MINISTRY OF COMMERCE AND INDUSTRY, EGYPT

Hydrobiology and Fisheries Directorate

NOTES AND MEMOIRS No. 21

THE FISHERY GROUNDS NEAR ALEXANDRIA

XIII. — ECHINODERMA

(with 27 Figures)

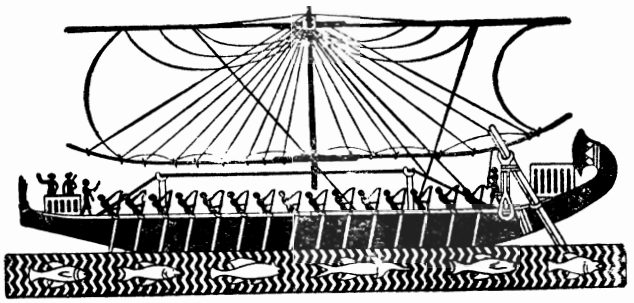
BY

TH. MORTENSEN (*Copenhagen*)

AND

AD. STEUER (*Rovigno d'Istria*)

(Translated from German)



CAIRO

GOVERNMENT PRESS, BULÂQ

1937

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XIII.—Echinoderma

BY

TH. MORTENSEN and AD. STEUER

(*Copenhagen*) (*Rovigno d'Istria*)

For this Report TH. MORTENSEN has determined the species and written the general remarks. AD. STEUER has arranged the charts of distribution, added to the list of species the remarks about the conditions of the bottom of the sea, and finally composed the part about the horizontal and vertical distribution.

List of Species, with the Localities

ASTEROIDEA

(1) *Astropecten bispinosus* Otto (Chart. 1).

St 11—1 specimen, St. 37—2 specimens, St. 45—2 specimens, St. 66—1 specimen, St. 90—1 specimen, St. 113—1 specimen, St. 136—1 specimen.

In 4-20 fath. on muddy and sandy bottom, on black bottom without vegetation in the harbour, on mud mixed with fine sand as well as on pure fine sand; the most common algae are *Caulerpa*. Is met with also in Abukir Bay.

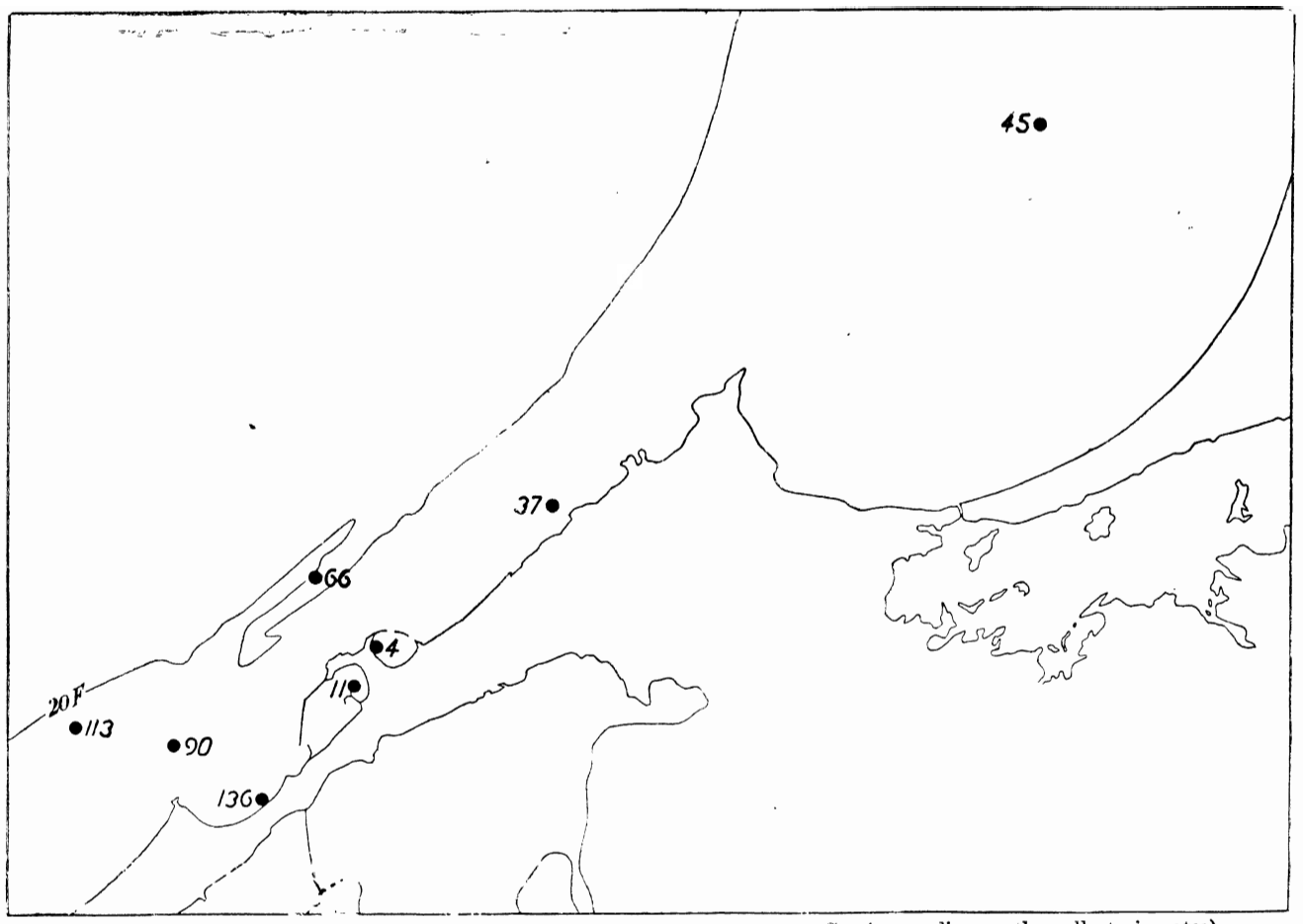


FIG. 1.—*Astropecten bispinosus* Otto (St. 4 according to the collector's notes)

(2) *Astropecten spinulosus* (Philippi) (Chart. 2).

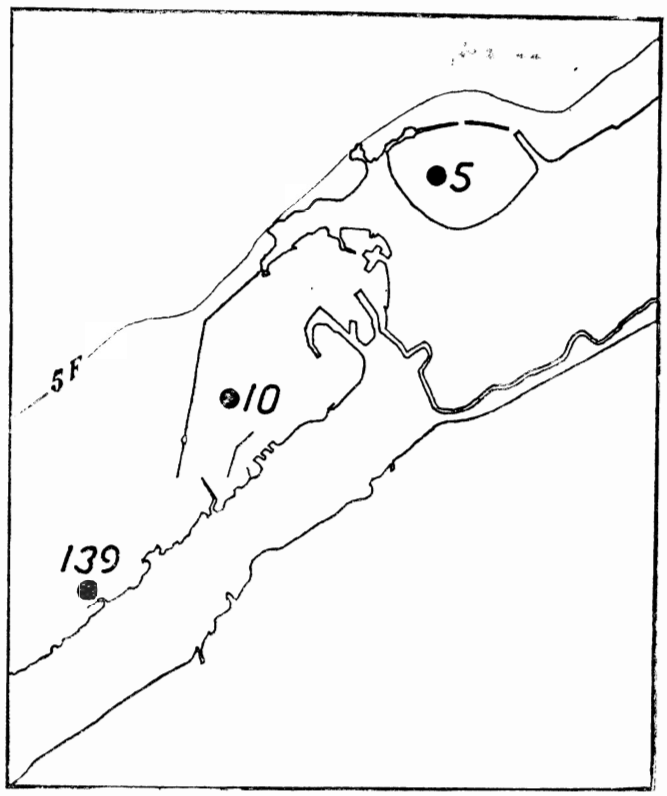


FIG. 2.—*Astropecten spinulosus* (Philippi)

St. 5—1 specimen, St. 10—1 specimen, St. 139—1 specimen.

In 2-6 fath.; on fine or coarse sand or sand mixed with mud, with *Caulerpa*. Has been found in the environs of the ports only.

(3) *Astropecten jonstoni* (Delle Chiaje) (Chart. 3).

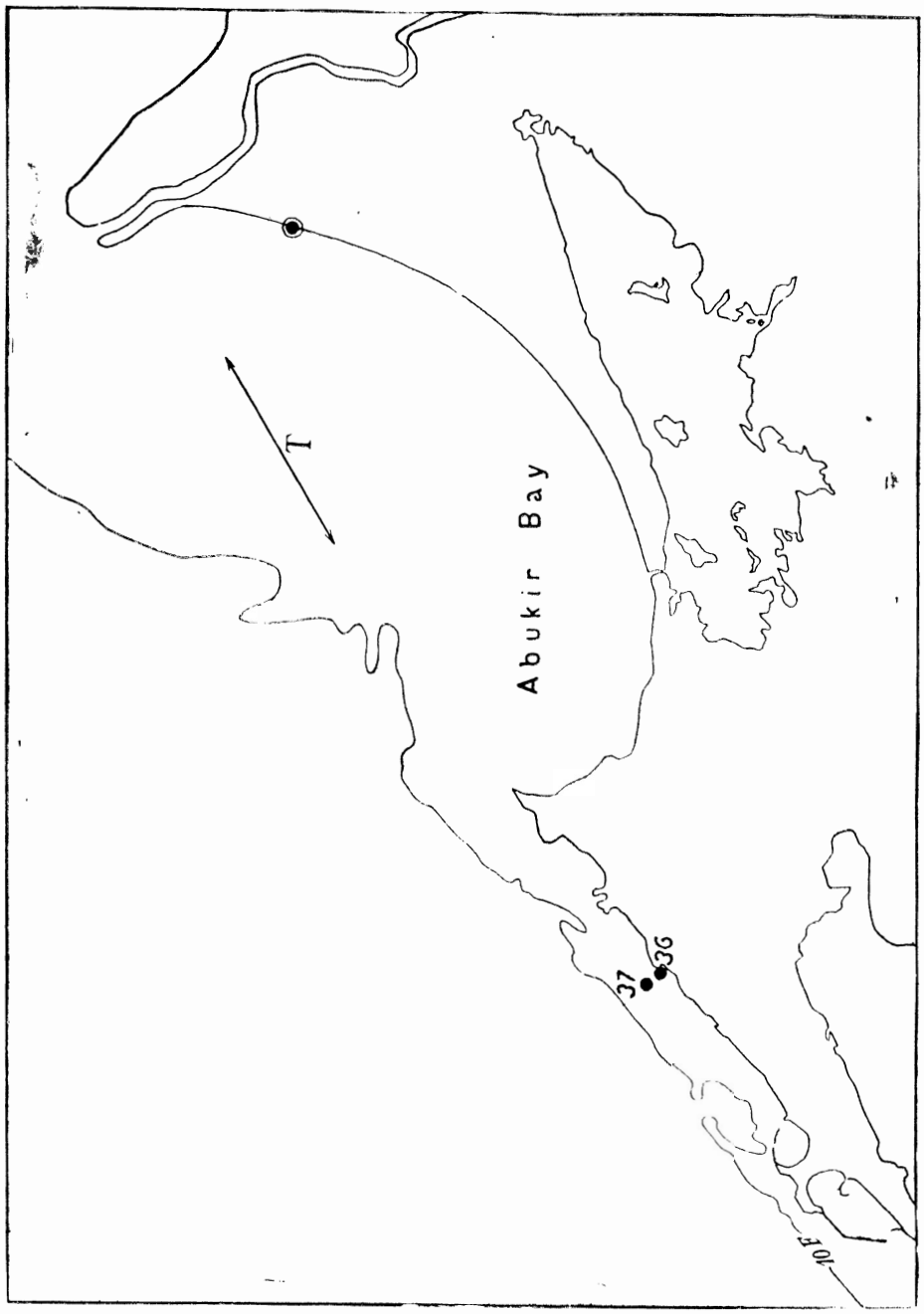


FIG. 3.—● *Astropecten jonstoni* (Delle Chiaje) T = Trawl. ● Dead on strand.

Trawl—7 specimens, St. 36—1 specimen, St. 37—1 specimen, coast of Abukir Bay—2 specimens.

In 3-7 fath.; on sandy ground, sometimes with *Caulerpa*; rare in the eastern and western part.

(4) *Astropecten irregularis* var. *pentacanthus* (Delle Chiaje) (Chart. 4).

