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TH. MORTENSEN  
ECHINODERMS  
OF TRISTAN DA CUNHA

PUBLISHED BY  
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## ECHINODERMS OF TRISTAN DA CUNHA

BY

TH. MORTENSEN

Up till now our knowledge of the Echinoderm fauna of Tristan da Cunha was confined to what was collected there by the "Challenger" and the "Discovery" Expeditions.

Not counting the deep-sea forms, from depths of 500 fathoms and beyond, the "Challenger" collected only five species of Echinoderms at Tristan da Cunha, viz.

*Astropecten mesactus* Sladen (90 fathoms).

*Crossaster penicillatus* Sladen (110 fathoms).

*Henricia (Cribrella) simplex* Sladen (90-150 fathoms).

*Asterias (Sclerasteria\*) eustyla* (Sladen) (100-150 fathoms).

*Arbacia Dufresnii* (Blv.) = *Arbacia crassispina* Mrtsn. (100-150 fathoms).

The "Discovery" collected four species of Ophiurans, viz.

*Ophiomyxa vivipara* Studer (80-140 m).

*Ophiactis seminuda* Mrtsn. (80-140 m).

*Amphiura da Cunhae* Mrtsn. (135 m).

*Amphipholis squamata* (D. Ch.) (40-60 m).

The Asteroids and Holothurians of the "Discovery" have not yet been published, so it is unknown whether any species were taken at Tristan da Cunha. No Crinoids were taken there by the "Discovery", any more than by the "Challenger".

The littoral fauna of Tristan da Cunha was up till now completely unknown. The collection made by Mr. Erling Sivertsen in the littoral region of Tristan da Cunha during the Norwegian Expedition, Dec. 1937--March 1938, is thus a most welcome addition to our knowledge of the fauna of this isolated group of small islands. In all 9 species of Echinoderms were collected by Mr. Sivertsen, viz.

*Henricia simplex* (Sladen).

\* — *obesa* (Sladen).

\**Allostichaster inaequalis* Koehler.

\**Eremasterias robusta* sp. nov.

*Ophiomyxa vivipara* Studer.

\**Amphiura capensis* Ljungman.

*Amphipholis squamata* (Delle Chiaje).

*Arbacia crassispina* Mrtsn.

\**Notechinus magellanicus* (Philippi).

The species marked \* were hitherto not known from Tristan da Cunha.

We thus know now in all 14 species of Echinoderms from the littoral--sublittoral region of Tristan da Cunha, viz. 7 Asterooids, 5 Ophiuroids, and 2 Echinoids, thus a rather poor fauna. That Crinoids do not seem to occur there is not so strange, considering the relative poverty of Crinoids in both the Magellanic and the Cape region; I think it more remarkable that not a single Holothurian has been found at Tristan da Cunha, and I cannot help suggesting that such will ultimately prove to occur there.

The species of Echinoderms now known to occur in the littoral — sublittoral region of Tristan da Cunha, with Nightingale and In-accessible Island, are thus the following:

<i>Astropecten mesactus</i> Sladen.	<i>Ophiomyxa vivipara</i> Studer.
<i>Henricia simplex</i> Sladen.	<i>Ophiactis seminuda</i> Mrtsn.
— <i>obesa</i> (Sladen).	<i>Amphiura da Cunhae</i> Mrtsn.
<i>Crossaster penicillatus</i> Sladen.	— <i>capensis</i> Ljungman.
<i>Allostichaster inaequalis</i> Koehler.	<i>Amphipholis squamata</i> (D. Ch.).
<i>Eremasterias robusta</i> Mrtsn.	<i>Arbacia crassispina</i> Mrtsn.
<i>Sclerasterias eustyla</i> (Sladen).	<i>Notechinus magellanicus</i> (Phil.).

#### ASTEROIDEA

**Henricia simplex** (Sladen). — *Cribrella simplex*. Sladen. 1889. "Challenger" Asteroidea, p. 547. pls. XCVII. 5—6; XCVIII. 9—10.

