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NOTES AND MEMOIRS No. 30

# THE FISHERY GROUNDS NEAR ALEXANDRIA

## XVIII.—Sipunculoidea, Phoronidea, Brachiopoda, Enteropneusta and Acrania

(With 4 Figures)

BY

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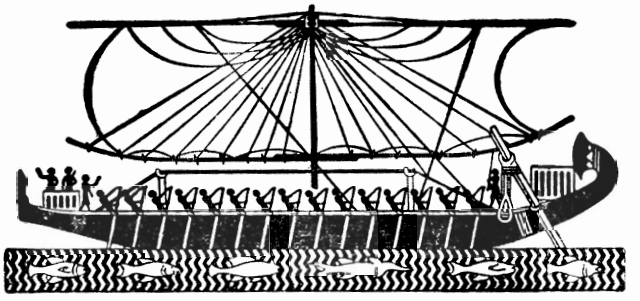
(Translated from German)



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### SIPUNCULOIDEA

Fig. 1

Up to now no single representative of this group of worms seems to be known from the Egyptian Mediterranean coast. W. FISCHER (1914, p.13) notes of the finding of *Aspidosiphon muelleri* Diesing (=*A. clavatus* (De Blainville 1827)) from the coral-reefs of Suez, one might "wohl mit Sicherheit schliessen, dass die vorliegende Art aus dem Mittelmeer ins Rote Meer gewandert ist" and consequently one must suppose that it also occurs at the Mediterranean coast, which is actually the case. This species indeed distinguishes itself by being widely spread.

The localities of the 4 species [1]) I fished are all situated in the western half of the district investigated, viz. westward off the peninsula of Abukir.

*Phascolosoma* F.S. Leuckart 1828.

*P. vulgare* (De Blainville 1827).

Localities: St. 32 (27.IX.1933) in a depth of 5½ fath. on stony Caulerpa-bottom (with coarse sand and little mud) in the Eastern Harbour. At St. 146 (15. XI. 1933), in a depth of 10 fath. on stony bottom overgrown with *Posidonia* and Algae (*Caulerpa*, *Halimeda*, *Dasycladus*), off the entrance to the Eastern Harbour one young specimen was taken.

CUÉNOT (1922, p. 8) reminds that this species is also to be found on the rhizoms of seaweeds. It is widely spread and known among others from the Mediterranean, the Adriatic and the Red Sea.

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[1]) The determination of the species has been executed by Prof. L. CUÉNOT (Nancy), for which kindness I thank him also in this place most heartily.

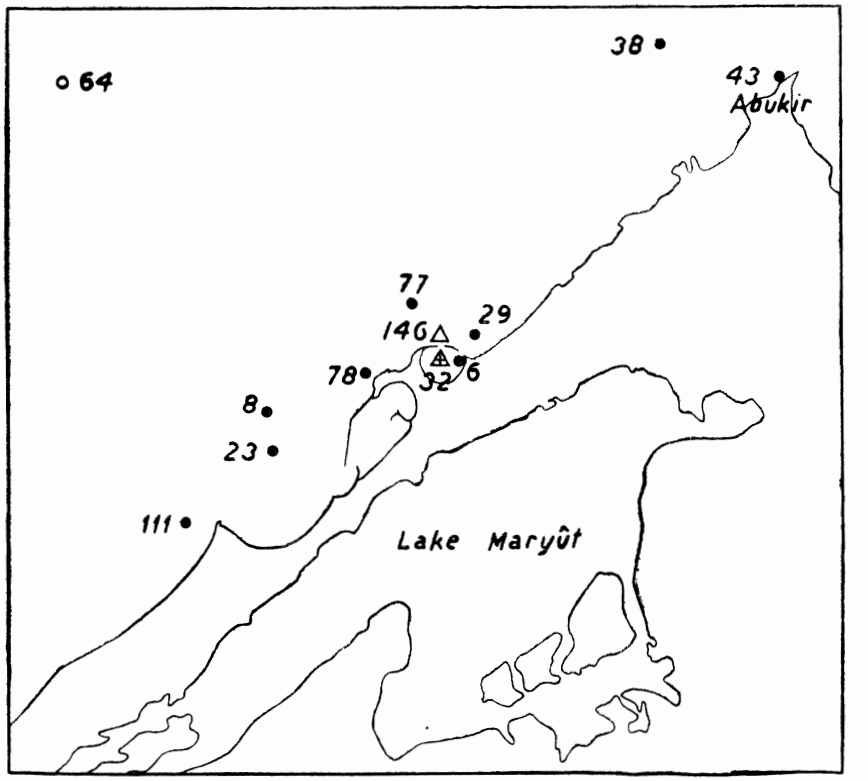


FIG. 1.

