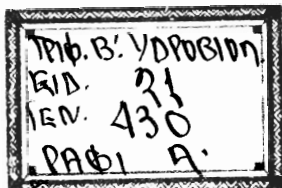


MINISTRY OF COMMERCE AND INDUSTRY, EGYPT

Hydrobiology and Fisheries Directorate



NOTES AND MEMOIRS No. 26

THE FISHERY GROUNDS NEAR ALEXANDRIA

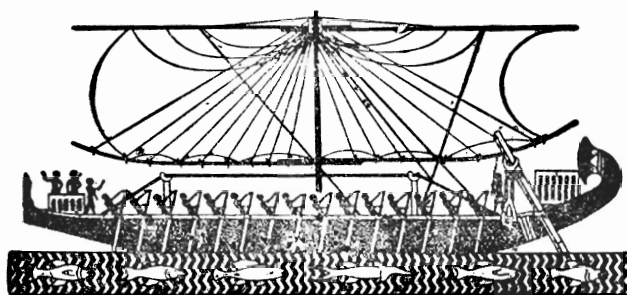
XVI.—CUMACEA, STOMATOPODA, LEPTOSTRACA

(with 16 Figures)

BY

ADOLF STEUER

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Biology, Rovigno d'Istria*



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1938

The Fishery Grounds near Alexandria

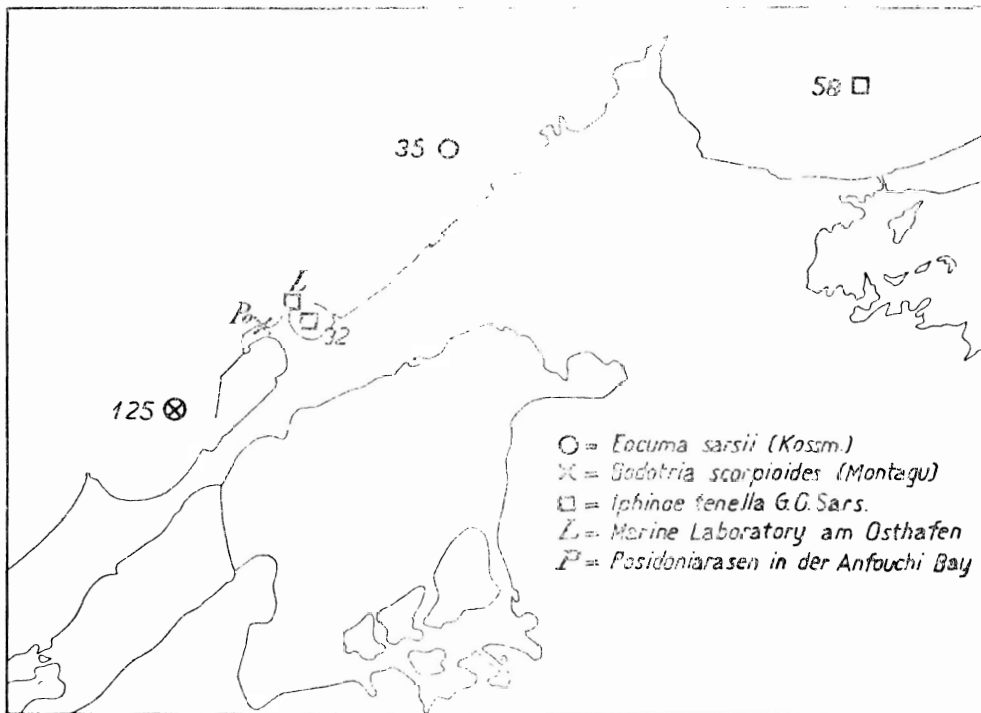
XVI.—Cumacea, Stomatopoda, Leptostraca

BY

ADOLF STEUER

I.—Cumacea

The only species of Cumacea known till now from the Egyptian coast of the Mediterranean is *Pseudocuma longicornis* (Spence Bate) belonging to the family *Pseudocumidae* and having been taken by the Cambridge-Expedition in the year 1924 in Port Said (CALMAN 1927, p. 400). Three more species have been found by me near Alexandria.



LIST OF LOCALITIES (Fig. 1).

Eastern Harbour.—Anchorage of El Hoot, the boat of the station, near the Marine Laboratory. September 2, 1933. Haul with Petersen's bottom sample (vide VATOVA 1935). Depth: more than 1 fathom. Bottom: sandy, with *Caulerpa*.

Note.—This work has appeared little shortened in: Not. Inst. Biolog. Rovigno (No. 21, 1936)

Iphinoe tenella G.O. Sars, 1 ♂ juv.

Eastern Harbour.—Stat. 32, September 27, 1933. Depth: 5½ fathoms. Bottom: coarse sand with stones and very little mud; Caulerpa.

Iphinoe tenella G.O. Sars, 3 ♂, 2 ♀, 2 ♂ juv., 2 ♀ juv.

