera of the second, third, and fourth thoracic segments are very narrow, seen from above; those of the fifth segment a little broader and posteriorly more produced. The epimera of the sixth and especially of the seventh segment are much broader and posteriorly much more produced than the others, besides on each side rising considerably above the more lateral part of the dorsal surface of the thorax, which is brought about by the curious fact that these epimera are turned outwards and somewhat upwards.

*Abdomen.* All the segments are very broad. The last segment either rather thin and tolerably large, or mostly, as in Figure 4, thin and very large, and in this instance almost membranous, so that the marginal part easily becomes

folded. The dorsal surface of this last segment sometimes with tolerably distinct, sometimes with very faint median keel, and else almost all over finely and densely pock-marked by exceedingly numerous and very small depressions. (This structure is not clearly defined on the copperplate, as the depressions are far more numerous than in the figure, and the intervals form a kind of irregular reticular work.)

*Uropods.* They have a very depressed peduncle and thin rami; the outer ramus is oblong-ovate, distally rounded; the inner ramus is considerably longer than the outer, with sub-acute end.

*Color.* In the six larger specimens the head, the thorax, the five short abdominal segments, and the basal part of the sixth segment, are yellowish with innumerable dark dots; the epimera of the three, and especially of the two, posterior thoracic segments, and the lateral angles of the five anterior abdominal segments are white; almost the whole last abdominal segment is grayish. In the smallest specimen the dorsal surface is darker, more grayish, with exception of the two last pairs of thoracic epimera and the angles of the five anterior abdominal segments, which are white.

*Size.* The largest specimen is 20.5 mm. long, and 10.5 mm. broad; the smallest is 14.5 mm. long, and 8.2 mm. broad.

*Habitat.* Station 3355 (Lat.  $7^{\circ} 12' 20''$  N., Long.  $80^{\circ} 55'$  W.), 182 fathoms, 2 specimens; Station 3389 (Lat.  $7^{\circ} 16' 45''$  N., Long.  $79^{\circ} 56' 30''$  W.), 210 fathoms, 4 specimens; Station 3391 (Lat.  $7^{\circ} 33' 40''$  N., Long.  $79^{\circ} 43' 20''$  W.), 153 fathoms, 1 specimen. On the labels I do not find any mention of the name or names of the fishes on which the parasites must have been found.

*Remarks.* The species seems to be well distinguished, especially by the pock-marked surface of the last abdominal segment. No males were found. In the marsupium of one female I found "pullus stadii primi" of Schiödte and Meinert; in Figure 4a a leg of the second pair, and in Figure 4b the posterior abdominal segments and the uropods of one of the specimens are shown. This may be sufficient, as the young one in this stage is very similar to those of the genus *Livoneca* drawn by Schiödte. Unfortunately, the "pullus stadii secundi," always much more interesting, was not found.

## EPICARIDEA.

As to the division of this very rich and highly interesting family into sub-families the reader is referred to my above mentioned treatise on the Isopoda of the Plankton Expedition. Of the four sub-families admitted (the very doubtful *Microniscinae* not included) only one, viz. the Bopyrinae, is represented in the collection. Of the five species secured both female and male — but no young ones — are present of the four species, while the fifth species is represented only by a male and a small portion of a female.

It is a rather unpleasant task to describe a few new forms of the Bopyrinae. Most of the authors who have contributed to the knowledge of the group

possessed very few species, and often even very few specimens, and the animals being not very easy to examine, and still less to describe and draw, the result is that most of the species are imperfectly represented, and many of the genera badly or not at all limited. Giard and Bonnier have given full descriptions of a few species only, as their principal work on this sub-family has not yet been published. They have made an attempt to divide the Bopyrinae into three groups, Phyxians, Bopyriens, and Ioniens; but I am unable to perceive the limits between the two first named groups, and even the group Ioniens is not very sharply defined. We must wait until a number of still unknown forms have been thoroughly studied and many of the already established species re-examined before it will be possible to divide the sub-family into natural groups. I must add, however, that the few descriptions just mentioned of the two authors have been very useful to me. In 1893, T. R. R. Stebbing, in his well known work, "A History of Crustacea — Recent Malacostraca," gave a very good catalogue of all the twenty-one genera and almost all the species hitherto established.

I must confess that I have been unable to refer more than one of my five new species to any of the genera hitherto established, and as they are very different from one another it is necessary to institute four new genera, — a result with which I am rather dissatisfied, not being sure that they all will prove to be valid. On account of the present state of things, I do not venture to lay down diagnoses of the new genera; but I hope that by means of my rather numerous figures and tolerably full descriptions it will be easy not only to recognize my species, but also to place the genera properly and work out the diagnoses, when in the future we get a real systematic arrangement.

#### 10. *Cryptione elongata*, n. gen., n. sp.

Plate III. Fig. 5-5 a; Plate IV. Fig. 1-1 g.

A fine female with its male (Fig. 1 a, m) was discovered.

##### a. *Female.*

The body is elongate (Fig. 1) and (the uropods not included) about twice as long as broad; the greatest breadth at about the middle.

*Head.* It forms, when seen from above (Fig. 1), almost a regular transverse oval, with the anterior half projecting in advance of the antero-lateral part of the thorax and the frontal margin considerably and evenly curved; the dorsal surface somewhat convex, with a depression a little inside of the anterior margin. The antennulæ (Fig. 1 b, a) rather distant from each other, of medium size, 3-jointed; the basal joint is considerably enlarged, the terminal joint minute. The antennæ (b) rather long, 3-jointed; the basal joint very large, ovate, with the second joint proceeding from the extero-anterior part; the second joint relatively rather long and robust (compare the following forms), the third somewhat shorter and considerably more slender. A frontal plate is absent, and between the antennulæ, the antennæ, and the labrum is found a rather large

free space. The labrum (*c*) is tolerably small, a little broader than the hypopharynx, the posterior margin emarginate. The hypopharynx (*h*) with the lateral margins sub-parallel. Mandibles (*d*), maxillulae (*e*), and maxillae (*f*) scarcely need special mention, their general shape and position being easily seen in Fig. 1 *b*. In this figure the place of attachment of the maxillipeds is lettered with *g*. The left maxilliped, seen from below, is shown in Figure 1 *c*; the first joint (1) with its usual free posterior dilatation, the second joint (2) with the exterior dilatation (*d*<sup>2</sup>) which is of secondary origin — as in the females of the family Cymothoidae — and cannot be considered as an exopod; the palp (*p*) is longer than in the following forms, but not distinctly jointed. The peculiar border behind the attachment of the maxillipeds is well developed, having on each side two oblique, good-sized rather broad, but not long, somewhat fleshy, lamellar processes (Fig. 1 *b*, *l*).

*Thorax.* On the four anterior segments the ovarian bosses are well developed, occupying but a little more than half the length of the sub-marginal part of each segment; in the other segments the bosses are wanting. The pleural plates ("lames pleurales" of Giard and Bonnier) of the four anterior segments are interesting: each of them is divided by a deep incision into two portions, the anterior of which is oblong, set off by a furrow and especially on the right side of the animal incised or emarginate exteriorly, while the posterior forms a shorter, rounded, not defined lobe. In the three posterior segments the pleural plates are larger and laterally more prominent, but neither divided nor set off. The ventral side of the two posterior segments is elevated and divided by numerous longitudinal ridges into low fleshy lamellae; the other segments possess a similar, but more narrow, transverse keel divided into small protuberances. The legs are normal, each sitting on an eminence which often is rather prominent (its appearance on the left side of the figure conveys the impression that the leg has a short basal joint, which of course is not the case); the second joint (basipodite, Giard and Bonnier, the basal joint being fused with the segment) not expanded; the claw is present, and none of the joints with keels or rugosities. The first left leg with its marsupial plate is exhibited in Figure 1 *d*, which, better than a long description, will show the differences between the plate in this and in the following forms; the transverse furrow on its exterior side is plainly seen, and on the inner side is found a transverse keel, the proximal part of which is divided into a few lamellae. The margins of the marsupial plates are more or less hairy; on the anterior margins of all plates the hairs are fewer and rather rudimentary, while especially the inner and posterior margin of the two posterior pairs of plates is densely set with rather short hairs (omitted in Fig. 1 *a*). (The marsupium was empty.)

*Abdomen.* The segments are distinctly separated on the dorsal side. The five anterior segments, all comparatively broad, on each side produced as good-sized free plates, which mostly are cut off in a more or less oblique direction; on the left side all these pleural plates are bent obliquely upwards. The ventral side of these segments shows a similar but less regular division into low lamellae as that of the posterior thoracic segments. The pleopods of medium size, each

with two subequal rami, the basal part of which is thicker, somewhat fleshy, the distal part more lamellar; some of the rami are oblong-triangular and distally almost produced, others are distally broader and rounded; almost the whole, or at least the major basal part of the ventral surface of all rami is furnished with conspicuous rounded knots, some of which plainly show that this structure is a rudimentary ramification; the pleopods decrease somewhat in size from before backward. Each uropod (Fig. 1) is an oblong, glabrous lamella, which is as large as, or a little larger than, a ramus of the first pleopod.

*Size.* From the front to the apex of the longest uropod the specimen is 13 mm., and to the end of the last abdominal segment 11.2 mm.; it is 6.6 mm. broad.

b. *Male.*

The body is very elongate, about  $3\frac{1}{2}$  times longer than broad (Fig. 1e and 1f).

*Head.* It is completely fused with the first thoracic segment. The eyes are very small, light grayish, and scarcely visible when the animal is seen from above. The frontal part bends much downward and forms a high border, which covers the basal part of the antennulæ and the antennæ (Fig. 1g); the margin is rather slightly curved. The antennulæ tolerably short, 3-jointed; the basal joint longer and very much thicker than the second; the third joint very slender and rather short. The antennæ rather long, 8-jointed; the first joint a little longer and about twice as broad as the second, which is about as long as, and much thicker than, the third and especially the fourth; the four distal joints exceedingly small. The mouth conical and protruding, but it was utterly impossible to study its elements with any certainty without a dissection.

*Thorax.* The segments, when seen from above, with their lateral outline feebly rounded and the incisions between them short. Each segment with a median, rather high, basally very broad and distally rounded cone on the ventral side (Fig. 1f); this cone is smaller on the two first segments than on the others. A leg of the first pair is shown in Plate III. Figure 5, and the corresponding leg of the fifth pair in Figure 5a; the general shape and the armature of the fifth and the sixth joint — the first joint as usual fused with the thorax and consequently not drawn — are easily seen.