△ *Phascolosoma vulgare.* + *Aspidosiphon clavatum.*
○ ,, *elongatum* ● *Physcosoma granulatum.*

*P. elongatum* Keferstein 1862.

Locality : St. 64 (1. XI. 1933), in 110 fath. on muddy ground mixed with coarse sand two young specimens were taken.

According to CUÉNOT (1922, S.9), the species lives like the preceding one, is however not so widely spread.

*Aspidosiphon* Diesing 1851.

*A. clavatum* (De Blainville 1827).

Locality : St.32 (27. IX. 1933), in a depth of 5½ fath. on stony *Caulerpa*-bottom (with coarse sand and little mud) in the Eastern Harbour.

*Physcosoma* Selenka 1897.

*Ph. granulatum*, (F. S. Leuckart 1828).

Localities :

St. 6 (11. IX. 1933), in 3 fath. on stony *Caulerpa*-bottom in the Eastern Harbour

St. 8 (16. IX. 1933), in 15 fath. on stony *Caulerpa*- and *Halimeda*-bottom.

St. 23 (20. IX. 1933), in 5–7 fath. at the margin of the Great-Pass in yellow *Amphioxus*-sand overgrown with *Halimeda* and *Udotea*.

St. 29 (25.IX.1933), in 7 fath. on stony *Caulerpa*-bottom.

St. 38 (12. X. 1933), in 17 fath. on stony algae-bottom (*Halimeda*, *Caulerpa*, etc.).

St. 43 (14. X. 1933), in shallow coast-water on crags of the peninsula Abukir, overgrown with *Posidonia* and algae.

St. 77 (5.XI.1933), in 7 fath. on stony *Caulerpa*- and *Halimeda*-bottom.

St. 78 (5. XI. 1933), in 5–6 fath. on stony *Caulerpa*-, *Halimeda*-, *Posidonia*-bottom.

St. 111 (9. XI. 1933), in 10 fath. on stony bottom overgrown with *Posidonia* and algae.

The species therefore lives off Alexandria on stony bottoms overgrown with *Posidonia* and algae (especially *Caulerpa* and *Halimeda*) down to 17 fath. This " espèce d'eau très peu profonde " (Cuénot 1922, p.17), is widely spread. At this species, too, W. Fischer (1922, p.11), believes that its occurrence in the Indic is "wahrscheinlich auf die Verbindung des Roten Meeres mit dem Mittelmeer durch den Kanal von Suez zurueckzufuehren."

## Phoronidea

Fig. 2

At one station only (52) on slimy ground of 22 fath., northward from Abukir two specimens of *Phoronis muelleri* de Selys-Longchamps 1902 were asserted. Time had been missing for examining the different tests more carefully : the species is most certainly spread at the whole delta of the Nile. It has been described very exactly by Selys-Longchamps (1904) from the " blauen Schlick " of 10-20 fathoms from Helgoland. 1933 only it has been found by me in the Canal di Leme near Rovigne and in the following year G. Gustafson

(1934) could prove it for many places of the western coast of Sweden. The present find from Alexandria is therefore the second in the whole Mediterranean, where the species is most certainly widely spread. [1])

Two *Actinotrochae* were found in a plankton-haul from 1. IV. 1933. St. 1. north-westward from El Dikheila (*see* STEUER 1935, Fig. 1). No hauls from the first months of the year exist. I should like to identify both *Actinotrochae* with *Actinotrocha branchiata* Joh. Mueller 1846, the larva of *Phoronis muelleri*. They were about 1·5 mm. long (on account of the bent and shrunk body more exact measuring had been impossible), the younger one had 32 tentacles and the preformation of the erythrocyts was distinctly visible. At the second, elder specimen the definite tentacles were already preformed in the characteristic arrangement according to size.

Less certain is the definition of three (badly preserved) *Actinotrochae* of a haul from Port Said from March 19th, 1933, which I could look through. The youngest stage, about 0·7 mm. long, at which 12 tentacles were to be recognized had already a rather long trunk-part, the eldest stage, about 1·4 mm. long, was just before the metamorphosis.