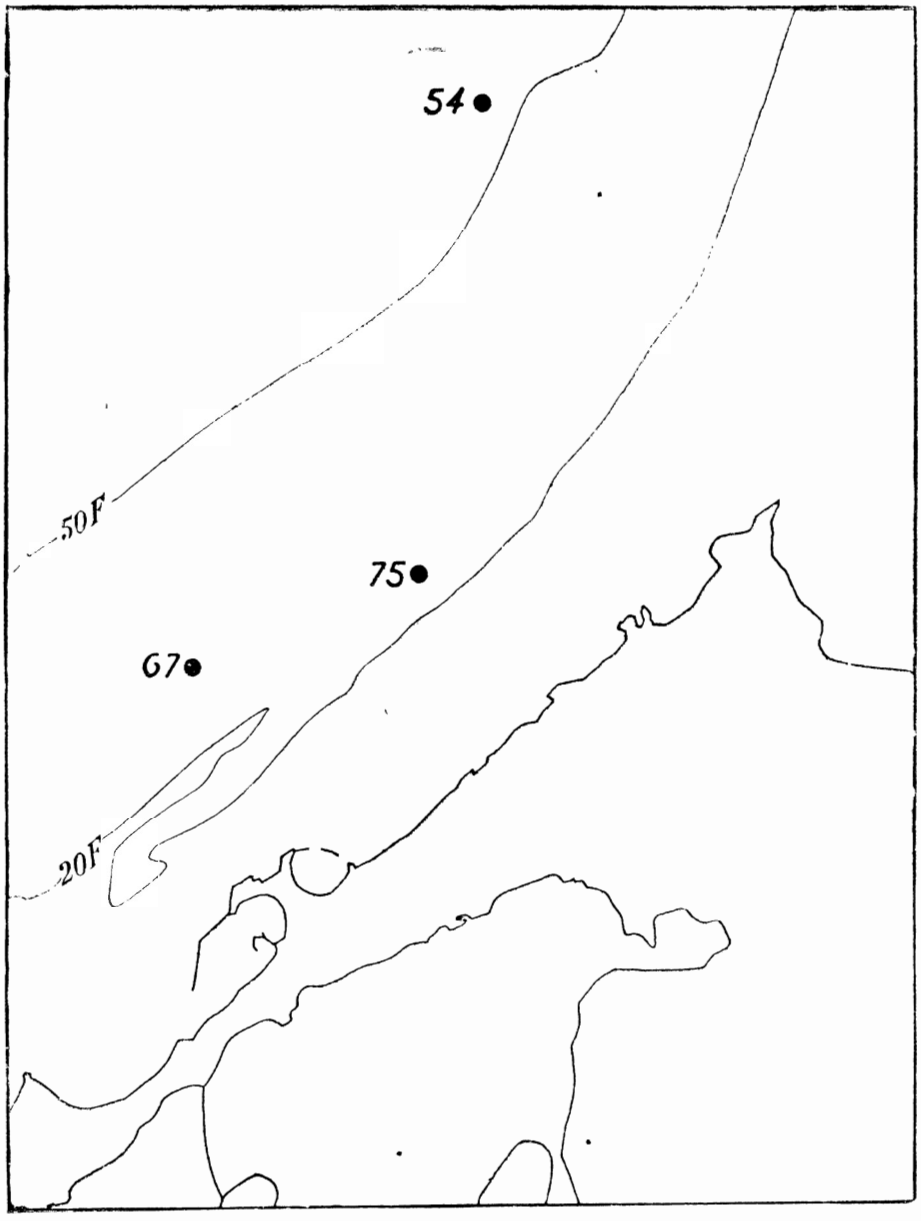


FIG. 4.—*Astropecten irregularis* var. *pentacanthus* (Delle Chiaje)

St. 54—2 specimens (young), St. 67—1 specimen, St. 75—2 specimens.

In 22-55 fath. on muddy or sandy ground without algae, in the western part only.

(5) *Asterina gibbosa* (Pennant) (Chart. 5).

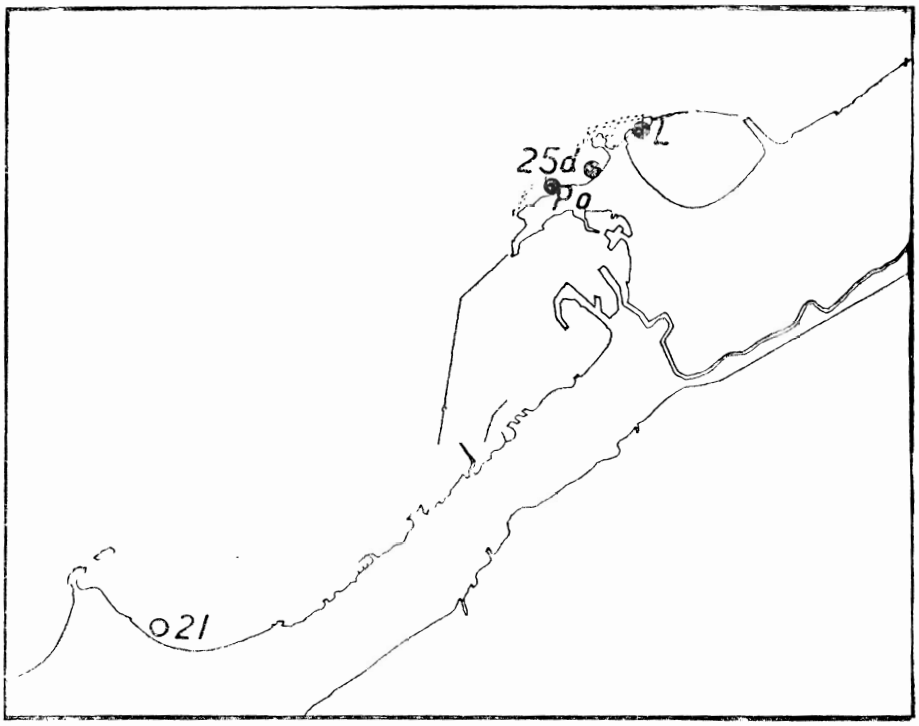


Fig. 5. ● *Asterina gibbosa* (Pennant)
○ =According to the collector's notes. L=Laboratory.

St. 25—6 specimens (young), Po—2 specimens, East Harbour—2 specimens, Eastern Harbour, off the Marine Laboratory—1 specimen.

On very shallow sandy ground, on banks of seaweeds and *Caulerpa* at the coast of the Eastern Harbour, in the Baby of Anfushi as well as near Dekheli in 1 1/2 fath.

(6) *Coscinasterias tenuispina* (Lamarck) (Chart. 6).

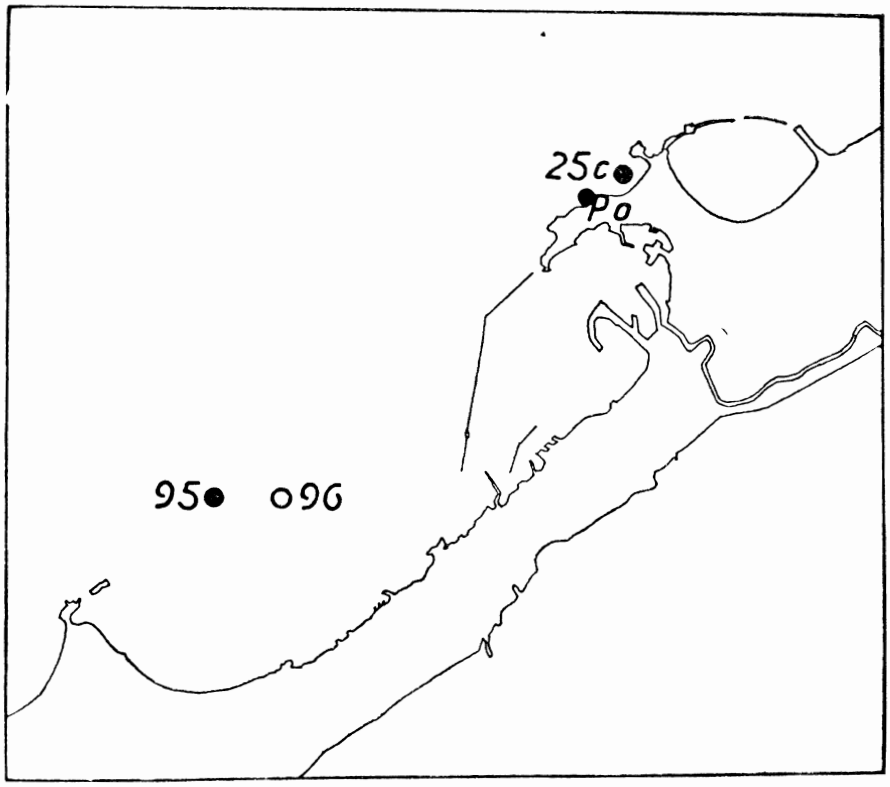


FIG. 6.—● *Coscinasterias tenuispina* (Lamarck)
○ = According to the collector's notes.

St. 25—1 specimen (young), Stat. 95—1 specimen (young), Po—1 specimen (young).

On sandy, stony bottom, in shallow places, to 6 (or 7 ?) fath, on banks of algae and *Posidonia*.

Ophiuroidea

(7) *Ophiomyxa pentagona* Müll. and Troschel (Chart. 7).

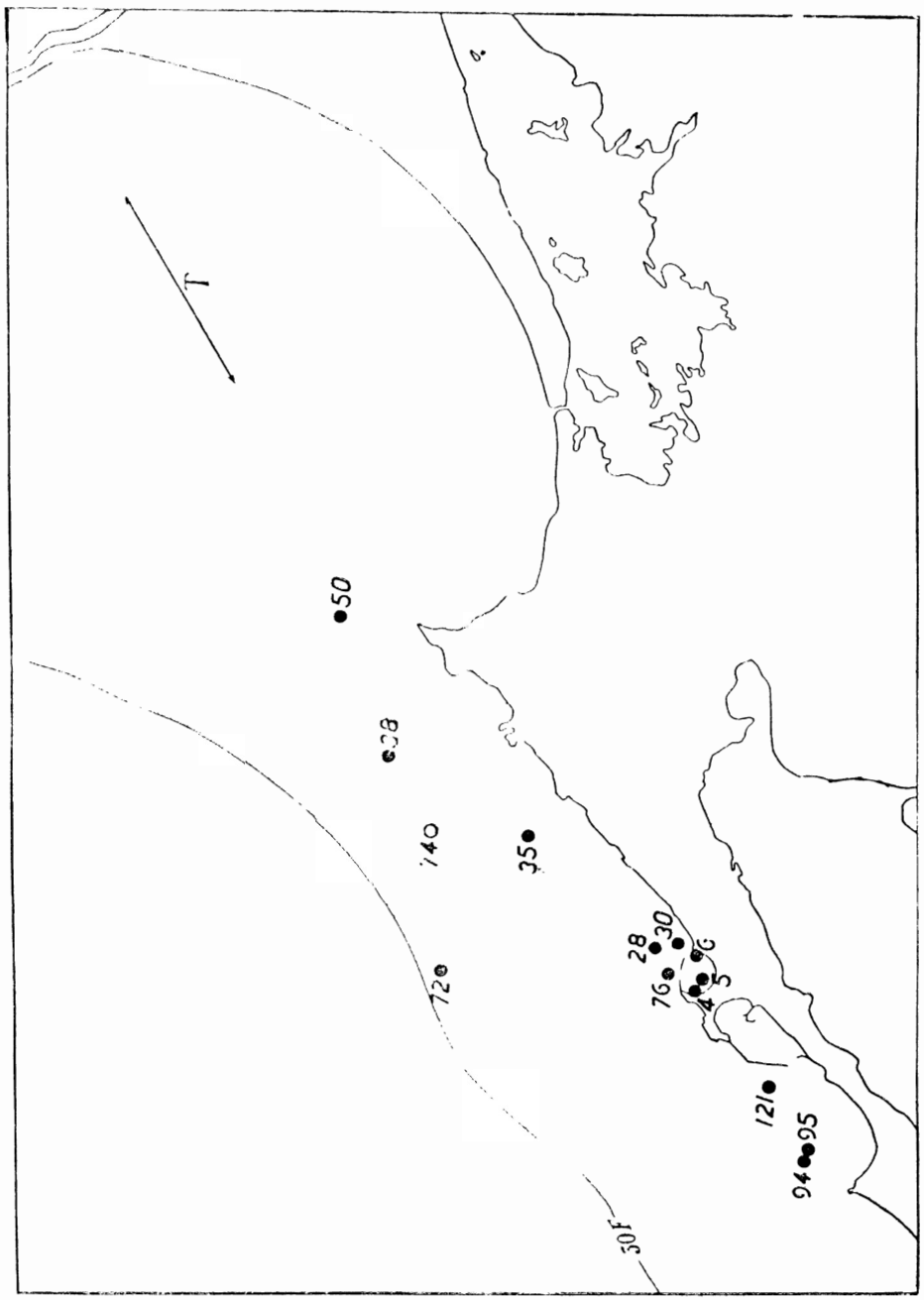


FIG. 7.—○ *Ophiomyxa pentagona* Müll. & Troschel ● *Ophiothrix fragilis* (Abildg.)
T = Trawl.

St. 74—1 specimen.

Once only in 23 fath. on mud with little vegetation (*Caulerpa* and other algae).

(8) *Ophiothrix fragilis* (Abildg.) (Chart. 7).

Trawl—6 specimens, St. 4—1 specimen, St. 5—2 specimens, St. 6—1 specimen, St. 28—10 specimens, St. 30—4 specimens, St. 35—5 specimens, St. 38—9 specimens, St. 50—13 specimens, St. 72—1 specimen, St. 76—3 specimens, St. 94—5 specimens, St. 95—4 specimens, St. 121—1 specimen.

In 2-20 fathoms, mostly on stony, also on sandy grounds, seldom on grounds mixed with mud, also on *Amphioxus*-sand. Vegetation usually *Caulerpa*, other algae as well, seldom *Posidonia*. (Accidentally) not found in the Western Harbour, in all other localities common, especially in the West.

(9) *Ophiopsila aranea* Forbes (Chart. 8).

