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BRACHIOPODA COLLECTED BY CANCAP I-III EXPEDITIONS TO THE SOUTH-EAST NORTH ATLANTIC. 1976-1978

CANCAP-project. Contributions to the zoology, botany and paleontology of the Canarian-Cape Verdean region of the North Atlantic Ocean, no. 34

by

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With three text-figures, two tables, and one plate

ABSTRACT

Recent brachiopods collected by CANCAP expeditions to the south-east North Atlantic between 1976 and 1978 are identified. Species belonging to *Pelagodiscus, Gryphus?, Dyscolia, Terebratulina, Eucalathis, Argyrotheca, Megathiris, Platidia, Phaneropora, Megerlia, Dallina, Macandrevia* and *Lacazella* have been recognised, including a new species *Argyrotheca grandicostata.*

Comparisons are made to show the close relationships of these Mauritanian brachiopods to recently-described brachiopod faunas from the Gulf of Gascogne (Lusitanian) and the Mediterranean Sea.

INTRODUCTION

This report is concerned with the Recent Brachiopoda collected by the CANCAP expeditions to the south-east North Atlantic between 1976 and 1978 (for locations, see figs. 1-3). Sixteen out of 110 stations which sampled the sublittoral benthos by appropriate methods yielded brachiopods in the CANCAP I expedition to the Madeira Archipelago and Morocco in 1976; 48 out of 156 stations yielded brachiopods in the CANCAP II expedition to the Canary Islands in 1977; and 24 out of 180 stations yielded brachiopods in the CANCAP III expedition to the Madeira Archipelago and Mauritania in 1978. These ratios agree with those for brachiopods collected on expeditions to other areas (Cooper, 1973) and indicate that brachiopods are not a common

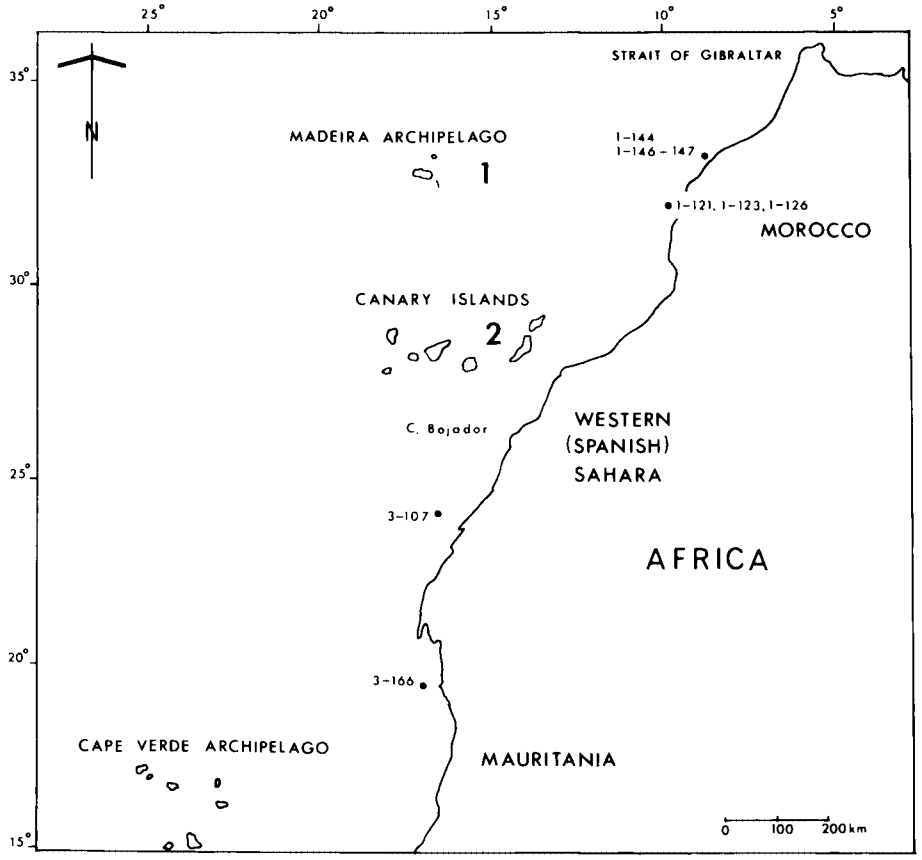

Fig. 1. The coast of Morocco, Western (Spanish) Sahara & Mauritania, showing location of CAN-CAP sampling stations yielding brachiopods. Those stations around the Madeira Archipelago and Canary Islands are shown in figs. 2 and 3, respectively.

constituent of grab or dredge hauls except in high latitudes in the southern hemisphere (Foster, 1974).

Most specimens were obtained with a Van Veen grab, although occasional examples appeared in dredge and trawl samples. Empty disarticulated tests formed the majority of samples collected, resulting in some identification problems where delicate internal structures were missing. Evidence of abrasion on many of these shells suggested prolonged immersion and some transportation, rendering precise depth ranges unreliable.

In spite of these shortcomings, however, the total of 88 lots containing brachiopods represents one of the most complete collections of this group from the Mauritanian faunal province (Gibraltar to Cape Blanc, plus Canary Is-

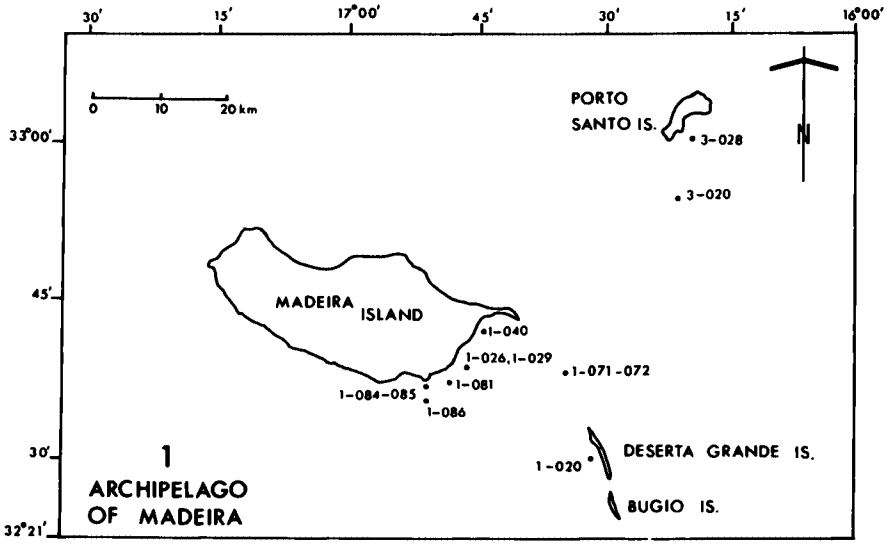

Fig. 2. The Madeira Archipelago, showing location of CANCAP sampling stations yielding brachiopods.

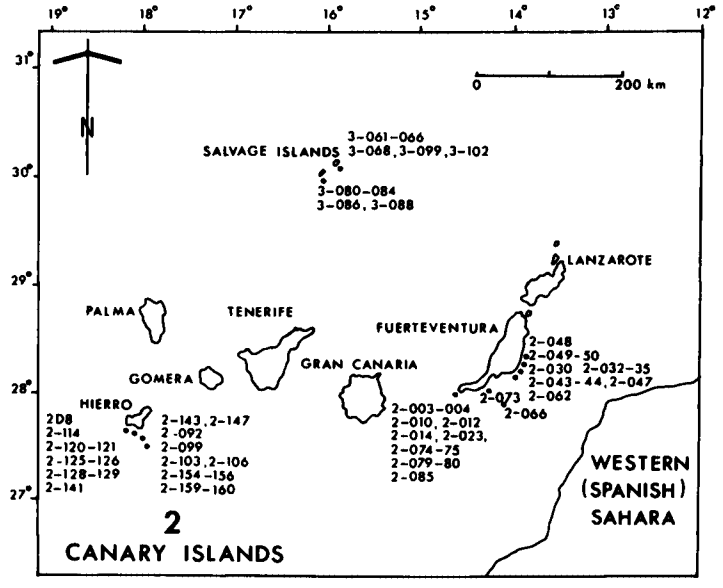

Fig. 3. The Canary and Selvagem (Salvage) Islands, showing location of CANCAP sampling stations yielding brachiopods.

lands and the Madeira Archipelago). While a few brachiopods were collected from this region by the CHALLENGER expedition (Davidson, 1880) the most extensive collections prior to CANCAP were made during voyages of the research vessels "Travailleur" in 1882 and "Talisman" in 1883. Brachiopods collected from these voyages were subsequently described by Fischer & Oehlert (1891). Since then, isolated cruises by research vessels such as the "Jean Charcot" to the Madeira Archipelago in 1966 (ZARCO expedition) and Walvis Ridge in 1978-79 (WALVIS expedition) and the "Meteor" to Morocco, Spanish Sahara and Mauritania in 1967, 1972 and 1975 have obtained brachiopods. These specimens were previously sent to the author for identification but have been used only for comparison purposes in this study.