In the autumn-plankton from Alexandria the following larvae were still to be found: In plankton-Station 4 a there were fished on Sept. 3rd, 1933, beside three specimens of *Actinotrocha branchiata* with partly already preformed definite tentacles, two smaller *Actinotrochae*, hardly 1 mm. long with strikingly well developed cirrae of the peri-anal ring, which fact speaks for *A. dubia*. At last a plankton-haul from St. 16, (= dredge-station 64), from November 1st, 1933, brought 7 more specimens of *A. branchiata* two of which showed already the rudiments for the definite tentacles.

While thus adult animals could be identified from the peninsula Abukir only, *Actinotrochae* had been fished everywhere in the western part of the district investigated on high sea, though not very numerous, yet in relatively largest number over greater depths of more than 100 fathoms in the utmost north-west.

On the temporal occurrence of the larvae the following can be said. Near Helgoland *Actinotrocha branchiata* is summerform, near Naples the swarming-time is removed toward the cool season. In the plankton of Algiers *Actinotrochae* (sp.?) occur according to ROSE (1926, 1927, 1934) from December to May. One isolated occurrence in September (ROSE 1934, p. 27) makes it likely that there is more than one species there. At the same time, however, two small *Actinotrochae* were also found off Alexandria, which very likely belong to another species. According to RUNNSTROEM (1936), *Phoronis*

[1]) According to *Cori* (1939, p. 168) also at Rosetta.

*muelleri* is most certainly a "mediterranean-boreal species" which immigrated after the late tertiary change of climate from the North Atlantic into the boreal and Mediterranean district and is in the boreal district summer-sprawner, in the Mediterranean winter-sprawner.

## Brachiopoda

Fig. 2

Of the Egyptian Mediterranean Coast Pallary (1912) has recorded the following three species: *Crania turbinata Poli* (rare near Ramleh), *Muehlfeldtia truncata* Linné with var. *rotundata* Pallary (rare