*Abdomen.* It occupies one third of the total length, and decreases posteriorly very little in breadth. The six segments are all well separated from each other. The five anterior segments with the lateral part almost triangular, when seen from above; each with a ventral cone as those in the thoracic segments, and, besides, each pleopod is developed as a protuberance of considerable size and directed obliquely inward and a little backward. The sixth segment relatively broad, on each side with a large, narrow conical, obtuse process, probably the uropod, originating from the side and directed somewhat outward and much backward; the posterior margin of the segment is angular.

*Size.* It is 4.1 mm. long to the apex of the uropods.

*Habitat.* The described pair were found in the branchial cavity of a specimen of *Nematocarcinus agassizii* Fax., from Station 3407 (Lat. 0° 4' S., Long. 90° 24' 30" W.), 885 fathoms. The swelling of the carapace is oblong, and not very high.

### 11. *Munidion princeps*, n. gen., n. sp.

Plate IV. Fig. 2-2e; Plate V. Fig. 1-1d.

Two females with their males were secured.

#### a. *Female.*

The body, when seen from above (Fig. 1), of an almost pyriform outline, and not quite  $1\frac{1}{2}$  times longer than broad (the uropods not included). One specimen has the right margin convex, — a "right" specimen; the other is a "left" specimen.

*Head.* It is much broader than long and encircled posteriorly and on the major part of its sides of the first thoracic segment; the dorsal surface is somewhat convex, and the frontal border tolerably broad and bent conspicuously upward; the anterior margin is slightly convex. The antennulæ (Plate IV. Fig. 2) separated by a frontal plate; they are of medium size, 13-jointed; the basal joint is comparatively large, the third extremely small. The antennæ are rather short, 3-jointed; the basal joint is long and exceedingly broad, almost triangular, with the expanded inner border overlapping the outer part of the mandibles and the lateral angle of the labrum, the produced anterior angle extends to the frontal plate and the second joint is inserted on the vertex of the triangle; the last named joint is short and slender, the third joint exceedingly small. The frontal plate is broadly triangular with obtuse vertex, completely occupying the small space between the foot of the antennulæ, the anterior angle of the antennæ, and the labrum. The labrum (c) scarcely of medium size, somewhat broader than the hemi-cylindrical hypopharynx. Hypopharynx, mandibles (d), maxillulæ, and maxillæ need no special mention. The left maxilliped is shown in Figure 2a; the most interesting character is that the palp has almost disappeared, as we see but a somewhat produced angle. The border behind the maxillipeds is very well developed, with a number of small protuberances, and having on each side two oblique slender processes, of which the inner is long, the outer very long.

*Thorax.* Ovarian bosses are developed on all segments; they are very prominent, most of them almost semi-globular (on the drawn specimens they are accidentally — caused by pressure — more or less depressed on the right side of the second to the fourth segment); in the three anterior segments they are large and gradually decrease in size backward, the two posterior pairs almost petiolated, the seventh pair small (in the small specimen the two posterior pairs are even reduced to prominent, distally not swelled processes). The bosses do not occupy the sub-lateral part of the segments to its whole length, only the larger

posterior portion, yet not extending to the posterior margin. The pleural plates are comparatively large, oblong, rounded, thus occupying the whole or at least most of the lateral margin; in the posterior segments they are broader and overlap each other considerably; their convex ventral side with numerous small tubercles and oblong knots. The three posterior segments on the ventral side with an interrupted row of very short fleshy keels; the other segments are not examined. The legs are robust; the second joint (Fig. 1 *b* and 1 *d*) on the outer side with a very high expansion, shaped as an oblique plate, which is about as high as long and somewhat shorter than the length of the joint; on both sides with irregular small protuberances; the other joints normal. In Figure 1 *b* is shown the first left leg with the marsupial plate; this plate shows on the under side a deep transverse furrow and more forward a group of low knots, on the upper side (Fig. 1 *c*) a kind of transverse keel, the marginal portion of which is divided into numerous irregular, small, thin-skinned processes. The basal part of the other four pairs of plates with numerous knots (Fig. 1 *a*). (The marsupium of both specimens with eggs.)

*Abdomen.* The five anterior segments with very large rounded pleural lamellæ, the anterior of which are somewhat transverse, the posterior oblong; the lamellæ cover the main part of one another, a large portion of the dorsal surface of the anterior segments, and the whole dorsal surface of the posterior ones. In Figure 1 the fifth pair of lamellæ are lettered *a*<sup>5</sup>. The second to the fifth segments on the ventral side each with a transverse row of short fleshy processes or knots, or lamellar keels; the first segment with an interrupted series of low lamellæ. The sixth segment (posteriorly behind the attachment of the uropods produced into an oblong, distally rounded and swelled, almost petiolated process. Each pair of pleopods consists of two large rami; in the anterior pairs these are shorter and rather broadly triangular, backwards they gradually become elongate. The uropods biramous, the rami similar to those of the last pleopods; in Figure 1 *a* the visible distal part of the rami on the left side of the figure are marked with 6, on the right side with 6<sup>1</sup>. The main part, or almost the whole, of both surfaces of the pleural lamellæ and of the pleopods and uropods is set with very low and irregular minute keels and more rounded protuberances, which are most developed on the anterior pleopods.

*Size.* The largest specimen — which has been taken as type for all the figures — is 14.2 mm. long to the end of the abdomen, 17.3 mm. long to the apex of the longest ramus of the uropods, and 10.9 mm. broad. The other specimen measures 15.6 mm. to the end of the uropods.

#### b. *Male.*

One specimen (Plate IV, Fig. 2 *b*) is symmetrical and undoubtedly normal; the other specimen (Fig. 2 *c*) is anomalous, not symmetrical, and somewhat misshapen, — especially the abdomen is conspicuously different. In the following the normal specimen is described, with some remarks concerning the other.



The body is considerably depressed and relatively broad, scarcely  $2\frac{1}{2}$  times longer than broad.

*Head.* Its dorsal surface almost flat, with irregular rugosities. The eyes are very small and dark. The frontal part bends feebly downwards; the anterior margin is considerably curved. The antennulæ (Plate IV. Fig. 2 *d*) are rather long, 3-jointed; the basal joint thick, the second longer than the first and comparatively thick, the third rather short and slender. The antennæ of medium length, 3-jointed; the basal joint of medium length and almost twice as broad as long, with the outer margin concave; the second joint is attached to the anterior half of the outer margin of the first joint; it is stout and twice as long as the basal one; the third joint is rather short and slender. The labrum of medium size, with the anterior margin very convex; its median part is covered by the hypopharynx, which extends forward to the middle of the basal joint of the antennulæ. The hypopharynx is long, not broad, and tapers somewhat towards the rounded apex. The mandibles and the maxillulæ are easily seen in the figure; a rounded protuberance behind each maxillula most probably represents the maxilla; maxillipeds I have not been able to discover.

*Thorax.* The fifth segment is the broadest, and from that the thorax decreases a little in breadth towards both ends. The segments, when seen from above, with the lateral outline much rounded, but the incisions between them are short. On the ventral side a median, very conspicuous cone on each segment. The legs subequal in structure; all are relatively short and very thick, but the fourth and fifth pairs are somewhat larger and still more clumsy than the first pair; Figure 2 *e* (on Plate IV.) represents the left leg of the first pair, and a description is scarcely needed.

*Abdomen.* It does not occupy one third of the length of the body, and anteriorly it is somewhat narrower than the last thoracic segment; it is triangular with rounded angles, a little longer than broad, and the lateral outline is somewhat sinuous, which shape indicates the segmentation. All segments are completely fused; vestiges of transverse sutures are scarcely discernible on the dorsal, but rather distinct on the ventral side.

*Size.* The specimen is 3.3 mm. long.

The misshaped male is exhibited in Figure 2 *c* (on Plate IV.). The outline of the thorax is somewhat irregular; the abdomen is very wry, with all the segments well separated on the dorsal surface, and the last segment having about the shape of an oblique square. The result of this deformity is, in my opinion, very interesting.

*Habitat.* The label states that the two females (with their males) were found in the branchial cavity of *Munida refulgens* Fax., from Station 3378 (Lat.  $3^{\circ} 58' 20''$  N., Long.  $81^{\circ} 36'$  W.), 112 fathoms.

12. *Pseudione galacanthæ*, n. sp.

Plate V. Fig. 2-24.

Five adult females and the same number of males have been transmitted. (Compare "Habitat.")

a. *Female.*

The body about  $1\frac{1}{2}$  times longer than broad.

*Head.* It is somewhat broader than long, fused with the considerably curved first thoracic segment and encircled forward to the antero-lateral angle, while its anterior margin is slightly curved; the frontal border is rather narrow and turned somewhat upwards; the dorsal surface is slightly convex. The antennulæ (Fig. 2*b*, *a*) are in contact anteriorly, posteriorly they are separated by a small, triangular frontal plate (*p*); they are of about medium size, 3-jointed; the basal joint is rather large, thick, the second shorter and more slender, the third very small, terminating in an exceedingly short bristle. The antennæ (*b*) are 4-jointed, rather short; the basal joint is very large, forming almost an oblique oval, yet the inner margin is almost straight, the outer very convex, and the second joint originates from its extero-anterior angle; the second and third joints are short and slender, the fourth very small, terminating in an exceedingly short bristle. The frontal plate is already mentioned. The labrum is very broad; the hypopharynx is oblong-triangular with rounded vertex. Mandibles (*d*), maxillulæ (*e*), and maxillæ (*f*) do not present any interesting peculiarities. The left maxilliped is shown in Figure 2*c*; the palp is very conspicuous, with some hairs, but not jointed. The border behind the maxillipeds is well developed, with numerous small, irregular protuberances, and only one pair of processes which are long and distally narrow.

*Thorax.* The four anterior segments with ovarian bosses, which are low, and occupy about two thirds of the lateral margin of each segment; the pleural plates which occupy the remaining one third of the margin, are short or narrow. The three posterior segments without bosses, but the pleural plates occupy the entire margin and are developed as lamellæ, increasing gradually in length and turning more backward from the fifth to the seventh segment; besides they are longer on the convex than on the other side of the animal. The legs are rather stout (Fig. 2*d* and Fig. 2*e*); the second joint about as broad as long, owing to the fact that on the whole outer side it is much expanded, with the outline almost semicircular; the fourth joint with a keel on the inner margin, and two short, knot-like keels are found on the same margin of the posterior, but disappear on the anterior pairs of legs. The first left leg, with its marsupial plate, is shown in Fig. 2*d*; the plate has on the lower side a broad and high transverse keel, and on the upper side a structure similar to that in *Munidion* (see above). Only the last segment on the ventral side with numerous small incisions and between these low fleshy projections; this structure is found both at the anterior and the posterior margin of the segment.