In terms of bathymetric distribution, the CANCAP brachiopods can be divided into two groups. The first group contains members of the Megathyrididae (species of *Argyrotheca* and *Megathiris*) and Thecideidae (*Lacazella*) which prefer the depth range 0-600 m, although occasional specimens can be found at greater depths. Species from this group that are also found in the Mediterranean Sea have a more restricted depth range there (Logan, 1979), suggesting that some brachiopod species have a wide depth tolerance and should be used with caution in this respect for paleoecological reconstruction of past environments. A second group of deeper-water inhabitants comprises species of the genera *Gryphus?, Dyscolia, Terebratulina, Eucalathis, Platidia, Phaneropora, Megerlia, Dallina, Macandrevia* and *Pelagodiscus,* the latter ranging down to 3120 m, the maximum recorded depth for a brachiopod from the CANCAP expeditions.

In the vast majority of cases Recent brachiopods must attach to a firm substrate following settlement and occasional living specimens obtained by the CANCAP expeditions revealed information about their attachment site. For instance *Megerlia truncata* (Linnaeus, 1767) was commonly found attached to dead deep-water scleractinian coral branches, while volcanic fragments offered a firm attachment for *Megathiris detruncata* (Gmelin, 1790) in shallow water and *Pelagodiscus atlanticus* (W. King, 1868) in deep water. In other cases extensive shell beds, some partially cemented, were colonised by *Megathiris detruncata* and *Lacazella mediterranea,* (Risso, 1826), the latter often cementing its larger valve to dead shells of its own species.

The affinities of the brachiopods from the CANCAP expeditions are shown in Table 1. Of the sixteen species recognised, nine were also identified from the same geographic area by Fischer & Oehlert (1891). These authors recognised 21 species; thus 12 species collected by them were not obtained by the CANCAP expeditions. A combination of CANCAP identifications with those of Fischer & Oehlert gives a total brachiopod species list of 27 species for the

TABLE 1. List of Mauritanian brachiopod species and their occurrence in other faunal provinces

Mauritanian Brachiopods (CANCAP + Fischer & Oehlert)	CANCAP (this report)	Fischer & Oehlert (1891)	Lusitanian Brachiopods (d'Hondt 1976; Cooper 1981)	Mediterranean Brachiopods (Logan, 1979)	Sub-Tropical Atlantic Brachiopods (Cooper, 1977)
Pelagodiscus atlanticus	+	+	+	-	+
Crania anomala	-	+	+	+	-
Cryptopora gnomon	-	+	+	-	-
Hispanirhynchia cornea	-	+	+	-	-
Dyscolia aff. D. subquadrata	+	-	-	-	-
Dyscolia wyvillei	-	+	+	-	+
Gryphus vitreus	-	+	+	+	-
Gryphus? cooperi	+	-	+	-	-
Dallithyris? sphenoidea	-	+	+	-	-
Terebratulina retusa	+	+	+	+	-
Eucalathis tuberata	+	+	+	-	-
Eucalathis ergastica	+	+	+	-	-
Argyrotheca cuneata	+	-	-	+	-
Argyrotheca cordata	+	-	-	+	-
Argyrotheca grandicostata	+	-	-	-	-
Argyrotheca cistellula	-	+	-	+	-
Megathiris detruncata	+	+	-	+	+
Platidia anomioides	+	+	+	+	+
Platidia davidsoni	-	+	-	+	+
Phaneropora incerta	+	+	-	-	+
Megerlia truncata	+	+	+	+	-
Megerlia echinata	-	+	+	-	+
Pantellaria monstruosa	-	+	+	?	-
Dallina septigera	+	+	+	-	-
Macandrevia cranium	+	+	+	-	-
Lacazella mediterranea	+	-	-	+	-
Gwynia capsula	-	+	-	-	-

Mauritanian faunal province, bearing in mind that the species *Muehlfeldtia* (now *Pantellaria*) *monstruosa* (Scacchi, 1836) may be a synonym of *Megerlia truncata,* as suggested by Atkins (1961) and Logan (1979).

The closest relationships of the Mauritanian brachiopods are with those of the Lusitanian faunal province to the north, with 17 species (63%) of the Mauritanian forms also occurring in the Lusitanian area. While only 11 species (41%) of the Mauritanian species are found in the Mediterranean, all Mediterranean species have now been recorded from the Mauritanian, with the discovery of *Argyrotheca cuneata* (Risso, 1826) and *Lacazella mediterranea* from the latter region. These species can now no longer be regarded as Mediterra-

nean neoendemics, as suggested by Logan (1979). The main difference between the two regions lies in the absence from the Mediterranean of typical Atlantic deep-water species belonging to such genera as *Pelagodiscus, Cryptopora, Dyscolia, Dallina* and *Macandrevia.* This may be related to the progressive development of the Gibraltar sill in the early Pleistocene, thus causing the gradual extinction of previously-established deep-water Mediterranean species dependent upon the incursion of deep cold Atlantic waters (Logan, 1979).

Similarities between the Mauritanian brachiopod fauna and that from the sub-tropical Western Atlantic region (Caribbean Sea and adjacent waters) are, as expected, less striking, with only 7 Mauritanian species (26%) occurring in this region. However, in terms of genera, Western Atlantic sub-tropical brachiopods show clear affinities with both the eastern Atlantic and Mediterranean fauna, as stressed by Cooper (1977).

SYSTEMATIC SECTION

The classification and terminology of Williams & Rowell (1965) have been used here and all supra-generic categories have been taken from this work. Detailed descriptions and synonymies of most of the species identified in this report have been omitted, but in each case a citation to a reliable description has been given.

Class INARTICULATA Huxley, 1869
Order ACROTRETIDA Kuhn, 1949; suborder ACROTRETIDINA Kuhn, 1949
Superfamily DISCINACEA Gray, 1840; family DISCINIDAE Gray, 1840; subfamily DISCINISCINAE Schuchert & LeVene, 1929

Pelagodiscus Dall, 1908
Pelagodiscus atlanticus (W. King, 1868)

Pelagodiscus atlanticus — Cooper, 1981: 8, pl. 2 figs. 39, 40.

Remarks. — This diminutive species is widespread throughout the oceans of the world, especially in deep waters. It is distinguished by its circular shell, cone-shaped upper dorsal valve and fringe of long setae around the perimeter of the shell. It was previously recorded by Fischer & Oehlert (1891) from deep waters off Morocco and the Azores and more recently by Cooper (1975, 1981) from the Gulf of Guinea, off Angola and from the Gulf of Gascogne. It was a common component of the WALVIS collections. The species was present at only one CANCAP locality, from which 14 examples were obtained.

Locality. — CANCAP III: 3-020 (RMNH 488).
Depth range. — 2830-3120 m.

Class ARTICULATA Huxley, 1869
Order TEREBRATULIDA Waagen, 1883; suborder TEREBRATULIDINA Waagen, 1883
Superfamily TEREBRATULACEA Waagen, 1883; family TEREBRATULIDAE Gray, 1840

Gryphus Mühlfeldt, 1811
Gryphus? cooperi d'Hondt, 1976

Gryphus? cooperi — Cooper, 1981: 14, pl. 3 figs. 1, 2.

Remarks. — Several CANCAP examples were identified with specimens described as *Gryphus cooperi* by d'Hondt (1976) from the Gulf of Gascogne and as *Gryphus? cooperi* by Cooper (1981) from the same region. As Cooper points out, the loop in these specimens is not similar to that in the type species of *Gryphus* and therefore the specimens are not correctly referable to *Gryphus*. Cooper (pers. comm.) is presently engaged in a major revision of the short-looped brachiopods. Pending the publication of this work, the specimens from the CANCAP expeditions are here provisionally assigned to *G.? cooperi*.