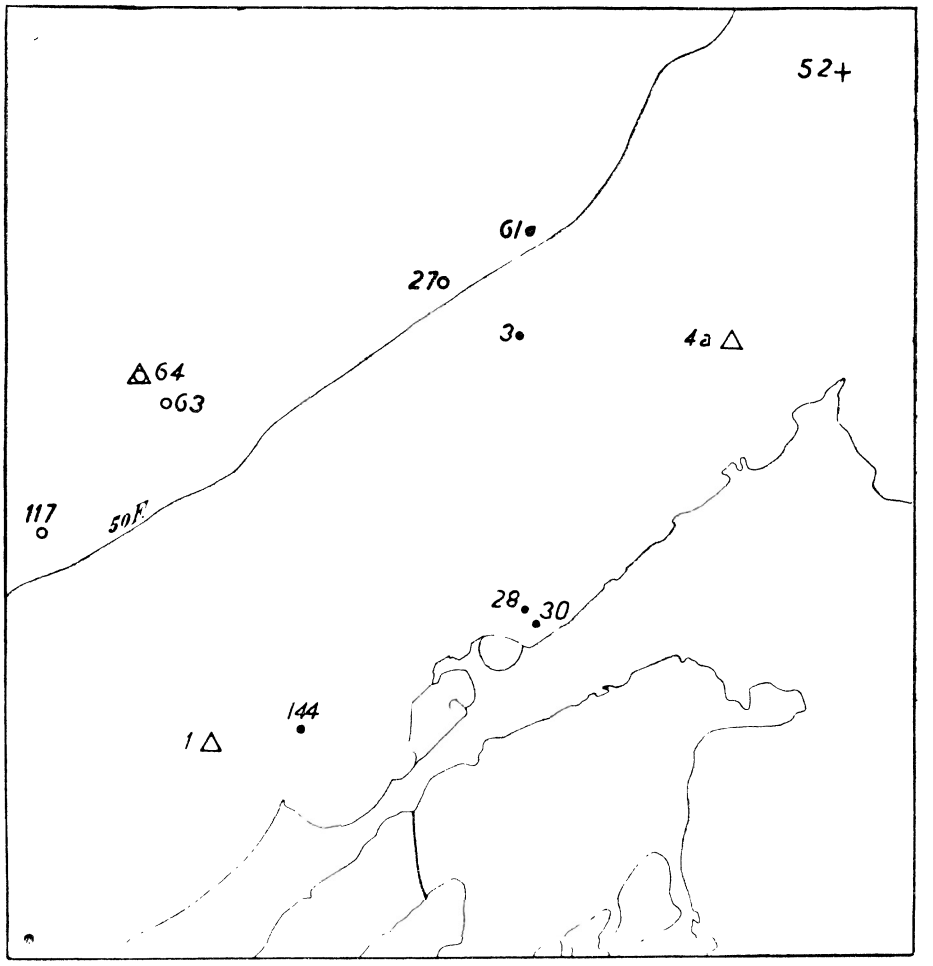


Fig. 2

+ *Phoronis.* ○ *Muehlfeldtia truncata.*

△ *Echinotrocha* ● *Argyrotheca cuneata.*

in greater depths) and *Megathyris decollata* Chemnitz (not rare in greater depths). The next locality at the African coast is very likely Benghasi near which the Austrian Pola-expedition had taken *Terebratula vitrea* Gmelin and *Platydia anomioides* Scacchi et Phil. in 680 m. (STURANY 1896, p.38).

## List of Localities

*Muehlfeldtia truncata* (Linné).

St. 27 (24. IX. 1933), 70 fath., mud with mollusk-shells.

St. 63 (1. XI. 1933), 74–85 fath., stony, coarse sand and mud (empty shells only).

St. 64 (1. XI. 1933), 110 fath., coarse sand and mud (empty shells only).

St. 117 (11. XI. 1933), 55 fath., mud and stones overgrown with algae (*Halimeda*, *Caulerpa*, etc.) sitting on calcareous algae.

*Argyrotheca* (=*Cistella*) *cuneata* Risso.

St. 3 (6. IX. 1933) over 34 fath., mud and algae.

St. 28 (25. IX. 1933), 10–12 fath., stony, algae.

St. 30 (25. IX. 1933), 7 fath., stony, algae.

St. 61 (30. X. 1933), 50 fath., stony, muddy, algae (one empty shell only).

St. 144 (15. XI. 1933), almost 18 fath., coarse sand and mud, algae.

Of these two species fished off Alexandria *Muehlfeldtia* (*Megerlia*) *truncata* (Linné) has according to this list been fished alive only in muddy grounds, 50–70 fathoms deep, mixed with stones, mollusk-shells and calcareous algae. The species is widely spread in the whole Mediterranean and has been known from the North African coast (Alexandria, Algeria, Tunis) and from the Aegean Sea. *Argyrotheca* (= *Cistella*) *cuneata* Risso was mostly recorded on stony, shallow bottoms, mixed with mud and coarse sand, usually richly beset with algae (*Halimeda*, *Caulerpa*, *Udotea*, *Dasycladus*, *Peyssonnellia*), in 7–34 fathoms [1]). The shells are maximally 3 mm. long and usually a little broader and only about 1·8 mm. deep. The median septum of the dorsal shell is winged, at the arm-skeleton the two half arches of the shelly loop are incomplete. This species, too, has repeatedly been

[1]) I owe the determination of this species according to my sketches to coll. B. RENSCH (Muenster) who also sent me—the relative literature missing here—some specimens from Berlin Museum (from Dalmatia, leg. Monterosato) for comparison, for which kindness I thank him also in this place most heartily.

found in the Mediterranean, at the French and Italian coasts, in the Southern Adriatic and in the Agean Sea, but evidently not yet at the African coast.

All the finds of Brachiopods of Alexandria are in the western part of the district investigated; *Muehlfeldtia truncata* (L.) lives in the far away stony and sandy mud-bottoms, while *Argyrotheca cuneata Risso* prefers shallower, hard bottoms, overgrown with *Halimeda*.

## Enteropneusta

Fig. 3

The first and up to now only Enteropneust known from the Eastern Mediterranean is *Saccoglossus gurneyi* (Robinson 1927), recorded by the Cambridge Expedition in the year 1924 from the Suez Canal. Off Alexandria the following two species have been fished by me :—

1. *Saccoglossus gurneyi* (Robinson 1927).