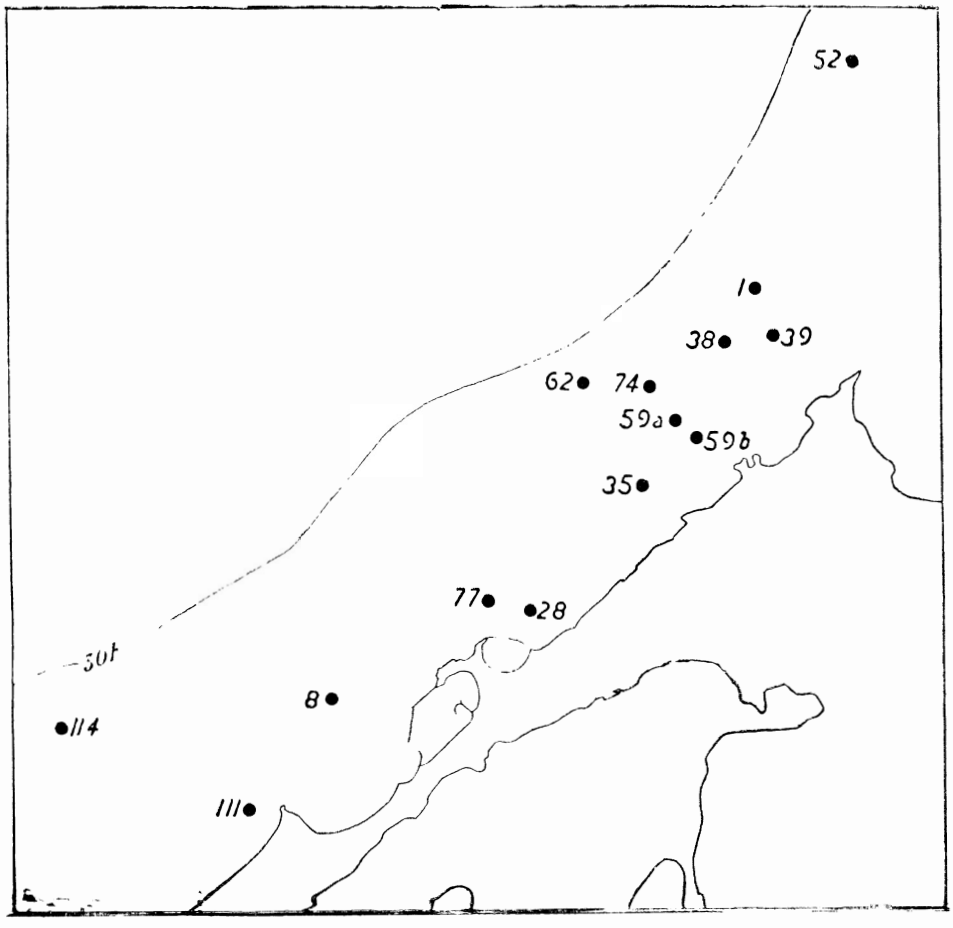
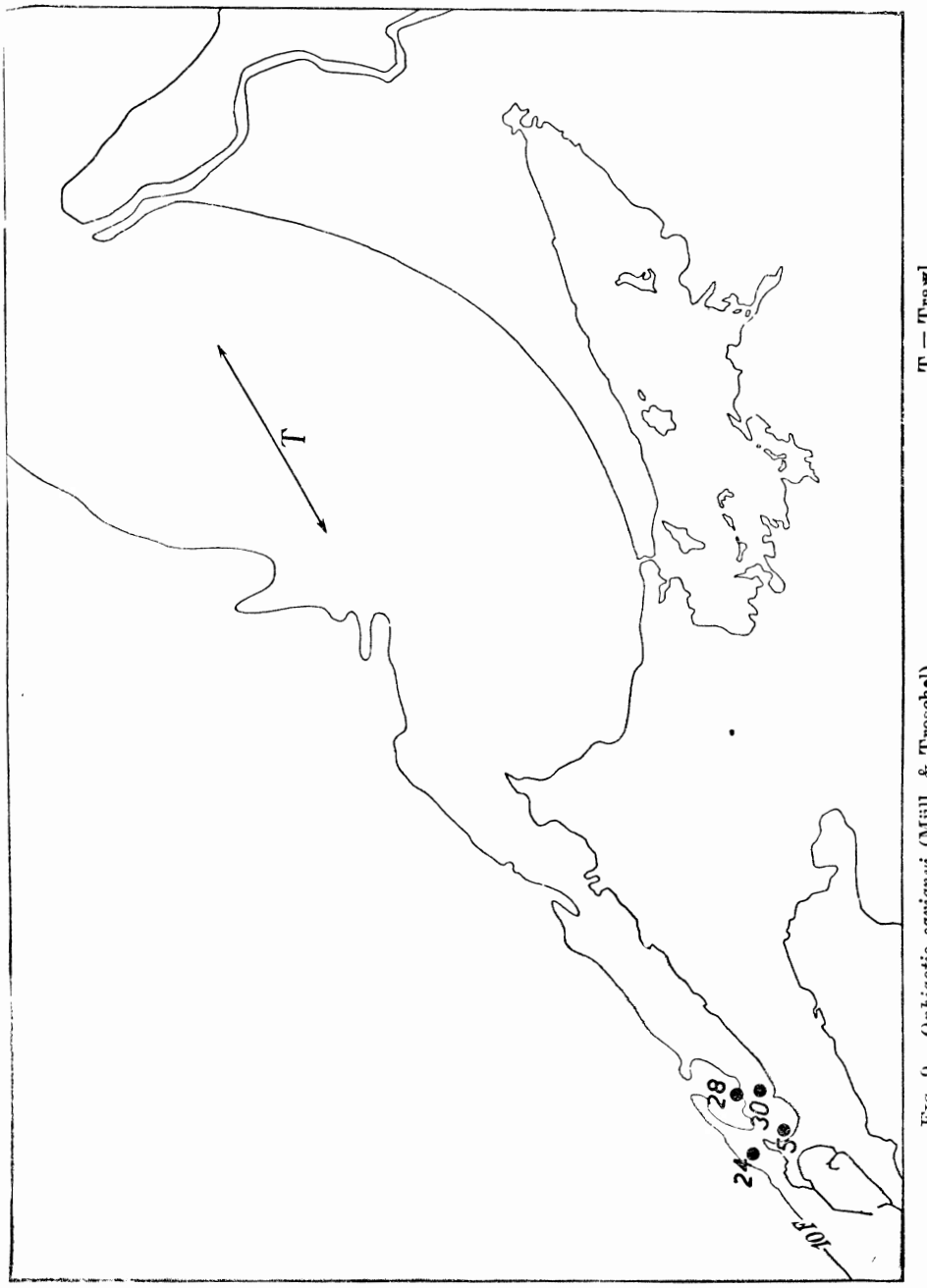


Fig. 8.—*Ophiopsila aranea* Forbes

St. 1.—1 specimen, St. 8—2 specimens, St. 28—2 specimens, St. 35—1 specimen (young), St. 38—2 specimens, St. 39—1 specimen, St. 52—1 specimen, St. 59*a*—1 specimen, St. 59*b*—1 specimen, St. 62—5 specimens, St. 74—4 specimens, St. 77—1 specimen, St. 111—1 specimen, St. 114—1 specimen.

In 7—28 fathoms. Mostly on stony *Halimeda*-bottom. In the West only.

(10) *Ophiactis Savignyi* (Müller and Troschel) (Chart. 9.).



T = Trawl.

Fig. 9.—*Ophiactis savignyi* (Müll. & Troschel)

Trawl—16 specimens, St. 5 (Eastern Harbour)—1 specimen, St. 24—1 specimen, St. 28—2 specimens. St. 30—7 specimens.

In 2-12 fathoms, mostly on stony *Caulerpa-Halimeda*-bottom. This Indian species has first been found off Port Said (Mortensen 1926) and has not penetrated further westward than the Bay of Anfushi.

(11) *Amphiura filiformis* (0. Fr. Müller) (Chart. 10).

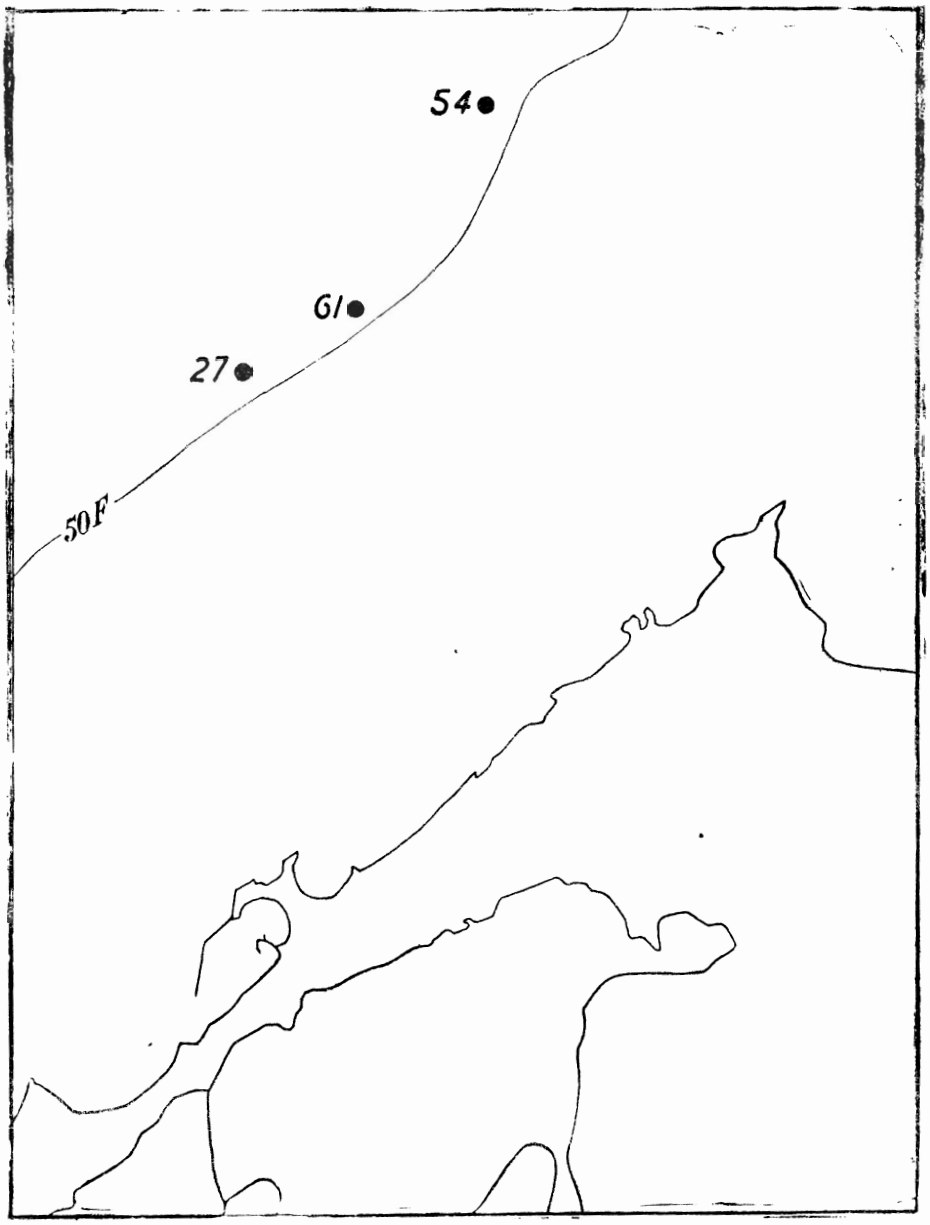


FIG. 10.—*Amphiura filiformis* (O. Fr. Müller)

St. 27—1 specimen, St. 54—1 specimen, St. 61—2 specimens.

In muddy bottoms 50-70 fathoms deep. (In the East so far off the coast fishing was not possible).

(12) *Amphiura mediterranea* Lyman (Chart. 11).

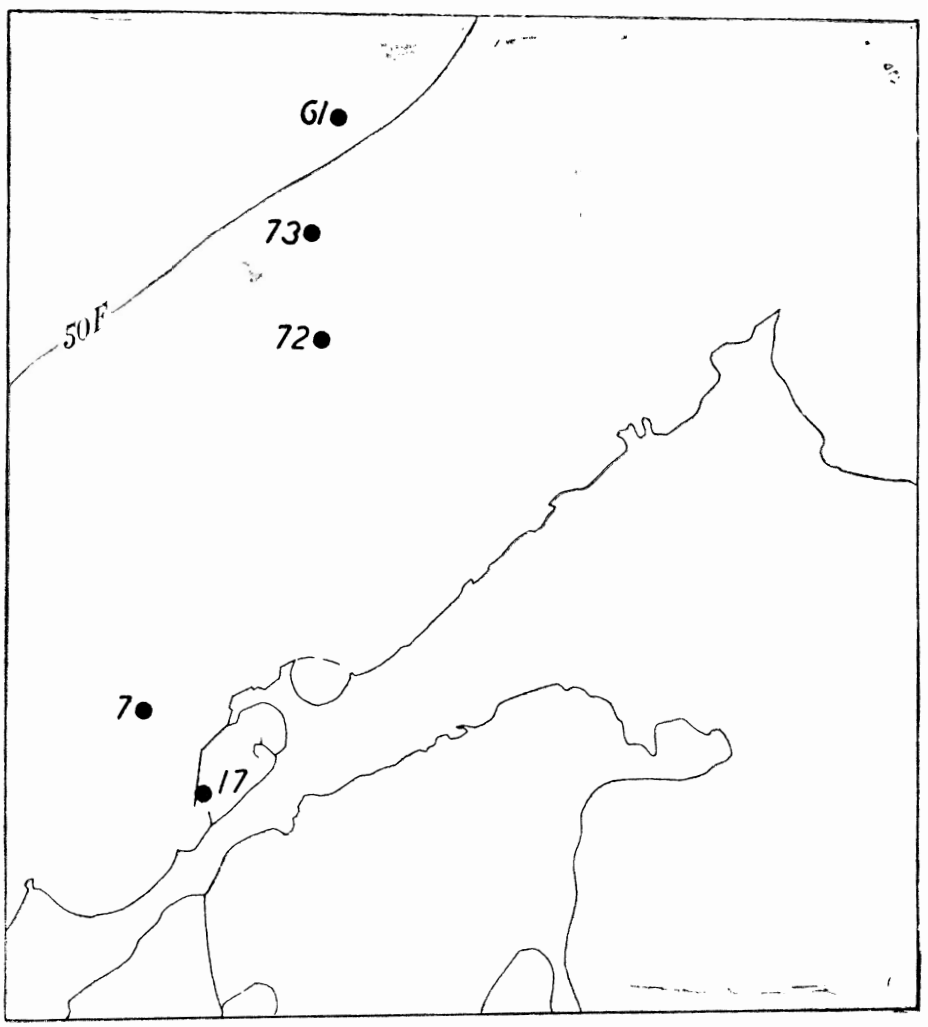


Fig. 11.—*Amphiura mediterranea* Lyman

St. 7—1 specimen, St. 17—3 specimens, St. 61—2 specimens, St. 72—1 specimen, St. 73—8 specimens.