Localities. — CANCAP II: 2-106, 2-114, 2-126, 2-141, 2-143, 2-156, 2-157, 2-159, 2-160 (RMNH 451, 458, 465, 470, 472, 479, 481, 483, and 485, respectively).

Depth range. — 330-1000 m.

Family DYSCOLIIDAE Fischer & Oehlert, 1891

Dyscolia Fischer & Oehlert, 1890
Dyscolia aff. **D. subquadrata** (Jeffreys, 1878)

Liothyris subquadrata — Davidson, 1886: 14, pl. 2 figs. 15, 16.

Remarks. — Two worn examples, here tentatively assigned to this species, from CANCAP II collections from the Canary Islands both show immature loops. The CANCAP specimens, although small, show the typical large foramen and symphytium, as well as internal features, typical of the genus *Dyscolia*. There is a strong similarity to *Dyscolia subquadrata* described by Jeffreys (1878) from the Bay of Biscay and off the coast of Portugal, but the worn condition of the valves precludes positive determination of the nature of the shell sculpture.

Localities. — CANCAP II: 2-075, 2-085 (RMNH 432 and 438, respectively).

Depth range. — 550-600 m.

Family CANCELLOTHYRIDIDAE Thomson, 1926; subfamily CANCELLOTHYRIDINAE Thomson, 1926

Terebratulina D'Orbigny, 1847
Terebratulina retusa (Linnaeus, 1758)

Terebratulina retusa — Logan, 1979: 37, fig. 8, pl. 3 figs. 1-18.

Remarks. — This distinctive species is common throughout the Atlantic, where it ranges northward into boreal regions. It is common in the western Mediterranean but rare in the eastern basin. Its geographical distribution and relationship to *Terebratulina septentrionalis* (Couthouy, 1838) have recently been discussed in a detailed re-description of this species by Logan (1979).

Fischer & Oehlert (1891) recorded *T. retusa,* under the name of *T. caputserpentis,* from off Morocco, Canary Islands and Cape Verde Islands.

This species is particularly prone to boring by carnivorous gastropods, which produce an irregularly-shaped hole in the brachiopod valves. Similar holes attributed to unknown gastropods have been described for *T. septentrionalis* from the east coast of Canada by Noble & Logan (1981).

Localities. — CANCAP: 1-121, 1-123, 1-126, 1-144, 1-146, 1-147; CANCAP II: 2-010, 2-085 (RMNH 378, 380, 382, 384, 387, 390, 396, and 437, respectively).

Depth range. — 85-600 m.

Subfamily EUCALATHINAE Muir-Wood, 1965

Eucalathis Fischer & Oehlert, 1890
Eucalathis tuberata (Jeffreys, 1878)

Eucalathis tuberata — Cooper, 1981: 12, pl. 1 figs. 9-12.

Remarks. — Fischer & Oehlert (1891) described and figured *Eucalathis tuberata* and *E. ergastica* Fischer & Oehlert, 1890 from the southeast North Atlantic. These species were recently re-described by Cooper (1981) from the Gulf of Gascogne. Four CANCAP localities yielded well-preserved examples of *E. tuberata,* which differs from *E. ergastica* in being smaller and more rounded, and in having more numerous, beaded radial costellae.

Cooper (1981) notes that this species has been recorded from the Mediter-

ranean, but I have not seen any examples of any species of *Eucalathis* from that region (Logan, 1979).

Localities. — CANCAP II: 2-079; CANCAP III: 3-072, 3-102 (RMNH 435, 506, and 521, respectively).

Depth range. — 600-900 m.

Eucalathis ergastica Fischer & Oehlert, 1890

Eucalathis ergastica — Cooper, 1981: 12, pl. 1 figs. 1-8.

Remarks. — The main differences between this species, which was identified in collections from six CANCAP localities, and *E. tuberata* have already been mentioned above.

Localities. — CANCAP II: 2-080, 2-114, 2-125, 2-128, 2-129, 2-156, 2-157 (RMNH 436, 457, 463, 466, 468, 480, and 482, respectively).

Depth range. — 340-1000 m.

Suborder TEREBRATELLIDINA Muir-Wood, 1955
Superfamily TEREBRATELLACEA King, 1850; family MEGATHYRIDIDAE Dall, 1870

Argyrotheca Dall, 1900
Argyrotheca cuneata (Risso, 1826)

Argyrotheca cuneata — Logan, 1979: 45, figs. 11, 12, pl. 4 figs. 1-12.

Remarks. — This species is a common constituent of shallow-water, shell-rich sediments off the Canary Islands (CANCAP II), Selvagem (Salvage) Islands and Mauritania (CANCAP III). It was not obtained from the Madeira Archipelago by CANCAP I, but a single example collected by the ZARCO expedition to this area in 1966, from south-east of Porto Santo at 60 m depth, appears to belong to this species.

A. cuneata is a common species in the Mediterranean, where it is widely distributed in shallow waters. It is characterised by red intercostal stripes anteriorly and by a pair of divergent prongs arising from the median septum of the brachial valve (Logan, 1979). Occasional specimens lack the red stripes, particularly in the eastern Atlantic examples but this is also typical of some Mediterranean examples. Although many species of *Argyrotheca* have been recognised (Cooper, 1977), the genus is in need of revision, mainly to establish the range of variation in individual species. Pending such a revision, several questionable specimens from CANCAP collections have been provisionally assigned to *A. cuneata*.

Localities. — CANCAP II: 2-003, 2-030, 2-032, 2-033, 2-035, 2-043, 2-044, 2-048, 2-073, 2-075, 2-085, 2-103; CANCAP III: 3-061 to 3-066, inclusive; 3-070, 3-080, 3-081, 3-083, 3-084, 3-099, 3-166 (RMNH 393, 401, 403, 405, 409, 411, 413, 417, 425, 430, 439, 446, 490, 491, 493, 494, 496, 498, 503, 508, 509, 511, 512, 517, and 523, respectively).

Depth range. — 28-645 m.

Argyrotheca cordata (Risso, 1826)

Argyrotheca cordata — Logan, 1979: 50, figs. 13, 14, pl. 5 figs. 1-12.

Remarks. — *A. cordata* is another small and highly variable megathyridid which is common throughout the Mediterranean Sea, from which it has recently been re-described by Logan (1979). It was not uncommon from CANCAP II stations off the Canary Islands, but was not collected from the Madeira Archipelago (CANCAP I) or from the west African coast (CANCAP III). A single example probably referable to this species was obtained by the ZARCO expedition in 1966 from 60 m depth south-east of Porto Santo, Madeira Archipelago.

Neither this species of *Argyrotheca* nor the preceeding one was recorded by Fischer & Oehlert (1891), although they did describe (but not figure) *Argyrotheca cistellula* (Searles-Wood, 1841) from deep water off the Canary Islands, the Azores and the coast of Morocco.

Localities. — CANCAP II: 2-003, 2-032, 2-033, 2-034, 2-035, 2-043, 2-044, 2-048, 2-049, 2-073, 2-075, 2-114, 2-147 (RMNH 392, 402, 404, 406, 408, 410, 412, 416, 419, 424, 429, 453, and 473, respectively).

Depth range. — 47-600 m.

Argyrotheca grandicostata sp. nov.
(pl. 1 figs. 1-10)

Material. — Holotype, RMNH 454; figured paratypes 1-4, 6, 7, RMNH 455; figured paratypes 5, 8, RMNH 464; unfigured paratypes 1-7, RMNH 455; unfigured paratypes 8-10, RMNH 464.