The genus *Saccoglossus* belongs to the third family of the Harrimaniidae Spengel 1901, for which according to Horst (1934) among others the missing synapticles of the branchial skeleton as well as the large eggs containing much yolk, and the direct development [2]) are characteristic. For its belonging to the genus *Saccoglossus* Schimkewitsch 1892 (syn. *Dolichoglossus*) speaks the proboscis which is very long in life. At very small preserved specimens it was though sometimes strikingly short, almost ball-shaped. From the locality itself one might conclude the species *S. gurneyi* ; the most striking characteristics agree indeed with this species (collar twice as long as broad ; notochord tissue dorsally spread out, the badly developed notochord-skeleton does not reach the posterior margin of the collar, the porus of the proboscis is situated in the dorsal medial line). Only the colour of the living animal was (according to an aquarell-sketch I had made of it in Alexandria) uniformly yellow. According to Robinson (1927) the collar is of a deep orange-yellow, while he calls the colour of the rest of the body faintly flesh-coloured.

The species was found in the Suez Canal from Port Said to Suez, in greatest quantities however in the Lake of Timsah in thick, black, slimy mud. The localities off Alexandria are in the Bay of Abukir :

St. 44 (15.X.1933), 10 fath., in fine, rich slime together with annelids. The largest fragment taken there had a size (in preserved state) of about 15 mm. At the living animal the maximally stretched out proboscis itself was 15 mm. long, the collar 1·5 mm.

[1]) "Entwicklung indirect" at Horst (1934, p. 401) is an erratum.

St. 45 (15.X.1933), southward from the forenamed station, in 9 fathoms in slime mixed with little sand ; the rest of the fauna was a little more abundant there. I noted *Astropecten bispinosus* Otto, *mussels* (*Mactra corallina* L.) and one naked snail. *Saccoglossus* was here already more scarce ; there were only a few very small specimens, and in the haul from the following, still more southerly situated station 46 (7 fath.) it was altogether missing.

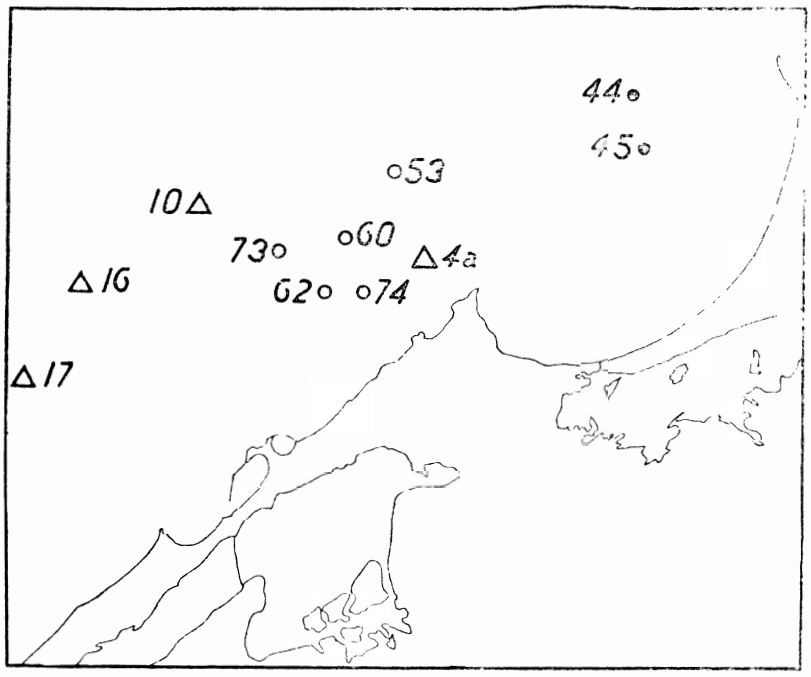


Fig. 3.

● *Saccoglossus gurneyi*. ○ *Glandiceps talaboti* △ *Tornaria dubia*

Horst (1934, p.392), says of its occurrence in the Suez Canal that very likely these animals as by *S. mereschkorskii*, as to the locality " verschiedene Forderungen gestellt werden, welche nur selten befriedigt werden koennen." The finds, in one case off Port Said, in the other case in the Bay of Abukir make one suppose that the species occurs nowadays along the whole mouth of the Nile. It is difficult to decide now whether it was already indigenous in the Mediterranean before the opening of the Suez Canal. It is striking that it lives especially in the Timsah Lake " in enormous numbers " and that it is closely related to the indic *S. bournei* (Menon) from Madras.

2. *Glandiceps talaboti* (Marion 1876).

List of localities of adult.

St. 53 (26.X.1933), in 33 fath., in yellowish mud.

St. 60 (30.X.1933), in 33 fath., mud.

St. 62 (31.X.1933), in 28 fath., mud.

St. 73 (4.XI.1933), in 38 fath., mud.