*Abdomen.* It occupies less than one third of the length of the animal, and the segments are well separated on the dorsal surface. The pleural plates are very large and lamellar, partly overlapping one another; in the first segment somewhat longer than those of the last thoracic segment, and then gradually increasing in length and turning more backward from the first to the fifth segment. The ventral side of the five anterior segments about as in the preceding species. Each pleopod with two triangular or ovate rami of medium size; the pleopods decrease somewhat in size from before backward, and the outer ramus is as a rule a little smaller than the inner one. Each uropod consists of one ramus (Fig. 2*b*) which is oblong-ovate and considerably smaller than the pleural plates of the fifth abdominal segment.

*Size.* The largest specimen is 10.4 mm. long to the apex of the sixth abdominal segment, 11.8 mm. to the end of the uropods, and 7.4 mm. broad. The smallest specimen — with eggs in the marsupium — is only 7 mm. long to the end of the abdomen, and 5.8 mm. broad.

b. *Male.*

The body is very elongate (Fig. 2*f*), between  $3\frac{1}{2}$  and 4 times longer than broad.

*Head.* The dorsal surface is convex, the antero-lateral margin much curved, and the anterior part of the head bends somewhat downward. Eyes could not be detected, but we find small frontal impressions, which vary very much in different specimens (in one specimen two pairs were found). The antennula (Fig. 2*g*) of medium length, 3-jointed; the basal joint thick and almost globular, the second shorter and much narrower than the first, the third minute. The antennæ of medium length, 5-jointed; the first joint thick and almost globular; the three following joints gradually a little shorter and much narrower; the apical joint minute. The labrum extremely broad, crescent-shaped. The hypopharynx reaches to the middle of the labrum; it is rather long, of medium breadth, tapering somewhat towards the rounded end. Mandibles, maxillulæ, and maxillæ (*f*) normal; the maxilliped (*g*) has the shape of a rather small oblong triangle.

*Thorax.* The fifth segment is the broadest, a little broader than the seventh, and considerably broader than the first segment. The lateral outline of the segments either rounded or (Fig. 2*f*) more straight with rounded angles; the incisions between the segments narrow, triangular, and very deep. The ventral surface without conical protuberances. The legs more slender than in the preceding form; from before backward to the fifth pair they increase a little in length and their hand in size, and from the fifth to the last pair at least the hand decreases somewhat in size. In Figure 2*h* is shown the left leg of the first pair, and in Figure 2*i* that of the seventh pair.

*Abdomen.* It occupies about two fifths of the total length of the animal, and decreases in breadth from before backward to the small square sixth segment. All segments are very movable; seen from above, their lateral portion in the large specimen is triangular with the lateral angles more or less acute,

in the small specimens less triangular and rounded laterally. In the anterior segments rudiments of pleopods are either scarcely discernible or visible as very low and broad rounded eminences.

*Size.* The largest specimen (Fig. 2 *f*) is 4.8 mm. long; a smaller specimen from which the three analytical figures have been drawn, is 3.5 mm. long; a small specimen is only 2.9 mm. long.

*Habitat.* The label indicates that the five adult females (with their males) were found in the branchial cavity of *Galacantha diomedee* var. *parvispina* Fax., from Station 3435 (Lat. 26° 48' 0" N., Long. 110° 45' 20" W.), 859 fathoms. In the Report on the Stalk-eyed Crustacea of the "Albatross" Expedition of 1891, W. Faxon writes (p. 81): "Seven specimens (5 males, 2 females) of var. *parvispina* house a Bopyrus in the left branchial chamber."

### 13. *Parargeia ornata*, n. gen., n. sp.

Plate VI. Fig. 1-14.

Only one female and its male are found.

#### a. *Female.*

The body is much distorted and scarcely  $1\frac{1}{2}$  times longer than broad.

*Head.* It is comparatively very broad, but otherwise of the same shape as in *Munidion* (*ante*, p. 115). The antennulæ (Fig. 1 *b*) separated by a frontal plate (*p*), of medium size, 3-jointed; the basal joint comparatively long and thick, the second short and narrow, the third exceedingly small. The antennæ (*b*) similar in shape to those of *Pseudione* (see above), but larger and 6-jointed; the basal joint very large, forming about an oblong oval, with both margins a little convex; the second joint is attached at the antero-exterior angle of the first, and is tolerably short and slender, yet longer and considerably thicker than the third; the three distal joints are exceedingly small. The frontal plate (*p*) rather large, about three times broader than long, anteriorly emarginate. The labrum exceedingly large, in the middle very short, but on each side forming a large oblique plate (*c*) which overlaps the distal part of the mandible and the maxillula, and the lateral part of the hypopharynx. This organ (*h*) is triangular and broader towards its base than in the preceding forms. The mandibles (*d*) extend in the middle with their acute tip beyond the end of the hypopharynx. Maxillulæ (*e*) and maxillæ (*f*) need no mention. The left maxilliped is shown in Figure 1 *c*; the palp consists of a prominent basal part and a small terminal joint. The border behind the maxillipeds well developed, with two pairs of long, oblique, distally slender processes.

*Thorax.* Ovarian bosses are found on the four anterior segments; they are oblong, considerably convex, and occupy from less to more than half of the sub-lateral portion of each segment. By a conspicuous or even deep furrow they are set off from the anterior part of the pleural plates, which lie outside or more beneath the bosses, are much arched, and look almost like "epimera" in

*Cymothoida*. The posterior portion of the lateral part of the segments mentioned is more or less protruding, rounded or angular, and must be considered as the posterior division of the pleural plate (compare *Cryptione*). On the three posterior segments the pleural plates are deeply incised, divided into a larger, broader, and more produced anterior part, and a much smaller, narrower, and less produced posterior one, which is more or less obsolete on the last segment. At least on the posterior segments the ventral side shows the usual low fleshy keels. The legs are slender; the second joint proximally on the outer side with a considerable rounded expansion, which is comparatively longer and broader on the anterior (Fig. 1 *d*) than on the posterior (Fig. 1 *e*) pairs; the other joints are normal. In Figure 1 *d* is shown the first leg with its unusually large marsupial plate; the transverse furrow is not deep; on the upper side the keel is tolerably high and much compressed, but without marginal processes. The marsupial plates do not quite reach each other at the middle; their natural position was somewhat disturbed in the specimen, and therefore it was necessary to make use of construction in Figure 1 *a*.

*Abdomen*. The segments distinctly separated at the middle on the flat dorsal surface. No pleural plates. The segments fleshy on the ventral side; only the first segment with slight furrows. The pleopods very curious, and rather similar to each other; each consists of two rami; the outer ramus is a very long, subrectangular or distally rounded, somewhat fleshy lamella, which is placed at the margin of the segment; the inner ramus is proportionally short, more or less ovate, fleshy, originating at some distance from the outer ramus, and on the left side of the animal it conveys the impression that the basal half is fused with the ventral side of the segment. (I am aware that another interpretation of the described facts could be advanced, namely, that the outer ramus is a pleural plate set off by a kind of articulation, and that the inner ramus in reality represents the entire pleopod, but this opinion I cannot share.) Each uropod consists of a single lamella of about the same shape and size as the nearest outer ramus of a pleopod.

*Size*. The specimen is 8.5 mm. long to the apex of the abdomen, 10.3 mm. long to the end of the uropods, and 7.2 mm. broad.

#### b. *Male*.

The shape of the body is interesting. It increases uniformly but rather slightly in breadth from the head to the last thoracic segment, and the abdomen is anteriorly somewhat broader than the preceding segment, triangular with rounded angles, somewhat broader than long, the anterior margin a little concave and the lateral margins convex. The body is a little more than  $2\frac{1}{2}$  times longer than the width of the abdomen.

*Head*. The dorsal surface is convex, the median part of the anterior outline almost straight. A pair of small spots or minute depressions perhaps represent the eyes. When the head is seen from below (Fig. 1 *g*), it is observed that the frontal border arises like a broad and rather high transverse keel above the attachment of antennulæ and antennæ. The antennulæ of medium length,

3-jointed; the basal joint thick, the second shorter and much narrower than the first, the third short and very slender. The antennæ rather short, 7-jointed; the first joint very thick, the second of about the same length but somewhat more slender, the third somewhat shorter and more slender than the second, the fourth rather short and very slender; the three distal joints exceedingly small. The mouth forms a basally broad, somewhat protruding oblique cone, but without a dissection I was not able to recognize several of the parts with any certainty; the figure will show what I believed I saw.

*Thorax.* The segments much arched on the dorsal side, the incisions between them of medium length, and most of them very narrow; their lateral margin is, when seen from the side, much more rounded than if seen from above. No ventral cones. The legs increase somewhat in length from before backward, but at the same time their hand decreases in size from the first (Fig. 1 *h*) to the seventh (Fig. 1 *i*) pair, and besides alters conspicuously in shape.

*Abdomen.* It occupies somewhat more than one fourth of the length of the animal; its outline is described above. All segments are completely fused, so that only some transverse, partly very indistinct furrows, but no sutures, are found on the dorsal surface. About half way between the median line and the lateral margin the dorsal surface presents a broad longitudinal depression, and in the median line a little behind the anterior margin a prominent knot. The ventral surface does not seem to be quite normal, but the following characters certainly are of importance: no rudiments of pleopods are to be discovered, but in the median line are found three protuberances: the first small, the second rather large, the third shaped as a short transverse keel.

*Size.* The specimen is 4.1 mm. long.

*Habitat.* In the branchial cavity of *Sclerocrangon procax* Fax., from Station 3418 (Lat. 16° 33' N., Long. 99° 52' 30" W.), 660 fathoms, 1 female with a male.

#### 14. *Bathygge grandis*, n. gen., n. sp.

Plate VI. Fig. 2-2 *c*.

Only a male, and the posterior part of a female have been sent to me.

##### a. *Female.*

The rudiment consists of the posterior part of the thorax, bearing three legs on one and two on the other side, and the abdomen.

*Thorax.* The pleural plates are very large oval lamellæ, only connected with the segment by somewhat less than the posterior half of their interior margin, and this result is due to the fact that they anteriorly are very much produced, highly overlapping each other, and posteriorly rather shortly produced. The legs are tolerably slender; the second joint not expanded; the fifth joint elongate, in the last pair as long as the hand.

*Abdomen.* It is turned to the left in a startling degree, and is proportionally small, — perhaps very small. The dorsal surface is soft-skinned, the segments

more or less distinctly separated. Pleural plates not developed. The pleopods quite soft, of medium size, decreasing conspicuously in size from before backward and attached to the lateral margin; each pleopod consists of a short peduncle and two lamellar oblong rami; the outer ramus much larger than the inner one. The uropods biramous; the outer ramus a little smaller than the outer of the fifth pleopod, the inner ramus very short, almost rudimentary. The pleopods are curled to such a degree that it would have been impossible without much construction to draw a sketch of the abdomen.

b. *Male.*

The body is a little more than three times longer than broad, and from the fourth thoracic segment it decreases in breadth towards both ends (Fig. 2).