Description. a) External characters. — Adult shell small, approximating 2 mm in width. Shell outline variable, but usually wider than long, with maximum width occurring near mid-valve or just anterior to it. Hinge-line short, extremities not produced. Shell biconvex, costate, costae prominent, few in number, rounded in outline, producing scalloped anterior margin. Usually three lateral costae in each valve, with a shorter central costa developing in sulcus of both valves in mature stage. Anterior commissure bilobate. Beak short, subtruncate, usually abraded; foramen large, hypothyridid, with pedicle

collar. Nature of pedicle unknown. Delthyrium flanked by very narrow rudimentary deltidial plates. Ventral cardinal area high, triangular, flat, apsacline; dorsal cardinal area short, anacline to cataline.

b) Internal characters. — Pedicle valve hinge-line straight; hinge teeth elongate, non-denticulate. Dental plates absent; pedicle collar supported by weak median septum extending over half the length of pedicle valve. Brachial valve with small, dorsally-convex cardinal process; hinge-line with short dental sockets; median septum thick, strong, beginning anterior to cardinal process, rising to sharp crest about three-quarters of the shell length, then sloping steeply anteriorly by way of one or two almost imperceptible serrations to a termination close to the anterior margin. Crural processes poorly developed. Brachial skeleton formed of prominent raised arcuate lamellae attached to crural bases, valve floor and anterior extremity of median septum. Lophophore and spicules not observed.

TABLE 2. Measurements (in mm) of holotype and paratypes of *Argyrotheca grandicostata* sp. nov. FP = figured paratypes, P = unfigured paratypes

	Length of pedicle valve	Length of brachial valve	Width at mid-length	Maximum width	Hinge width	Apical angle
Holotype	1.7	1.3	2.0	2.0	1.3	88°
FP 1	1.4	1.2	1.3	1.5	1.0	78°
FP 2	1.7	1.4	1.7	2.0	1.0	71°
FP 3	1.3	1.0	1.3	1.7	1.0	78°
FP 4	2.7	–	2.0	2.3	1.6	75°
FP 5	1.7	–	1.8	2.1	1.5	95°
FP 6	–	1.3	2.2	2.2	1.5	–
FP 7	–	1.6	2.1	2.2	1.5	–
FP 8	1.4	1.3	1.6	1.8	1.3	90°
P 1	–	1.3	2.1	2.3	1.6	–
P 2	2.0	–	2.0	2.3	1.5	79°
P 3	–	1.4	2.2	2.2	1.3	–
P 4	2.0	–	2.0	2.3	1.4	88°
P 5	1.4	–	1.6	2.0	1.5	92°
P 6	–	1.0	1.2	1.3	1.0	–
P 7	–	1.6	2.2	2.2	1.5	–
P 8	–	1.3	2.0	2.0	1.6	–
P 9	2.3	–	2.3	2.3	1.5	85°
P 10	1.6	–	1.6	2.0	1.3	78°

Remarks. — All known Recent Caribbean species of *Argyrotheca* were recently re-described by Cooper (1977), (who listed eleven species, while the three Recent Mediterranean species of the genus were re-described by Logan (1979). The species here described, which is characterised by having few prominent rounded costae, cannot be identified with any previously described *Argyrotheca.*

The Mediterranean species *A. cordata* (Risso) occasionally exhibits a strongly-costate variety, but that species has a very distinctive internal structure (Logan, 1979) which is quite different from the south-east North Atlantic species here described. Davidson (1887, pl. 22 figs. 30, 30a) illustrated a specimen of *A. cuneata* (Risso) with prominent ribs, but this Mediterranean form has a distinctively-coloured shell of pink-red intercostal stripes (Logan, 1979). *A. schrammi* (Crosse & Fischer, 1866) from the Caribbean was described and figured by Davidson (1887) and Cooper (1977) but this taxon has a shell outline which is widest at the hinge line, with acutely-produced lateral extremities approaching an alate condition. *A. crassa* (Cooper, 1977), also from the Caribbean, is a much larger species than *A. grandicostata*, but otherwise has several characteristics in common, including similar but less prominent costation. The crural processes are described by Cooper (1977) as moderately long, in contrast to the rudimentary crural processes in *A. grandicostata.*

Localities. — CANCAP II: 2-114, 2-126 (RMNH 454, 464).

Depth range. — 330-480 m.

Megathiris D'Orbigny, 1847
Megathiris detruncata (Gmelin, 1790)

Megathiris detruncata — Logan, 1979: 55, figs. 15, 16, pl. 6 figs. 1-13.

Remarks. — This species ranges throughout the Mediterranean area and is present in the eastern Atlantic as far north as the Channel Islands. It was previously recorded from the Mauritanian province by Fischer & Oehlert (1891). It was collected by all three CANCAP expeditions, by the ZARCO expedition in 1966 to the Madeira Archipelago and by "Meteor" off Morocco in 1967. It is a relatively shallow-water species, rarely exceeding 600 m in depth in the Atlantic, and is always easily recognised by a crested and serrated lateral septum on each side of the median septum in the brachial valve.

As reported by Logan (1979), examples of an unusually large variety of this species, characterised by a highly convex pedicle valve, and flat, very worn, almost catacline cardinal areas were collected by the ZARCO expedition in 1966 from very shallow water (30-50 m) around Madeira, Porto Santo and Deserta Islands, Madeira Archipelago. Similar specimens have been obtained

from the deepest recesses of caves at 3-15 m depth from the Algarve and Estremadura regions of western Portugal by Saldanha, often attached to scleractinian corals (Zibrowius & Saldanha, 1978). The extreme wear in the beak region of both valves appears to be responsible for the catacline appearance of the cardinal areas and suggests that the morphological variation in this species may be phenotypically controlled, although why this should be most prevalent in cave-dwelling individuals is not yet understood.

Localities. — CANCAP I: 1-020, 1-026, 1-029,1-040, 1-071, 1-072, 1-081, 1-084, 1-085, 1-086, 1-121, 1-123, 1-144, 1-146, 1-147; CANCAP II: 2-074, 2-075, 2-085, 2-103, 2-106, 2-114, 2-120; CANCAP III: 3-068, 3-070, 3-088, 3-102, 3-166 (RMNH 367-377, 379, 383, 386, 389, 426, 428, 440, 447, 450, 452, 459, 499 502, 515, 519 and 524, respectively).

Depth range. — 56-800 m.

Family PLATIDIIDAE Thomson, 1927

Platidia Costa, 1852
Platidia anomioides (Scacchi & Philippi, 1844)

Platidia anomioides — Logan, 1979: 60, figs. 17, 18, pl. 7 figs. 1-11.

Remarks. — A single well-preserved specimen referable to this species was obtained by the CANCAP III expedition from the coast of the former Spanish Sahara. The brachial skeleton is complete and identifies this species clearly as *P. anomioides,* rather than the closely-related *P. davidsoni* (Deslongchamps,1855), with which it is often associated. The differences between these species, both of which are common in the Mediterranean, have been discussed by Logan (1979).

Locality. — CANCAP III: 3-107 (RMNH 522).

Depth range. — 1000-1100 m.

Family PHANEROPORIDAE Zezina, 1981

Phaneropora Zezina, 1981
Phaneropora incerta (Davidson, 1880)
(pl. 1 figs. 11-17)

Magasella incerta — Davidson, 1887: 101, pl. 18 figs 2, 3a.

Remarks. — The family Phaneroporidae was established by Zezina in 1981 to include the genera *Leptothyrella* (Muir-Wood, 1965) with type species *L.*

ignota (Muir-Wood, 1959) from the Indian Ocean, and *Phaneropora,* with type species *P. galatheae* Zezina, 1981, from the S.W. Pacific. Also included in *Phaneropora* was *P. incerta* (Davidson, 1880) from the Atlantic. The latter species was first described by Davidson (1880, 1887) as *Magasella incerta* from the Caribbean. Specimens from Arguin Bank and the Azores in the eastern Atlantic were later identified with Davidson's species but questionably assigned to *Platidia* by Fischer & Oehlert (1891). The CANCAP specimens show the rodlike extremity of the median septum, the strong dental plates, the zygolophous and heavily-spiculate lophophore and the absence of a cardinal process, hinge-plates and ascending branches of the loop, all characteristic of the genus *Phaneropora.*

P. incerta differs from *P. galatheae* in lacking small tubercles at the sides of the beak in both valves. Zezina (1981: 19) notes that the Pacific species differs from the Atlantic one in that the descending branches of the brachial skeleton "do not attach to the septum immediately, but through the spicules of the lophophore".

The species occurred in six lots collected by CANCAP II and III expeditions from the Canary Islands, Madeira Archipelago and Selvagem Grande, while it was also collected by the "Jean Charcot" near the Walvis Ridge during the WALVIS expedition.

Localities. — CANCAP II: 2-129, 2-155, 2-159; CANCAP III: 3-028, 3-071, 3-072, 3-102 (RMNH 467, 478, 484, 489, 504, 507 and 520, respectively).