St. 74 (4.XI.1933), in 23 fath., mud.

According to HORST (1934, p.380) the species, though occasionally met with near the surface, yet seems to prefer deeper water. Off Alexendria I found it (STEUER 1935, p.10) in about 50-80 m. In the Gulf of Naples it had, according to SPENGEL (1893, p. 243) been fished even in 30 m. only, the scarcity of the findings however speaks for the fact " dass die Art tatsaechlich der besser durchforschten und leichter zugaenglichen Litoralzone nicht angehoert." SPENGEL had 7 specimens from there at his disposition: I only fished a few more fragments of different sizes. The largest (one was more than 10 cm. long) was taken with a charged dredge at St. 53. The animal obviously lives deeper burrowed in yellowish mud. According to SPENGEL (ibid., p.225) it is said to be met with " in feinem Sande." "an den anderen Fundstellen, bei Marseille und an der Kueste Marokkos lebt diese Art aber in fettem, grauem Schlamm ..." (Horst, 1934, p. 385). MARION already speaks (according to HORST ibid. p. 380) of the "durchdringenden Jodgeruch " of the animal. I, too, was struck especially at the animals of the haul from St. 74 the characteristic smell, resembling that of *Balanoglossus clavigerus* Delle CHIAJE 1829.

List of localities for larvae.

Planktonhaul 4a (3. IX. 1933), 4 sm. n. Montazah, over about 15 fathoms 3 vertical hauls out of depths of 20 m. (temp. 25, 8°) : 244 specimens.

,, 10 (24. IX. 1933), at St. 26 over 126 fath. out of 60 m. vertical : 18 specimens.

,, 16 (1. XI. 1933), at St. 64 over 110 fath. out of 60 m. vertical : 46 specimens.

,, 17 (11. XI. 1933), at St. 117 over 55 fath. out of 60 m. vertical : 1 specimen.

The larvae of *Glandiceps talaboti* designed as *Tornaria dubia* had very much shrunk at preserving. As far as one could state most of them were in the Spengel-stage, many of them were in the younger Krohn-stage and very few of the haul from 3. IX. distinguished by their smallness and transparency could be designed as Metschnikoff-stage (trunk-coelom not or hardly preformed, only primary lobes and saddles). The elder Krohn-stage, not yet known more exactly (according to STIASNY 1935, p. 84), occurring " wohl nur in groesserer Tiefe (150–200m)," is missing. It is striking that the larvae are missing in the numerous hauls near the coast, out of the ports e.g., and that they occur in greatest number in that haul 4a which is nearest to the locality of the adult. From here the larvae seem to be drifted westward perhaps by a current caused by the estuary of the Nile. According to our finds the larvae are swarming here at the time from September to the middle of November, while, according to STIASNY (1935, p. 73. 83) they were fished off Naples in the year 1914 in the middle of June and in July 1934 from the beginning of March to the end of May.

Hauls with Enteropneusts are up to now still matters of chance. Off Alexandria *Glandiceps talaboti* could be recorded in the central part of the district investigated on muddy bottoms without algae (in the east, St. 53), and with algae (in the west, St. 60, 62, 73, 74). It is no unlikely that the district inhabited by Enteropneusts would have proved more widely extended if more adapted apparatuses (bottom-sampler !) could have been used. As is well known many species indicate their locality by their smell and it is possible to find out their localities " durch Abriechen des Sandes " (HORST 1934, p. 380). Now the coarse, yellow sand off Alexandria, inhabited by *Amphioxus*, when poured on deck and the full sun shining on it, usually had a strong smell of Jodoform (STEUER 1935, p. 10). So it is possible that also in the widely spread *Amphioxus*-sand Enteropneusts are present but had only not been caught by our dredges. [1])

ACRANIA

Fig. 4

List of Localites

| | |
|---|---|
| St. 21 (20. IX. 1933) 1½ fath. | St. 35 ( 7. X. 1933) 7 fath. |
| St. 23 (20. IX. 1933) 5–7 fath. | St. 40 (12. X. 1933) 8 fath. |
| St. 25*a* (21. IX. 1933) presence likely. | St. 50 (18. X. 1933) 9 fath. |

[1]) See: *Hinrichs* und *Jacobi*, 1938, p. 26.