TRISTAN DA CUNHA: Julia Point, several specimens from the littoral zone (stations 14, 64, 66, 68, 71, and 74).

The colour of the living specimens was reddish.

That these specimens are identical with Sladen's *Cribrella simplex*, taken by the "Challenger" off Tristan da Cunha at depths of c. 160—270 metres, I must regard as beyond doubt.

That it is a quite distinct species, not identical with *Henricia* (viz. *Echinaster*) *ornata* Perrier, as maintained by Bell (1905. Marine Investigations in S. Africa. III. Echinoderma, II. p. 250) and Döderlein (1910. Asteroidea, Ophiuroidea, Echinoidea. in Schultze. Forschungsreise im W. und Zentral S. Africa. Jen. Denkschr. XVI, p. 252 —

probably relying on Bell's statement), I must regard as quite certain. The specimens conform very well with Sladen's description and figures. The discrepancy between his description and figures, particularly Pl. XCVIII, 10, pointed out by Koehler (1917. Echinodermes de Kerguelen. Ann. Inst. Océanogr. VII. Fasc. VIII, p. 36) is evidently due to the said figure having been drawn from a specimen in alcohol, the description from dried specimens. When enclosed in their thick skin the adambulacral spines may make the impression of being arranged in double series, but in dried specimens it is evident that they are arranged in a single transverse series.

The species is known till now only from the localities, where it was taken by the "Challenger", viz. off Tristan da Cunha, Crozet Isl., Prince Edward Isl., and Marion Isl., at depths of c. 90–380 m. That it is now found to occur also in the littoral region at Tristan da Cunha is of considerable interest.

One of the Tristan da Cunha specimens recalls the var. *granulata* (Sladen), so beautifully figured by Koehler (op. cit. Pls. I. 1, 6, 7; II. 4, 5). There is, however, so much variation in the spinulation that I cannot but regard them all as individual variations, the more so as all the specimens are from one and the same locality.

To the Magellanic *Henricia Pagenstecheri* (Studer) the present species does not seem very closely related, judging from a comparison with specimens of *H. Pagenstecheri*, identified by Koehler, sent me on loan from the Stockholm Museum. Particularly the marginal plates are much more distinct in *Pagenstecheri* than in *simplex*.

**Henricia obesa** (Sladen). Pl. I, fig. 2. — *Cribrella obesa*. Sladen. 1889. "Challenger" Asteroidea, p. 544, pls. 96. 3–4; 98. 5–6.

TRISTAN DA CUNHA: Julia Point, littoral zone, two small, poorly preserved specimens. R = 8 mm.

It is customary to regard *H. obesa* as synonymous with *H. Pagenstecheri* (both from the Magellanic region). I do not think this correct; at least the present specimens (which correspond very well with Sladen's description and figures of *obesa*) look so different from *H. Pagenstecheri* (as well as from *H. simplex*), that I cannot but regard it as a distinct species. The figure here given will also convey the impression that we have here a distinct species — the very broad arms, together with the slight development of the marginal plates being very characteristic features. But it is not the place here to enter

on a detailed study of the subantarctic *Henricias*, for which a rich material will be needed.

Most probably the present specimens are only young ones — unfortunately I did not examine the condition of the gonads before they were dried.

***Allostichaster inaequalis*** Koehler. Pl. I, fig. 1. — Koehler. 1923. *Astéries & Ophiures*. Zool. Res. Swedish Antarctic Exped. I. 1. p. 50. Pls. I. 7—8; VII. 1—3.

TRISTAN DA CUNHA: Julia Point, 8 specimens from littoral zone (starlons 64, 68, and 74).

One of the specimens (from st. 74) is a fine adult, R. 22 mm, with all six arms equally developed (Pl. I, fig. 1); the other specimens are small, and in various stages of division and regeneration.

These specimens conform completely with the description and figures given by Koehler (Op. cit.); moreover, I have had a cotype, kindly sent me from the Stockholm Museum, for comparison, so there can be no doubt that the Tristan da Cunha specimens are really identical with this Magellanic species.

