I.

# ECHINODERMS FROM THE SOUTH AFRICAN FISHERIES AND MARINE BIOLOGICAL SURVEY. PART I. SEA-URCHINS (ECHINOIDEA).

BY

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In my Report on The Echinoderms of South Africa (1923, Ann. S. Afr. Mus., Vol. 13, pt. 7) 46* species of Echini (and one variety) are listed. This Report was based on a collection made by the s.s. "Pieter Faure" in the first S. African Marine Biological Survey, already partly reported on by the late Prof. Jeffry Bell (Mar. Investig. in S. Africa, Vol. III, 1905). The present collection was made in 1920-1921, by a second Survey boat, s.s. "Pickle." The collection of Echini here reported on contained 133 specimens of 24 species, and one well-marked variety. There are four species new to science and four others (including the variety) not listed in my Report. One of the new species, the Clypeaster, makes it seem highly probable that the young Clypeastroid listed in my report as *C. humilis* is in reality the young of the new species and, hence, *Clypeaster humilis* should be stricken from the list of South African echini. Thus the number of known South African sea-urchins should be given as 52 species and 2 named varieties. It should be added that the Schizasters in the present collection show that the South African species is really *lacunosus*, and not *edwardsi*, as listed in my Report; indeed the validity of *edwardsi* is made very dubious.

PRIONOCIDARIS BACULOSA (*Lamarck*).

St. 202. Near Richards Bay, Zululand. 33 fms. Sand. August 24, 1920. 4 specimens.

These are very fine specimens of this handsome species, and they extend the known range of the species far to the south. The smallest is 25 mm. in diameter, with primary spines 35 mm. long, whilst the largest is 50 mm. through and the

* The statement on pp. 366 and 367 of the Report that "44 species" are listed is due to the fact that, after these paragraphs were written and sent out to Cape Town, two additional species were added to the list, and this fact was overlooked when the proof was read.

spines are 83 mm. The characteristic spots on the collar of the large spines have merged together longitudinally so that the collars are beautifully striped instead of spotted.

CHÆTODIADEMA AFRICANUM, *sp. nov.* (Pl. I).

Test flattened as usual in the genus, 45 mm. in horizontal diameter with the height almost exactly one-fourth as much. Coronal plates, 16, of which the uppermost five have no primary tubercle; the sixth has one on its outer half; the next eight have two, and the two plates nearest the peristome have none or one which is scarcely distinguishable from the 4—6 secondaries which each bears. There are very few secondaries in the midzone and almost none above, and even miliaries are few and scattered above the ambitus. Ambulacra only about 6 m. wide; thus only about one-fourth the interambulacra or a little more. The number of ambulacral plates cannot be made out actinally with any certainty but there are 14 or 15 primary tubercles in each column and as 4—6 of the abactinal plates have none and the 8 pore-pairs nearest the mouth are not associated with any, the number would seem to be not fewer than 23 or 24. All the primary tubercles are perforate of course and strongly crenulate. Pore-pairs in an almost unbroken vertical series; only at the ambitus are "arcs of three" distinguishable, and even there they are only slightly indicated. The abactinal pores are clearly larger than the actinal. The actinal pore-pairs are not widely separated from each other; there are about 25 in each column between peristome and ambitus.

Abactinal system 15-16 mm. in diameter or about .35 h.d. Ocular plates all broadly insert, the pore small and near distal margin. Genital plates more or less pentagonal with the large pore in the distal angle; madreporite scarcely larger than the others. Anal system about 8 mm. across with relatively large plates adjoining the oculogenital ring but the central portion with only granule-like plates. Each genital except the madreporite bears a secondary tubercle and spine together with a number of miliaries, and many of the larger anal plates also carry secondaries as well as miliaries; on the madreporite there are only a few scattered miliaries. Each ocular plate with only half a dozen miliaries. Anal tube not very conspicuous.

Actinostome about 12 mm. in diameter, a trifle more than .25 h.d., with distinct wide, actinal slits. Buccal membrane rather closely covered with small plates (at least outside the rather large squarish buccal plates); the pairs of buccal plates are rather widely separated from each other, but the two plates of a pair lie close together; a good many of the small plates on the actinostome carry pedicellariae. Teeth strongly notched on each side of the sharp tip. Primary spines all broken, rather solid with a small central cavity only near

base, finely ridged longitudinally and covered with crowded whorls of minute teeth. Secondary spines slender, acicular.

Pedicelliariæ of two kinds, triphyllous and tridentate; former rather scarce, small, valves truncate somewhat wider at tip than at base; tridentate common actinally but not abundant anywhere, and few and small above the ambitus; valves less than half a millimetre long, straight or more commonly slightly curved and meeting only at or near tip.

Colour of specimen dried from alcohol, light brown with a purplish tinge; bare tubercles pale greenish-yellow; wherever the epidermis is rubbed off abactinally the plates show greenish-yellow; a broad distinct line (.30–.50 mm. wide) runs from near the inner end of the uppermost plate in each interambulacral column across the first seven plates nearly to the ambitus, parallel to the series of ambulacral pores and about 4 mm. from it; in life this line was presumably blue, but it is now a dark sepia brown. Actinally the test is light brown, the tubercles and the plates where the epidermis is rubbed off nearly white. Primary spines at ambitus and above dusky on the upper side and pale yellowish or dirty whitish on the lower; some at least were banded once or more with dull reddish; the degree and amount of duskiness appears to have varied with the size and position of the spine; actinally the primaries and all other spines are pale greenish-yellow, the largest distinctly banded with reddish.

St. 107. East from Durban, 180 fms. Mud, sand and shells. June 16, 1920. 6 specimens.