*Head.* The dorsal surface rather convex; the median portion of the anterior margin almost straight. No eyes. The frontal border bent slightly downwards (Fig. 2 a). The antennulæ rather short, 3-jointed; the basal joint tolerably thick, and partly overlapped by the rostrum; the second joint slender and rather short, the third very small. The antennæ comparatively long, 7-jointed; the four proximal joints of about the same length, but decreasing much in breadth from the rather thick basal joint to the fourth one; the fifth joint is short and very slender, the two last joints exceedingly small. The mouth forms a rostrum which, when seen from below, is triangular, considerably depressed and directed forward, reaching almost to the frontal margin of the head. The hypopharynx is very large, and just outside it is seen the very oblong lateral part of the labrum (*d*), the median part of which is concealed by the hypopharynx; at first I believed that these oblong organs were the mandibles, but a closer examination gave the result mentioned, while the mandibles, being needles with brown apex, were discovered within the rostrum. Maxillulæ are not observed; the maxillæ (*f*) are small semicircular lobes lying considerably behind the posterior edge of the labrum. The maxillipeds (*g*) are short, extremely slender, almost styliform.

*Thorax.* The segments are rather convex, the incisions between them comparatively broad and very deep; the lateral margins are much curved when seen from the side. The legs increase considerably in length, and very much in thickness, from the first (Fig. 2 b) to the fifth pair (Fig. 2 c) which is robust, with the hand very large; the two posterior pairs again decrease somewhat in size. The terminal margin of the hand is deeply concave, thus differing considerably from the preceding forms.

*Abdomen.* It occupies scarcely one fourth of the length of the animal; it is narrower than the last thoracic segment, shortly ovate in outline, without the slightest rudiment of segmentation or abdominal feet; both the ventral and especially the dorsal surface are very convex.

*Size.* Uncommonly large, being 7 mm. long, and 2.3 mm. broad.

*Habitat.* The branchial cavity of *Glyphocrangon spinulosa* Fax., from Station 3424 (Lat. 21° 15' N., Long. 106° 23' W.), 676 fathoms, 1 female with its male.

*Remarks.* The species is established essentially on the very large male, the mouth parts of which are very different from those of other forms known to me. I hope that it will prove to be rather easy to recognize the form, but I hesitated to establish the new genus, the knowledge of the female being very incomplete. However, I found it impossible to refer the species to any of the genera hitherto published.

#### ONISCIDÆ.

##### 15. *Porcellio lævis* Latr. (1804).

I will only refer to the account in G. Budde-Lund's *Crustacea Isopoda Terrestria*, 1885, which is the principal work on the Oniscidæ; the author (pp. 138-140) describes the species, presents an enormous quantity of synonymy and references to earlier authors, and adds a very long list of localities for this almost cosmopolitan form.

*Habitat.* Chatham Island, Galapagos (March 29, 1891), four specimens (determined by G. Budde-Lund).

ZOOLOGICAL MUSEUM, COPENHAGEN,  
September 16, 1897.



## EXPLANATION OF THE PLATES.

## PLATE I.

1. *Eurycope pulchra*, n. sp.

- Fig. 1. Female seen from above,  $\times \frac{3}{2}$ . Of the antennulæ only the two proximal joints, of the antennæ only the four proximal joints are drawn; the thoracic legs omitted, with the exception of the basal joint of the four anterior pairs.
- Fig. 1a. Female seen from left side,  $\times \frac{3}{2}$ . Antennulæ and antennæ as in the preceding figure; the first thoracic leg is drawn, but of the six other pairs only the basal and the major part of the second joint are shown.
- Fig. 1b. Right mandible seen from below,  $\times 11$ .
- Fig. 1c. Left mandible seen from below,  $\times 11$ ; most of the palp omitted; *a*, cutting portion; *b*, molar process; *l*, lacinia mobilis; *m*, muscle (only the basal part); *p*, palp (proximal part).
- Fig. 1d. Left maxillula seen from below,  $\times 11$ ; 1, first joint; *l*<sup>1</sup>, lobe of the first joint; 2, second joint; 3, third joint; *l*<sup>3</sup>, lobe of the third joint.
- Fig. 1e. Left maxilla seen from below,  $\times 11$ ; 1, first joint; 2, second joint; *l*<sup>2</sup>, lobe of the second joint; 3, third joint; *l*<sup>3</sup>, lobes of the third joint.
- Fig. 1f. Left maxilliped seen from below,  $\times 11$ ; 1, first joint, *ep.* its epipod; 2, second joint; *h*, its coupling hooks; *l*<sup>2</sup>, lobe of the second joint; 7, seventh joint.
- Fig. 1g. First thoracic leg,  $\times \frac{3}{2}$ .
- Fig. 1h. Thoracic leg of fifth pair,  $\times \frac{3}{2}$ ; the natatory hairs omitted; 1, first joint; 2, second joint; 7, seventh joint. This and the preceding analytical figures are drawn from parts of a female.
- Fig. 1i. Abdomen of a male seen from below,  $\times \frac{11}{3}$ ; *a*, pleopod of first pair; *b*, pleopod of second pair; *c*, uropod; *d*, anal doors.

2. *Eurycope scabra*, n. sp.

- Fig. 2. Female seen from above,  $\times 2$ . The antennulæ completely wanting; of the antennæ the four proximal joints, and of the thoracic legs only the basal joint are seen. As to the correctness of the outline of thorax and abdomen, see the description.
- Fig. 2a. Left mandible seen from below,  $\times \frac{25}{3}$ .
- Fig. 2b. Left maxillula seen from below,  $\times \frac{25}{3}$ .
- Fig. 2c. Left maxilla seen from below,  $\times \frac{25}{3}$ .
- Fig. 2d. Left maxilliped seen from below,  $\times \frac{25}{2}$ .

## PLATE II.

1. *Eurycope scabra*, n. sp. (continued).

Fig. 1. First thoracic leg of female seen from the exterior side,  $\times 6$ .

2. *Aga maxima*, n. sp.

Fig. 2. Female without marsupium, natural size; the apex of the last abdominal segment was wanting.

Fig. 2 a. Right side of thorax of the same specimen showing the "epimera," etc., natural size.

Fig. 2 b. Left leg of the second pair of the same specimen seen from below, scarcely  $\times 3$ .

Fig. 2 c. Left leg of the fifth pair seen from below, scarcely  $\times 3$ .

3. *Aga acuminata*, n. sp.

Fig. 3. Head of female without marsupium, seen half from above and half from in front,  $\times 3$ .

Fig. 3 a. Right side of thorax and of the two anterior abdominal segments of the same specimen,  $\times 2$ .

Fig. 3 b. Posterior part of abdomen with the uropods of the same specimen, scarcely  $\times 3$ .

4. *Aga plebeia*, n. sp.

Fig. 4. Head and first thoracic segment of a good-sized female without marsupium, seen half from above and half from in front,  $\times \frac{3}{2}$ .

Fig. 4 a. Right side of thorax and of the two anterior abdominal segments of the same specimen,  $\times \frac{7}{4}$ .

Fig. 4 b. Left leg of second pair of the same specimen, seen from below,  $\times \frac{3}{2}$ .

Fig. 4 c. Left leg of fifth pair of the same specimen, seen from below,  $\times \frac{3}{2}$ .

Fig. 4 d. Posterior part of the abdomen with the uropods of the same specimen,  $\times \frac{3}{2}$ . The hairs and spines on the uropods and on the posterior margin of the last abdominal segment omitted.

5. *Aga longicornis*, n. sp.

Fig. 5. Female without marsupium,  $\times$  about  $\frac{3}{2}$ .

Fig. 5 a. Right side of thorax and of the two anterior abdominal segments of the same specimen,  $\times \frac{3}{2}$ .

Fig. 5 b. Posterior part of abdomen with the uropods of the same specimen,  $\times \frac{1}{2}$ .

## PLATE III.

1. *Aga longicornis*, n. sp. (continued).

Fig. 1. Left leg of second pair of the female exhibited in the preceding plate, seen from below,  $\times \frac{1}{2}$ .

Fig. 1 a. Left leg of fifth pair of the same female, seen from below,  $\times \frac{1}{2}$ .

2. *Rocinela laticauda*, n. sp.

- Fig. 2. Male (the largest specimen), natural size.  
 Fig. 2a. Head of female without marsupium, seen from below,  $\times 5$ .  
 Fig. 2b. Right side of thorax of the small immature female, scarcely  $\times 3$ .  
 Fig. 2c. Left leg of second pair of the larger immature female, seen from below, scarcely  $\times 4$ .  
 Fig. 2d. Left leg of fifth pair of the same female, seen from below, scarcely  $\times 4$ .  
 Fig. 2e. Last thoracic segment and abdomen of the small immature female, scarcely  $\times 3$ .

3. *Rocinela modesta*, n. sp.

- Fig. 3. Head of female with marsupium, seen from below,  $\times 6$ ; the flagella of the antennæ are broken off.  
 Fig. 3a. Left leg of second pair of the same female, seen from below,  $\times 1\frac{2}{3}$ .  
 Fig. 3b. Left leg of fifth pair of the same female, seen from below,  $\times 1\frac{2}{3}$ .  
 Fig. 3c. Last thoracic segment and abdomen of the same female,  $\times 3$ .

4. *Irona foveolata*, n. sp.

- Fig. 4. Female with marsupium,  $\times \frac{7}{4}$ .  
 Fig. 4a. Leg of second pair of "pullus stadii primi,"  $\times 22$ .  
 Fig. 4b. Posterior part of abdomen of "pullus stadii primi,"  $\times 22$ .

5. *Cryptione elongata*, n. gen., n. sp.

- Fig. 5. Leg of first pair of the male,  $\times 111$ .  
 Fig. 5a. Leg of fifth pair of the male,  $\times 111$ .

## PLATE IV.

1. *Cryptione elongata*, n. gen., n. sp. (continued).