On the other hand, it very closely resembles also Perrier's "*Asterias*" *capensis* (cf. my Echinoderms of S. Africa, p. 276, Pl. XV. 11—12, the species being there mentioned as *Cosmasterias capensis*; evidently it is not a *Cosmasterias*, but an *Allostichaster*) — and it is quite possible that they are identical. As a matter of fact it is very doubtful whether *capensis* does actually come from the Cape region; it would be too remarkable that, as a littoral species, it should never have been found again in this well known region. Until it is actually found there the species *capensis* is better left entirely out of consideration.

The related New Zealand species *Allostichaster insignis* Farquhar is easily distinguished from *inaequalis* by its much thicker inframarginal spines.

***Eremasterias robusta*** sp. nov. Pl. I, figs. 3—4.

NIGHTINGALE: among Lithothamnions growing on rocks in the surf-zone, 3 specimens (the holotype: R = 21 mm, r = 7 mm; the others respectively R = 17 mm and 10 mm).

Arms five, robust looking, not attenuated. The dorsal side of the arms with a moderately dense covering of uniform, short, capitate spines, which may show an incipient arrangement in transverse series on the sides of the arms. Superomarginal plates generally each with

only one spine, of the same character as the dorsal spines, inframarginal plates with two or three coarse, not capitate spines, arranged in an oblique series; as seen from the ventral side they form a distinct fringe to the arm. The ventrolateral plates are quite rudimentary, narrow,

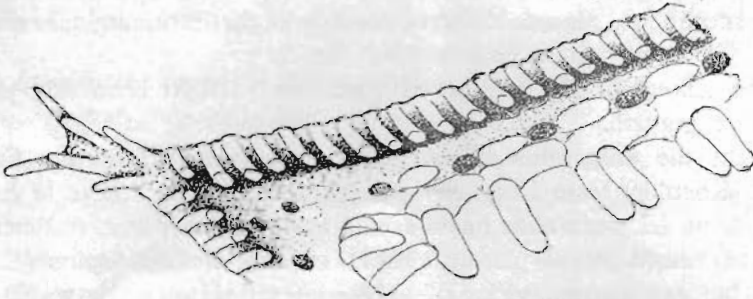


Fig. 1. Jaw and part of oral side of *Eremasterias robusta*; shows the monoserial adambulacral spines and the single series of ventrolateral plates, without spines; between these are seen the papular spaces. The limits of the ventrolateral plates not very distinct. The lower border of the figure formed by the inferomarginal plates with their spines.  $\times 10$ .

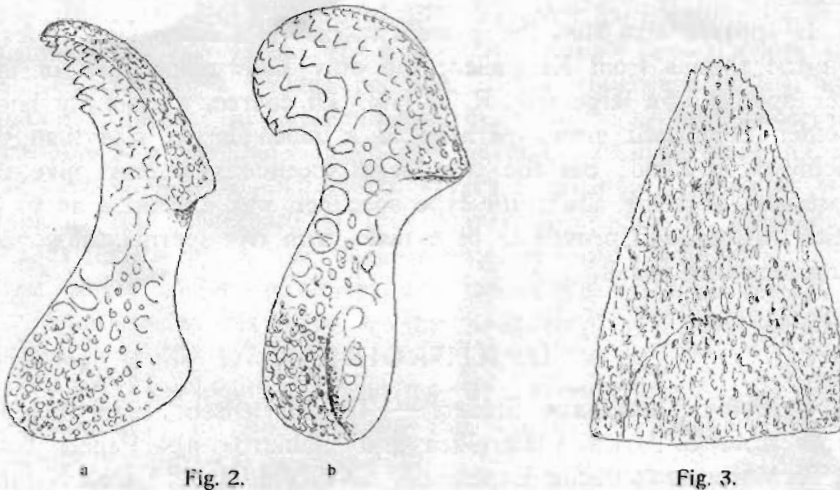


Fig. 2. Valve of crossed pedicellaria of *Eremasterias robusta*, in side view (a) and seen from the inside (b). Fig. 3. Valve of straight pedicellaria of *Eremasterias robusta*, from the inside. All  $\times 200$ .

elongate, and carry only a single, rather slender spine, usually lacking in the proximal part, more or less regularly present in the middle part of the arm. The regularly monoserial adambulacral spines are rather slender, capitate, and more or less distinctly curving outwards. The innermost spines on the jaws not enlarged (fig. 1).