The discovery of a Chætodiadema in South African waters is a matter of great interest for the genus was originally described in 1903 from Siam and additional species have since been described from Japan, Hawaii and Australia. The African species seems to be nearest the Australian, but the differences in the tuberculation of the test, in the poriferous areas, and in the size of the actinostome would seem to indicate that it is quite distinct. Rudmose Brown (1912, Proc. Roy. Phys. Soc. Edinburgh, vol. 18, p. 39) has recorded the Siamese species of Chætodiadema from Pemba Bay, Portuguese East Africa, but the specimens were much smaller than those on which Mortensen's species was based; In view of the discovery of an African Chætodiadema, it is certainly remarkable that the Siamese species occurs at Pemba Bay.

PHORMOSOMA INDICUM *Döderlein.*

The discovery of this fine echinothurid off the Natal Coast, while not surprising, is very interesting as it is an addition to the South African fauna. The specimens are 110-125 mm. and are readily distinguished from *placenta* by the larger size, brighter colour and prominent abactinal primaries.

St. 175. East from Durban, 460 fms. Mud. Aug. 3 1920. 2 specimens.
St. 401. East from Durban, 230 fms. Mud. July 19, 1921. 1 specimen.

PHORMOSOMA PLACENTA *Wyville Thomson.*

This well-known species was taken only in deep water off the western coast of Cape Colony.

St. 336. West from Lambert's Bay, 360 fms. Mud. April 21, 1921. 1 specimen.
St. 354. West from St. Helena Bay, 620 fms. Globigerina ooze. May 24, 1921. 8 specimens.
St. 525. West from Dassen Island, 1,000 fms. Globigerina ooze. Nov. 17, 1921. 8 specimens.
St. 534. West from Dassen Island, 1,010 fms. Globigerina ooze. Nov. 29, 1921. 3 specimens.

ARÆOSOMA PAUCISPINUM, *sp. nov.* (Pl. II.)

Test collapsed, wrinkled and distorted but about 130 mm. in diameter; interambulacra at ambitus about 50 mm. wide and ambulacra at same point about 32. Coronal plates about 43 in a column, very low and wide. Ambulacral plates about 56 in the corresponding column. Abactinal system about 25 mm. across. Actinostome about 35. Neither is peculiar or remarkable in any way. Abactinal surface with a moderate number of secondaries and more numerous miliaries but with very few primaries, and these are little larger than the secondaries and are irregularly scattered, not more than three or four in each interambulacrum; in the ambulacra it is most difficult to draw the line between the secondaries and primaries so that it is hard to say whether there are any true primaries there, but one or two large tubercles occur on many plates. Actinally there is the usual regular series of primaries bounding the interambulacra on each side and in addition, 10-12 plates in each column have a second primary, either at the middle or nearer the inner end. On the ambulacra there are no tubercles as large as these but there are many large secondaries (and many smaller ones too) and the biggest of these might be called primaries. On the whole the general impression is that of relatively few and relatively small spines.

Pedicellariæ rather numerous, but only triphyllous and tridentate were found. The triphyllous are notable for their large size; the valves are upwards of half a millimeter long and the width at tip is one-third or more of the length, while the base is hardly half as wide as the tip. The tridentate pedicellariæ show great diversity in size but little in form. The valves are .30–2.00 mm. in length, straight, somewhat compressed, in contact for most of the length of the blade, but the largest are less fully in contact than the smaller ones;

the large ones are quite stout, the thickness of the head at its base being more than half its length. No tridentate with curved valves were to be found anywhere.

Colour of dried specimen deep red, becoming brownish where the epidermis is thinnest. Spines pinkish or pale red.

St. 373. East-north-east from Durban, 212 fms. Mud. June 29, 1921. 2 specimens.

—— 2 specimens in poor condition without label.

This handsome urchin is easily distinguished from its nearest allies, *A. hystrix* of the North Atlantic and *pyrochloa* of the Japanese coast, by the scarcity of abactinal primary tubercles, the deeper red colour which is not at all vermilion, and the apparent absence of large pedicellariæ with curved, involute valves. It is not likely to be confused with any other member of the genus.

ECHINOSOMA PETERSII (*A. Agassiz*).

The present specimens confirm the occurrence of this West Indian species in South Africa waters, although it is not impossible that a good series of West Indian specimens compared with an equivalent series from South Africa would reveal constant and tangible differences. The two individuals at hand are dull reddish purple in color and are 175 and 185 mm. in horizontal diameter. The larger individual (from St. 243) has a considerable number of deep, hemispherical depressions in the actinal surface, 7-9 mm. in diameter. In one of these, fragments of a crustacean, apparently an isopod, were found and it seems probable that the depressions are caused by a symbiotic, it not a completely parasitic, isopod. The smaller individual, from deeper water, has no such depressions anywhere in its test.

St. 95. Off Durban, 192 fms. Mud. June 10, 1920. 1 specimen.*

St. 243. South-west from Cape Town, 110 fms. Mud. October 11, 1920. 1 specimen.

SALMACIS BICOLOR *Agassiz*.

The present specimen is somewhat deformed; the diameter through III-5 is 61 mm., while at right angles to that line it is only 60. The mouth (centre of peristome) is 31 mm. from the anterior margin of test, but the centre of the anal field is only 27 mm. back of that margin. Abactinal system not peculiar; all oculars fully exsert. Secondary spines red. Primaries rose-purple at base becoming greenish distally with 3-5 rose-purple bands; tips, particularly on the oral surface, more or less whitish.

St. 465. East-south-east of the mouth of the Tugela River, 37 fms. Mud, sand. Sept. 12, 1921. 1 specimen.

* Field notes say: "Deep crimson in colour." The preserved specimens are more purple than red.