In 5-50 fathoms, mostly on mud with *Caulerpa*. In the West only.

(13) *Amphiura Chiajei* Forbes. (Chart. 12).

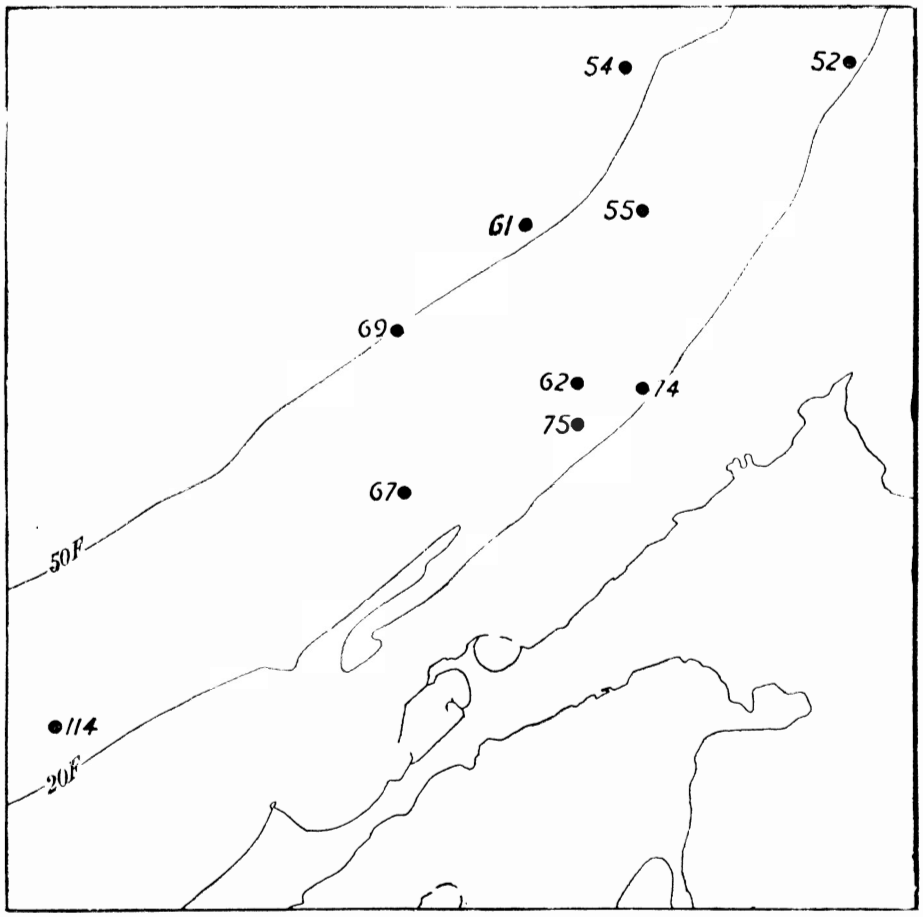


FIG. 12.—*Amphiura Chiajei* Forbes

St. 52—2 specimens, St. 54—1 specimen, St. 55—2 specimens, St. 61—1 specimen, St. 62—3 specimens, St. 67—1 specimen, St. 69—1 specimen, St. 74—3 specimens, St. 75—1 specimen, St. 114—1 specimen.

In 22-55 fathoms on muddy ground mostly free from algae, in the West only. Characteristic form of the *Schizaster-Chiajei* (Sch. Ch.)—community.

(14) *Amphipholis squamata* (Delle Chiaje) (Chart. 13).

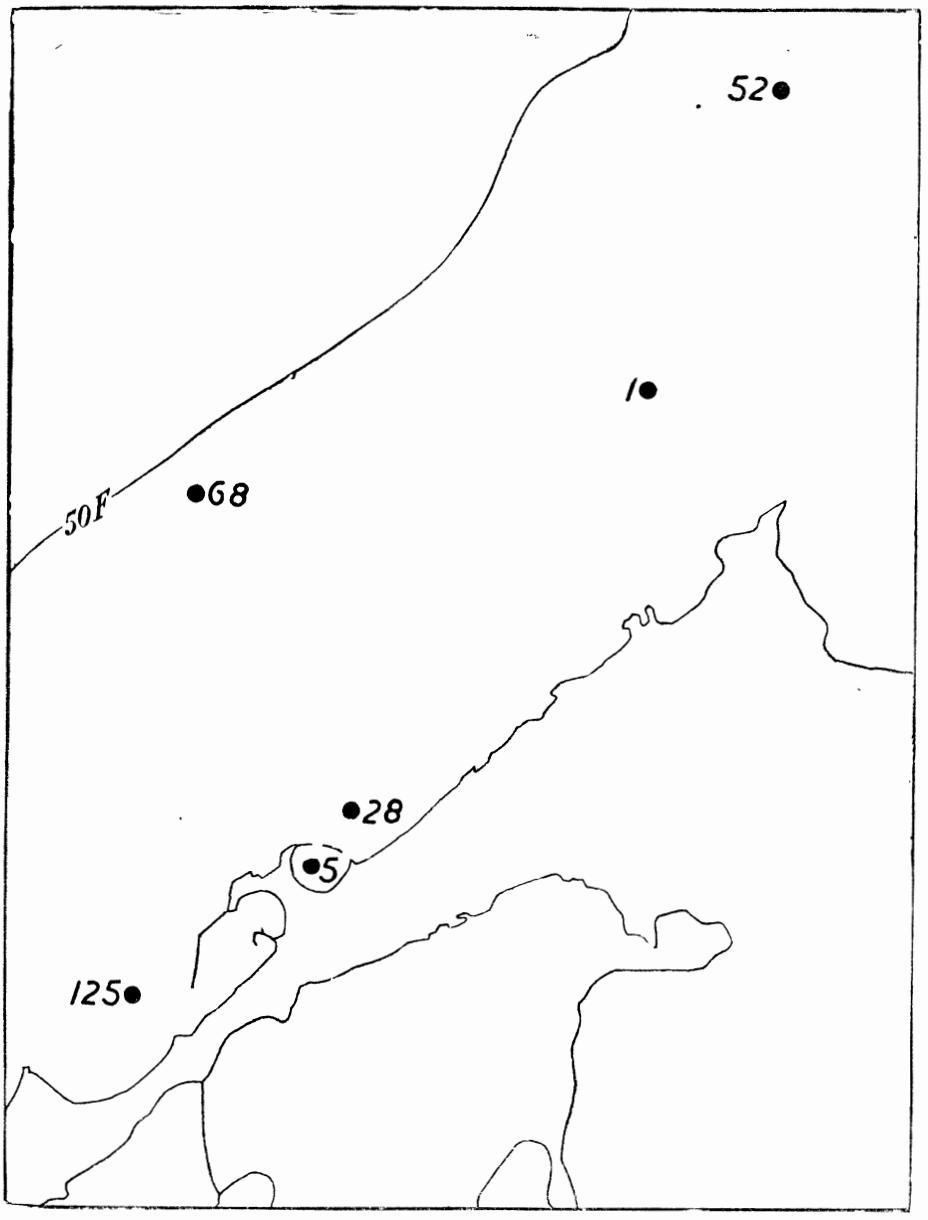


Fig. 13.—*Amphipholis squamata* (Delle Chiaje)

St. 1—1 specimen, St. 5 (Eastern Harbour)—1 specimen, St. 28—1 specimen, St. 52—1 specimen, St. 68—1 specimen, St. 125—6 specimens.

On muddy and sandy bottom 2-37 fathoms deep mostly with algae, in the West only.

(15) *Ophiura texturata* Lamarck. (Chart. 14).

FIG. 14.—*Ophiura texturata* Lamarck

St. 92—1 specimen, St. 145—1 specimen, St.?—1 specimen.

On muddy grounds with *Caulerpa* 21-25 fathoms deep, seldom, only to the West of Alexandria.

(16) *Ophioderma longicauda* (Lamarck) (Chart. 15).

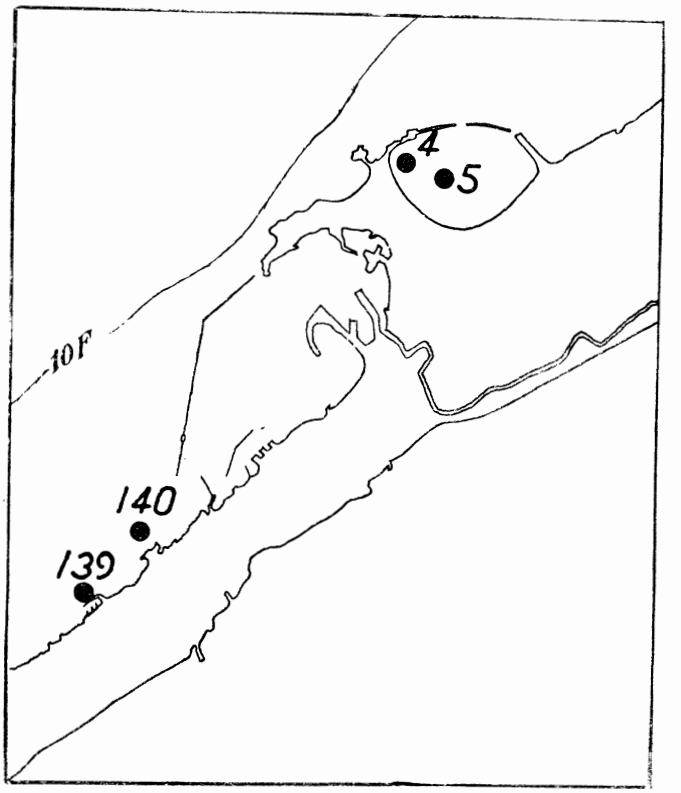


FIG. 15.—*Ophioderma longicauda* (Lamarck)

St. 4—3 specimens, St. 5 (East Harbour)—1 specimen, St. 139—2 specimens, St. 140—1 specimen.

2-8 fathoms deep on sandy bottom with *Caulerpa* and *Posidonia* in the district of the two harbours only.

Echinoidea

(17) *Stylocidaris affinis* (Philippi) (Chart. 16).

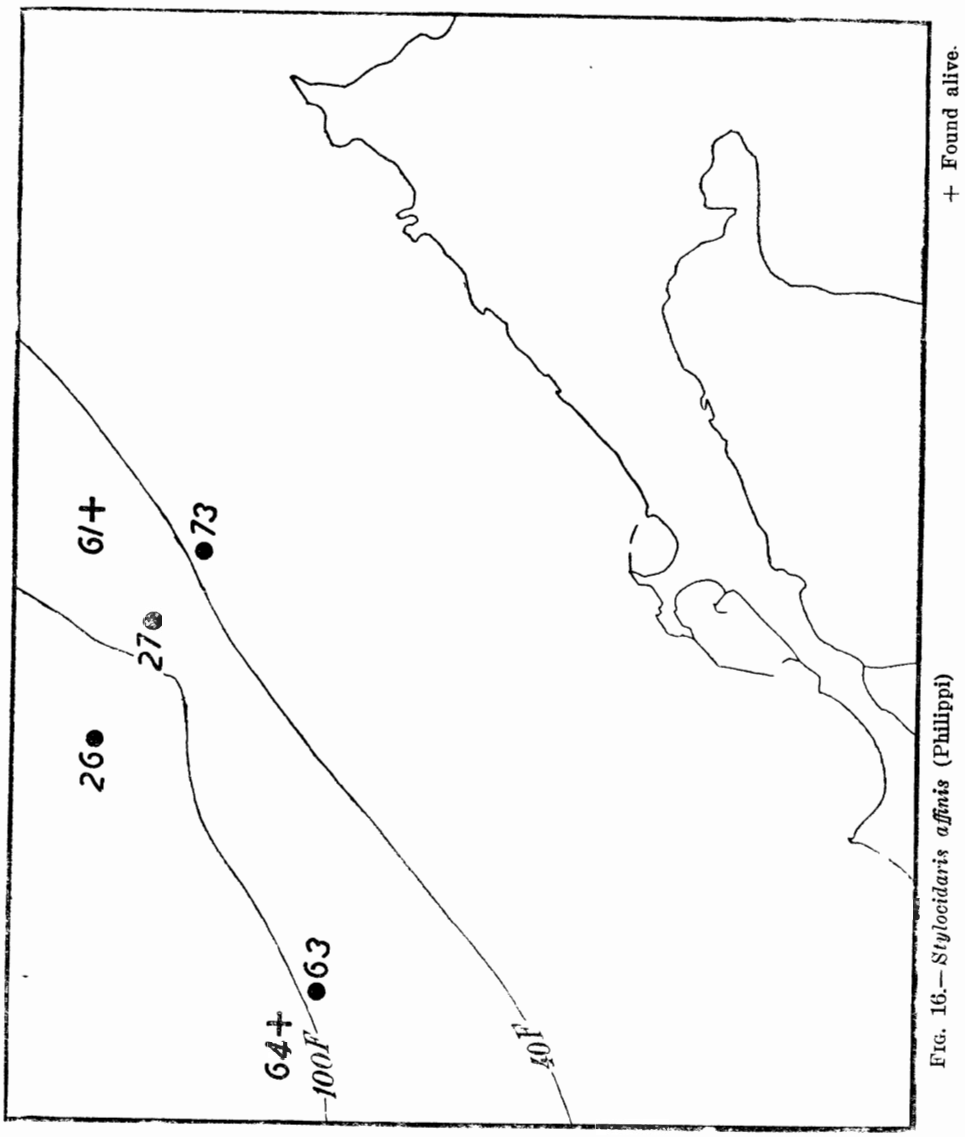


Fig. 16.—*Stylocidaris affinis* (Philippi)

St. 26—spines only, St. 27—spines only, St. 61—1 young specimen, spines and fragments, St. 63—spines only, St. 64—1 young specimen, St. 73—spines only.

On muddy bottom 38-126 fathoms deep (alive in 50-126 fathoms only) only in the West (because nearer the coast).