Depth range. — 700-900 m.

Family KRAUSSINIDAE Dall, 1870

Megerlia King, 1850
Megerlia truncata (Linnaeus, 1767)

Megerlia truncata —Logan, 1979: 68, fig. 21, pl. 9 figs. 1-23.

Remarks. — Examples belonging to this well-known and widely-distributed species were obtained by CANCAP I and II expeditions to the Madeira Archipelago – Morocco and the Canary Islands, respectively. The maximum recorded depth was 600 m, which is in accordance with its bathymetric range down to the upper part of the bathyal zone in the Mediterranean (Logan, 1979). The species was recorded by Fischer & Oehlert (1891) from shallow water in the Canary Islands and Morocco and by the "Meteor" expedition off Morocco in 1967 at a depth of 150 m.

Localities. — CANCAP I: 1-123, 1-144, 1-146, 1-147; CANCAP II: 2-003,

2-004, 2-012, 2-014, 2-023, 2-034, 2-044, 2-047, 2-048, 2-050, 2-074, 2-075, 2-085, 2-092, 2-099, 2-103, 2-120, 2-141, 2-147 (RMNH 381, 385, 388, 391, 394, 395, 397, 399, 400, 407, 414, 415, 418, 420, 427, 434, 441, 444, 445, 449, 461, 471, and 475, respectively).

Depth range. — 49-600 m.

Family DALLINIDAE Beecher, 1893; subfamily DALLININAE Beecher, 1893

Dallina Beecher, 1893
Dallina septigera (Lovén, 1846)

Dallina septigera — Cooper, 1981: 23, pl. 2 figs. 41-43.

Remarks. — *Dallina septigera* is a common Atlantic species and has been recorded from the Mauritanian region by Fischer & Oehlert (1891) and from the Lusitanian region by d'Hondt (1976) and Cooper (1981), but not from the Mediterranean (Logan, 1979). Only a single example was obtained from the CANCAP expeditions, but additional specimens were collected by the "Meteor" off the former Spanish Sahara at 600-800 m in 1975.

Locality. — CANCAP II: 2-062 (RMNH 421).

Depth. — 1520 m.

Genus **Macandrevia** King, 1858
Macandrevia cranium (Müller, 1776)

Macandrevia cranium — Cooper, 1981: 17, figs. 2, 3, pl. 2 figs. 19-30.

Remarks. — This is a very common species in the Atlantic, ranging greatly in depth (Cooper, 1981). It was previously recorded from the Mauritanian faunal province by Fischer & Oehlert (1891) and from the Lusitanian faunal province by d'Hondt (1976) and Cooper (1981). It is unknown from the Mediterranean (Logan, 1979). Only one specimen, with the brachial skeleton unfortunately damaged, was collected by the CANCAP expeditions.

Locality. — CANCAP II: 2-062 (RMNH 422).

Depth. — 1520 m.

Order uncertain; suborder THECIDEIDINA Elliot, 1958
Superfamily THECIDEACEA Gray, 1840; Family THECIDEIDAE Gray, 1840

Lacazella Munier-Chalmas, 1881
Lacazella mediterranea (Risso, 1826)

Lacazella mediterranea — Logan, 1979: 73, fig. 22, pl. 10 figs. 1-8.

Remarks. — Although most specimens collected by CANCAP expeditions appear larger than their Mediterranean counterparts, there is no doubt of the identity of these forms with *Lacazella mediterranea*. Of the three modern species of *Lacazella* known, *L. mediterranea* and *L. mauritiana* Dall, 1920, the latter from the Indian Ocean, are very similar internally but the recently-described *L. caribbeanensis* (Cooper, 1977) has rather marked internal differences, mainly in the form of the hemispondylium of the pedicle valve.

L. mediteranea, recently re-described from the Mediterranean by Logan (1979), is numerous in CANCAP samples, where the shells usually appear worn. The species is a cementing form attaching to shell debris or branches of scleractinian coral and appears to be a common constituent of shell-rich gravels (Caulet, 1967).

This is the first occurrence of *L. mediterranea* from the Mauritanian province and extends the range of this species beyond the Mediterranean for the first time. It was not recorded by Fischer & Oehlert (1891) but most of their sampling was done in deep water, probably beyond the normal depth limits of this essentially shelf-dwelling species.

Localities. — CANCAP II: 2-013, 2-075, 2-085, 2-092, 2-103, 2-120, 2-141, 2-147, 2-D8; CANCAP III: 3-062, 3-064, 3-065, 3-068, 3-070, 3-082, 3-084, 3-086, 3-088, 3-099 (RMNH 398, 431, 442, 443, 448, 460, 469, 474, 487, 492, 495, 497, 500, 501, 510, 513, 514, 516, and 518, respectively).

Depth range. — 5-600 m.

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CANCAP BRACHIOPOD STATIONS

A. CANCAP I (Madeira Archipelago – Morocco) 1976

Sta. 1-020: W of Deserta Grande, Madeira Archipelago, 32° 31′ N 16° 32′ W, van Veen grab, depth 144 m, fine sand with clay and shell gravel, 8.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 367)

Sta. 1-026: SE of Madeira, 32° 41′ N 16° 45′ W, van Veen grab, depth 101 m, sand with shell gravel, 9.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 368)

Sta. 1-029: SE of Madeira, 32° 41′ N 16° 46′ W, van Veen grab, depth 340 m, sandy clay, 9.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 369)

Sta. 1-040: SE of Madeira, 32° 44′ N 16° 44′ W, van Veen grab, depth 56 m, sand and shells, 10.III.1976.
Megathiris detruncata (worn dead shell) (RMNH 370)

Sta. 1-071: E. of Madeira, 32° 41′ N 16° 35′ W, van Veen grab, depth 120 m, shells and sand, 14.III.1976.
Megathiris detruncata (worn dead shells and living examples attached to red scleractinian coral) (RMNH 371)

Sta. 1-072: E of Madeira, 32° 41′ N 16° 35′ W, van Veen grab, depth 80 m, shells and sand, 14.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 372)

Sta. 1-081: near S coast of Madeira, 32° 38′ N 16° 49′ W, van Veen grab, depth 90-102 m, muddy sand, shells and some clay, 15.III.1976.
Megathiris detruncata (dead shells) (RMNH 373)

Sta. 1-084: near S coast of Madeira, 32° 38′ N 16° 51′ W, van Veen grab, depth 86 m, sand and shells with some clay, 15.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 374)

Sta. 1-085: near S coast of Madeira, 32° 38′ N 16° 51′ W, van Veen grab, depth 150 m, coarse sand and shells, 15.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 375)

Sta. 1-086: off S coast of Madeira, 32° 37′ N 16° 51′ W, van Veen grab, depth 360 m, clay, 15.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 376)

Sta. 1-121: off Cape Hadid, Morocco, 32° 1′ N 9° 57′ W, van Veen grab, depth 125 m, clayey sand and shell gravel, 25.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 377)
Terebratulina retusa (dead shells) (RMNH 378)

Sta. 1-123: off Cape Hadid, Morocco, 31° 58′ N 9° 54′ W, van Veen grab, depth 89 m, sandy clay, 25.III.1976.
Megathiris detruncata (worn dead shells) (RMNH 379)
Terebratulina retusa (dead shells) (RMNH 380)
Megerlia truncata (dead shells) (RMNH 381)

Sta. 1-126: off Cape Hadid, Morocco, 31° 54′ N 9° 55′ W, 5 m-beamtrawl, depth 85 m, muddy sand, 25.III.1976.
Terebratulina retusa (worn dead shells) (RMNH 382)

Sta. 1-144: off Cap Blanc du Nord, Morocco, 33° 13′ N 8° 49′ W, van Veen grab, depth 100 m, sand with big stones, 28.III.1976.
Megathiris detruncata (dead shells) (RMNH 383)
Terebratulina retusa (dead shells) (RMNH 384)
Megerlia truncata (dead shells and heavily encrusted living examples attached to rock fragments) (RMNH 385)

Sta. 1-146: off Cap Blanc du Nord, Morocco, 33° 14′ N 8° 49′ W, van Veen grab, depth 105 m, sand, shells, gravel, stones, 28.III.1976.
Megathiris detruncata (dead shells) (RMNH 386)
Terebratulina retusa (dead shells) (RMNH 387)
Megerlia truncata (dead and live shells) (RMNH 388)