SALMACIS DUSSUMIERI *Agassiz.*

The present specimen is only 44 mm. in diameter and 22 mm. high. The test and small spines are nearly white while the larger primaries are olive green, whitish at base and with 2-4 indistinct bands of brownish. There is no trace of red anywhere. This seems to be a fairly typical though light-coloured *dussumieri* and is the first indubitable record for the East African coast. Specimens from the vicinity of Zanzibar referred to *dussumieri* are, so far as I know, more probably *erythracis*, but in view of the finding of the present specimen on the Natal coast, the occurrence of *dussumieri* at Zanzibar is highly probable.

St. 146. Off the mouth of the Tongoot River, 36 fms. Sand, shells. July 13, 1920. 1 specimen.

TEMNOPLEURUS REEVESII (*Gray*).

In my South African Report (l.c., p. 381)I declined to accept as authentic Döderlein's record of this temnopleurid from the South African coast, based on a small specimen taken by the "Valdivia." I can no longer maintain such a position for the specimen before me is certainly *reevesii* and there is no reason to doubt that it came from the Natal coast. The species must, therefore, be admitted to the South African list. The present specimen is adult, 27 mm. in diameter and 14 mm. high; ocular I is not quite insert, but it is much more nearly so than V. Primary spines dull pink, unbanded; those of the abactinal side are darkest, almost dull red; secondaries similar but pedicellariæ almost white; oral spines white. The horizontal groove-pits of the test are conspicuously deep.

St. 146. Off the mouth of the Tongoot River, 36 fms. Sand, shells. July 13, 1920. 1 specimen.

ECHINUS GILCHRISTI *Bell.*

The colour of the smaller specimens of this urchin is quite distinctive, for the abactinal side is a characteristic greenish-grey, with the red-brown tube-feet in marked contrast; the primary spines are nearly white or at least very light coloured. But unfortunately larger specimens, those over 50 mm. h.d., do not seem to retain this colouration. A specimen 82 mm. h.d. is, in its dried condition, the usual indistinctive yellow-brown "museum colour" which specimens of Echinus are prone to show. Even in small specimens the feet are not always red-brown. One of the present series 53 mm. in diameter has the feet greenish-grey like the test. Large specimens are easily confused with large specimens of *Paracentrotus agulhensis* and only a careful examination of the ambulacra can certainly distinguish them. Even as regards this fundamental character, it is necessary to note that in large specimens of Paracentrotus some abactinal ambulacral

plates have but three elements and thus assume a pseudo-Echinus appearance. Of course the test of *Echinus gilchristi* is usually higher, relatively, than that of *P. agulhensis*, and there are differences in the pedicellariæ too. All the specimens of *gilchristi* in the present collection are from stations west of long. 18° 36′.

St. 6. West-north-west of Cape St. Martin, 151 fms. Mud, sand. March 7, 1920. 2 specimens.

St. 88. South-west of Saldanha Bay, 110 fms. Green mud, black sand. May 19, 1920. 2 specimens.

St. 222. South of False Bay, 80 fms. Mud. October 14, 1920. 2 specimens.

ECHINUS GILCHRISTI HIRSUTUS *Döderlein*.

There is a single sea-urchin that corresponds so well with Döderlein's description and figures, I feel sure of its identity. But it is so unlike *gilchristi*, I find it hard to consider it merely a variety or form of that species. In view, however, of the well known diversity of form and appearance common in the genus, I leave *hirsutus* where Döderlein placed it. I expect, however, that abundant material will give it independent rank. The present specimen is 38 mm. h.d. by 18 mm. in height ; it is reddish-white and on some of the small white spines around the peristome there are one or two narrow red rings, as in Döderlein's paratype. The general character is much coarser than that of *gilchristi* and the secondary spines are stouter and much less numerous. The name *hirsutus* seems to me very inappropriate for this form.

St. 63. About 50 miles west of Robben Island, 220 fms. Green sand, mud. May 4, 1920. 1 specimen.

ECHINUS HORRIDUS *A. Agassiz*.

This is a wonderful series of this remarkable sea-urchin and throws a great deal of light on its growth changes. The young *horridus* is evidently quite a normal hemispherical sea-urchin with the vertical diameter nowhere nearly equal to the horizontal. The smallest specimen at hand is 39 mm. h.d. by 29 v.d. ; thus the height is about three-fourths of the diameter. This proportion holds until the specimens are well past 50 mm. h.d. ; indeed, one specimen 91 mm. h.d. shows this same proportion as its height is only 67 mm. But most specimens over 70 mm. h.d. are over 60 mm. high, and often very much so ; a specimen 85 mm. h.d. is 75 mm. v.d. or the height is 87 per cent. of the diameter. Specimens over 85 mm. h.d. are usually 80 mm. v.d. or more, the percentage of height to diameter running from 92 up. One specimen only 75 mm. h.d. is 82 mm. v.d. (or v.d. = 1.09 h.d.) ; another 85 mm. h.d. is 100 mm. v.d., v.d. equalling 1.17 h.d. Finally a specimen 105 mm. in diameter is 125 mm. high, or v.d. = 1.19 h.d. This is not only

the largest example of *horridus* yet taken but it also has the largest number of coronal plates, 38 per column. Its height, however, is relatively much less than that of the one figured in my "Endeavour" report (1916, pl. xxxix); in this Australian specimen the height is 1.43 diameter.