(18) *Genocidaris maculata* A. Agassiz (Chart. 17).

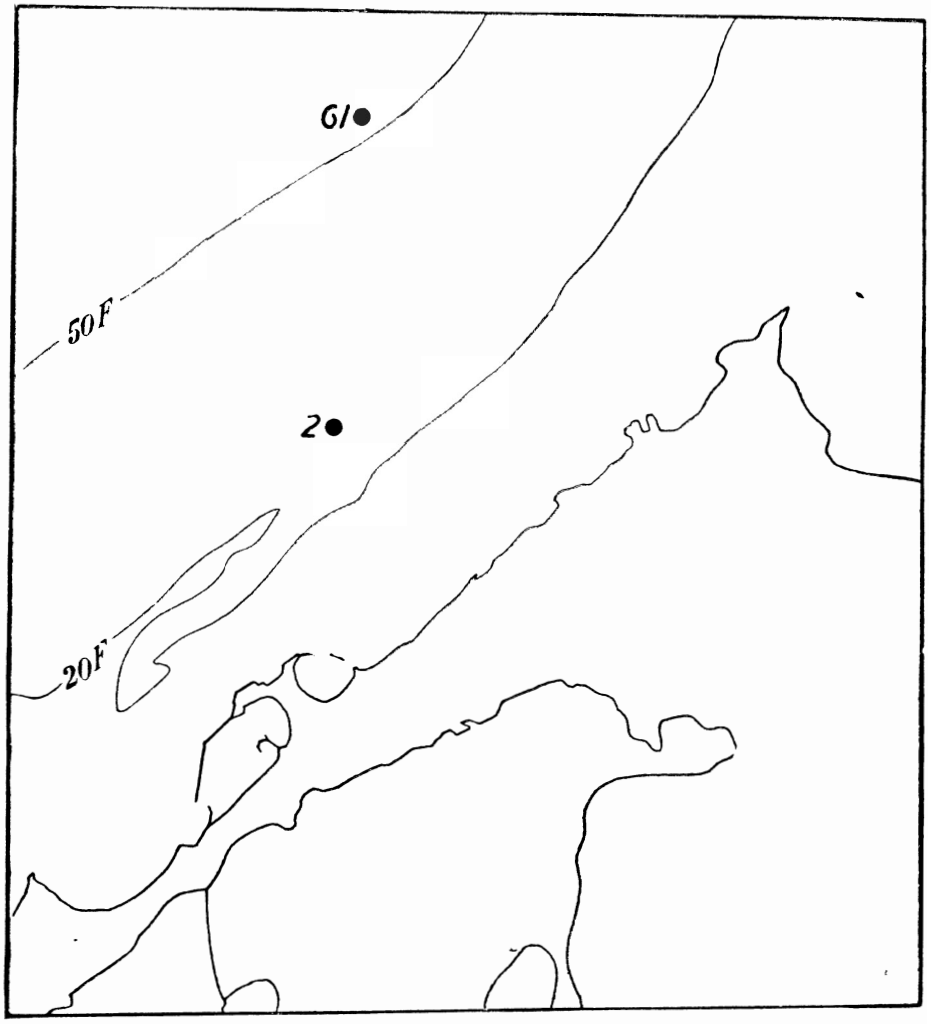


FIG. 17.—*Genocidaris maculata* A. Agassiz

(Syn. *Arbacina Pallaryi* Gauthier).

St. 2—1 specimen, (dead test). St. 61—several dead test, 1 live specimen.

On two places of the "*Halimeda*-barrier" in the West in 25-50 fathoms on stony ground mixed with sand and mud.

(19) *Paracentrotus lividus* (Lamarck) (Chart. 18).

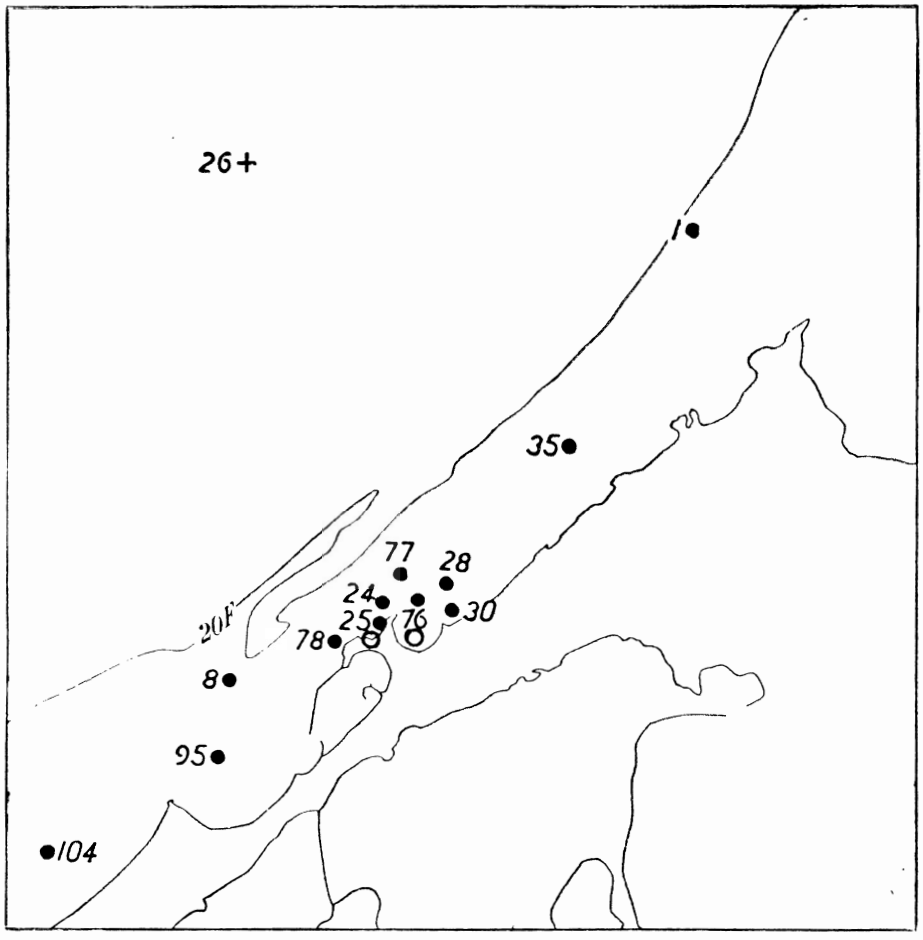


FIG. 18.—● *Paracentrotus lividus* (Lamarck)
+ Dead test only. ○ According to the collector's notes.

St. 1—1 young specimen, St. 8—1 young specimen, St. 24—3 young specimens, St. 25—4 specimens, St. 26—1 young specimen (dead test), St. 28—6 young specimens, St. 30—1 young specimen, St. 35—2 young specimens, St. 76—6 young specimens, St. 77—1 young specimen, St. 78—5 specimens, St. 95—1 specimen, St. 104—1 specimen, St. ?—4 specimens.

In 5—21 fathoms on stony *Caulerpa*—and *Halimeda*-bottom, frequent in the West.

(20) *Echinocyamus pusillus* (O. Fr. Müller) (Chart. 19).

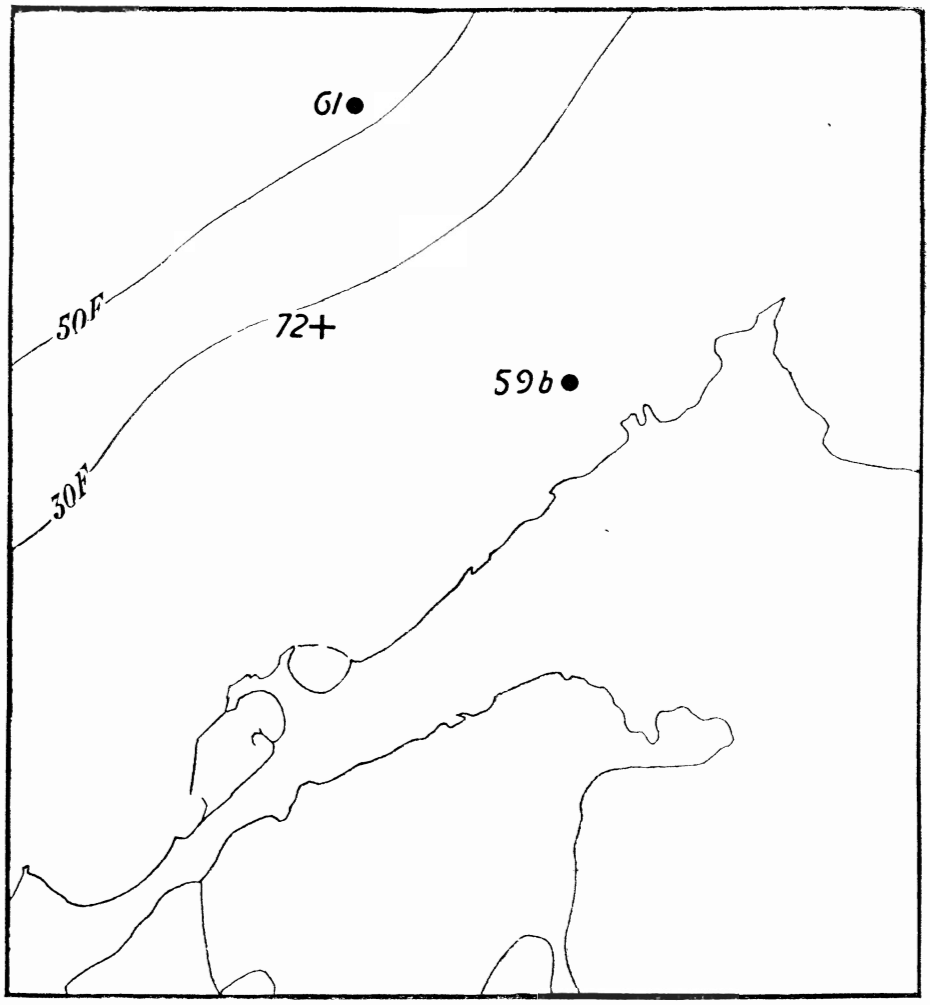


FIG. 19.—*Echinocyamus pusillus* (O. Fr. Müller)
+ Found alive.

St. 59*b*—4 specimens, dead tests, St. 61—6 specimens, dead tests, St. 72—1 specimen (alive).

In 15-50 fathoms, alive however in 30 fathoms once only, on sandy and muddy ground with *Caulerpa*, together with the following species.

(21) *Plagiobrissus costae* (Gasco) (Chart. 20).

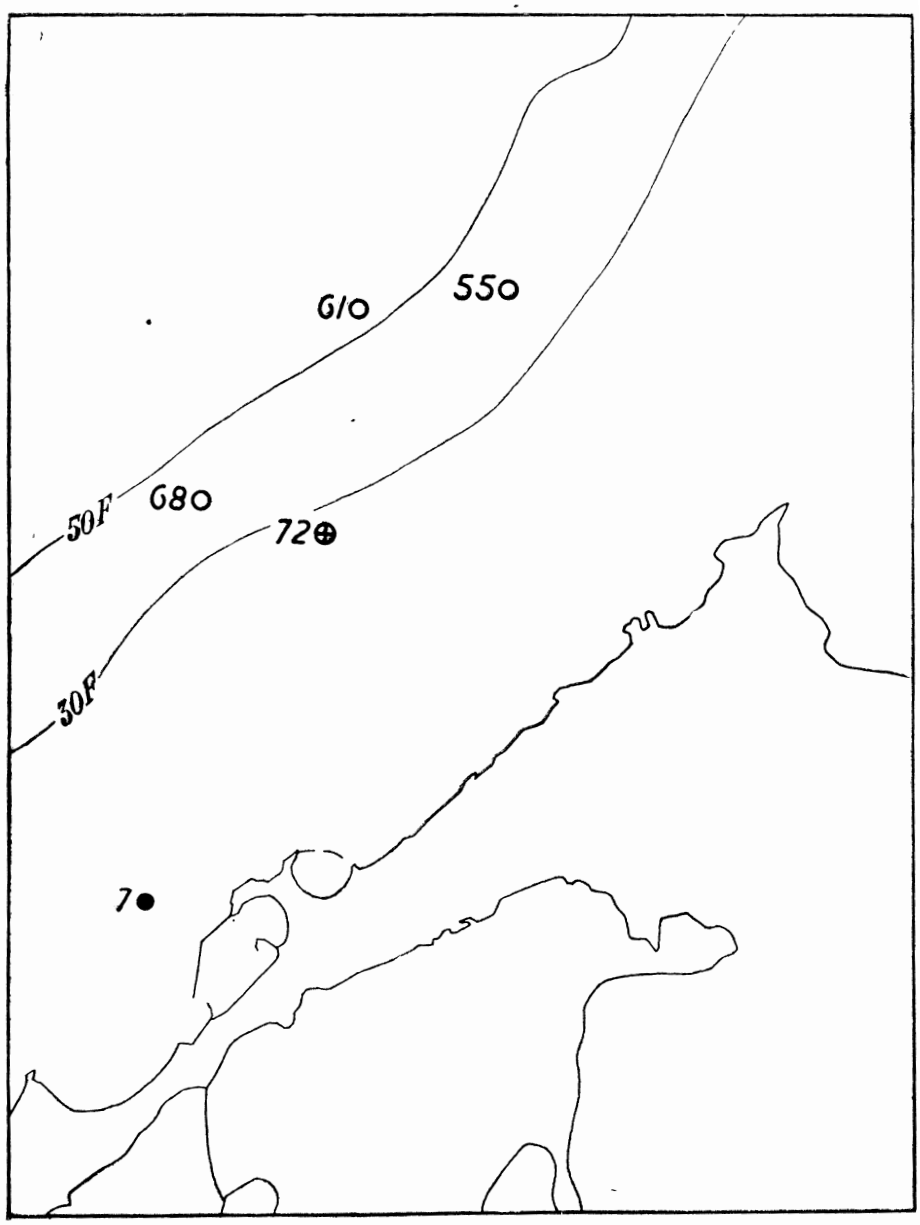


Fig. 20.— + *Plagiobrissus costae* (Gasco)
● *Brissus brissus* (Leske)
○ *Brissopsis lyrifera* (Forbes)

St. 72—2 specimens (very young).