Stat. 35.—October 7, 1933. Depth: 7 fath. Coarse sand with stones and seaweed (*Posidonia*) and algæ (*Caulerpa*, *Halimeda*, etc.), *Amphioxus*-ground.

Eocuma sarsii (Kossm.), 1 ♂.

Off the Barracks Ras el Tin, (Po), Anfouchi Bay.—October 10, 1933. In shallow coast water above Foraminifera-sand in *Posidonia* meadows taken with the plankton-net.

Bodotria scorpioides (Montagu), 1 ♀, 1 carapace, 3 juv.

Stat. 58.—October 28, 1933. Depth: 4 fath. Sandy ground with algæ (*Caulerpa*) and seaweed (*Cymodocea*).

Iphinoe tenella G.O. Sars, 2 ♀.

Stat. 125.—November 13, 1933. Depth: 6 fath. Coarse sand with stones and algæ, *Amphioxus*-ground.

Bodotria scorpioides (Montagu), 1 ♂, 1 ♀, 1 ♂ juv.

Eocuma sarsii (Kossm.), 1 ♀, 3 ♂ juv., 1 ♀ juv.

LIST OF SPECIES

(1) *Bodotria scorpioides* (Montagu). Figs. 2–5.

(Syn. *Cuma edwardsii* Goodsir).

1 ♂ (Length: 5 mm.), 2 ♀ (Length: 3 mm.), 4 juv. and one fragment (carapace).

FAGE (1929, p. 8) had noticed that the numerous ♂ which he had met at the French Mediterranean coast (near Banyuls-sur-mer) differed almost without exception from those described till then and also from

the atlantic forms from Concarneau examined by himself by the following characteristics : —

	Atlantic forms	Mediterr. forms
Carinae along the body	distinct	indistinct.
dorsal carina along the segments with limbs	distinct	indistinct or missing.
at the third maxilliped the process at the base (2) almost reaches the end of the merus (4)		it hardly surpasses the ischium (3).
at the third maxilliped the terminal claw is longer than the dactylus (7).		it is shorter.
at the first pereopod the inner margin of the base (2) is more angular.		it is less angular.
at the first pereopod the carpus (5) is much longer than the two preceding joints (3,4)		it is hardly as long as those.
at the first pereopod the carpus is almost as long as the propod (6) and dactylus (7) taken together.		it is shorter than those two.
at the uropods the base of the endopodite bears at the inner margin (usually 7) spines.		three spines only.
at the uropods the apical spine of the exopodite is $1\frac{1}{2}$ times longer than the apical spine of the endopodite.		it is not longer than that.

According to this FAGE seems inclined to separate the Mediterranean forms as a special race from the forma typica if Sars (1879) had not described the typical northern form from the Italian coast and given a figure of it. In any case the ♂ found in the western Mediterranean show distinct female characters of the "forma typica," e.g. in the number and size of the spines of the uropods.

Among the specimens from Alexandria the carinae along the carapace were most distinct at a ♀ from St. 125, hardly indicated however at a mature ♂ of the same station (Fig. 2). The third maxilliped is built like the "Mediterranean type," the terminal claw

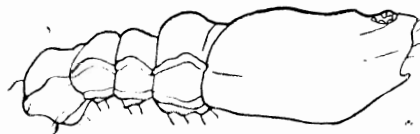


FIG. 2.—*Bodotria scorpioides* (Montagu) forma *mediterranea* ♂.
Carapace and thoracic segments. Side view.

however being strikingly large (Fig. 3*a*). The first pereopod too (Fig. 4*a*) resembled that of the Mediterranean form, only the outer margin of the first joint being somewhat concave. At the uropods as at the ♀ the rami are longer than half the stylus and the endopodite is very indistinctly two-jointed and has at the right uropod altogether 7 spines as at the figure given by Sars (1879, Pl. 3, Fig. 10), at the left one 6 only (northern type). The apical spine of the exopodite however is not longer than that of the endopodite which corresponds with the Mediterranean type (Fig. 5).

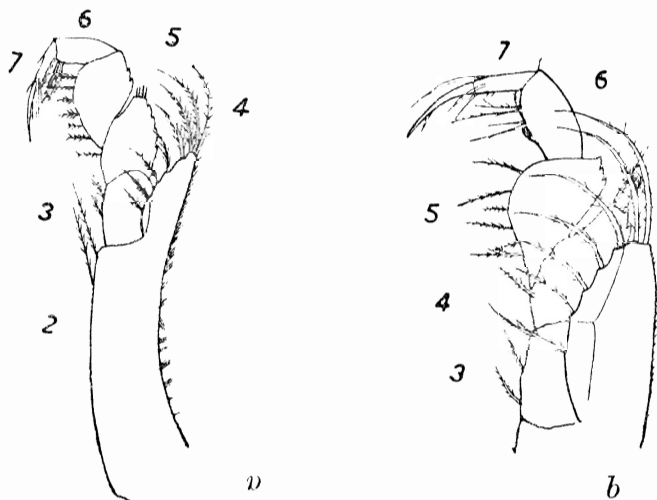


FIG. 3.—*Bodotria scorpioides* (Montagu) forma *mediterranea* 3rd maxilliped
a = ♂, b = ♀.