It is interesting to note that there is no definite relation in *horridus* between size and the number of coronal plates for a specimen only 89 mm. h.d. has 38 coronal plates, the same as in the largest specimen. There are only 31 coronal plates in the specimen 91 mm. h.d., but this specimen is only 67 mm. high. Nevertheless, the height is not determined by the number of coronal plates, nor *vice versa*, for one specimen 82 mm. high has 38 coronal plates, and the same number occurs in the specimen 125 mm. high. A specimen 80 mm. high has 34 coronal plates and another 100 mm. high has but 35.

The primary spines are only 20-30 mm. long and are stoutest at the ambitus which is far, usually very far, below the mid-zone. Orally the spines are small, pale and slender and the nearer the mouth they are the smaller and paler. The colour of all the specimens is a bright vermilion, or more or less orange, red. The primary spines are a very bright red with a polished surface, particularly those at and above the ambitus. As none of the specimens are alcoholic, I do not know whether this red colour withstands alcohol for a longer time than that of the northern species of Echinus. As a rule, the red colour of Echinus is somewhat fugitive.

St. 70. West-south-west of Saldanha Bay, 226 fms. Mud. May 7, 1920. 2 specimens.

St. 71. Same place and date as St. 70. 1 specimen.

St. 89. South of St. 70, 214 fms. Mud, stones. May 19, 1920. 2 specimens.

St. 226. South-west of False Bay, 212 fms. Mud, sand. October 25, 1920. 1 specimen.

St. 333. Off Lombert's Bay, 235 fms. Mud. April 20, 1921. 1 specimen.

St. 342. West of Luderitz Land, 310 fms. Mud. May 4, 1921. 5 specimens. (39 specimens are recorded from this station.)

St. 484. Off Saldanha Bay, 212 fms. Mud. October 18, 1921. 1 specimen. (4 specimens are recorded from this station.)

All of the above stations are off the south-western coast of South Africa between 212 and 310 fms. This restricted geographical and bathymetrical range is remarkable in view of the occurrence of the species off the southern coasts of Chili and Australia. Possibly it is not circumpolar and does not occur between 20° and 140° E. long.

PARECHINUS ANGULOSUS PALLIDUS *H.L.C.*

It is quite remarkable that the only specimens of the common South African sea-urchin, *P. angulosus*, in the collection are of this variety. Perhaps it was not thought worth while to send me the common form or, more probably, the species is so much a shore or rock-living form that it was not taken in the fisheries investigations. Saldanha Bay is the type locality for *pallidus* and the present specimens are from that vicinity. The one from St. 9 is 25 mm. h.d. by 13 mm. high and the bare abactinal areas in both ambulacra and interambulacra are bright reddish-pink. The anal plates like the spines are pure white. The other specimens are smaller and are dull coloured, brownish-grey with greenish poriferous areas and white spines.

St. 9. North-west of Cape St. Martin, 100 fms. Green mud. March 8, 1920. 1 specimen.

St. 13. Saldanha Bay, 9 fms. Sand. March 13, 1920. 2 specimens, listed as *Echinus angularis*.

PARACENTROTUS AGULHENSIS *Döderlein*.

The specimens at hand are all large ones, 64-80 mm. h.d. and the height is 46-56 per cent. of the diameter. It is noteworthy that not a few plates in the ambulacra above the midzone have only 3 elements and a casual glance might identify the specimens as Echinus. But this condition is probably only an evidence of senescence.

St. 76. About 50 miles south-west of Saldanha Bay, 448 fms. Green sand, mud. May 11, 1920. 2 specimens.
St. 88. South-west of Saldanha Bay, 110 fms. Green mud, black sand. May 19, 1920. 1 specimen.

PARACENTROTUS GRANDIS *H.L.C.*

Now that there are large specimens of *agulhensis* for comparison, it is a satisfaction to find the validity of this species confirmed. The present specimen is, in all essentials, like the holotype and paratype on which the species was based.

St. 519. About 170 miles west from Olifants River, 600 fms. Globigerina ooze. Nov. 9, 1921. 1 specimen.

CLYPEASTER AUDOUINI *Fourtau*.

This species was previously known from Durban, but the actual collecting of specimens on the Natal coast is interesting. These individuals range in size from 58 mm. long by 56 mm. wide and 9.5 mm. high to 76 by 76 by 9. Even in the dry condition they are quite green and in the list of animals taken at St. 170 they are called "green, flat, sea-urchins," and the extraordinary fact is recorded that the alcohol used as preservative turned "pink." While it is not definitely stated

that the living animal is green, that would seem to be the natural inference and the pink colour in the alcohol would thus seem most unlikely. Further and much more careful study of the remarkable pigments of the Clypeastroids is greatly to be desired.

St. 170. Off Umvoti River, Natal, 29 fms. Sand, shells. July 30, 1920. 7 specimens.

" Flat, green sea-urchins " are listed in the published reports from the following Stations : 95, 112, 113, 129, 137, 138, 139, 170, 184, 258, 265, 267, 268, 269, 272, 291, 359, 360, 362, 364, 395 and 468, from 3 to 2,000 specimens being recorded from each station. Of all these stations only one (St. 170) has a depth of less than 90 fms., and it is only at that station that the turning pink of the alcohol is mentioned. We are fairly safe in assuming, then, that St. 170 was the only place where *C. audouini* was taken. At all the other stations, which are east and north-east of Durban, at depths of 91-210 fms., the new species *eurychorius* was probably the " flat, green " urchin referred to.

CLYPEASTER EURYCHORIUS,* *sp. nov.* (Pl. III.)