Once only in 30 fathoms together with the preceding on the "*Halimeda*-Barrier".

(22) *Brissus brissus* (Leske) (Chart. 20).

St. 7—1 specimen.

Once only in 17 fathoms on stony *Caulerpa*-bottom off the Western Harbour.

(23) *Brissopsis lyrifera* (Forbes) (Chart. 20).

St. 55—1specimen, adult, St. 61—3 specimens, young, St. 68—fragments, St. 72—2 specimens young, St. ?—fragments.

In 30-50 fathoms on muddy bottom (rarely mixed with sand) without algae or with *Caulerpa*, in the West only.

(24) *Ova* (*Schizaster*) *canalifera* (Lamarck) (Chart. 21).

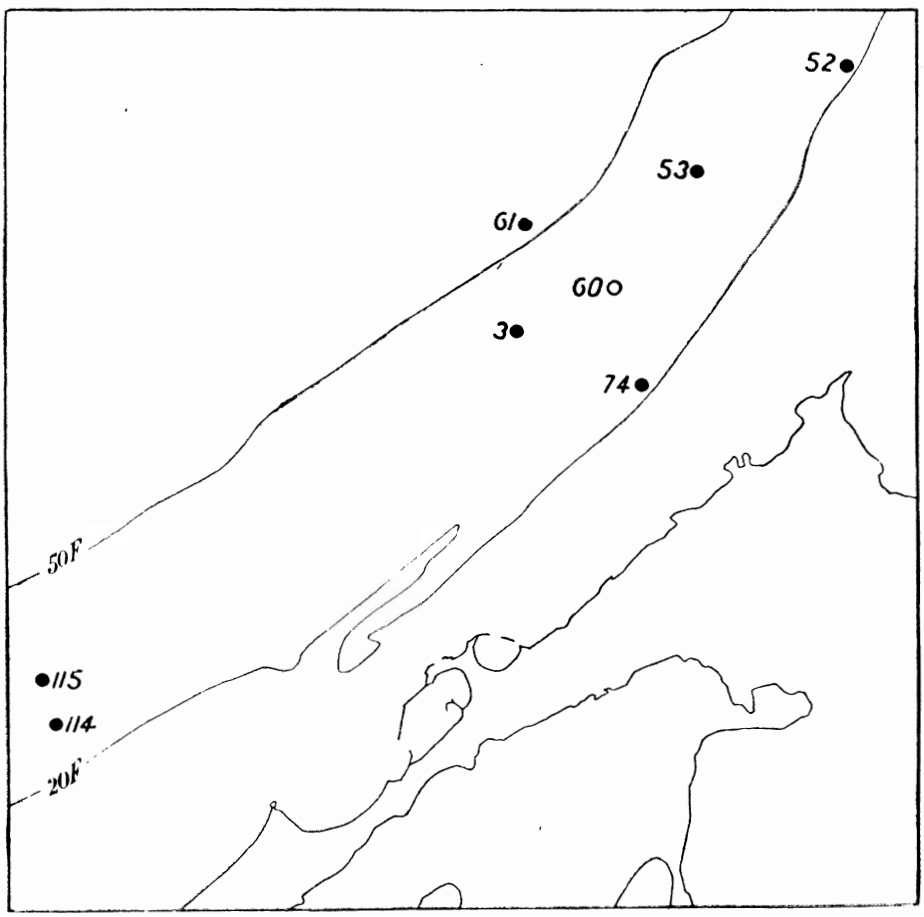


FIG. 21 —● *Ova* (*Schizaster*) *canalifera* (Lamarck)
○ According to the collector's notes.

St. 3—2 specimens, St. 52—fragments, St. 53—2 specimens (1 adult, 1 young), St. 61—1 specimen (young), St. 74—5 specimens, St. 114—1 specimen (young), St. 115—1 specimen (young), St. ?—4 specimens.

On muddy ground 22-50 fathoms deep with or without algae (*Caulerpa*) frequent near the western coasts, characteristic form of the "*Schizaster-Chiajei* (Sch.-Ch.)—and of the "*Schizaster—Turritella*" (Sch. T.)—community.

(25) *Echinocardium cordatum* (Pennant) (Chart. 22).

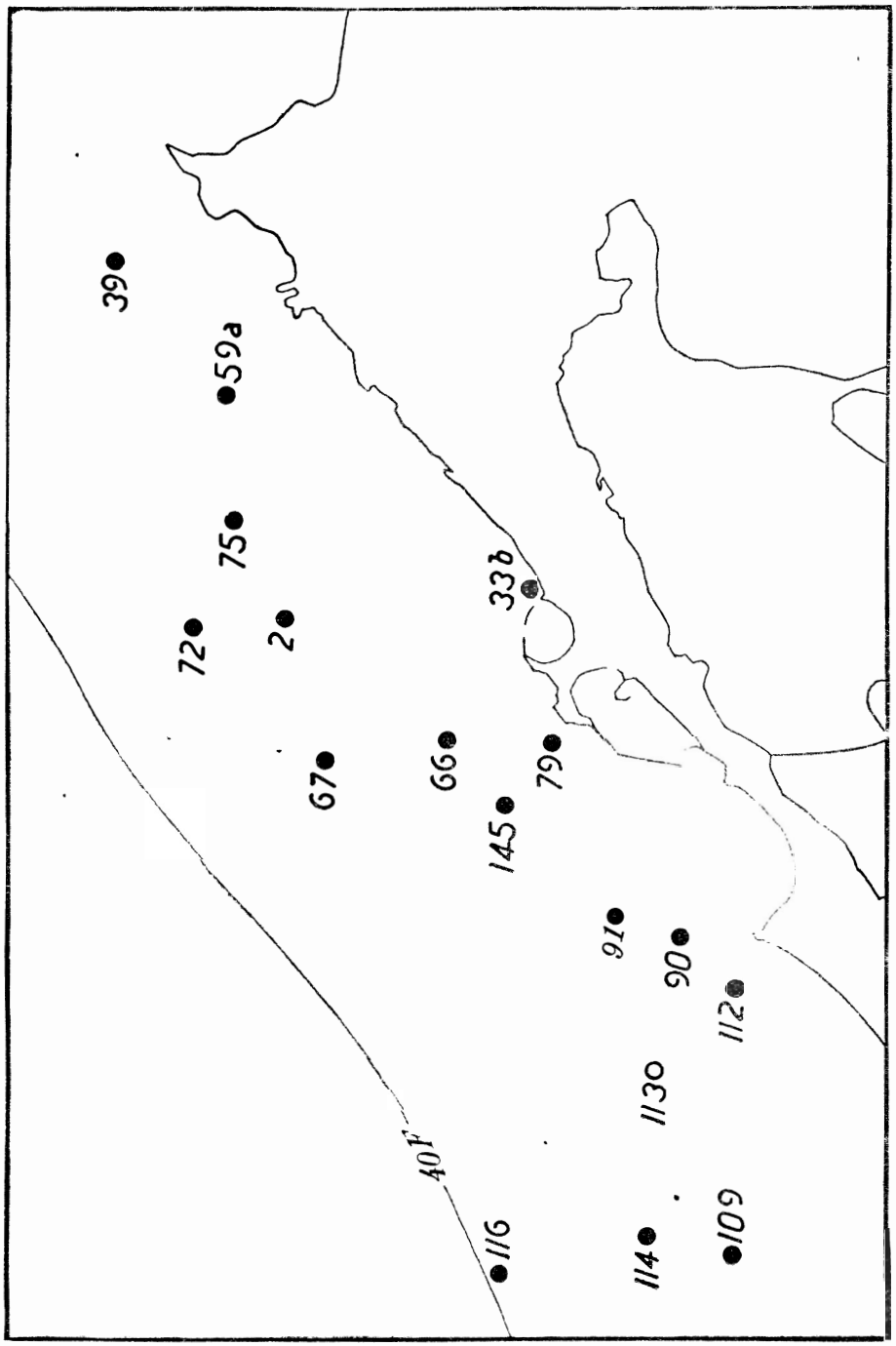


FIG. 22. — ● *Echinocardium cordatum* (Pennant) ○ According to the collector's notes.

St. 2—5 specimens, St. 33*b*—1 specimen, St. 39—1 specimen, St. 59*a*—1 specimen, St. 66—3 specimens, St. 67—5 specimens, St. 72—2 specimens, St. 75—several specimens, St. 79—1 specimen, St. 90—2 specimens, St. 91—1 specimen (missing on the chart), St. 109—2 specimens, St. 112—4 specimens, St. 114—2 specimens, St. 116—5 specimens, St. 145—2 specimens.

Off the shallow coast to 35 fathoms, usually on muddy ground with or without algae.

Holothurioidea

(26) *Holothuria Polii* (Delle Chiaje) (Chart. 23).

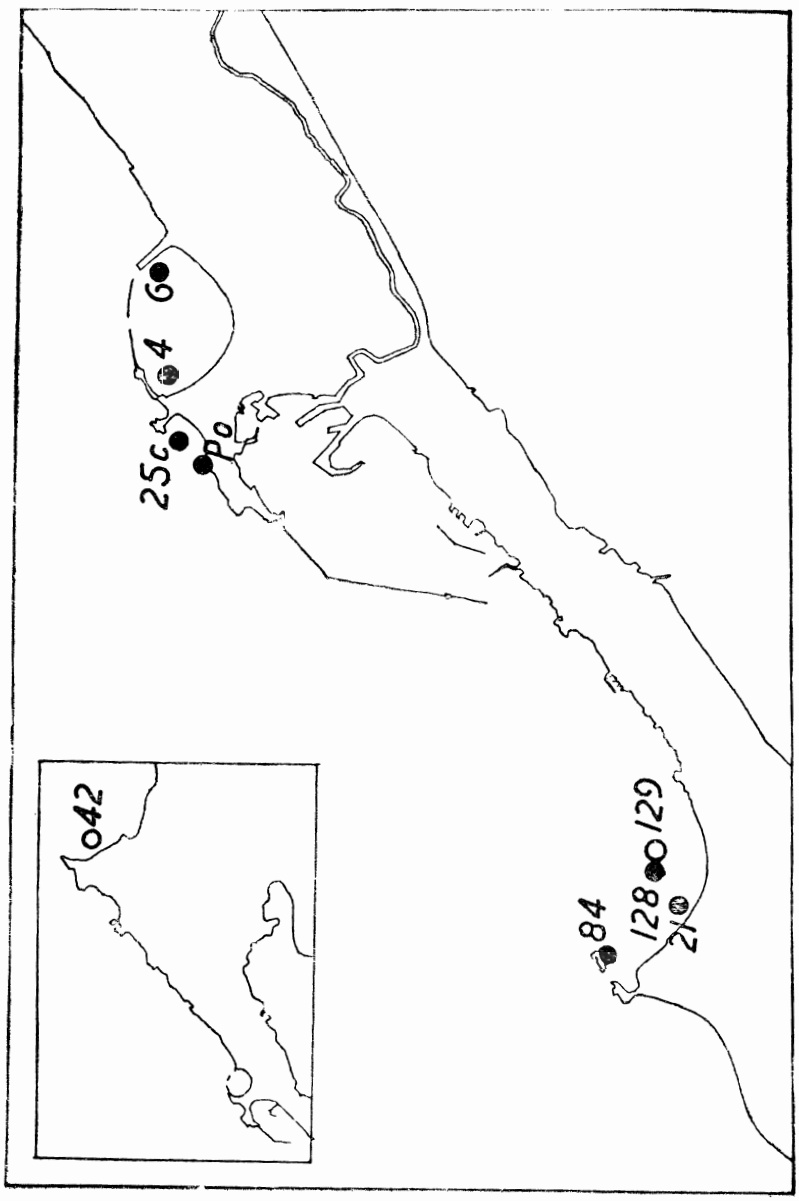


Fig. 23. — ● *Holothuria Polii* (Delle Chiaje)
○ According to the collector's notes.

St. 4—1 specimen, St. 21—1 specimen, St. 25—1 specimen, St. 84—3 specimens, St. 128—2 specimens, Po (Ras-el-Tin)—4 specimens, Eastern Harbour—1 specimen.

Off the coast to 7 fathoms on sandy bottoms in the Eastern Harbour with *Posidonia* and *Caulerpa*, in the Bay of Anfushi and in the Bay of Dekhela. (Also in the Bay of Abukir).

(27) *Holothuria sanctori* (Delle Chiaje) (Chart. 24.).