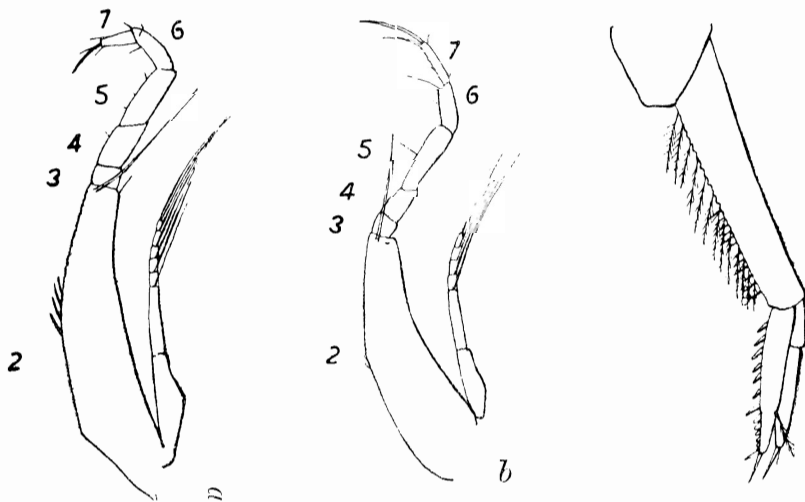


FIG. 4.—*Bodotria scorpioides* (Montagu) forma *mediterranea*, 1st pereopod.
a = ♂, b = ♀.

FIG. 5.—*Bodotria scorpioides* (Montagu) forma *mediterranea*,
♂, right uropod.

The ♀ from Alexandria resemble those of the "northern form." The process at the base of the third maxilliped does not reach (as at the ♂) the end of the merus (vide FAGE 1929 Pl. 1, Fig. 1) but ends a little lower already as SARS (1879 Taf. 2, Fig. 11) shows (Fig. 3b); at the first pereopod also at the ♀ the outer margin is not as much concave as at SARS' Fig. 12 (Fig. 4b).

On the variability of the species in the Mediterranean one can at present say the following only: The ♂ show in the utmost west (Gibraltar, Gulf of Lyon) according to FAGE almost without exception certain female characters while the inhabitants of the Italian coasts (according to SARS 1879) hardly differ from the atlantic forms. The only ♂ found in the utmost So near Alexandria shows in the main Mediterranean characters.

The species has however also been cited by GRAEFFE (1900, p. 30) for the Gulf of Triest as "häufigste Form, welche im Schlamm der Gruende von 7-14 Faden Tiefe leben" and I could also identify it a short time ago for the eastern bay of the Island St. Andrea (in a depth of 4-6 metres on sand and seaweed) near Rovigno. Among the animals which have been found in a glass in the collection of our institute at Rovigno (by mistake signed after the war as *Leucon mediterraneus* G.O. SARS) and were doubtlessly collected by GRAEFFE near Triest there were 7 ♂, all of them belonging to the "northern form," which fact of course supports the statement made by SARS. The species has however according to MAKAROFF (1929, p. 169) been fished "auch im Nordwestgebiet des Schwarzen Meeres" by DERSHAWIN (1925). As Mr. A. DERSHAWIN (March 20, 1936) had the kindness of telling me⁽¹⁾ the three ♂ from the western coast of the Caucasus which he examined according to my request belong to my astonishment to the Mediterranean race.

So we really have to distinguish in the Mediterranean-pontic area, as FAGE (1929) supposed two races, namely the forma typica or septentrionalis which till now had only been recorded from the Italian coasts (Tyrrenian and Jonic Sea and northern Adriatic) and a forma mediterranea, which till now had been found in the western and south-eastern Mediterranean and in the north-western Black Sea. In the North-Atlantic the northern race occurs at the French, English and Norwegian coasts up to Skudesnaess, in the North Sea, Skagerrak, Kattegat and in the Belt Sea in depths of 3-120 m. (STEBBING 1913 p. 26, ZIMMER 1933 (p. X g. 80). According to SARS (1879, p. 181) and FAGE (1933-1934 p. 163) it occurs on literal sandy bottom in 5-10 fathoms which corresponds with our findings.

⁽¹⁾ In this matter besides Mrs. E. GURLANOVA (Leningrad) and Mr. A. B. MARTYNOV (Moskow) had taken trouble; I repeat my heartiest thanks to them also in this place.

(2) *Eocuma sarsii* (Kossm.) Figs. 6-8.