Length, 107 mm. ; breadth, 96 mm. ; height, 22 mm. ; mouth sunken 8-9 mm. below the test margin ; margin of test, about 8 mm. thick. Test rather flat outside the petaloid area, which is somewhat abruptly elevated ; lower surface flat, sloping very slightly toward the mouth and then rather abruptly depressed around the mouth ; this depressed area is only about 20 mm. across. Tuberculation of test rather sparse and scattered with small primary tubercles ; there are only about 45-50 tubercles to a sq. cm. of the flattened abactinal surface. Ridges between pore-pairs of unpaired petal with rarely more than a single primary tubercle. Miliaries not at all crowded, apparently not more than ten times as numerous as the primaries. Madreporite nearly circular, about 4 mm. across. Genital pores small.

Unpaired petal, with about 28 pore-pairs on each side, 32 mm. long, 18 mm. across where widest, about 6-8 mm. from tip ; the first pores are present 5-6 mm. from the madreporite the proximal pore-pairs being quite aborted ; poriferous areas converging at tip, very narrow, only 2 mm. wide, where widest distally ; petal open by fully 10 mm. Anterior petals not quite 30 mm. long and about 13 mm. wide near tip ; there are about 26 visible pore-pairs on each side, the proximal ones being aborted ; the petals are open by about 4 mm. only. Posterior petals rather more than 30 mm. long and fully 16 mm. wide ; the tips are open fully 5 mm. and there are about 27 pore-pairs to a side. Periproct about 5 mm. in diameter, scarcely wider than long, a full 6 mm. from the margin.

* Gr. εὐρυχωρία = *plenty of room*, in reference to the widely spaced primary tubercles.

Primary spines small and very slender ; the largest are close to the mouth but they are only about 3 mm. long. Miliary spines, slender, thickened at tip, especially those near mouth where they are almost capitate. Pedicellariæ few and scattered, chiefly however near the mouth ; none were seen on the abactinal surface ; all those found are tridentates, with compressed valves, slightly expanded and meeting at tip ; the largest seen had valves less than half a millimeter long and most were much smaller than that ; they are not at all distinctive.

Colour dull brown with a slight reddish tinge abactinally and distinctly yellowish (somewhat greenish) orally especially near the mouth. Apparently in life the color is green, for the published record for St. 138 speaks of " flat, green sea-urchins " having been taken.

St. 138.* East-north-east from Durban, 174 fms. Mud. July 8, 1920. 5 specimens.

The discovery of this very distinct Clypeaster in moderately deep water (much deeper than that in which *audouini* lives) off the Natal coast is very interesting, and emphasizes the absence of the genus from the western and southern coasts of Cape Colony. That the new species is locally plentiful is indicated by the published records, which says 57 specimens were taken at St. 138, and 2,000 (probably of this species) at St. 112. The nearest ally of the new form is apparently *C. virescens* of Japan and Australia, but it is easily distinguished from that species, as well as from *humilis* and other related species, by the narrow, convergent poriferous areas of the unpaired petal, and the very sparse tuberculation of the test, especially on the upperside.

In view of the character of this species and its abundant occurrence on the coast of Natal, I think there is little reason to doubt that the two very young Clypeasters listed in my South African Report (*op. cit.*, p. 392) as *C. humilis* are really the young of *eurychorius*, and therefore *humilis* should be removed from the list of Echini of South Africa.

ECHINOLAMPAS CRASSA *Bell.*

There is a bare test of this remarkable urchin in the collection which is distinctly the largest yet known. It is 109 mm. long, 100 mm. wide and 58 mm. high. The anterior edge of the peristome is 48 mm. from the anterior margin of test. Anterior petal 11 mm. wide with the sides almost perfectly parallel. Petals II and IV, 11 mm. wide, 15 mm. from ambitus, but 13 mm. wide, 40 mm. from ambitus. Petals I and V similar but a trifle wider. Test wall very hard and solid, 3-5 mm. thick at ambitus. Bell says the " bourrelets " are

* See above under *C. audouini* for long list of stations where *eurychorius* seems to have been taken.

" feebly developed." In the present specimen they, and the phyllodes, are distinctly well-developed.

St. 458. Off Keiskama River, 48 fms. Sand, shells. Sept. 2, 1921. 1 specimen.

URECHINUS NARESIANUS *A. Agassiz.*

These specimens are all small, ranging from 12, by 10, by 5.5 mm., to 34 by 28 by 15.5. Their colour is pale purple, the smaller ones so pale as to be almost white.

St. 534. West from Dassen Island, 1,010 fms. Globigerina ooze. Nov. 29, 1921. 10 specimens.

BRISASTER FRAGILIS (*Duben and Koren*).

The specimens are all badly crushed, but there is no reason to doubt their identity. The smallest is less than 20 mm. long, but the others are about 43, by 40, by 18 mm.

St. 60. South-west from Dassen Island, 164 fms. Green mud. May 4, 1920. 2 specimens.

St. 62. West-south-west from Dassen Island, 160 fms. Green mud. May 4, 1920. 1 specimen.

SCHIZASTER LACUNOSUS (*L.*).

All but one of the specimens are badly crushed but one adult, 59 mm. long, 53 mm. wide and 45 mm. high, is in fair condition and it has been possible to make a careful comparison of all the material with specimens from Japan. I fail to find any character by which the African and Japanese individuals can be distinguished from each other, nor am I satisfied that the characters supposed to distinguish *edwardsi* of the West African Coast from *lacunosus* are really valid.

St. 170. Off Umhlali River, 29 fms. Sand, shells. July 30, 1920. 3 specimens.

St. 432. Off Tugela River, 23 fms. Mud. August 15, 1921. 2 specimens.

BRISSOPSIS LYRIFERA (*Forbes*).

The specimens are all more or less crushed. The largest was apparently about 60 mm. in length, which is very large for the species. All were taken west of longitude 19° E. and only once south of lat. 34° S. or east of long. 17° 40′ E. Apparently the species was not met with in 1921.