The pedicellariæ are scarce, scattered, found mainly along the inframarginal spines. The crossed pedicellariæ (fig. 2 a, b) are found in good numbers, scattered on the dorsal side, mainly around the base of the spines. The straight pedicellariæ are much more scarce than the crossed ones, only three examples in all observed on the two largest specimens, placed at the upper side of the inframarginal series of spines. They are small, quite simple (fig. 3).

The colour of the preserved specimens a light brownish; in life they were grayish.

From the only other known species of *Eremasterias*, the *E. antarctica* (Koehler) from Kerguelen, the present species differs in having only 5 arms (*E. antarctica* has 6 arms), in having only one, rudimentary series of ventro-lateral plates, without or with a single spine (*E. antarctica* has two distinct series of ventro-lateral plates, each with two—three strong spines); also it appears that the innermost spines on the jaws are much stronger in *E. antarctica* than in the present species (cf. Koehler. Echinodermes de Kerguelen. 1917. Ann. Inst. Océanogr. VII. Fasc. VIII, p. 30, Pl. IX, figs. 5—8, 10, and 17; *Pisaster antarcticus*).

It appears also that the present species is a much smaller form than the species from Kerguelen; the only known specimen of this latter species is a large one, R. 70 mm. Of course, we do not know whether *E. robusta* grows perhaps to a much larger size than the specimens in hand; but the two larger specimens at least give the impression of being adult; the type specimen was examined as to its genital organs, and proved to be a male, with ripe sperma, the gonads being, however, small.

## OPHIUROIDEA

**Ophiomyxa vivipara** Studer. — Th. Mortensen. 1933. Echinoderms from S. Africa (Asteroidea and Ophiuroidea). Papers from Dr. Th. Mortensen's Pacific Expedition. LXV. Vid. Medd. Dansk Naturh. Foren., 93, p. 301. — Th. Mortensen. 1936. Discovery Reports. XII. Echinoidea and Ophiuroidea, p. 241.

TRISTAN DA CUNHA: Julia Point, at lowest tide, 10 specimens under stones (stations 68 and 74).

These specimens, like the single specimen taken by the "Discovery" at Tristan da Cunha, agree with the typical, Magellanic form of the species in regard to the armspines, there being 2 spines already

from the 3rd—4th joint, sometimes even already from the second joint. Thus, they do not belong to the var. *capensis*, in which there are two spines only from the 5th—6th armjoint.

One of the specimens, preserved in formaline, has kept its colour very beautifully, a uniform dark red on the dorsal side of both disk and arms; the oral side of lighter reddish colour.

***Amphiura capensis*** Ljungman. — Th. Mortensen. 1933. Echinoderms from S. Africa, p. 348.

TRISTAN DA CUNHA: Julia Point, 5 specimens in a rock pool (station 165).

This species was not hitherto known from Tristan da Cunha.

***Amphipholis squamata*** (Delle Chiaje). — Th. Mortensen. 1933. Echinoderms from S. Africa, p. 364. — Th. Mortensen. 1936. Discovery Reports. XII. Echinoidea and Ophiuroidea, p. 292.

TRISTAN DA CUNHA, NIGHTINGALE, and INACCESSIBLE.