- Fig. 1. Female seen from above,  $\times 1\frac{2}{3}$ .  
 Fig. 1a. Same female seen from below,  $\times 1\frac{2}{3}$ ; *m*, male; *mxp*, maxilliped; 1', rami of first pleopod on the left side (of the animal = right side of the figure); 2, rami of second pleopod on the right side; 4', rami of fourth pleopod on the left side; 5, rami of fifth pleopod on the right side; 5', rami of fifth pleopod on the left side; 6, uropods. The marginal hairs on the marsupial plates are omitted.  
 Fig. 1b. Head of the female seen from below and both maxillipeds omitted,  $\times 9$ ; *a*, antennula; *b*, antenna; *c*, labrum; *d*, mandible; *e*, maxillula; *f*, maxilla; *g*, place of attachment of the maxilliped; *h*, hypopharynx; *l*, lobes or processes from the border behind the maxillipeds.  
 Fig. 1c. Left maxilliped of the same female seen from below,  $\times 1\frac{2}{3}$ ; 1, first joint with its posterior expansion; 2, second joint; *d*<sup>2</sup>, dilatation on the outer side of the second joint; *p*, palp.  
 Fig. 1d. Left leg of first pair with its marsupial plate seen from below,  $\times 1\frac{2}{3}$ ; 2, second joint of the leg (the first joint being fused with the thorax).

- Fig. 1 *e*. Male seen from above,  $\times \frac{1}{2}$ .  
 Fig. 1 *f*. Same male seen from below,  $\times \frac{2}{3}$ .  
 Fig. 1 *g*. Head of the same male seen from below,  $\times 36$ .

2. *Munidion princeps*, n. gen., n. sp.

- Fig. 2. Anterior part of the head of the large female seen from below, scarcely  $\times 10$ ; *c*, labrum; *d*, mandible; *f*, maxilla.  
 Fig. 2 *a*. Left maxilliped of the large female, seen from below, scarcely  $\times 7$ .  
 Fig. 2 *b*. Normal male,  $\times \frac{2}{3}$ .  
 Fig. 2 *c*. Misshaped male,  $\times \frac{2}{3}$ .  
 Fig. 2 *d*. Head of the normal male, seen from below,  $\times 39$ .  
 Fig. 2 *e*. Left leg of first pair of the normal male,  $\times 44$ .

PLATE V.

1. *Munidion princeps*, n. gen., n. sp. (continued).

- Fig. 1. The large female seen from above, about  $\times \frac{1}{3}$ ; *a*<sup>5</sup>, pleural plates of the fifth abdominal segment.  
 Fig. 1 *a*. Same female seen from below, about  $\times \frac{1}{3}$ ; 1, rami of first pleopod on the right side (of the animal, left side of the figure); 1', rami of first pleopod on the left side; 4, rami of fourth pleopod on the right side; 5, rami of fifth pleopod on the right side; 5', rami of fifth pleopod on the left side; 6, rami of the right uropod; 6', rami of the left uropod.  
 Fig. 1 *b*. Left leg of first pair with its marsupial plate of the same female, seen from below, scarcely  $\times 7$ .  
 Fig. 1 *c*. Posterior part of the marsupial plate exhibited in the preceding figure, and seen from above,  $\times \frac{1}{3}$ .  
 Fig. 1 *d*. Left leg of sixth pair of the same female, scarcely  $\times 7$ .

2. *Pseudione galacantha*, n. sp.

- Fig. 2. Large female, seen from above,  $\times \frac{2}{3}$ ; 6, uropods.  
 Fig. 2 *a*. Same female seen from below,  $\times \frac{2}{3}$ ; 1', rami of first pleopod on the left side (of the animal); 4', rami of fourth pleopod on the left side; 5, rami of fifth pleopod on the right side; 5', rami of fifth pleopod on the left side; *a*<sup>5</sup>, pleural plates of fifth abdominal segment.  
 Fig. 2 *b*. Anterior part of the head of female, seen from below,  $\times 10$ ; *a*, antennula; *b*, antenna; *c*, labrum; *d*, mandible; *e*, maxillula; *f*, maxilla; *p*, frontal plate.  
 Fig. 2 *c*. Left maxilliped of female, seen from below,  $\times 10$ .  
 Fig. 2 *d*. Left leg of first pair with its marsupial plate, seen from below,  $\times 10$ .  
 Fig. 2 *e*. Left leg of sixth pair of female,  $\times 10$ .  
 Fig. 2 *f*. Largest male,  $\times 10$ .  
 Fig. 2 *g*. Head and a part of the first thoracic segment of a smaller male seen from below,  $\times 39$ ; *f*, maxilla; *g*, maxilliped.  
 Fig. 2 *h*. Left leg of first pair of the last named male,  $\times 47$ .  
 Fig. 2 *i*. Left leg of seventh pair of the same male,  $\times 47$ .

## PLATE VI

1. *Parargeia ornata*, n. gen., n. sp.

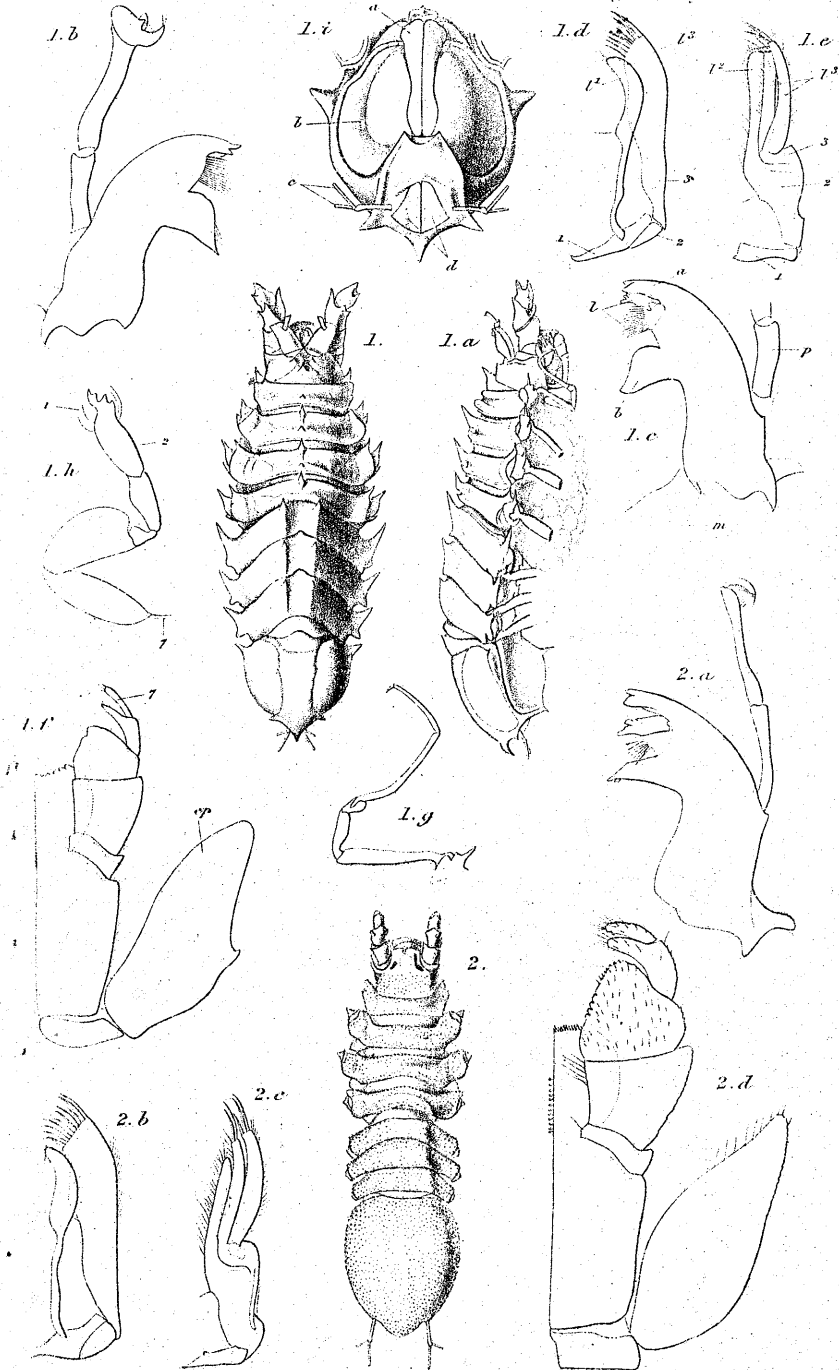
- Fig. 1. Female seen from above, about  $\times \frac{2}{3}$ .  
 Fig. 1 a. Same female seen from below, about  $\times \frac{2}{3}$ ; as to the marsupial plates see the description of the species.  
 Fig. 1 b. Anterior part of the head of the same female seen from below,  $\times 13$ ; *b*, antenna; *c*, labrum; *d*, mandible; *e*, maxillula; *f*, maxilla; *h*, hypopharynx; *p*, frontal plate.  
 Fig. 1 c. Left maxilliped of the same female seen from below, scarcely  $\times 10$ .  
 Fig. 1 d. Left leg of first pair with its marsupial plate seen from below, scarcely  $\times 10$ .  
 Fig. 1 e. Left leg of seventh pair of the same female, scarcely  $\times 10$ .  
 Fig. 1 f. Male,  $\times \frac{2}{3}$ .  
 Fig. 1 g. Head of the same male seen from below,  $\times 39$ .  
 Fig. 1 h. Left leg of first pair of the same male,  $\times 46$ .  
 Fig. 1 i. Left leg of seventh pair of the same male,  $\times 46$ .