St. 7. North-west of Cape St. Martin, 112 fms. Green mud. March 8, 1920. 3 specimens.

St. 44. North-west from Dassen Island, 85 fms. Green mud. April 13, 1920. 8 specimens.

St. 46. West from Dassen Island, 260 fms. Green mud. April 13, 1920. 1 specimen.

St. 56. North-west of Cape St. Martin, 102 fms. Green mud. April 28, 1920. 2 specimens.

St. 62. South-west of Dassen Island, 160 fms. Green mud. May 4, 1920. 1 specimen.

St. 222. South of False Bay, 80 fms. Mud. October 14, 1920. 4 specimens.

SPATANGUS CAPENSIS *Döderlein.*

These specimens are not remarkable in any way. except that the height of the test ranges from 45 to 52 per cent. of the long diameter.

St. 6. West-north-west of Cape St. Martin, 151 fms. Mud, sand. March 7, 1920. 2 specimens. (The published record of St. 6 says : *Spatangus capensis*, 14 specimens ; purple in colour.)

St. 88. South-west of Saldanha Bay, 110 fms. Green mud, black sand. May 19, 1920. 1 specimen. (Published record : *Spatangus capensis*, 100 specimens ; purple.)

In the published record *Sp. capensis* is also listed from St. 60, 8 specimens ; St. 90, 10 specimens ; St. 213, 51 specimens ; St. 218, 32 specimens ; St. 230, 5 specimens ; St. 234, 51 specimens ; St. 243, 11 specimens ; St. 244, 41 specimens, and St. 249, 3 specimens. These stations are all on the Continental slope of the south-western part of Cape Colony at depths of 95-210 fms.

MARETIA PARVITUBERCULATA,* *sp. nov.* (Pl. IV.)

Length of test, 68 mm. ; breadth, 51 mm. ; height, 20 mm. ; abactinal system, 26 mm. from anterior margin ; peristome about 10 mm. wide by 4 mm. long, with a prominent lip, its anterior margin 23 mm. from test margin ; periproct 8 mm. in diameter, on the vertical posterior end of test ; subanal fasciole *practically wanting*, distinguishable only just below the sides of the periproct, where it leaves the periproctal margin ; bare sternal area about 25 mm. wide posteriorly. Unpaired petal practically wanting though the ambulacral pores can be made out with a lens. Anterior petals well-marked ; there are 23 or more pore-pairs in the anterior series but the first (most proximal) four or five are only distinguishable with a lens ; in the posterior series are 25 or more of which the first four or five are very small ; the whole petal is about 27 mm. long ; at the open tip it is 5 mm. wide, but 12 mm. from the abactinal system it is 7.5 mm. across ; the poriferous areas thus converge distally but as they diverge slightly at the tip of the petal, they appear less convergent than they are. Posterior petals

* Parvituberculatus = *with little tubercles*, in reference to the small size of the primary tubercles.

very conspicuous, 38 mm. long, 7 mm. wide near middle and 8 mm. wide at the fully-open tips; poriferous areas, 2 mm. across where widest, each with about 34 pore-pairs of which the first three or four are very small. Genital pores (4) moderately large and close together. Abactinal surface covered by primary spines, 10-20 mm. long and very slender, distinctly curved at base, but thence perfectly straight, and miliary spines about 2 mm. long, more or less curved, slender but blunt. Primary tubercles small for a Maretia, the scrobicular area seldom 2 mm. across and very little depressed; these tubercles are rather uniformly scattered all over the abactinal surface including interambulacrum 5, but those on the ambulacra are much smaller than elsewhere and form a single series on the inner margin of the poriferous area, one tubercle to each plate, with occasional omissions.

Actinal surface with the conspicuous plastron free from tubercles, though there are many miliary spines scattered over it. The peristome is so far back that the plastron is relatively small. Anterior to mouth, at each side of plastron and below periproct are large numbers of primary (and secondary) tubercles and spines accompanied by very numerous miliaries; the longest primaries and the stoutest are those along the sides of the plastion in interambulacra 1 and 4, but those of the subanal area are most conspicuous as they stand out from the rear end of the test. Owing to the practical absence of a subanal fasciole, there is no distinct subanal plastron but the tuberculation of that region passes over into that of the ambulacra on each side and of interambulacrum 5 above the periproct. Peristome very considerably sunken with a well-developed lip and conspicuous phyllodes.

Pedicellariæ apparently all tridentate but of two very different forms. Careful search failed to find any globiferous, ophicephalous and triphyllous pedicellariæ in this large specimen. The slender tridentate have very slender compressed valves, .40–1.00 mm. long, in contact for nearly their entire length. The stout tridentate have short, thick heads, .25–.50 mm. long, the valves slightly compressed at the narrow middle, expanded and in contact at tip; in some cases the valves are rather narrow, very straight and in contact for most of the expanded terminal portion, but near the mouth we meet with the opposite extreme the valves being quite strongly curved and in contact only at the very tip.

Colour abactinally rose-purple; actinally a lighter shade of the same; in all the ambulacra the spines are rose-purple but on the interambulacra, particularly at and above the ambitus in interambulacra 1 and 4, the spines over considerable areas are nearly white, thus giving the animal a very striking and rather handsome variegated appearance; most of the longer primaries are prettily banded, at least distally, with rose-purple and whitish.

St. 107. Off Durban, 180 fms. Mud, sand, shells. June 16, 1920. 5 specimens. (The published record says : 35 specimens. " Fine red spines.")