This species was taken in good numbers at many places in the littoral zone of both Tristan da Cunha and Nightingale Island, and it was also dredged at a depth of 35—55 metres, hard bottom, off Nightingale Island (sts. 115, 116). Also at Inaccessible Island it was taken (st. 154, 40 m); 1 young specimen. Some specimens (st. 13) found among Corallinas in sheltered fissures in the rocks were observed to resemble the Corallinas in colour. Several specimens were found in the roots of floating *Macrocystis*, a very interesting observation, which explains the occurrence of this viviparous species at small isolated islands. Interesting is also its occurrence at Little Beach (st. 77), among algæ, where it was alternatingly covered by fresh and salt water.

The species was taken by the "Discovery" at Tristan da Cunha, at depths of 40—117 metres.

As I have pointed out in my "Discovery" Report, I do not see any possibility for distinguishing the Magellanic form, *A. patagonica* Ljungm. from typical *A. squamata*.

## ECHINOIDEA

***Arbacia crassispira*** Mrtsn. Pl. I, figs. 5—7. — Th. Mortensen. 1910. Echinoidea of the Swedish S. Polar Exped., p. 32. Pls. V. 1—3; XV, 1, 4, 5, 7, 11, 14. — Th. Mortensen. 1935. Monograph of the Echinoidea. II. p. 580.

TRISTAN DA CUNHA: Julia Point, 4 specimens from the littoral zone; 3 tests on the beach.

These specimens vary rather considerably in the extent of the aboral naked interambulacral spaces, from very much reduced, as in the type specimen (Op. cit. 1910. Pl. V, 1—3), to quite distinct, more or less sharply limited, reaching almost to the ambitus. These specimens with the distinct naked aboral spaces are transitional to *Arbacia Dufresnii* and make it evident that *A. crassispina* is only a local form of *A. Dufresnii*. Whether it is then regarded as a separate species or only as a variety of *Dufresnii* is of no consequence; in any case, its much coarser spines and the generally much smaller naked aboral interambulacral spaces simply forbid the identification of this Tristan da Cunha form with the S. American *A. Dufresnii*.

One specimen is interesting in having oculars I, IV, and V insert. This same specimen is also remarkable in the ambital spines being unequally developed, much longer on one side than on the other; this recalls the condition often found in *Stomopneustes variolaris* (cf. Th. Mortensen. Monograph of the Echinoidea. II. Pl. LXXII. Fig. 1), and is, no doubt, an adaptation to the cavity in the rock in which it dwells.

One of the specimens found on the beach is broken, the upper part of the test lacking.

**Notechinus magellanicus** (Philippi). — Th. Mortensen. 1910. Echinoidea of the Swedish S. Polar Exped., p. 36. Pl. XVI, figs. 3, 6, 9—12, 19.

TRISTAN DA CUNHA: Julia Point, 2 specimens of medium size under stones in rock pools (stations 64 and 74).

These specimens belong to the typical, S. American form of *magellanicus*.

A broken test was found on the beach.

### Zoogeographical Remarks.

The very isolated position of the small islands of the Tristan da Cunha group makes the zoogeographical relations of its littoral—sublittoral fauna particularly interesting. As it lies midway between S. Africa and the Magellanic region with the Falkland Islands, it is beforehand to be expected that it must have derived its fauna from the two said regions. The facts bear out this expectation very clearly.

Of undoubtedly Magellanic origin are *Henricia obesa*, *Allostichaster inaequalis*, and the two Echinoids, *Notechinus magellanicus* and *Arbacia crassispina*, the latter being only a local form of the S. American

*Arbacia Dufresnii*. Also *Ophiomyxa vivipara* decidedly belongs to the typical S. American form, not to the variety from the Cape region.