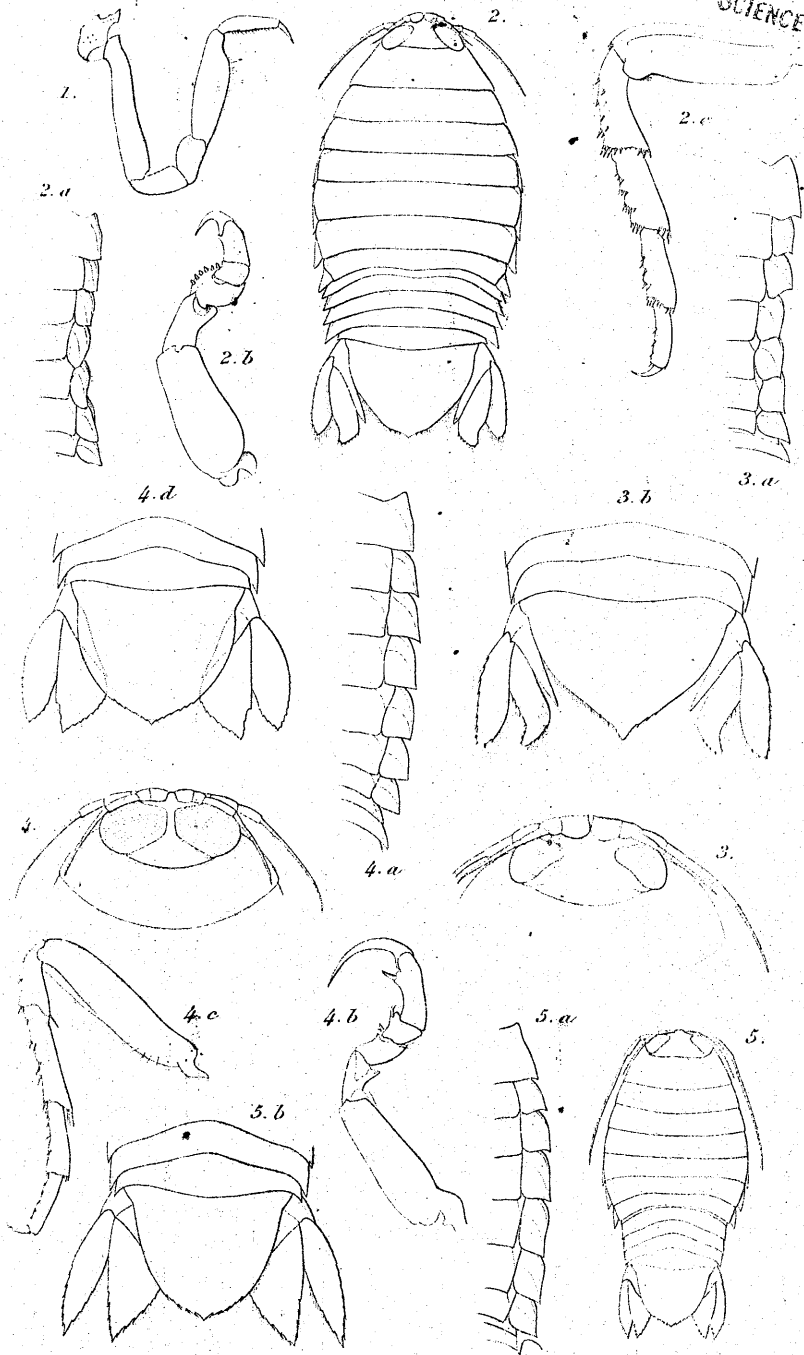
2. *Bathygyge grandis*, n. sp.

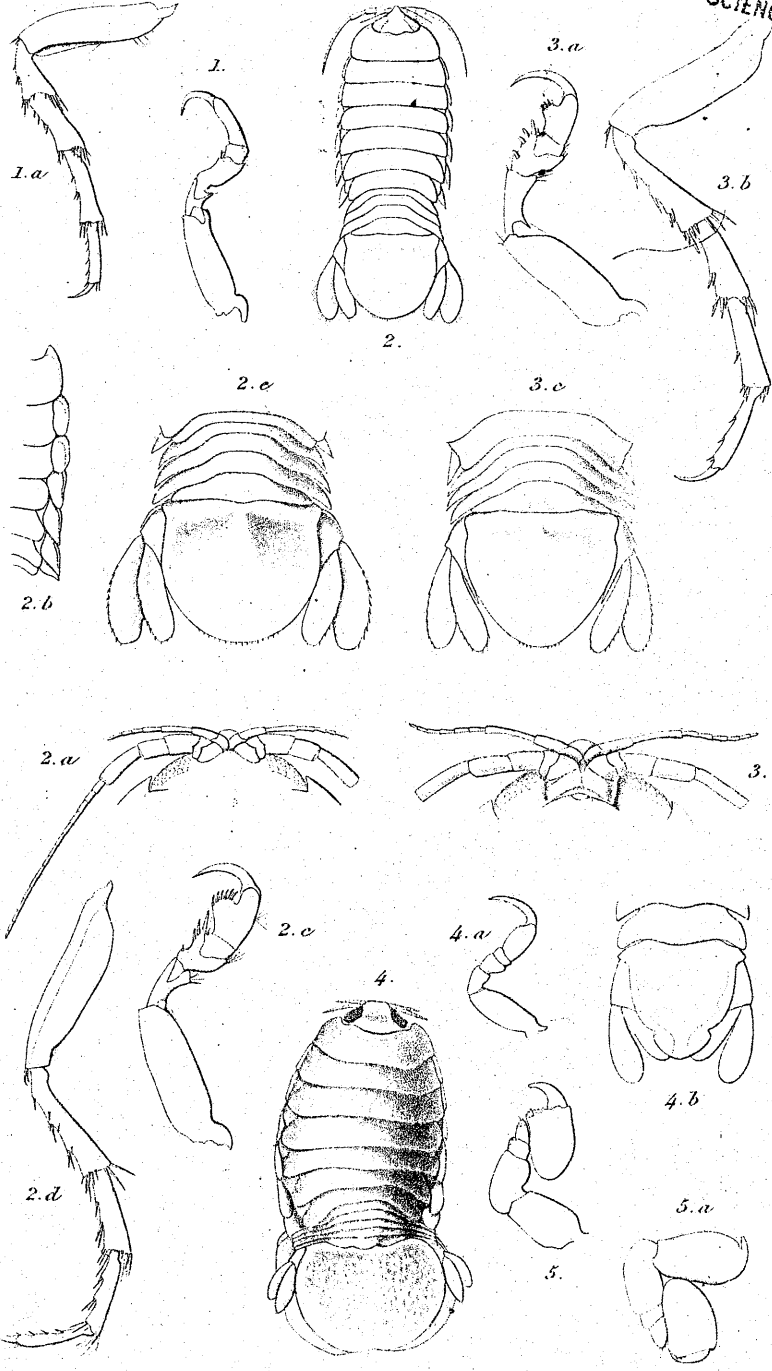
- Fig. 2. Male, scarcely  $\times \frac{1}{2}$ .  
 Fig. 2 a. Head of the male seen from below,  $\times 26$ ; *d* (by error instead of *c*), labrum; *f*, maxilla; *g*, maxilliped.  
 Fig. 2 b. Left leg of first pair of the male,  $\times 19$ .  
 Fig. 2 c. Left leg of fifth pair of the male,  $\times 19$ .

## PLATE VII.

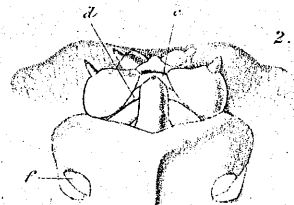
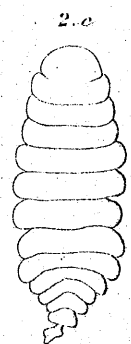
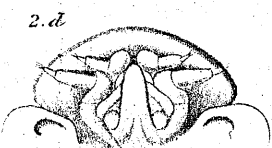
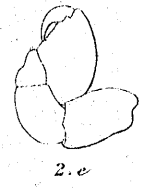
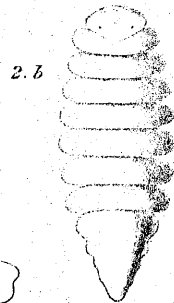
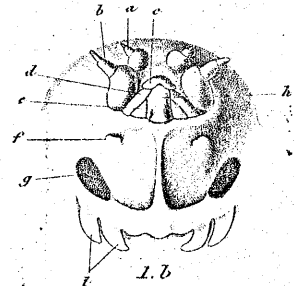
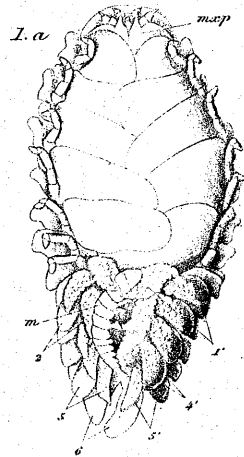
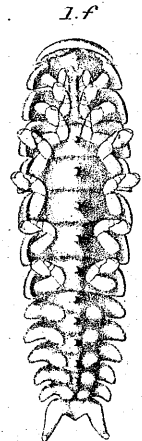
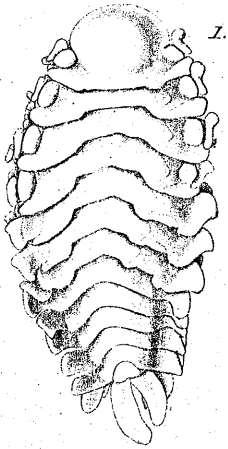
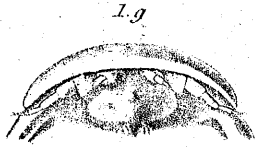
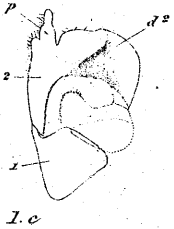
## ROUTE OF THE "ALBATROSS."