I have been much perplexed as to the proper placing of this fine new spatangoid for it falls very readily into the genus Platybrissus of the family Palæopneustidæ, if one calls the subanal fasciole wanting, as it really is. Unfortunately, however, in somewhat smaller specimens the fasciole is not wanting. Thus in a paratype, 50 mm. long, it is perfectly distinguishable, though very narrow, enclosing a subanal plastron, 15 mm. wide and 8 mm. high. Evidently therefore we have here a case similar to that of *Palæotropus josephinæ*, where the subanal fasciole, perfectly evident in half-grown specimens, has wholly disappeared in the fully-developed adult. For the present it seems to me better to put the new South African species in Maretia as its real relationships are, I think, unquestionably with that genus and not with the Palæopneustridæ. Compared with *Platybrissus roemeri* (of which only two specimens are known) there are two striking differences ; in Platybrissus, the test is almost a perfect ellipse in outline and very flat abactinally, while in the new Maretia the test is somewhat more oval and interambulacrum 5 is not at all flat abactinally ; again in Platybrissus, the peristome is almost as long as wide, it is scarcely sunken at all, and there is practically no " lip," while in this South African form, the peristome is much wider than longer, deeply sunken and has a very prominent lip. So, while the facies of the two species is obviously different, one cannot compare them critically without feeling that they are rather closely related, and that Platybrissus almost certainly has a subanal fasciole in early youth, at least. From all the known species of Maretia, the new form is readily distinguished by the form of the petals, the small and numerous primary tubercles and the condition of the subanal fasciole.

ECHINOCARDIUM CAPENSE *Mortensen.*

In view of the fact that the " Pieter Faure " failed to find this species but did find *E. cordatum* at half a dozen spots, it is quite remarkable that the " Pickle " has not taken *cordatum* but has found the less common species at one spot. The specimens are all damaged and most of them in fragments.

St. 62. About 60 miles west-south-west of Dassen Island, 160 fms. Green mud. 5 specimens.

Museum of Comparative Zoölogy,
Cambridge, Mass., U.S.A.,
April 11, 1924.

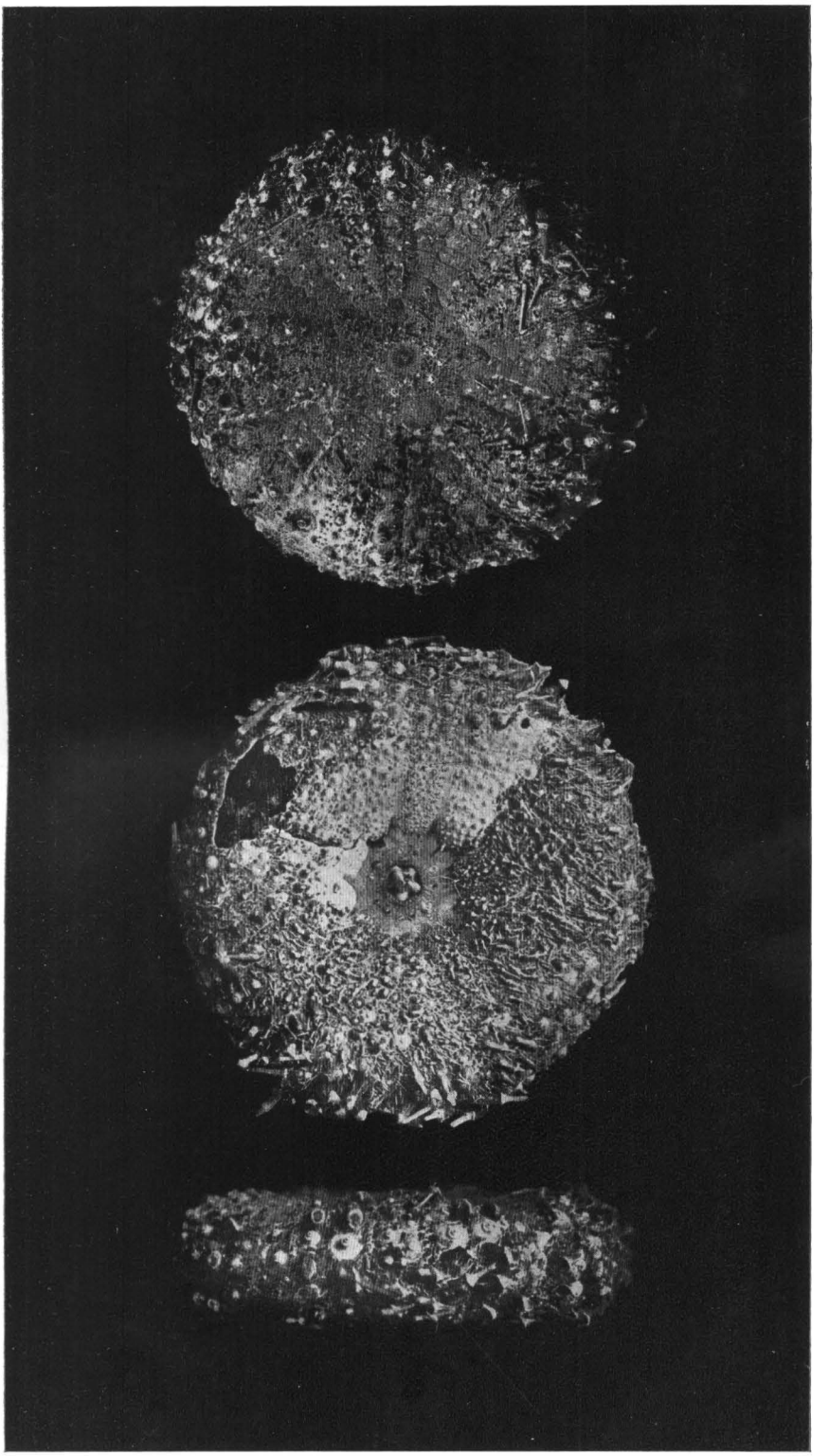
## NOTE.