From the Cape region has come *Amphiura capensis*, this eminently S. African Ophiuroid being otherwise known with certainty only from S. Africa, from the Cape Peninsula to Lüderitz Bay. The record of its occurrence at Ascension may probably be due to erroneous labelling, as indicated by the fact that it does not seem to occur at St. Helena. The records of its occurrence at Angola and Senegal are due to erroneous identifications (cf. Th. Mortensen. Echinoderms of S. Africa. Papers from Dr. Th. M's. Pacific Exped. LXV. Vid. Medd. Dansk Naturhist. Foren. København. 93. 1933, p. 350). The finding of this species at Tristan da Cunha is thus of considerable zoogeographical interest. Since the species is viviparous and evidently confined strictly to the littoral region, it must have been carried to Tristan da Cunha in the roots of some large algæ. Tristan da Cunha is out of the usual way of the Benguela current that moves northwards along the S. African coast; but the current further moves westwards, S. of St. Helena, towards the Brazilian coast, and then partly turns eastwards again (cf. Schott. Geographie d. Atlantischen Ozeans. II. Ed. 1926, Taf. XV). It is thus thinkable that *Amphiura capensis* may have been brought to Tristan da Cunha along this long circuit; otherwise it might be suggested that it has been brought there by some exceptional west-moving storm, which would probably carry the algæ to Tristan da Cunha in much shorter time than the normal current would require for such transport.

Such supposition is not needed to explain the occurrence at both Tristan da Cunha and the Cape of the Asteroids *Crossaster penicillatus* and *Sclerasterias eustyla*; these species being not littoral, they may be widely distributed in the S. Atlantic region, also in deeper water than the respectively c. 750 and c. 300 metres down, to which depths they are till now known to occur. (*Crossaster penicillatus* is known also from Gough Island). One may suggest the Walfisch ridge to be the way along which they reached Tristan da Cunha (cf. "Meteor" Exped. VI. Atlas. Beilage XCII). Also *Henricia simplex*, known only from Tristan da Cunha and the Kerguelen region (Prince Edward, Marion, and Crozet Islands) must evidently be widely distributed in the S. Atlantic—subantarctic seas.

The following species are till now known only from Tristan da Cunha: *Astropecten mesactus*, *Eremasterias robusta*, *Ophiactis seminuda*, and *Amphiura da Cunhae*. Whether this will mean that they are really endemic it is impossible to tell, so long as the South Atlantic is so little explored as regards its bottom fauna. It may be suggested that