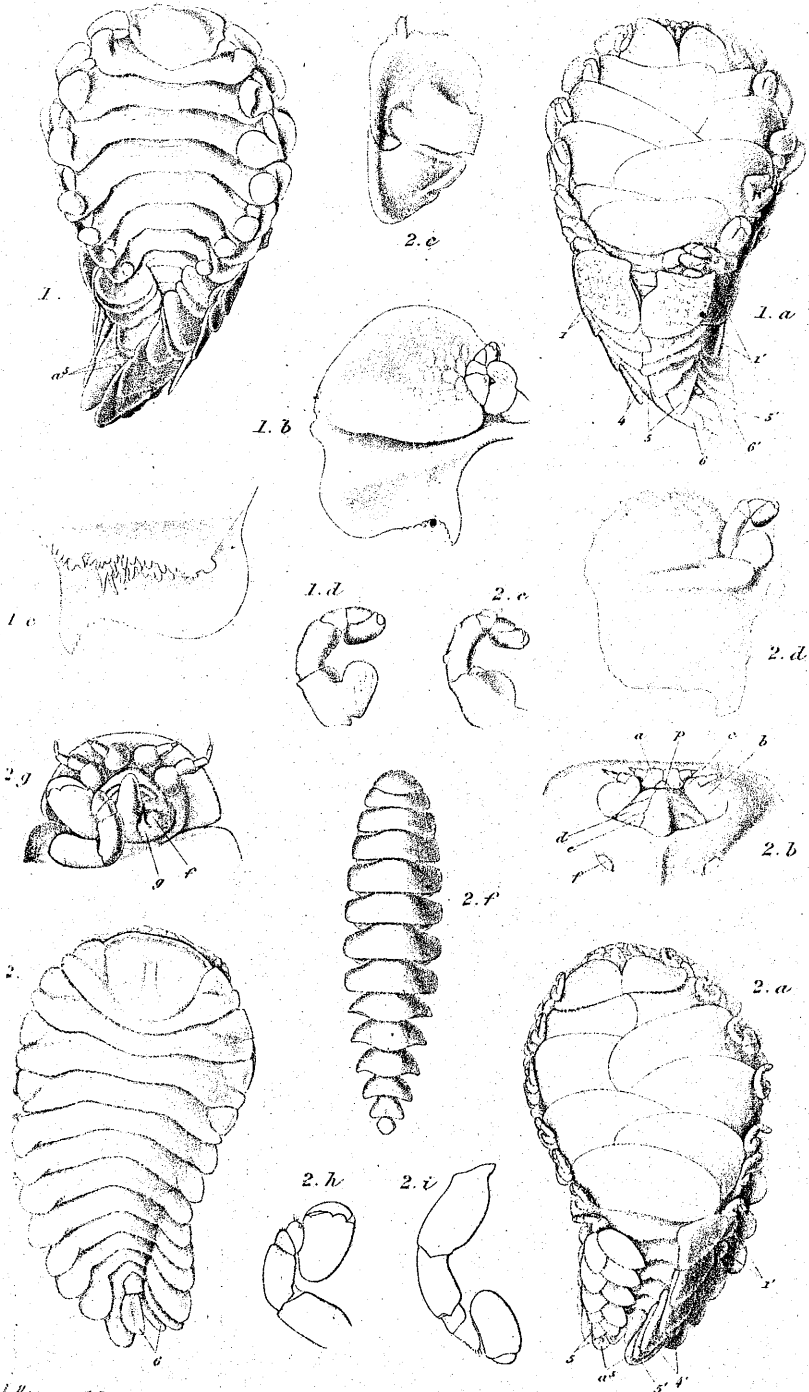


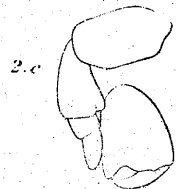
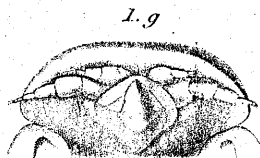
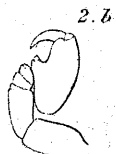
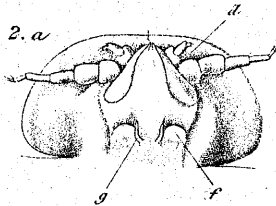
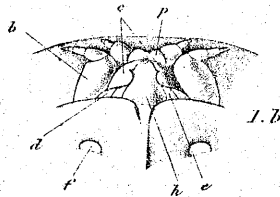
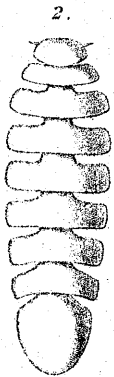
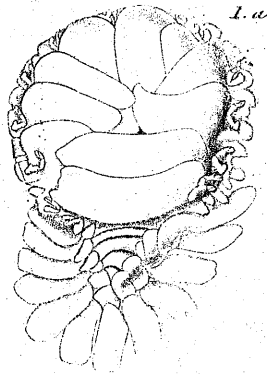
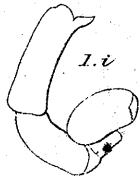
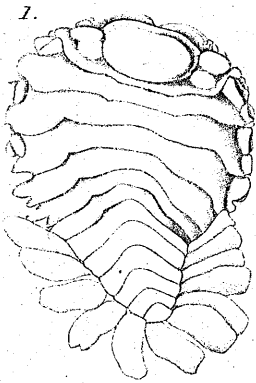
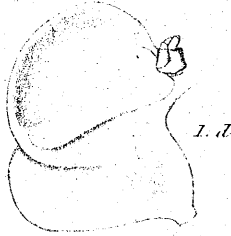
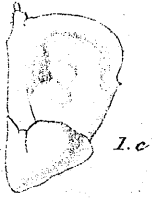


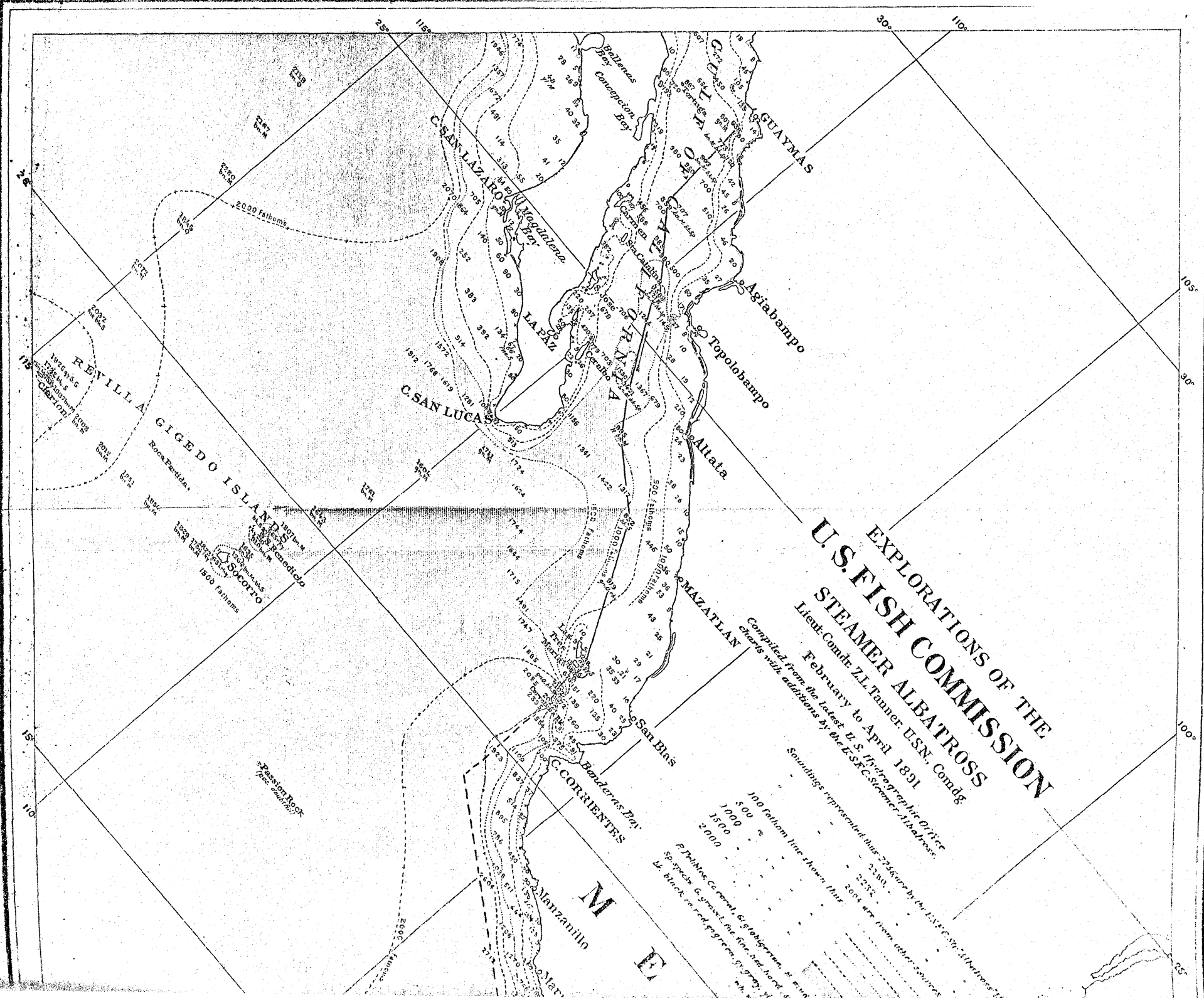












EXPLORATIONS OF THE  
**U.S. FISH COMMISSION**  
 STEAMER ALBATROSS  
 Lieut-Comdr. Z.I. Tanner, USN, Comdr.  
 February to April 1891

Compiled from the latest U.S. Hydrographic Office charts with additions by the U.S.S. Fish-Com. Albatross

Soundings represented thus: 256400 by the U.S.S. Fish-Com. Albatross  
 22100 -  
 22372 -  
 208 are from other sources

100 fathom line shown thus  
 500 -  
 1000 -  
 1500 -  
 2000 -

Plotted by Comdr. G. J. Robinson, U.S.N.  
 Checked by Comdr. R. C. Johnson, U.S.N.  
 Lt. Black, U.S.N., registered

Scale 1:50,000

**EXPLORATIONS OF THE  
U.S. FISH COMMISSION  
STEAMER ALBATROSS**

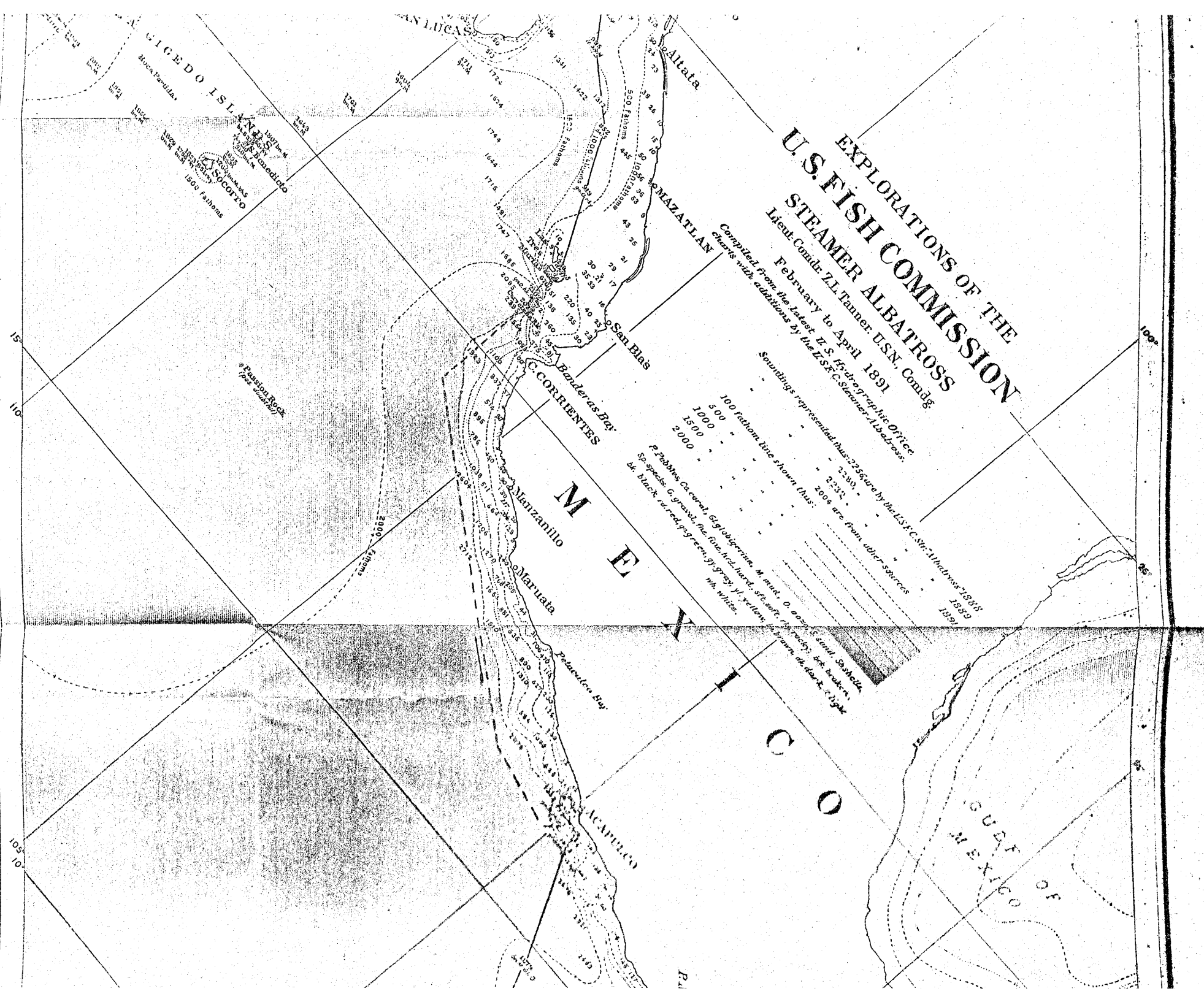
Lieut. Comdr. Z. L. Tanner, U.S.N., Comd'r.  
February to April 1891

Compiled from the latest U.S. Hydrographic Office charts with additions by the U.S.F.C. Steamer Albatross.