1 ♂ (Length : 6 mm.), 1 ♀ (length : 5.5 mm.), 3 ♂ juv., 1 ♀ juv. The specimens from Alexandria do not quite correspond with the descriptions of CALMAN (1907 p. 120) and STEBBING (1913 p. 22) being here at my disposition. There is an uninterrupted waving line from each side of the pseudorostrum to the lateral cornua (Fig. 6); it forms

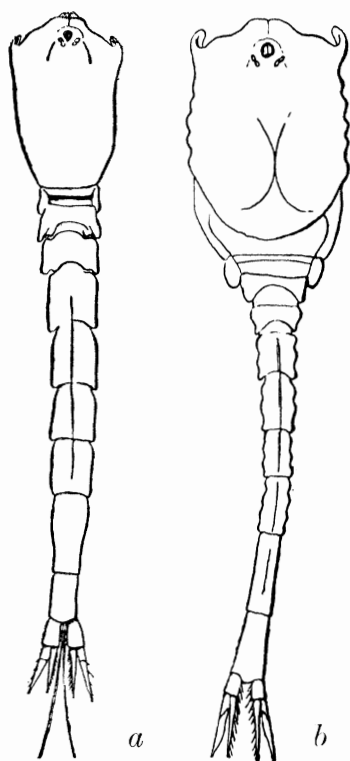


FIG 6.— *Eocuma sarsii* (Kossm.)
a = ♂, b = ♀.

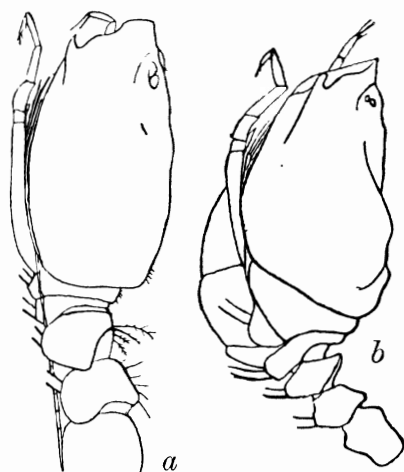


FIG. 7.— *Eocuma sarsii* (Kossm.) Carapace and the thoracic segments. Side view.
a = ♂, b = ♀.

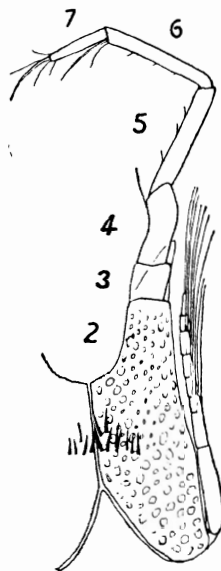


FIG. 8.— *Eocuma sarsii* (Kossm.) ♂
1st pereopod.

no protruding process (vide STEBBING 1913 p. 22, Fig. 14). The lateral cornua are not stretched out but bent inward at the top

The hind margin of the carapace has no median process. Only at the ♀ the carapace shows lateral elevations (Fig. 6b, 7b) which meet in the median line, and in dorsal and ventral view the side margins appear wavy (Fig. 6b). In both sexes the carapace and the rest of the body is scarred (fig. 8) and only the ♂ is dorsally near the last thoracic segments (Fig. 7a) hairy like the ♂ of *E. ferox* (P. Fisch.) drawn by Sars (1879 T. 9, Fig. 1). The eyes are parted in three and furnished as far as one can say without preparation with double lenses. The frontal lobe is slightly parted by a fissure. At the first pereopod (Fig. 8) the very sharply pointed process of the inner margin of the basipodite (=2nd joint) and the curved meropodite (=4th joint) are striking. At the dorsal plate of the peduncle of the uropod there are no oblique ridges and as to their size the animals better agree with the numbers given for *E. ferox* (P. Fisch.).

It is a pity that nothing seems to be known on the variability of *Eocuma sarsii* and that mature ♀ have been unknown till now. (FAGE 1928, p. 335). So further findings will have to decide whether the present Egyptian species is to be placed to *E. sarsii* or whether it is to be regarded as a separate, nearly related species. ⁽¹⁾

Eocuma sarsii (Kossm.) is known till now from the Indian ocean (Gulf of Manar), the Red Sea and from the Mediterranean from Cannes only. Here the species was fished in a depth of 27–36 m, in the Gulf of Manar in 13 m. Our findings are also in depths of 11–13 m. on Amphioxus-sand.

(3) *Iphinoe tenella* G.O. Sars.

2 ♂ (length : 7 mm.), 3 ♀ (length : 7–8 mm.), 3 ♂ juv., 4 ♀ juv.

In spite of the great variability by which according to FAGE (1933/34 p. 165) the species of the genus are distinguished, the adult specimens from Alexandria agreed well with the diagnosis given by STEBBING (1913, p. 47) for the species. At the inner margin of the first joint of the endopodite of the uropod the ♂ had a little more spines (9–10), the ♀ 5.

The species had for a long time been regarded as purely Mediterranean; it had been noted by Sars from La Goulette near Tunis, Syracuse, Naples and Spezia ⁽²⁾, as well as shortly by FAGE (1933–1934 p. 166) from Banyuls-sur-mer. It has however also been found by him in Concarneau and occurs according to him also in the Channel

⁽¹⁾ Colleague L. FAGE (Paris) had the kindness of giving me his opinion based on a sketch I had sent to him, that we have to do with *E. sarsii* or "une espèce très voisine de celle-ci." "Le pseudorostre tronqué, la sculpture du thorax et de l'abdomen, me paraissent caractéristiques, de même que la situation et la forme des cornes."