St. 51 (18. X. 1933) 13 fath.
St. 56 (28. X. 1933) 4 fath.
St. 59*b* (28. X. 1933) 15 fath.
St. 81 ( 5. XI. 1933) 6 fath.
St. 86 ( 5. XI. 1933) 5 fath.
St. 93 ( 6. XI. 1933) 9 fath.
St. 97 ( 6. XI. 1933) 4 fath.
St. 104 ( 1. XI. 1933) 10½ fath.
St. 106 ( 1. XI. 1933) 7 fath.
St. 112 ( 9. XI. 1933) 15 fath.
St. 119 (12. XI. 1933) 5½ fath.
St. 121 (12. XI. 1933) 5½ fath.
St. 122 (12. XI. 1933) 5 fath.
St. 125 (13. XI. 1933) 6 fath.
St. 134 (14. XI. 1933) 6 fath.
St. 136 (14. XI. 1933) 5-6 fath.
St. 138 (14. XI. 1933) 3-6 fath.
St. 140 (14. XI. 1933) 4-8 fath.
St. 143 (15. XI. 1933) 13 fath.

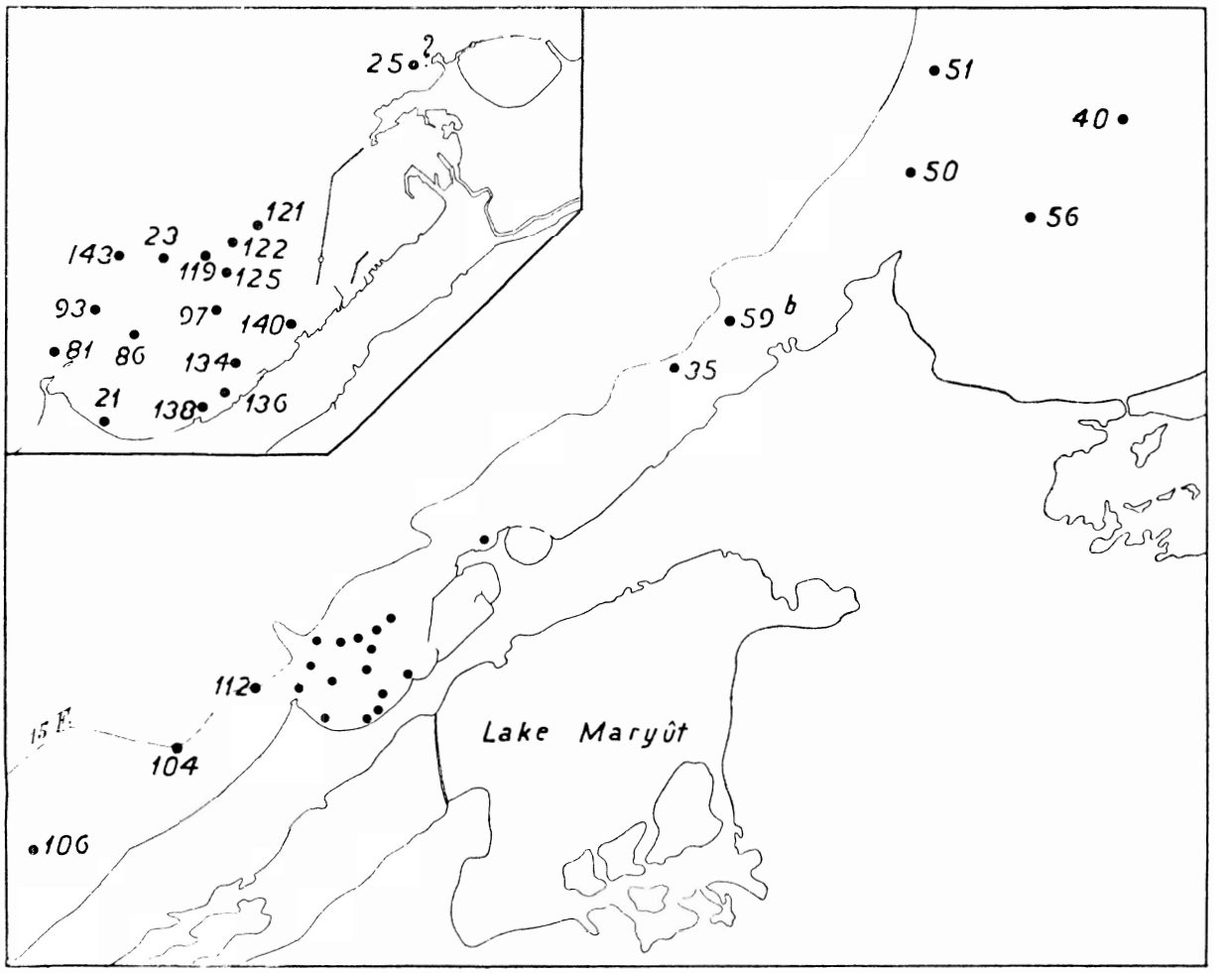


Fig. 4. -*Branchiostoma lanceolatum.*

Up to now the coast of Algiers was known as the southmost locality in the Mediterranean for *Branchiostoma lanceolatum* (Pallas). the place nearest to our finds is the Suez Canal (according to GRUVEL 1933). According to FRANZ (1927, p. 481) the *Branchiostomae* of the Black Sea differ " von jedem bisherigen *Br. lanceolatum* durch die *laengliche Rostralflosse* " and other characteristics and FRANZ expects a clearing of the circumscription of the genus by " die Ermittlung der zwischen Sewastopol und Messina vorkommenden Branchiostoma-Formen. " The examination of the specimens of Alexandria has proved their conformity with forma typica.

As is already known the maximal sizes of the specimens of the different localities differ greatly. The largest size is " im Pantano-Salzsee bei Messina erreicht (bis 60 mm. Laenge)," which fact may according to FRANZ " auf reicherer Ernaehrung beruhen." I could state at *Branchiostoma* from Messina maximal sizes of 57 mm. Relatively large were also the animal fished by GRUVEL in April 1933 in the Suez Canal (max. size 52 mm. [1]), strikingly small however are those caught by me off Alexandria in autumn (September to November 1933, max. size 32 mm.). North Adriatic animals (near Rovigno d'Istria, September 1935) show a middle size (max. size 43·5 mm.). It is striking that maximal sizes are reached by animals from more or less closed localities. We know however neither from the Suez canal nor from Pantano how much organic substance is produced per $m^2$. In Pantano shell-fishing is going on very intensely (according to Cori 1891, p. 501), and according to SPAERCK (1931) sedentary mussels feeding on microorganisms and on detritus are very characteristic for