Sta. 1-147: off Cap Blanc du Nord, Morocco, 33° 15′ N 8° 48′ W, van Veen grab, depth 100 m, sand and shell gravel, 28.III.1976.
Megathiris detruncata (dead shells) (RMNH 389)
Terebratulina retusa (dead bored shells) (RMNH 390)
Megerlia truncata (dead shells) (RMNH 391)

B. CANCAP II (Canary Islands) 1977

Sta. 2-003: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 29′ W, van Veen grab, depth 140-200 m, sand, calcareous algae, shells, 23.VIII.1977.
Argyrotheca cordata (dead shells) (RMNH 392)
Argyrotheca cuneata (dead and living shells) (RMNH 393)
Megerlia truncata (dead shells) (RMNH 394)

Sta. 2-004: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 29′ W, rectangular dredge, depth 180-330 m, epifauna of mixed bottom, 23.VIII.1977.
Megerlia truncata (dead shells) (RMNH 395)

Sta. 2-010: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 29′ W, van Veen grab, depth 100-300 m, sand and shell gravel, 24.VIII.1976.
Terebratulina retusa (dead shells) (RMNH 396)

Sta. 2-012: S of Fuerteventura, Punta Jandia, 28° 2′ N 14° 28′ W, van Veen grab, depth 170 m, sand, 24.VIII.1977.
Megerlia truncata (dead shells) (RMNH 397)

Sta. 2-013: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 30′ W, van Veen grab, depth 225 m, sand, 24.VIII.1977.
Lacazella mediterranea (very worn dead shells) (RMNH 398)

Sta. 2-014: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 29′ W, rectangular dredge, depth 100-200 m, many sponges, other epizoa, 24.VIII.1977.
Megerlia truncata (living shells) (RMNH 399)

Sta. 2-023: S of Fuerteventura, Punta Jandia, 28° 3′ N 14° 30′ W, van Veen grab, depth 154 m, sand, 25.VIII.1977.
Megerlia truncata (heavily-encrusted dead shells) (RMNH 400)

Sta. 2-030: S of Fuerteventura, Punta Jandia, 28° 12′ N 14° 1′ W, van Veen grab, depth 28 m, sand, 26.VIII.1977.
Argyrotheca cuneata (immature dead shells) (RMNH 401)

Sta. 2-032: S of Fuerteventura, Punta Jandia, 28° 11′ N 14° 1′ W, van Veen grab, depth 40 m, substrate unknown, 26.VIII.1977.
Argyrotheca cordata (living shells) (RMNH 402)
Argyrotheca cuneata (living shells) (RMNH 403)

Sta. 2-033: S of Fuerteventura, Punta Jandia, 28° 10′ N 14° 1′ W, van Veen grab, depth 60 m, substrate unknown, 26.VIII.1977.
Argyrotheca cordata (dead shells) (RMNH 404)
Argyrotheca cuneata (dead shells) (RMNH 405)

Sta. 2-034: S of Fuerteventura, Punta Jandia, 28° 10′ N 14° 2′ W, van Veen grab, depth 90 m, substrate unknown, 26.VIII.1977.
Argyrotheca cordata (living shells) (RMNH 406)
Megerlia truncata (living shells) (RMNH 407)

Sta. 2-035: S of Fuerteventura, Punta Jandia, 28° 10′ N 14° 2′ W, triangular dredge, depth 45-80 m, substrate unknown, 26.VIII.1977.
Argyrotheca cordata (dead shells) (RMNH 408)
Argyrotheca cuneata (dead shells) (RMNH 409)

Sta. 2-043: SE of Fuerteventura, Punta de Gran Tarajal, 28° 11′ N 13° 59′ W, van Veen grab, depth 47 m, sand, calcareous algae, 27.VIII.1977.
Argyrotheca cordata (living and dead shells) (RMNH 410)
Argyrotheca cuneata (living and dead shells) (RMNH 411)

Sta. 2-044: SE of Fuerteventura, Punta de Gran Tarajal, 28° 11′ N 14° 00′ W, triangular dredge, depth 49 m, calcareous and other algae, 27.VIII.1977.
Argyrotheca cordata (living shells) (RMNH 412)
Argyrotheca cuneata (living shells) (RMNH 413)
Megerlia truncata (living shell) (RMNH 414)

Sta. 2-047: SE of Fuerteventura, Punta de Gran Tarajal, 28° 11′ N 14° 02′ W, Agassiz trawl, depth 100-125 m, mixed bottom, 27.VIII.1977.
Megerlia truncata (heavily-encrusted dead shells) (RMNH 415)

Sta. 2-048: SE of Fuerteventura, Punta de Gran Tarajal, 28° 14′ N 13° 51′ W, van Veen grab, depth 100 m, sandy bottom, 27.VIII.1977.
Argyrotheca cordata (living shells) (RMNH 416)
Argyrotheca cuneata (living shells) (RMNH 417)
Megerlia truncata (living shells) (RMNH 418)

Sta. 2-049: SE of Fuerteventura, Punta de Gran Tarajal, 28° 12′ N 13° 53′ W, Agassiz trawl, depth 70 m, sand, shells, red algae, 27.VIII.1977.
Argyrotheca cordata (living shells) (RMNH 419)

Sta. 2-050: SE of Fuerteventura, Punta de Gran Tarajal, 28° 12′ N 13° 52′ W, triangular dredge, depth 70 m, sandy bottom, 27.VIII.1977.
Megerlia truncata (living shells) (RMNH 420)

Sta. 2-062: SE of Fuerteventura, Punta de Gran Tarajal, 28° 07′ N 13° 45′ W, ring trawl, depth 1520 m, plain with pteropod ooze, 29.VIII.1977.
Dallina septigera (dead shell) (RMNH 421)
Macandrevia cranium (dead shell) (RMNH 422)

Sta. 2-066: SE of Fuerteventura, Punta de Gran Tarajal, 28° 01′ N 13° 57′ W, van Veen grab, depth 886 m, sandy clay, 29.VIII.1977.
Brachiopod indet. (RMNH 423)

Sta. 2-073: S of Fuerteventura, Punta de Morro Jable, 28° 02′ N 14° 21′ W, van Veen grab, depth 96 m, sandy bottom, 30.VIII.1977.
Argyrotheca cordata (dead shells) (RMNH 424)
Argyrotheca cuneata (dead shells) (RMNH 425)

Sta. 2-074: S of Fuerteventura, Punta Jandia, 28° 2′ N 14° 29′ W, van Veen grab, depth 530 m, sandy clay with a few worms, 30.VIII.1977.
Megathiris detruncata (dead shells) (RMNH 426)
Megerlia truncata (very worn dead shells) (RMNH 427)

Sta. 2-075: S of Fuerteventura, Punta Jandia, 28° 2′ N 14° 30′ W, van Veen grab, depth 550 m, substrate unknown, 30.VIII.1977.
Megathiris detruncata (worn dead shells) (RMNH 428)
Argyrotheca cordata (dead shells) (RMNH 429)
Argyrotheca cuneata (dead shells) (RMNH 430)
Lacazella mediterranea (worn dead shells) (RMNH 431)
Dyscolia cf. *subquadrata* (immature loop; dead shell) (RMNH 432)
Macandrevia sp. indet. (worn pedicle valve only) (RMNH 433)
Megerlia truncata (dead shells) (RMNH 434)

Sta. 2-079: S of Fuerteventura, Punta Jandia, 28° 1′ N 14° 26′ W, van Veen grab, depth 870 m, substrate unknown, 31.VIII.1977.
Eucalathis tuberata (immature loop, dead shells) (RMNH 435)

Sta. 2-080: S of Fuerteventura, Punta Jandia, 28° 1′ N 14° 26′ W, van Veen grab, depth 980 m, substrate unknown, 31.VIII.1977.
Eucalathis ergastica (dead shells) (RMNH 436)

Sta. 2-085: S of Fuerteventura, Punta Jandia, 28° 2′ N 14° 30′ W, van Veen grab, depth 500-700 m, clayey sand and shells, 31.VIII.1977.
Terebratulina retusa (dead shell) (RMNH 437)
Dyscolia cf. *subquadrata* (dead shell) (RMNH 438)
Argyrotheca cuneata (dead shells) (RMNH 439)
Megathiris detruncata (dead shells) (RMNH 440)
Megerlia truncata (dead shells) (RMNH 441)
Lacazella mediterranea (dead shells) (RMNH 442)