⁽²⁾ If one adds *I. serrata* G. O. Sars nec. Norman and *I. gracilis* G. O. Sars nec. Spence Bate (according to Fage p. 166) Messina is a further finding place.

and at the atlantic coast of Morocco. Like the two other Iphinoe-species of the Mediterranean (*trispinosa* (Goodsir) which however according to FAGE is only a synonym for *tenella* G.O. Sars, and *inermis* G.O. Sars) it lives in litoral, coarse or muddy sand which agrees well with the findings near Alexandria.

*
* *

All three Cumacea taken near Alexandria belong to the family Bodotriidae which according to ZIMMER (1933 p. X g. 108) are almost without exception inhabitants of sand as well as *Pseudocuma longicornis* ⁽¹⁾ recorded from Port Said by CALMAN (1927) which occurs in the northern seas also "im allerflachsten Wasser." The Bodotriidae mentioned above had also been taken in shallow coast water down to 7 fathoms.

II.—Stomatopoda

Up to now one single species, viz. *Squilla mantis* Rondelet (by others (Linné) ⁽²⁾ seems to have been known from the Egyptian coast of the Mediterranean. (H.M. FOX 1929 p. 857, note; MONOD 1931). Altogether the eastern Mediterranean is insufficiently investigated also concerning these animals. My list of findings, too, is scarce and might perhaps be more numerous if I had been able to fish with larger nets (trawl) in deeper water.

LIST OF LOCALITIES (Fig. 9) ⁽³⁾

Bay of Abukir.—Trawl. September 3, 1933.—Depth : 10 fath.
Muddy ground with algæ.

Squilla mantis Latreille, 2♀, 1♂ juv.

St. 74.—November 4, 1933. Depth : 23 fath. Muddy ground
with algæ.

⁽¹⁾ Calman (1927 p. 400) only gives Sars' findings "from Sicily"; it ought to be Syracuse and Messina. The finding from Tunis is missing.

⁽²⁾ According to Balss (in lit.) it would be more exact to say *S. mantis* Latreille. Monod, too, says so (1925). Later on (1931) he quotes as author's name *Rondeletius*. On this matter coll. Balss writes to me: "Zum ersten mal beschrieben wurde sie 1554 von *Rondeletius*, der aber als vorlinnéisch nicht als Autor angegeben werden kann. Linné selbst hat die *Squilla* des Mittelmeeres und Ostindiens (die *Rumphius* beschrieben hatte) als eine Art aufgefasst, scheint die Form nur nach der Literatur aufgeführt zu haben und hat sie möglicher Weise nie gesehen. Erst Latreille hat eine richtige Beschreibung mit Differentialdiagnose gegeben."

⁽³⁾ On the map (Fig. 9) there stands wrongly *Squilla africana* Calman.

Squilla mantis Latreille, 1 ♀ juv.

St. 75.—November 4, 1933, Depth : 25 fath. Sandy mud.

Squilla mantis Latreille, 1 ♀ juv.