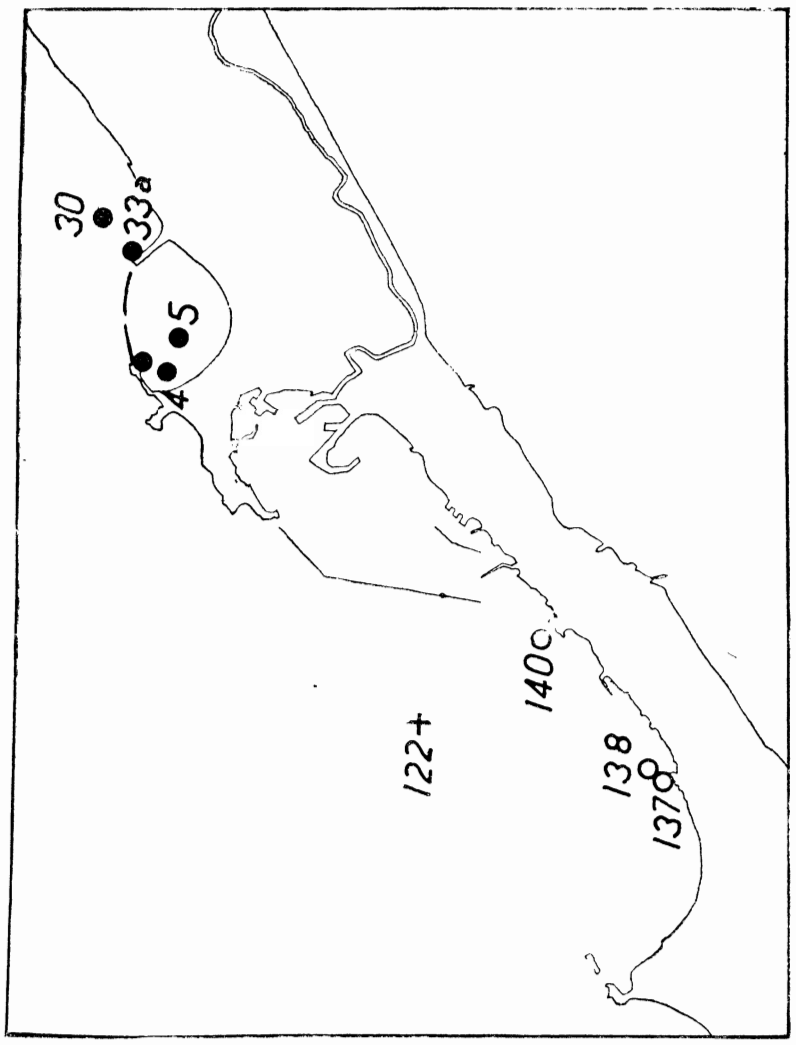


Fig. 24.—+ *Holothuria sanctori* (Delle Chiaje)
○ " " According to the collector's notes.
● *Cucumaria syracusana* (Grube)

St. 122—1 young specimen.

In3-6 fathoms in the *Amphioxus*—sands of the Bay of Dekhela overgrown with seaweeds and algae.

(28) *Cucumaria syracusana* (Grube) (Chart. 24).

St. 4—2 specimens, St. 5—3 specimens, St. 30—1 specimen, St. 33*a*—1 specimen, off the Marine Laboratory—1 specimen.

On the shallow beach to 7 fathoms on sands with *Caulerpa* in the surroundings of the Eastern Harbour only.

(29) *Cucumaria Grubei* v. Marenzeller (Chart. 25).

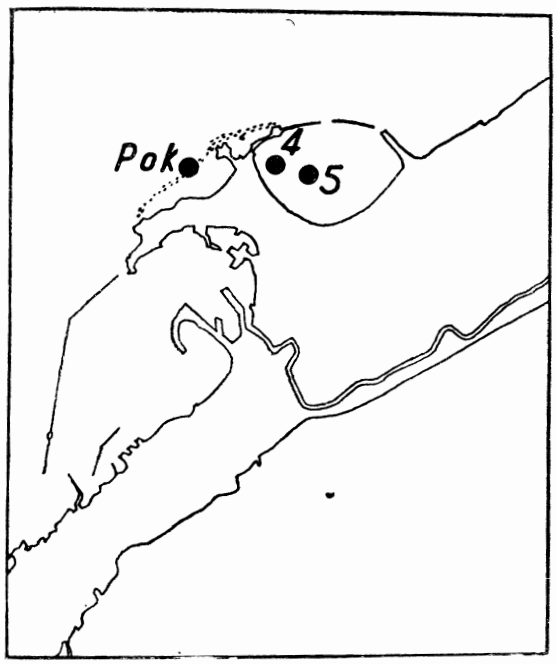


FIG. 25.—*Cucumaria Grubei* v. Marenzeller

St. 4—1 specimen, St. 5—6 specimens, Po (Ras-el-Tin)—1 specimen.

On crags and upon sand between algae to 3 fathoms in the Eastern Harbour and in the Bay of Anfushi only.

(30) *Cucumaria elongata* Düben & Koren (Chart. 26).

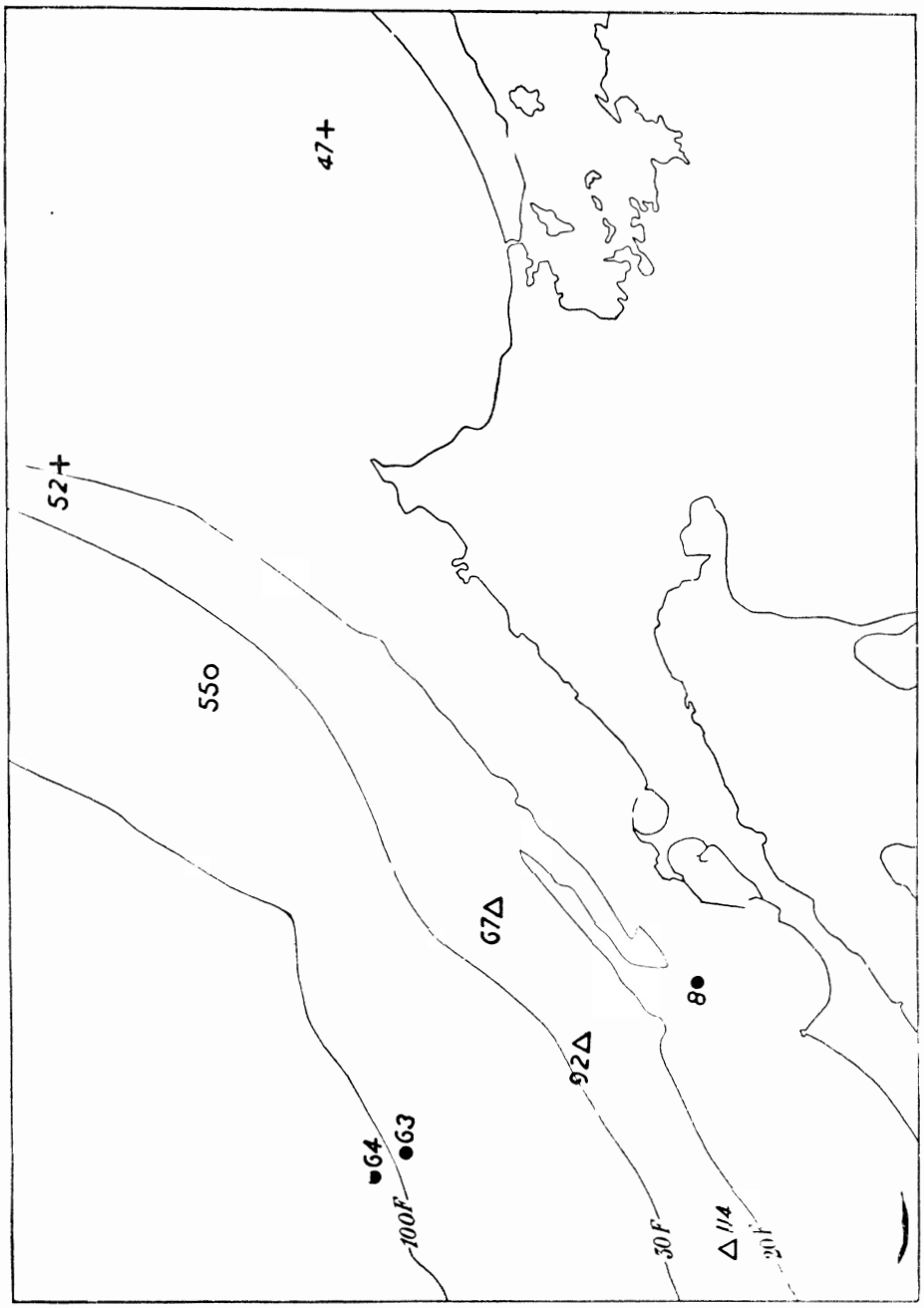


FIG. 26.— + *Cucumaria elongata* Dub. et Kor.
○ *Labidoplax digitata* (Montagu).

St. 47—1 specimen (young), St. 52—1 specimen (young).

In 6—22 fathoms on sandy and muddy bottoms without vegetation, in the east-basin only, can therefore best stand brackish water.

(31) *Thyone fusus* (O. Fr. Müller) (Chart. 26).

St. 8—1 young specimen. St. 63—1 young specimen, St. 64—1 young specimen.

In 15—110 fathoms on muddy, sandy or stony bottom with or without vegetation, in the utmost West only, consequently sensible to low salinity.

(32) *Labidoplax digitata* (Montagu) (Chart. 26).

St. 55—1 young specimen (fragment).

Once only in 40 fathoms on mud without algae.

Crinoidea

(33) *Antedon mediterranea* (Lamarck) (Chart. 26).

St. 67—1 specimen, St. 92—1 specimen, St. 114—1 specimen.

In 22-25 fathoms on muddy and sandy ground with *Caulerpa* on a narrow stripe 6-7 miles off the coast and parallel to it. In the West only.

Horizontal Distribution

The number of species seems to diminish at the North-African coast towards the East. One of the best known Asteroids, the big *Marthasterias glacialis*, is recorded from the Algerian coast only, *Echinaster sepositus* and *Astropecten aurantiacus* are met with on the Tunisian coast and certainly reach further eastward, so *Echinaster sepositus* (according to the collector's notes) at least as far as Mersa Matruh. (About 27° E.), and also *Astropecten aurantiacus* is probably still found off the western part of the Egyptian coast. If we divide the district of the coast investigated in a western portion, about as far as Silsila off the Eastern Harbour (about at profile *d*), a middle portion as far as the Peninsula of Abukir (profile *e*) and an eastern portion (Bay of Abukir)*, we find that about 15 species penetrate as far as Silsila, 11 only as far as the profile of Abukir, while 6 species only were found in the shallow, sandy and muddy bottoms of the Bay of

* Vide : I. Prelim. Rep. 1935, Chart II

Abukir, where vegetation is scarce, namely two species of Asteroids, two of Ophiuroids, and two of Holothurioids. Of these *Cucumaria elongata* is up till now limited to the Bay of Abukir, of all Holothurioids obviously the most euryhaline; *Astropecten jonstoni* reaches westward to Sidi Bichr; the Ophiuroid *Ophiactis Savignyi*, an immigrant from the Indian Ocean, has first been recorded from the Mediterranean in 1926 off Port Said and its western distribution is limited at the present time to the Eastern Harbour and the Pharo. Here there is a rich feeding ground strikingly rich in species (12 species). In this harbour in particular and in the neighbouring shallow Bay of Anfushi* where at least 5 species are met with) sea-urchins (*Paracentrotus lividus*) are collected every day by native fishermen diving after them. The fragment of a shell found at St. 26 at a great depth (126 fath.) has probably been brought there accidentally, not actually been living at that depth.

Vertical Distribution

In shallow waters near the coast, occur *Asterina gibbosa* and *Coscinasterias tenuispina*. A little deeper, to 3 fathoms, we find *Cucumaria Grubei*, *Astropecten spinulosus* (to 6 fathoms), *Holothuria Polii* and *Cucumaria syracusana* (to 7 fathoms), the Ophiuroid *Ophioderma longicauda* (8 fathoms) as well as *Astropecten jonstoni* (10 fathoms). *Astropecten bispinosus* (20 fath.), *Paracentrotus lividus* (21 fath.), and *Cucumaria elongata* go a little deeper. The next (to about 30 fath.) are the Ophiuroids *Ophiothrix fragilis* and *Ophiopsila aranea*, *Ophiura texturata*, and perhaps still *Ophiomyxa pentagona* as well as the Echinoids *Echinocyamus pusillus* and *Plagiobrissus Costae*. *Antedon mediterranea* has only seldom been found between 22 and 25 fathoms. *Amphipholis squamata* and *Echinocardium cordatum* penetrate to about 40 fathoms. The 50-fathom-line is reached by *Amphiura mediterranea* (5-50 fathoms), of Asteroids by *Astropecten irregularis pentacanthus* and by the Ophiuroid *Amphiura Chiajei* (both 5—50 fathoms) and besides by the sea-urchin *Ora canalifera* (about 20-50 fathoms), by *Genocidaris maculata* (25-50 fathoms), *Brissopsis lyrifera* (30-50 fathoms) and perhaps by the Synaptid *Labidoplax digitata* (40 fath.). The 50-fathom-line was surpassed by 3 species, namely *Amphiura filiformis* (50-70 fathoms), *Stylocidaris affinis* (50-126 fathoms) and *Thyone fusus* (15-110 fathoms). This last is therefore the most eurybath.

* Vide : I. Prelim. Rep. 1935, Chart. I.

According to the condition of the bottom we find the distribution as follows. On hard bottom, namely on crags, stones, coarse sand and on the plants growing on them occur : *Asterina gibbosa, Coscinasterias tenuispina, Ophiothrix fragilis, Ophiopsila aranea, Ophiactis Savignyi, Genocidaris maculata, Paracentrotus lividus, Holothuria Sanctori, Cucumaria Grubeilli* and *Thyone fusus*.

On real sandy ground are to be met with : *Astropecten jonstoni, Ophioderma longicauda, Holothuria Polii* and *Cucumaria syracusana*. In mud mixed with sand we have records of : *Astropecten spinulosus* and *Cucumaria elongata*. In mud as well as in sand live : *Astropecten bispinosus* and *A. irregularis pentacanthus, Amphipholis squamata, Echinocyamus pusillus, Plagiobrissus costae* and *Brissopsis lyrifera*. In mud only we found : *Amphiura filiformis, mediterranea* and *Chiajei, Ophiura texturata, Ova canalifera, Echinocardium cordatum* and *Labidoplax digitata*. *Astropecten bispinosus* is able to live even in the black, rotten mud of the West Harbour (St. 11) ; almost as far reaches *Amphiura mediterranea* (St. 17) and a little distant from it lives *Holothuria Polii* (St. 128, 129).

As to the vegetation, one can say that the species living in the shallow zone near the coast prefer banks of seaweed and algae, whereas the species occurring, according to the vertical distribution given above, in depths of 10-20 fathoms are generally restricted to the *Halimeda*—Biocoenosis. Further seaward about as far as the 50-fathom-line reaches the *Caulerpa*-zone ; in still greater depths is mud with little or no vegetation.