Sta. 2-092: S of Hierro, off Punta Restinga, 27° 37′ N 17° 59′ W, van Veen grab, depth 176 m, substrate unknown, 3.IX.1977.
Lacazella mediterranea (living shells) (RMNH 443)
Megerlia truncata (living shells) (RMNH 444)

Sta. 2-099: S of Hierro, off Punta Restinga, 27° 37′ N 18° 00′ W, van Veen grab, depth 160 m, substrate unknown, 3.IX.1977.
Megerlia truncata (living shell) (RMNH 445)

Sta. 2-103: S of Hierro, off Punta Restinga, 27° 37′ N 17° 59′ W, van Veen grab, depth 240 m, substrate unknown, 3.IX.1977.
Argyrotheca cuneata (worn dead shells) (RMNH 446)
Megathiris detruncata (worn dead shells) (RMNH 447)
Lacazella mediterranea (worn dead shells) (RMNH 448)
Megerlia truncata (worn dead shells) (RMNH 449)

Sta. 2-106: S of Hierro, off Punta Restinga, 27° 35′ N 17° 59′ W, rectangular dredge, depth 600-1000 m, dead corals, shells, 3.IX.1977.
Megathiris detruncata (dead shells) (RMNH 450)
Gryphus? cooperi (living shells) (RMNH 451)

Sta. 2-114: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 9′ W, van Veen grab, depth 340-480 m, substrate unknown, 4.IX.1977.
Megathiris detruncata (dead shells) (RMNH 452)
Argyrotheca cordata (dead shells) (RMNH 453)
Argyrotheca grandicostata (dead shells) (RMNH 454 and 455)
Platidia sp. indet. (dead shells) (RMNH 456)
Eucalathis ergastica (dead shells) (RMNH 457)
Gryphus? cooperi (living shell) (RMNH 458)

Sta. 2-120: SW of Hierro, off Punta Orchilla, 27° 42′ N 18° 8′ W, rectangular dredge, depth 350-400 m, rocky bottom, sponges, 5.IX.1977.
Megathiris detruncata (dead shells) (RMNH 459)
Lacazella mediterranea (dead shells) (RMNH 460)
Megerlia truncata (dead shells) (RMNH 461)

Sta. 2-121: SW of Hierro, off Punta Orchilla, 27° 42′ N 18° 8′ W, rectangular dredge, depth 470-510 m, rocky bottom, 5.IX.1977.
Brachiopod indet. (broken shell) (RMNH 462)

Sta. 2-125: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 10′ W, rectangular dredge, depth 500-1000 m, rocky bottom, 6.IX.1977.
Eucalathis ergastica (dead shells) (RMNH 463)

Sta. 2-126: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 10′ W, van Veen grab, depth 330-430 m, substrate unknown, 6.IX.1977.
Argyrotheca grandicostata (living shell) (RMNH 464)
Gryphus? cooperi (living shell) (RMNH 465)

Sta. 2-128: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 10′ W, rectangular dredge, depth 630-900 m, rocky bottom, stones, 7.IX.1977.
Eucalathis ergastica (living shells) (RMNH 466)

Sta. 2-129: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 10′ W, van Veen grab, depth 900 m, substrate unknown, 7.IX.1977.
Phaneropora incerta (dead shells) (RMNH 467)
Eucalathis ergastica (dead shells) (RMNH 468)

Sta. 2-141: SW of Hierro, off Punta Orchilla, 27° 41′ N 18° 09′ W, rectangular dredge, depth 480-540 m, volcanic rocks, gravel, 9.IX.1977.
Lacazella mediterranea (worn dead shells) (RMNH 469)
Gryphus? cooperi (living shell) (RMNH 470)
Megerlia truncata (living shell) (RMNH 471)

Sta. 2-143: S of Hierro, W of Punta Restinga, 27° 40′ N 18° 2′ W, van Veen grab, depth 510 m, substrate unknown, 9.IX.1977.
Gryphus? cooperi (living juvenile shell) (RMNH 472)

Sta. 2-147: W of Punta Restinga, 27° 41′ N 18° 3′ W, van Veen grab, depth 550-600 m, gravel and sand, 9.IX.1977.
Argyrotheca cordata (dead shell) (RMNH 473)
Lacazella mediterranea (worn dead shells) (RMNH 474)
Megerlia truncata (dead shells) (RMNH 475)

Sta. 2-154: S of Hierro, off Punta Restinga, 27° 35′ N 17° 59′ W, van Veen grab, depth 550 m, coarse sand and gravel, 10.IX.1977.
Eucalathis sp. indet. (dead juvenile shell) (RMNH 476)

Sta. 2-155: S of Hierro, off Punta Restinga, 27° 35′ N 17° 59′ W, van Veen grab, depth 700 m, fine sand, pteropod ooze, 10.IX.1977.
Eucalathis sp. indet. (dead juvenile shell) (RMNH 477)
Phaneropora incerta (dead shell) (RMNH 478)

Sta. 2-156: S of Hierro, off Punta Restinga, 27° 35′ N 18° 00′ W, van Veen grab, depth 1050 m, fine sand, pteropod ooze, 10.IX.1977.
Gryphus? cooperi (dead shells) (RMNH 479)
Eucalathis ergastica (dead shells) (RMNH 480)

Sta. 2-157: S of Hierro, off Punta Restinga, 27° 36′ N 17° 59′ W, van Veen grab, depth 650 m, fine sand, pteropod ooze, 10.IX.1977.
Gryphus? cooperi (dead shell) (RMNH 481)
Eucalathis ergastica (dead shell) (RMNH 482)

Sta. 2-159: S of Hierro, off Punta Restinga, 27° 36′ N 17° 59′ W, van Veen grab, depth 620 m, coarse sand, pteropod ooze, 10.IX.1977.
Gryphus? cooperi (dead shell) (RMNH 483)
Phaneropora incerta (dead shell) (RMNH 484)

Sta. 2-160: S of Hierro, off Punta Restinga, 27° 36′ N 17° 59′ W, van Veen grab, depth 550 m, coarse sand, gravel, dead coral, 10.IX.1977.
Gryphus? cooperi (dead shell) (RMNH 485)
Eucalathis sp. indet. (dead shell) (RMNH 486)

Sta. 2-D8: SW coast of Hierro, off Faro de Orchilla, 27° 42′ N 18° 8′ W, diving, depth 5-25 m, rocky bottom with some sand, 5-9.IX.1977.
Lacazella mediterranea (living and dead shells) (RMNH 487)

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Sta. 3-020: S of Porto Santo, 32° 53′ N 16° 21′ W, Agassiz trawl, depth 2830-3120 m, deep sea clay, clinkers, 15.X.1978.
Pelagodiscus atlanticus (living shells) (RMNH 488)

Sta. 3-028: S of Porto Santo, 33° 01′ N 16° 20′ W, van Veen grab, depth 740 m, sand, clay, 16.X.1978.
Phaneropora incerta (juvenile dead shells) (RMNH 489)

Sta. 3-061: S Selvagem Grande, 30° 8′ N 15° 52′ W, van Veen grab, depth 84 m, white sand, calcareous algae, 21.X.1978.
Argyrotheca cuneata (dead shell) (RMNH 490)

Sta. 3-062: S of Selvagem Grande, 30° 8′ N 15° 52′ W, van Veen grab, depth 99 m, white sand, calcarocus algae, 21.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 491)
Lacazella mediterranea (dead shells) (RMNH 492)

Sta. 3-063: SW of Selvagem Grande, 30° 8′ N 15° 52′ W, van Veen grab, depth 80 m, white sand, calcareous algae, 21.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 493)

Sta. 3-064: SW of Selvagem Grande, 30° 8′ N 15° 53′ W, van Veen grab, depth 90 m, greyish sand, calcareous algae, 21.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 494)
Lacazella mediterranea (dead shells) (RMNH 495)

Sta. 3-065: SW of Selvagem Grande, 30° 8′ N 15° 53′ W, van Veen grab, depth 100 m, grey fine sand, shell gravel, calcareous algae, 21.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 496)
Lacazella mediterranea (dead shells) (RMNH 497)