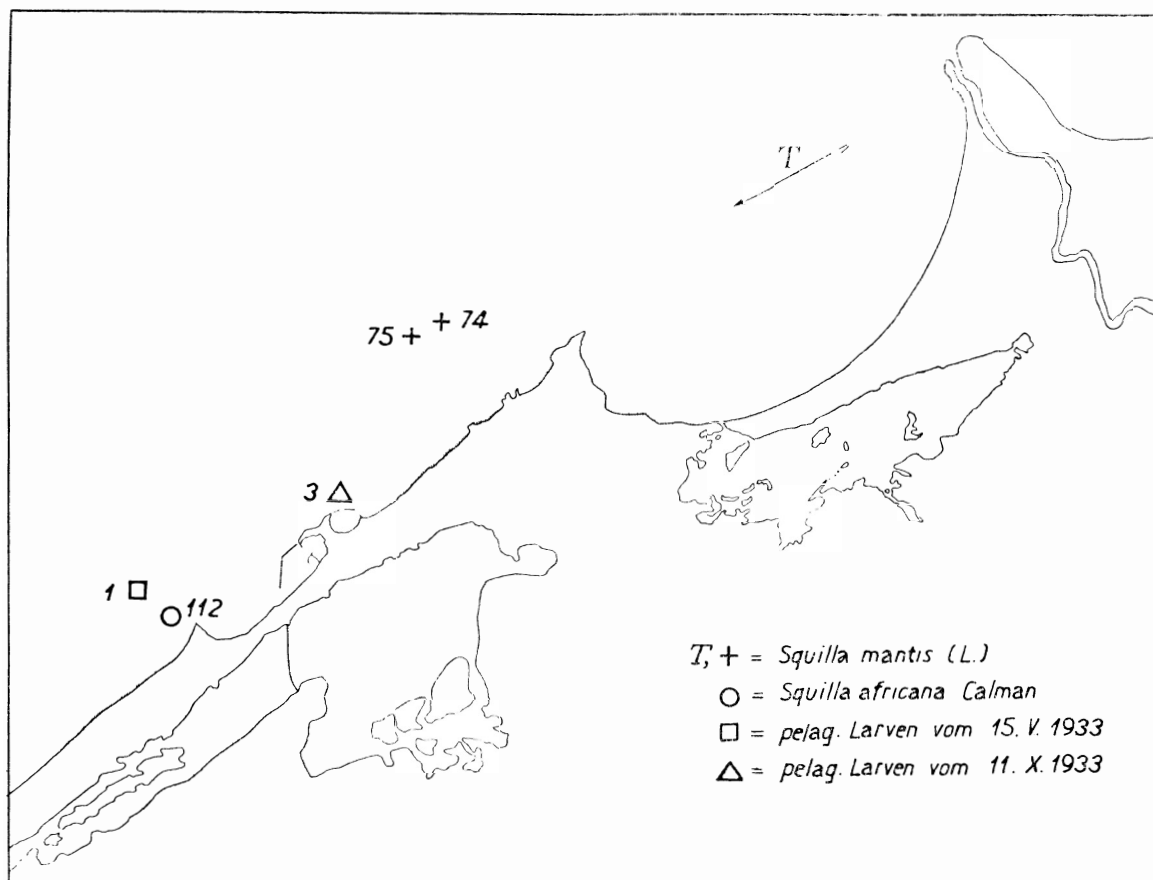


FIG. 9.

St. 112.—November 9, 1933, Depth : 15 fath. Fine sand with little mud ; Amphioxus-ground bottom with few algæ.

Squilla massavensis Kossmann, 1 ♂ juv.

*
* *

Off the Eastern Harbour.—Plankton haul with "Net with large opening" October 11, 1933.

Squilla sp. 1 juv. in the 10th pelagic stage.

Near Agami Island.—Vertical haul with middle plankton net from 30 m. May 15, 1933.

Squilla sp. 1 juv. in second pelagic stage.

LIST OF SPECIES

1.—Litoral Stages

Squilla massavensis Kossmann (Figs. 10-15).

1 ♂ juv. (Length : 2.5 cm.)

According to MONOD'S (1925, p. 90) key for determination the animal is to be identified with CALMAN'S species *Squilla africana*, for also at the present specimen preserved in alcohol a considerable black spot is to be seen at the exopodite of the uropod (Fig. 10). That the second characteristic : "5^e (dernier) maxillipède munie d'un épipodite" is missing is very likely due to a misprint in the table of determination, for CALMAN'S description (1916 p. 375) says distinctly : "Fifth thoracic limb without epipodite." (Fig. 11).

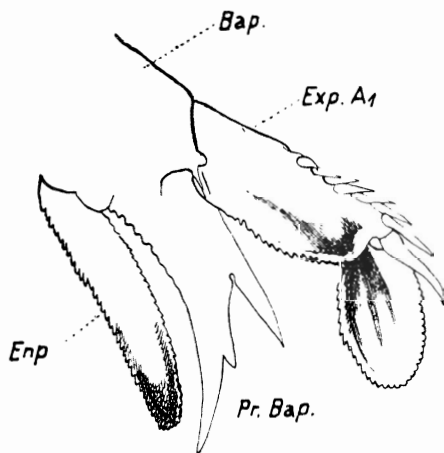


FIG. 10.—*Squilla massavensis* Kossmann. Right uropod, dorsal view. Bap.—basipodite, Exp. A₁—1st joint of exopodite, Pr. Bap.—process of basipodite, Enp.—Endopodite.

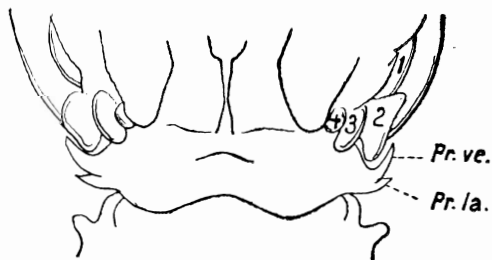


FIG. 11.—*Squilla massavensis* Kossmann. Posterior part of the anterior trunk, ventrally, with the branchial leaves (1-4) of the Maxillipeds and the 5th thoracic segment. Pr. ve.—ventral process Pr. la.—lateral process.

The side margin of the carapace is not angular behind but it is round (Fig. 12) and the median bifurcate carina was not yet to be seen. The 1st free thoracic segment (=5th somite) wears laterally a double process, viz. a larger anterior ventral one (pr. ve.) in continuation to the anterior lateral crista (Cr. an. lat.) and behind to a smaller lateral one (Pr. la.) as termination of the posterior lateral crista (Cr. po. la.)