From the above can be inferred that the following species are very often found at the same locality : *Asterina gibbosa* and *Coscinasterias tenuispina* (see Kœhler, 1921, p. 26). As a third associate we often find, instead of *Marthasterias glacialis, Holothuria Polii*. Together with *Paracentrotus lividus* is often met *Ophiothrix fragilis* and *Ophiopsila aranea*. However we never find living together *e.g. Astropecten bispinosus* and *Ophiomyxa pentagona* or *Holothuria Polii* (see Kœhler, 1921, p. 47 and 68).

General Remarks

The Echinoderma-fauna off Alexandria is composed of the following elements :

(1) Almost cosmopolitan species : *Amphipholis squamata, Ophiactis Savignyi, Echinocardium cordatum, Holothuria impatiens*.

(2) Atlantic-Mediterranean species : *Coscinasterias tenuispina*, *Amphiura Chiajei*, *filiformis*, *Paracentrotus lividus*, *Echinocyamus pusillus*, *Brissopsis lyrifera*, *Cucumaria elongata*, *Thyone fusus*, *Holothuria sanctori* and *polii*, *Labidoplax digitata*.

(3) Purely Mediterranean species : *Astropecten spinulosus* and *jonstoni*, *Ova canalifera*, *Cucumaria Grubei* and *syracusana*, *Antedon mediterranea*.

The collection of Echinoderms from the Mediterranean coasts of Egypt consists exclusively of well-known species and calls for very few descriptive remarks only.

The single young specimen of *Holothuria sanctori* contains no buttons; but the tables are of the form typical of the species, so I have no doubt that the identification as *H. sanctori* is correct. This is in conformity with the observation mentioned in my paper on the Suez Canal Echinoderms (p. 117) that buttons are almost absent in the young *Holothuria impatiens*, as also with the observation of *H.L. Clark* (quoted loc. cit) that buttons are absent in the young *H. monacaria*. These facts tend to indicate that tables in general appear before buttons in *Holothuria*.

Concerning *Ophiothrix fragilis* it may be mentioned that some specimens have spines on the disk, recalling thereby *O. quinquemaculata;* but they are otherwise typical *fragilis*, and as there are all transitional forms, I rather doubt whether *quinquemaculata* really represents a distinct species.

It is a very interesting fact that *Ophiactis Savignyi* has now been proved to occur in the Mediterranean, having wandered in from the Red Sea through the Suez Canal. There can be no doubt but that it will now spread over the whole of the Mediterranean, and it would be of great interest to watch its gradual dispersal. In order to make it easy also for non-specialists to distinguish this species from the indigenous Mediterranean species, *Ophiactis virens* (M. Sars) I give here figures of the two species. Superficially they are very much alike : both of them are 6-armed and self-dividing, and both of them of greenish colour, and of the same size; but they are quite distinct species, the easiest observable differences being that one, *O. Savignyi*, has two papillæ to each side of the jaws, the other *O. virens*, only one (Figs. 27 *a*, *c*); further the shape of the dorsal armplates is different, *O. Savignyi* having a small rounded prominence in the

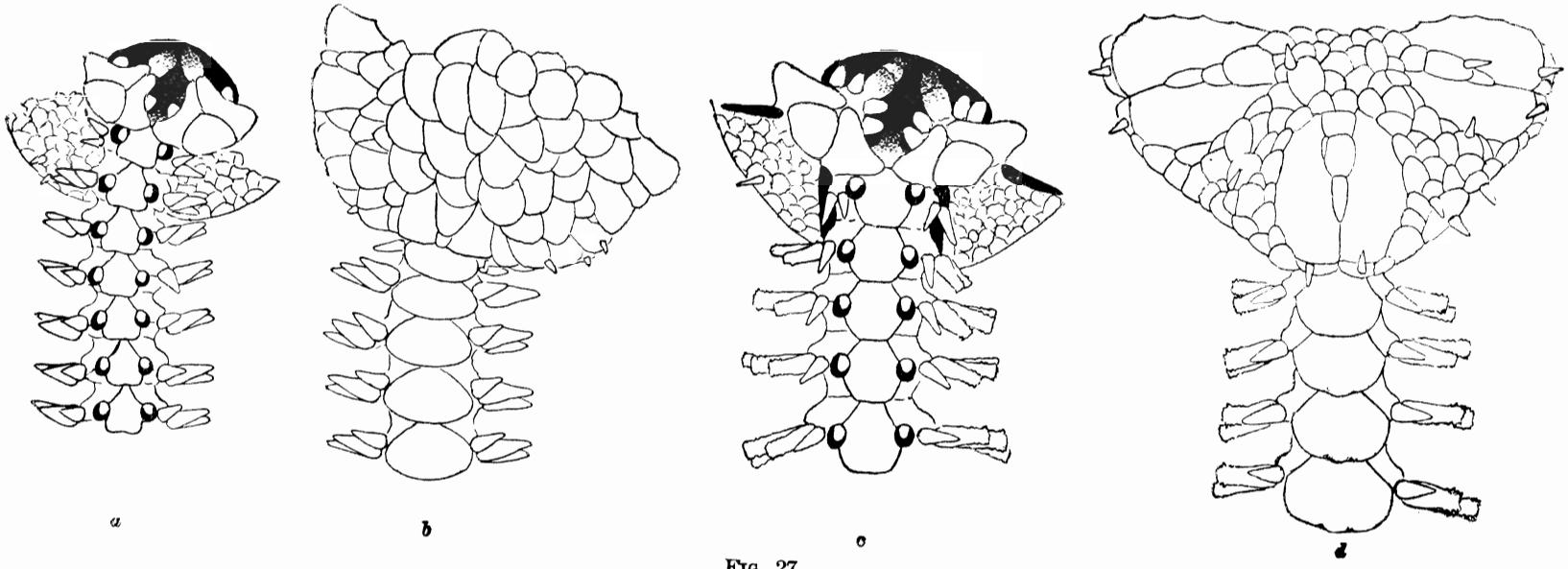


FIG. 27.
(a, b) *Ophiactis virens* (M. Sars.)
(c, d) *Ophiactis Savignyi* (Müller & Troschel).

middle of the distal edge of these plates, generally made the more conspicuous through the presence of a small whitish spot to each side of this prominence; in *O. virens* there is no such prominence, the distal edge of the dorsal plates being simply rounded (27 *b, d*).

This is the only species of Echinoderms till now known to have wandered into the Mediterranean from the Red Sea through the Suez Canal. The old record of an Echinoid, *Heterocentrotus mamillatus*, having wandered into the Mediterranean through the Suez Canal was shown already by *Fourtau* (1904, p. 414) to be a mistake due to erroneous labelling (Cf. my report, 1926, p. 129). It ought to be superfluous to mention this any more. But since *W. Steinitz*, in his paper (1929, p. 77), and quite recently *Tortonese*, (1935, p. 222) again mention *Heterocentrotus mamillatus* as having, according to *Gauthier* and *Ludwig*, wandered into the Mediterranean—evidently without knowing *Fourtau's* paper or having observed the statement in my paper quoted—it is necessary here again to emphasize that this supposed immigration rests on a mistake. Not that I expect, though, that *Heterocentrotus mamillatus* herewith will disappear from the list of immigrations through the Suez Canal. Mistakes of that sort usually continue to live, though ever so much refuted. I may add that *Tortonese* states this immigration to be "molto dubbia".

The question whether any Echinoderm species have wandered through the Suez Canal into the Red Sea from the Mediterranean does not directly concern us here. Still I think it desirable to say a few words here about this matter.

In my paper quoted on the Echinoderms of the Suez Canal I came to the result that there is "no certainty that even a single species has come from the Mediterranean". The more surprising is it to find that *A. Russo* (1929-1932) records a great number of Mediterranean Echinoderms from the Red Sea, as having wandered down there through the Suez Canal—*viz. Astropecten aurantiacus*, *Astrop. spinulosus*, *Echinaster sepositus*, *Centrostephanus longispinus*, *Echinus melo*, *Dorocidaris papillata*, *Spatangus purpureus*, *Schizaster canaliferus*, *Ophiactis virens*, *Ophiacantha setosa*, *Ophiothrix fragilis*; even a species otherwise found only at the N. American coasts, *Echinarachnius parma*, is recorded here from the Red Sea. I have not the slightest doubt but that all these species are erroneously identified. The *Echinarachnius parma*, of which a specimen was sent me by Prof. *Russo*, proved to be *Clypeaster Audouini*; photos sent me of the specimens identified as *Centrostephanus longispinus* and *Dorocidaris papillata* proved to be respectively *Diadema setosum* and

Prionocidaris baculosa. In a recent paper (1935) Prof. *Russo* has then also put a question mark at most of these Mediterranean species. We may then well set all these supposed immigrations to the Red Sea from the Mediterranean aside as due to erroneous identifications, or at least unreliable until the identifications have been verified through careful re-examination.

In the last named paper Prof. *Russo* also records several Red Sea species from Port Said, *viz. Astropecten polyacanthus* Müller & Troschel, *A. inutilis* Kœhler, *A. nobilis* Kœhler, *A. Bonnieri* Kœhler, and *Prionocidaris baculosa*, var. *erythræa* Döderlein. This does not sound so incredible as those Mediterranean species from the Red Sea, since it is to be expected that several of the Red Sea species will gradually find their way through the Suez Canal into the Mediterranean. But in view of the numerous errors in the identifications of the Red Sea Echinoderms, as explained above, one cannot rely on the correctness either of these specimens from Port Said—particularly the very difficult *Astropecten*-species.

In the above-mentioned paper by *Steinitz* the sea-star *Asterias tenuispina* Lamk. (now *Coscinasterias*) is mentioned as common to the Mediterranean and the Red Sea already before the existence of the Suez Canal (Op. cit. p. 12, 20). This statement rests on an identification by *W. Lange* of specimens collected by *Möbius* at the East African coast (*Lange* names it *Asterina tenuispina*, but *Steinitz* suggests, probably with full right, that it must be the *Asterias tenuispina*), *Steinitz* stating that "es liegt kein Grund vor, die Diagnose anzuzweifeln". On the contrary, I think there is every reason to doubt this "diagnosis" (*viz.* identification). If the specimen identified by *Lange* was really the many-armed form now designated as *Coscinasterias*, it has beyond any doubt been the species *calamaria* Gray, distributed all over the Indo-Pacific, from Japan to New Zealand and East Africa, not the Mediterranean-Atlantic species *tenuispina*. That *Lange*, who has not otherwise given proof of being specially acquainted with the classification of sea-stars, should have been able to distinguish these two closely related species is quite unbelievable.

Whereas this supposed occurrence in both the Mediterranean and the Red Sea of *Coscinasterias tenuispina* is thus to be dismissed as an evident mistake, there is another Echinoderm actually common to the Mediterranean and the Red Sea, namely *Holothuria impatiens* (Forskål). But this is a cosmopolitan species, like *Amphipholis squamata* (D. Ch.), which likewise occurs both in the Mediterranean and the Red Sea. As this Holothurian was

known from both these seas long before the opening of the Suez Canal, there is here no question of a wandering from one sea to another through the Canal.

It is a noticeable fact that several common littoral Mediterranean Echinoderms are absent in this collection from the coasts of Egypt, such as *e.g. Arbacia lixula, Sphærechinus granularis, Astropecten aùrantiacus, Marthasterias glacialis*—species which could not possibly have been overlooked, if they really did occur there. This leads to the question whether any of the Mediterranean Echinoderms are limited to the Western part of the Mediterranean Sea and, in such case, where the limit is, and which are the causes that put a stop to their extension into the Eastern Mediterranean. These questions cannot be answered at present, and mainly for the reason that the littoral Echinoderm fauna of the Eastern Mediterranean is almost totally unknown, beyond what has now been made known by the present researches at the Egyptian coast.

In the "Bibliothèque de la Faune des Colonies Françaises" III. "Les Etats de Syrie", par *A. Gruvel*, 1931, is found, p. 127-128, the following statement about the Echinoderms : *

"La faune des côtes de Syrie est véritablement pauvre en Echinodermes. On y rencontre bien quelques Astéries ou Etoiles de mer dans les dragages ou chalutages, un certain nombre d'Ophiures et de rares Comatules, mais en fait d'espèces comestibles on n'en trouve qu'une seule—l'oursin livide (Paracentrotus lividus L.) qui se loge dans les anfractuosités des roches calcaires de la côte, dans lesquelles il se creuse une sorte de niche parfaitement lisse et arrondie. C'est la seule espèce que l'on rencontre de temps en temps sur les marchés et particulièrement sur celui de Beyrouth. Nous n'en avons jamais vu ailleurs.

Cela prouve surabondamment que sa consommation est très restreinte, limitée qu'elle se trouve à quelques amateurs européens seulement".

From this it seems rather certain that at least *Sphærechinus granularis* does not occur at the Syrian coast, no more than it does at the Egyptian coast, whereas *Paracentrotus lividus* appears to occur all along the Eastern coasts. But this is also all that can be said with any degree of certainty at present. A thorough investigation of the littoral fauna of the Eastern Mediterranean is among the most urgent tasks.

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* I owe this quotation to Dr. *G. Ranson*, Musée d'Hist. Nat. Paris, to whom I beg to tender my best thanks for this service.

A question, intimately connected with the above, of the possibly limited extension of various Echinoderms into the Eastern Mediterranean is this, whether any of the species actually found at the Egyptian coast are in dwarfed condition, as might be expected to be the case at the outermost limits of distribution of such species. *Paracentrotus lividus*, the commonest of them, is, so far as I can see, not smaller than in the Western Mediterranean, and the same holds good of *Ora canalifera*. On the whole, it is decidedly my impression that none of the species can be said to be in a dwarfed condition. But the material at hand is scarcely sufficient for allowing definite conclusions as to this problem.

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