rich bottoms. Also about the finding in the Suez Canal, GRUVEL (1933, p. 92) says : " nous avons rencontré là beaucoup de mollusques vivants...." Here, between km. 49 and 50 was found " le plus grand nombre de ces animaux." Also in Pantano they occur according to HATSCHEK (1882, p.2) " in zahlloser Menge." according to PINTNER (1909, p.22) " in ganzen Scharen."

Quantitative investigations have been made till now only from the Amphioxus-bottoms near Rovigno in the northern Adriatic. The raw weight of the organic substance amounts according to VATOVA (1935) to 9·1 g. per $m^2$. 16 *Branchiostoma* are in 1 $m^2$. So these north-Adriatic Amphioxus-sands produce little organic substance, which may also be the case at the same biocenoses off the Egyptian coast, though in some groups of animals of this biocenosis (e.g. nematodes) the richness of species is a relatively great one 2.)

[1]) By R. DOLLFUSS' (Paris) kind intervention I could measure the specimens collected by Prof. GRUVEL, for which kindness I am just as obliged to those two gentlemen as for a copy of GRUVEL's publication.

[2]) At the coast of Portugal SPAERCK (1931, p. 10) found 10 specimens ( = lg.) pro $m.^2$.

Perhaps it will in future be possible to conclude from the relative size to which certain leading forms of some Biocenoses here and there grow out, on the productiveness of the bottoms.

As had formerly been shown (STEUER 1935, chart I, II) the *Amphioxus*-sands of Alexandria are situated in a depth of about 4-15 fath. in little distance from the coast and are growing larger off the mouth of the Nile near Rosette in the western bay of Abukir, while they are drawing closely along the coast in a depth of 1½ - 8 fath. in the bay of Dikhela. The communication with the outer *Amphioxus*-bottoms has been interrupted by the quantities of mud advancing from the west port. The most shallow *Amphioxus*-bottoms nearest to the laboratory are very likely situated off the Anfouchi-Bay. For here (St. 25a) I fished already in shallow coast-water out of the rowing-boat the faithful companion of *Branchiostoma*, namely the Polychaete *Armandia polyophthalma* Kuekenth.

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[1]) This paper was not at my disposition and had kindly been sent to me by the direction of the Marine Laboratory in Alexandria.

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