A collection of sea-urchins made by the South African Fisheries and Marine Biological Survey in the years 1920 and 1921 was sent to me by Dr. J. D. F. Gilchrist and a report on it was prepared by me and sent out to Cape Town in the fall of 1923. Through some unfortunate mischance, the manuscript was destroyed after reaching Cape Town safely, and I was asked to furnish a duplicate copy. Unfortunately no such copy exists, and it has therefore been necessary to rewrite the report. This has been rendered difficult by the fact that the bulk of the collection was returned to Cape Town after the manuscript was sent in, but it is possible because of the material retained by the Museum of Comparative Zoölogy, which fortunately includes paratypes of the four new species. Under the circumstances, therefore, the descriptions of these new forms are made from the paratypes while the figures are (with one exception) of the holotypes. Naturally the present report is less complete than the one destroyed.

HUBERT LYMAN CLARK.

M.C.Z., Cambridge,

Mass., U.S.A., April 4, 1924.



CHÆTODIADEMA AFRICANUM H.L.C.

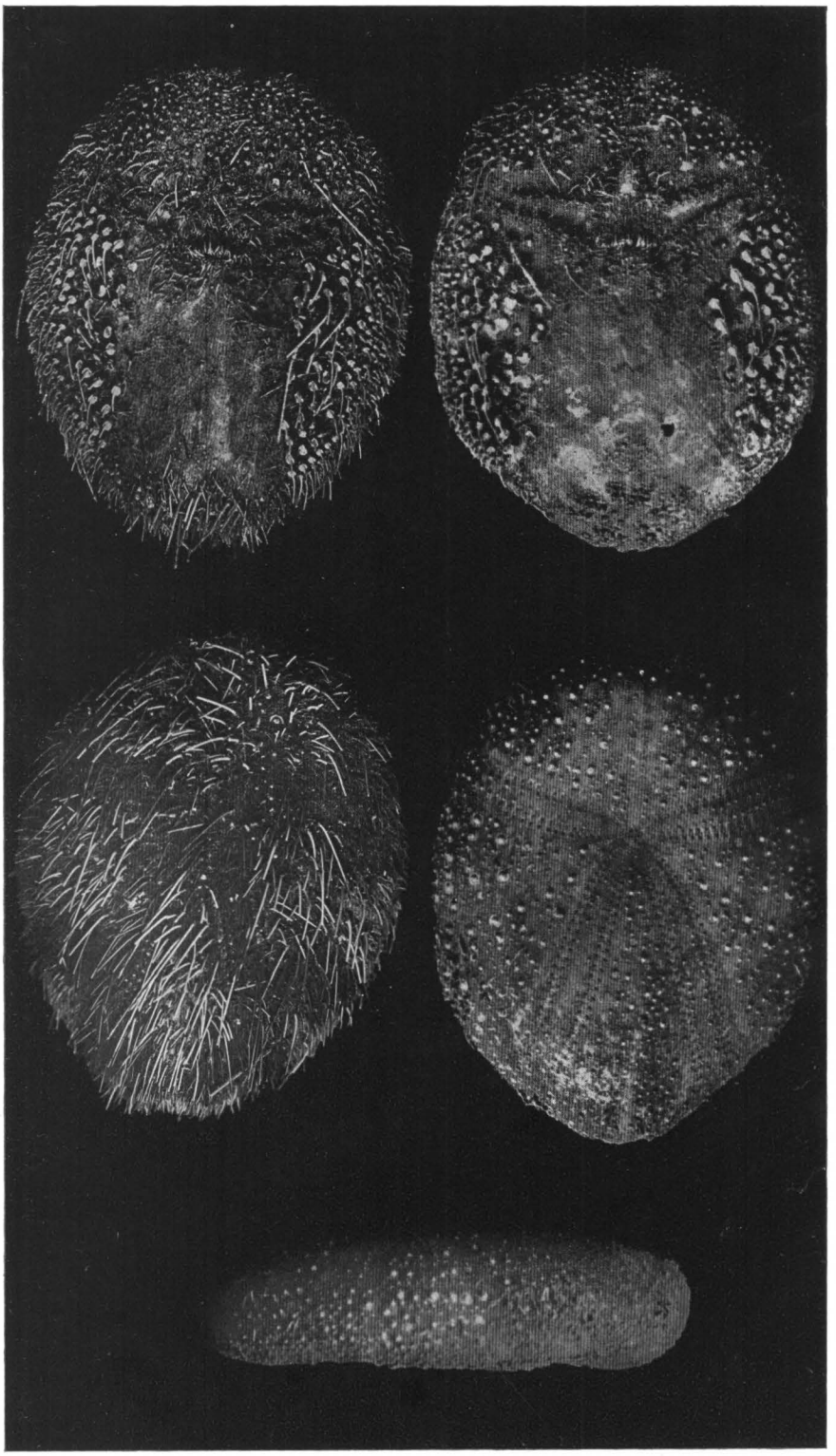
Top, bottom and side view, about natural size.

ARÆOSOMA PAUCISPINUM H.L.C.

Top and bottom view, natural size 110 x 105 mm.

CLYPEASTER EURYCHORIUS H.L.C.

Left side and top view, natural size 145 x 130 mm.
Bottom view, natural size 115 x 105 mm.




MARETIA PARVITUBERCULATA H.L.C.

1 and 2 lower and upper side, natural size 65 x 50 mm.

3, 4 and 5 lower, upper and left hand side, natural size 58 x 43 mm.

UNION OF SOUTH AFRICA.

# FISHERIES AND MARINE BIOLOGICAL SURVEY.

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