(Fig. 11-13). At the telson (Fig. 14) the median crista (Cr. me.) which shows a distinct notch in its first third tapers at the caudal end into a long point.

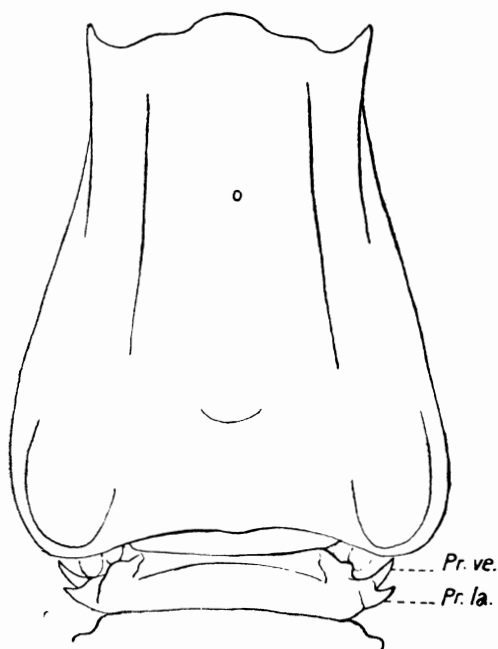


FIG. 12.—*Squilla massavensis* Kossmann. Carapace and 5th thoracic segment, dorsal view. Pr. ve.—ventral process, Pr. la.—lateral process.

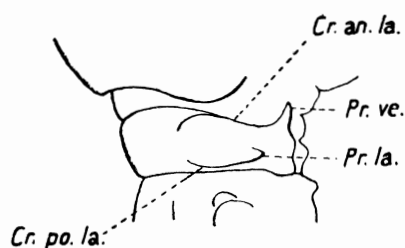


FIG. 13.—*Squilla massavensis* Kossmann. Side view. 5th thoracic segment. Pr. ve.—ventral process, Pr. la.—lateral process, Cr. an. la.—anterior lateral crista. Cr. po. la.—posterior lateral crista.

The lateral rows of bunches (compare BALSS 1910, Fig. 4) are hardly yet indicated. At the carpus of the leg of prey (Fig. 15) one bunch only with two basal hairs is to be seen.

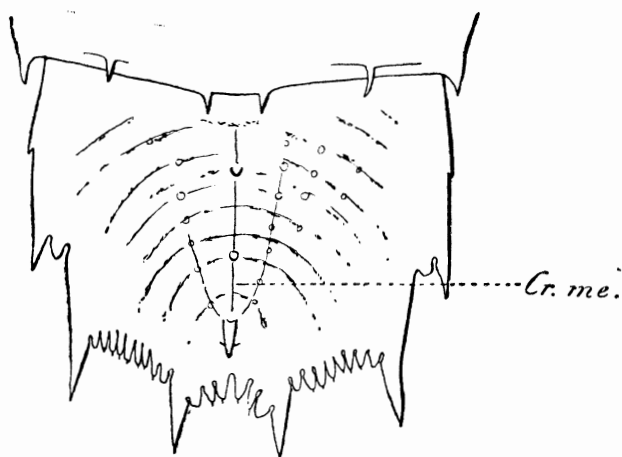


FIG. 14.—*Squilla massavensis* Kossmann. Telson, dorsal view. Cr. me.—median crista.



FIG. 15.—*Squilla massavensis* Kossmann. Carpus (IV) of the right raptorial limb, inner plain.

At the process of the basipodite of the uropod the lowest part of the incision is not yet round, the concave medial margin of the process (pr. Bap. in Fig. 10) is at its base a little waved (compare Parisi, 1922, Fig. 2), the convex outer margin of the longer tooth has in its middle a pointed process.

The species is known till now from the Red Sea (Suez, Massouah), the gulf of Aden (Djibouti), the Persian gulf and the gulf of Oman and has shortly also been noted by H. Balss (in lit.) from the coast of Palestine. For the publication of this finding coll. Balss kindly puts at my disposal the following diagnoses :—

Squilla massavensis Kossmann.

Kemp 1913 p. 76 (Lit).

Tattersall 1921 p. 356.

Parisi 1922 p. 99.

Locality: 1♀ Palestine (¹). Khan Yunis (southward from Gaza). 5m deep. Length (rostrum to telson in the median line): 85 mm.

This species differs from *Squilla africana* Calman (to which form it resembles very much on account of the dark colour of the exopodit of the uropod) by the following characters (adult animals having been compared :—

S. massavensis

Dactylus of the leg of prey outside concave.

No tooth at the basipodite of the leg of prey.

Lateral teeth of the fifth thoracical segment situated almost one beside the other, the ventral one much larger than the lateral, posterior one.

Anterior tooth of the 6th thoracical segment very well developed, pointed.

Telson with tubercles near the median line.

S. africana

Dactylus of the leg of prey outside straight.

A strong tooth at the basipodite of the leg of prey.

The anterior one of the two lateral teeth of the fifth thoracical segment is situated altogether ventrally (it had been over-looked by Calman); it is directed with its point to the front and is a little shorter than the lateral one.