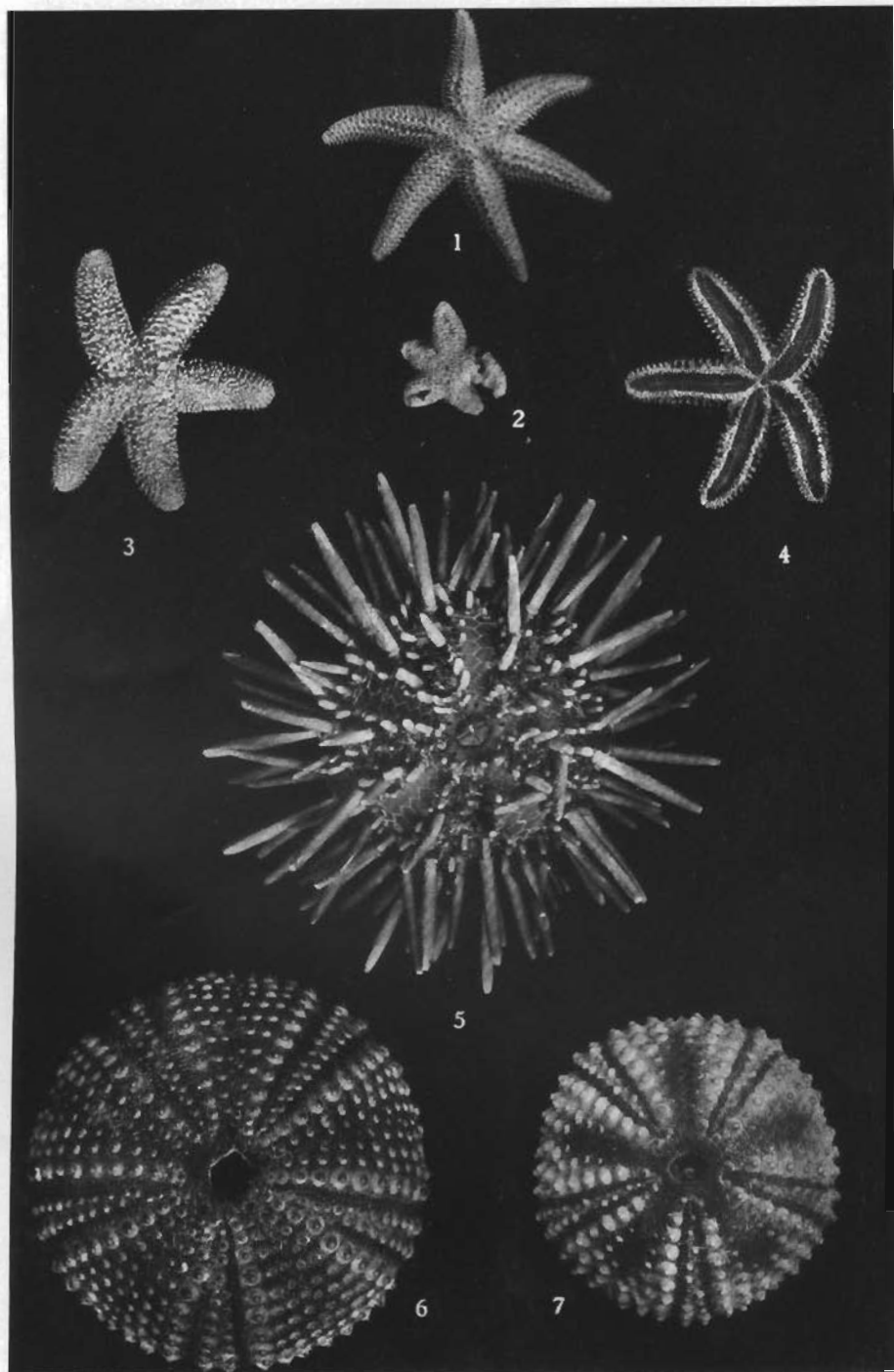
these species will be found to occur, at least, also at Gough Island, as it may be expected, reversely, that the Ophiuroids taken there at depths of 102—141 metres by the "Discovery", viz. *Ophiacantha* (cf. *Valenciennesi*), *Ophiactis nidarosiensis* Mrtsn., *Amphiura magellanica* Ljungman, and *Amphiura grandisquama* Lyman (cf. Mortensen. Echinoidea and Ophiuroidea. Discovery Reports XII. 1936) will be found to occur also at Tristan da Cunha. It would particularly be very interesting if both the two viviparous species *Amphiura capensis* and *magellanica* would be found to occur together at these isolated islands. Also *Arbacia* (probably) *crassispina* and *Notechinus magellanicus* are known from Gough Island (cf. Koehler. Echinodermes II. Exped. Antarctique Française ("Pourquoi-Pas"). 1912, p. 225). — *Amphipholis squamata* as cosmopolitan has no bearing on the zoogeographical relations of the marine fauna of Tristan da Cunha.

The result of this investigation is then that zoogeographically Tristan da Cunha is nearest related to the Magellanic region, at least as far as the littoral—sublittoral Echinoderm fauna is concerned. But, as was to be expected from its position midway between S. Africa and the Magellanic region, it has also some relation with the S. African region. — It is noteworthy that it has not a single Echinoderm in common with St. Helena, apart from the cosmopolitan *Amphipholis squamata*.

### Explanation of Plate I.

- Fig. 1. *Allostichaster inaequalis* Koehler, Dorsal side.  
Fig. 2. *Henricia ovesq* (Sladen), Dorsal side.  
Fig. 3—4. *Eremasterias robusta* sp. nov. Dorsal (3) and oral side (4).  
Fig. 5. *Arbacia crassispina* Mrtsn. Aboral side.  
Fig. 6—7. — — Naked tests. Aboral side.

All figures in natural size.



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1. ALLOSTICASTER INÆQUALIS KOEHLER; 2. HENRICIA OBESA (SLADEN);  
 3—4. EREMASTERIAS ROBUSTA N. SP.; 5—7. ARLACIA CRASSISPINA MITSN.