Sta. 3-066: SW of Selvagem Grande, 30° 7′ N 15° 53′ W, van Veen grab, depth 110 m, light sand and shell gravel, 21.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 498)

Sta. 3-068: SW of Selvagem Grande, 30° 7′ N 15° 53′ W, van Veen grab, depth 310 m, fine light sand, shell gravel, 21.X.1978.
Megathiris detruncata (dead shells) (RMNH 499)
Lacazella mediterranea (dead shells) (RMNH 500)

Sta. 3-070: SW of Selvagem Grande, 30° 7′ N 15° 54′ W, van Veen grab, depth 645 m, fine sand 21.X-1978.
Lacazella mediterranea (dead shells) (RMNH 501)
Megathiris detruncata (dead shells) (RMNH 502)
Argyrotheca cuneata (dead shells) (RMNH 503)

Sta. 3-071: SW of Selvagem Grande, 30° 7′ N 15° 54′ W, van Veen grab, depth 748 m, very fine clayey sand, 21.X.1978.
Phaneropora incerta (dead shell) (RMNH 504)

Sta. 3-072: SW of Selvagem Grande, 30° 6′ N 15° 54′ W, van Veen grab, depth 830 m, fine sand with shell gravel, 21.X.1978.
Argyrotheca sp. indet. (worn dead shells) (RMNH 505)
Eucalathis tuberata (worn dead shells) (RMNH 506)
Phaneropora incerta (dead shells) (RMNH 507)

Sta. 3-080: S of Selvagem Pequena, 30° 2′ N 16° 1′ W, van Veen grab, depth 65 m, fine grey sand with clay, 22.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 508)

Sta. 3-081: S of Selvagem Pequena, 30° 1′ N 16° 1′ W, van Veen grab, depth 91 m, fine sand, nearly pure white, 22.X.1978.
Argyrotheca aff. *A. cuneata* (dead shells) (RMNH 509)

Sta. 3-082: S of Selvagem Pequena, 30° 1′ N 16° 1′ W, van Veen grab, depth 104 m, fine white, sand, 22.X.1978.
Lacazella mediterranea (dead shells) (RMNH 510)

Sta. 3-083: S of Selvagem Pequena, 30° 1′ N 16° 1′ W, van Veen grab, depth 192 m, fine white sand, shell gravel, 22.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 511)

Sta. 3-084: S of Selvagem Pequena, 30° 1′ N 16° 1′ W, van Veen grab, depth 190 m, nearly pure white sand, 22.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 512)
Lacazella mediterranea (dead shells) (RMNH 513)

Sta. 3-086: S of Selvagem Pequena, 30° 1′ N 16° 0′ W, rectangular dredge, depth 140-170 m, substrate unknown, 22.X.1978.
Lacazella mediterranea (dead shells) (RMNH 514)

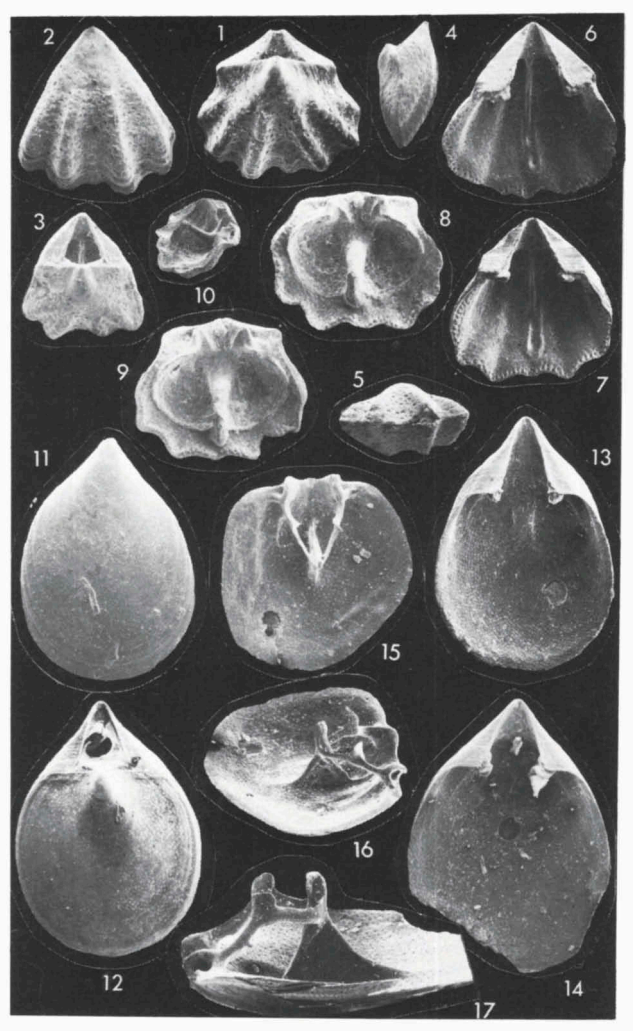
Sta. 3-088: S of Selvagem Pequena, 30° 1′ N 16° 1′ W, van Veen grab, depth 240 m, fine white sand, shell gravel, 22.X.1978.
Megathiris detruncata (dead shells) (RMNH 515)
Lacazella mediterranea (dead shells) (RMNH 516)

Sta. 3-099: S of Selvagem Pequena, 30° 7′ N 15° 52′ W, van Veen grab, depth 585 m, fine sand, 23.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 517)
Lacazella mediterranea (dead shells) (RMNH 518)

Sta. 3-102: SW of Selvagem Pequena, 30° 7′ N 15° 53′ W, van Veen grab, depth 600 m, fine light sand, shell gravel, 23.X.1978.
Megathiris detruncata (dead shells) (RMNH 519)
Phaneropora incerta (dead shells) (RMNH 520)
Eucalathis tuberata (dead shells) (RMNH 521)

Sta. 3-107: off Spanish Sahara, 24° 17′ N 16° 49′ W, Agassiz trawl, depth 1000-1100 m, mud, worm tubes, sponge spicules, 26.X.1978.
Platidia anomioides (dead shell) (RMNH 522)

Sta. 3-166: off Mauritania, 19° 22′ N 16° 54′ W, rectangular dredge, depth 195-235 m, calcareous boulder, 31.X.1978.
Argyrotheca cuneata (dead shells) (RMNH 523)
Megathiris detruncata (dead shells) (RMNH 524)



Figs. 1-10. *Argyrotheca grandicostata* new species. 1, dorsal view of complete specimen, holotype (RMNH 454), showing characteristic outline and ornament, × 22, CANCAP II Sta. 2-14; 2, ventral view of complete specimen, paratype No. FP2 (RMNH 455), × 22, CANCAP II Sta. 2-14; 3, dorsal view of complete juvenile specimen, paratype No. FP3 (RMNH 455), × 22, CANCAP II Sta. 2-14; 4, side view of complete specimen, paratype No. FP1 (RMNH 455), × 22, CANCAP II Sta. 2-14; 5, anterior view, paratype No. FP8 (RMNH 464), × 22, CANCAP II Sta. 2-126; 6, pedicle valve interior, paratype No. FP5 (RMNH 464), × 20, CANCAP II Sta. 2-126; 7, pedicle valve interior, paratype No. FP4 (RMNH 455), CANCAP II Sta. 2-14; 8, brachial valve interior, paratype No. FP7 (RMNH 455), CANCAP II Sta. 2-14; 9, 10, brachial valve interior, paratype No. FP6 (RMNH 455), × 20 and × 12, respectively (tilted view), CANCAP II Sta. 2-14.

Figs. 11-17. *Phaneropora incerta* (Davidson). 11, ventral view of complete specimen (RMNH 520), × 21, CANCAP III Sta. 3-102; 12, dorsal view of complete specimen (RMNH 504), × 21, CANCAP III Sta. 3-071; 13, pedicle valve interior (RMNH 504), × 20, CANCAP III Sta. 3-071; 14, pedicle valve interior (RMNH 520), × 21, CANCAP III Sta. 3-102; 15, 16, brachial valve interior, plane and tilted views to show median septum and brachial skeleton (RMNH 507), × 22, CANCAP III Sta. 3-072; 17, side view of brachial valve interior (RMNH 520), × 41, CANCAP III Sta. 3-102.