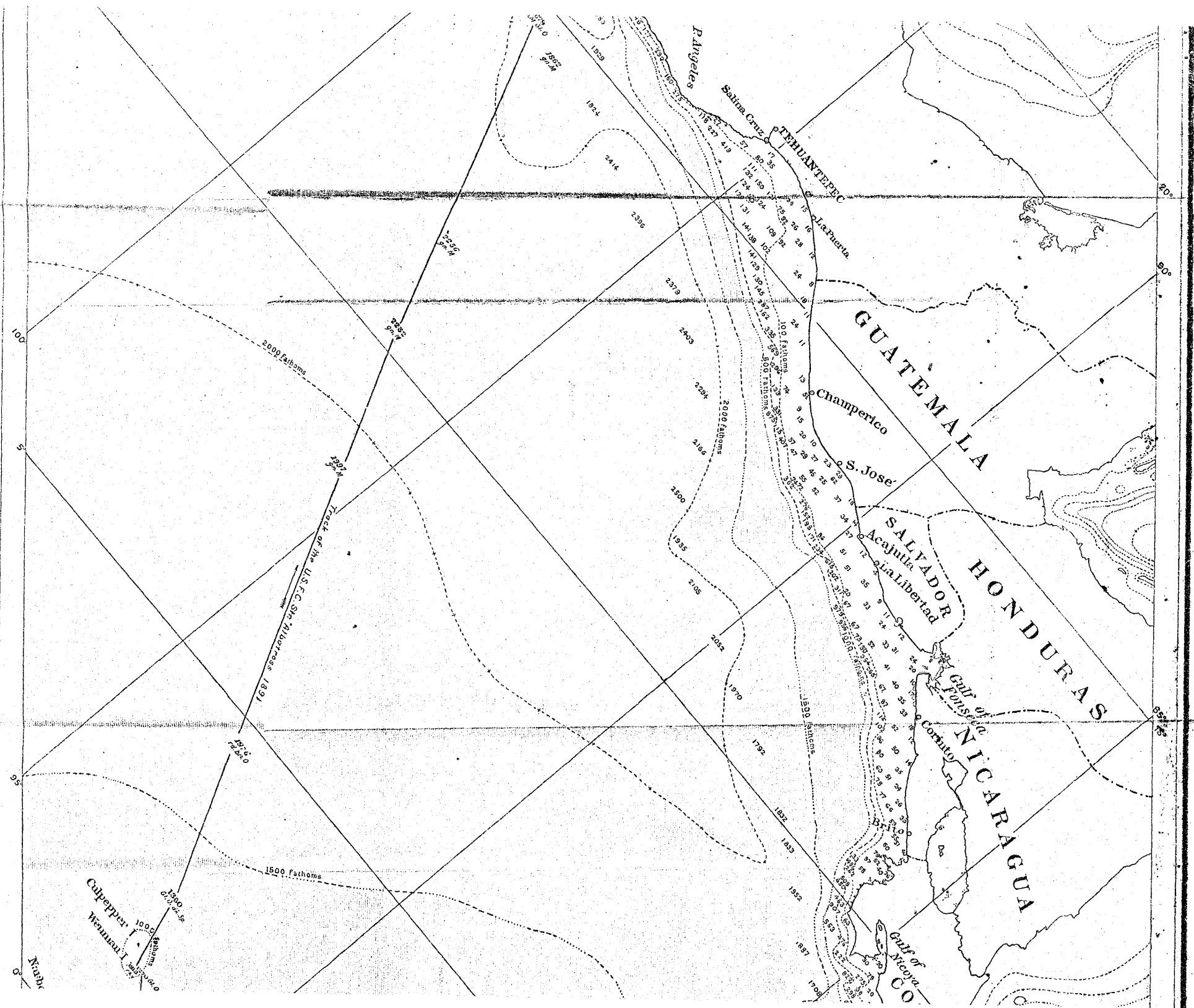
Sounding represented thus: 225649 by the U.S.F.C. Steamer Albatross 1891  
 " 2280 " 1889  
 " 2232 " 1891  
 " 200 are from other sources

100 fathom line shown thus:  
 500 " "  
 1000 " "  
 1500 " "  
 2000 " "

P. Pebbles; C. Coral; G. Globigerina; M. mud; O. oolite; S. sand; Sh. shells;  
 Sp. specks; G. gravel; Mr. fine; H. hard; S. soft; R. rocks; Bk. broken;  
 Bk. black; R. red; P. green; G. grey; V. yellow; W. brown; Wh. white.







100

5

95

90°

80°

85°

95°

Culpeper  
Wanman I.  
1000  
1500  
2000  
2500  
3000  
3500  
4000  
4500  
5000  
5500  
6000  
6500  
7000  
7500  
8000  
8500  
9000  
9500  
10000

1000  
1500  
2000  
2500  
3000  
3500  
4000  
4500  
5000  
5500  
6000  
6500  
7000  
7500  
8000  
8500  
9000  
9500  
10000

2000 fathoms

1891

1500

1500 fathoms

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

2000

P. Angeles

Salina Cruz

PEHUANTEPEC

La Puente

Champerico

S. Jose

SALVADOR

Acajutla

Libertad

HONDURAS

Gulf of Fonseca

COMUTO

NICARAGUA

Gulf of Nicoya

CO

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

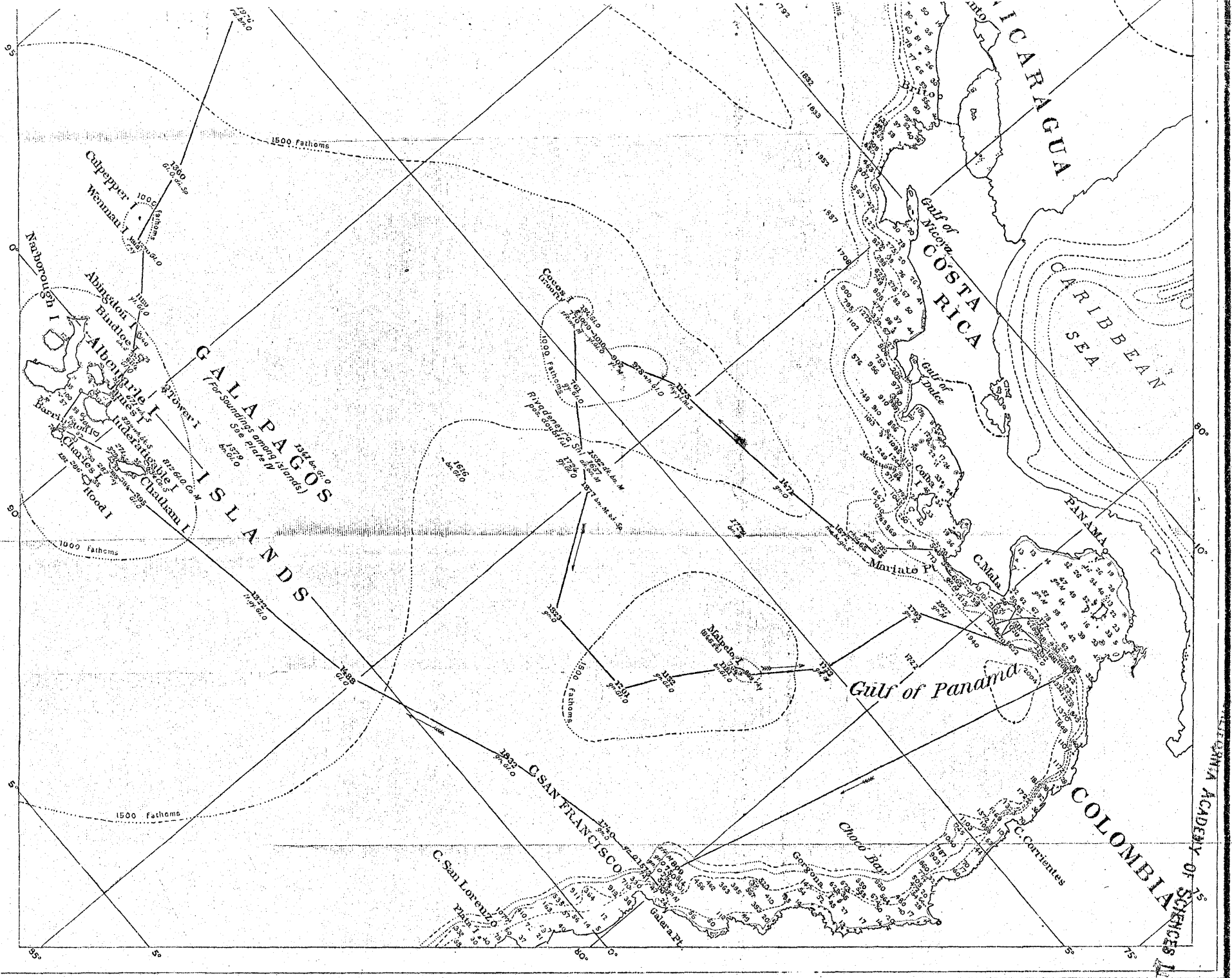
Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891

Track of the U.S.F.C. Sta. Alvarado 1891



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