Anterior tooth of the 6th thoracical segment rudimentary.

Telson without tubercles near the median line.

(¹) Belonging to the Hebrew University of Jerusalem.

Squilla mantis Latreille.

2 ♀ (length : 12 and 9.3 cm.), 1 ♂ juv. (length : 4 cm.), 2 ♀ juv. (length : 3.3 cm.).

Of the juvenile litoral stages that of a length of 4 centimetres is a ♂, the copulatory apparatus of which at the first abdominal limb resembles that given by GIESBRECHT (1910 p. 137, Taf. 6, Fig. 52) for a stage of 48 mm. (Fig. 16) ; it will very likely belong to about stage 6, is however relatively small. The two other immature specimens are ♀ in stage 5.

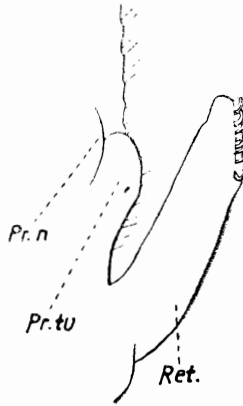


FIG. 16.—*Squilla mantis* Latreille ♂. Litoral juvenile stage of 4 cm. length. Copulatory apparatus of the 1st abdominal limb. Ret.—retinaculum, Prtu.—tubeshaped process, Pr.n.—hookshaped process.

As locality of this most frequent Mediterranean species CARUS (1885 p. 464) gives for the eastern Mediterranean according to Guérin quite generally the Greek archipelago. Besides FOX 1929 ("It is very common in the Port Said market, but was not taken in the Canal") MONOD (1931 p. 430) gives as localities : 1 ♂, 1 ♀, from Port Said (Febr. 13, 1928), 1 ♀ from Palestine, 1 ♂ 1 ♀, from Syria.

2.—Pelagic Stages..

Squilla sp.

Two specimens in 10th and 2nd pelagic stage.

Of the two larvæ that had been fished the larger one corresponded almost perfectly with the description given by GIESBRECHT (1910, p. 169) of the 10th pelagic stage of *S. mantis* : it is however much smaller, viz. 13 mm. (to at least 20 mm.).

Of the two species of the second pelagic stage described by GIESBRECHT (1910, p. 93, 94) *Squilla mantis* and *desmaresti*, our specimen corresponds in size (5 mm.) with the latter; like this one its median spine of the antennule segment is directed forward. However the exopodite of the antenna has 9 feathered bristles (instead of ten) and at the exopodite of the 2nd-4th abdominal limb I count 11 (instead of 9) bristles, while the corresponding stage of *S. mantis* has 12.

If this second pelagic stage, as its smallness makes one conclude, and for the same reason perhaps also the 10th pelagic stage belong to *S. massavensis*, the three findings of *Squilla mantis* would up to now be limited to the east, those of *S. massavensis* to the west of the area investigated.

The first species had been found in depths of 10-25 fathoms on muddy grounds, for which I am inclined to name Enteropneusta as characteristic forms. Also near Triest this species lives according to GRAEFFE (1900) "in den tieferen Schlammgruenden." The second species has been found on sandy Amphioxus-ground.

S. mantis belongs according to S. EKMAN (1935 p. 122) to the "spezifisch atlantischen Formen" of the mediterranean-atlantic area. The most southward locality in the Atlantic ocean is at present, Casablanca at the coast of Marokko, so that one supposed by the findings up to now that the residence of the related smaller species continues further southward (MONOD 1925, p. 87). *Squilla massarensis* Kossmann is a new immigrant from the Red Sea.

III.—Leptostraca

Like the *Cumacea* also the *Leptostraca* belong according to S. EKMAN (1935 p. 326) to the faunistically badly known groups of animals.

Though I had attended to them at fishing I could not note any *Nebalia* in the surroundings of Alexandria. They altogether do not seem to have been observed at the egyptian mediterranean coast. The Cambridge-Expedition fished one single immature ♀ of *Nebalia bipes* (O. Fabr.) in Lake Timsah, which curiously resembled to the "southern species" *N. longirostris* G. M. Thomson (CALMAN 1927, p. 399).

Summary

Of the three species of *Cumacea* that had been taken *Iphinoe tenella* G.O. Sars was found relatively abundantly in the eastern harbour of Alexandria and in the Bay of Abukir, *Eocuma sarsii* (Kossm.) in a somewhat aberrant form in few specimens in Amphioxus-sand only, at last *Bodotria scorpoides* (Montagu) forma *mediterranea* in the Anfouchi Bay only and near the entrance to the west port of Alexandria, while for the northern Adriatic the forma *septentrionalis* could be stated.

Of Stomatopodes *Squilla mantis* Latreille had been found in different stages in the muddy grounds eastward from Alexandria and in the west, in the Amphioxus-sand off the Dikheila peninsula, a juvenile ♂ of *Squilla massavensis* Kossmann had been fished.

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