

# Recent Brachiopoda from the oceanographic expedition SEAMOUNT 2 to the north-eastern Atlantic in 1993

**Alan LOGAN**

Centre for Coastal Studies and Aquaculture, University of New Brunswick,  
P.O. Box 5050, Saint John, N.B., E2L 4L5 (Canada)  
logan@unbsj.ca

---

Logan A. 1998. — Recent Brachiopoda from the oceanographic expedition SEAMOUNT 2 to the north-eastern Atlantic in 1993. *Zoosystema* 20 (4) : 549-562.

## ABSTRACT

Eight species of recent brachiopods belonging to the genera *Neocrania*, *Dyscolia*, *Abyssothyris*, *Stenosarina*, *Eucalathis*, *Platidia*, *Phaneropora* and *Dallina* have been identified from collections from the 1993 SEAMOUNT 2 expedition to Meteor, Hyères, Irving-Cruiser, Plato, Atlantis, Tyro and Antialtair seamounts in the north-eastern Atlantic. The species misidentified by Jeffreys (1878) as *Terebratulina vitrea* var. *sphenoidea* [non Philippi, 1844] is described as *Stenosarina davidsoni* n.sp. The affinities of the SEAMOUNT 2 brachiopods are with the Mauritanian biogeographic province. Diversity and number of stations yielding brachiopods increase from south to north in the cluster of six seamounts (Meteor-Tyro) south of the Azores. Brachiopod diversity for the seven seamounts as a whole is less than for the Canary Islands to the east. There is an as yet unexplained absence from the seamounts of deeper water species belonging to such genera as *Pelagodiscus*, *Hispanirhynchia*, *Terebratulina*, *Gryphus*, *Megerlia* and *Macandrevia*, which commonly occur around island archipelagos such as Madeira, the Canaries and the Cape Verdes, as well as off the Iberian coast and the African mainland.

## KEY WORDS

Brachiopods,  
Recent,  
SEAMOUNT 2,  
north-eastern Atlantic.

## RÉSUMÉ

*Brachiopodes actuels récoltés lors de l'expédition océanographique SEAMOUNT 2 dans l'océan Atlantique Nord-Est en 1993.* Huit espèces de brachiopodes actuels appartenant aux genres *Neocrania*, *Dyscolia*, *Abyssothyris*, *Stenosarina*, *Eucalathis*, *Platidia*, *Phaneropora* et *Dallina* ont été identifiées à partir des collections réalisées lors de l'expédition SEAMOUNT 2 de 1993 aux pitons sous-marins Meteor, Hyères, Irving-Cruiser, Plato, Atlantis, Tyro et Antialtair dans l'océan Atlantique Nord-Est. L'espèce incorrectement identifiée par Jeffreys (1878) comme *Terebratulula vitrea* var. *sphenoidea* [non Philippi, 1844] est décrite comme *Stenosarina davidsoni* n.sp. Les brachiopodes de SEAMOUNT 2 montrent une affinité avec la faune de la province biogéographique mauritanienne. La diversité et le nombre de stations où ces brachiopodes ont été observés augmentent du sud au nord dans le groupe des six pitons (Meteor-Tyro) au sud des Açores. La diversité en brachiopodes pour la totalité des sept pitons est inférieure à celle des îles Canaries à l'est. On observe sur ces pitons, sans pouvoir l'expliquer actuellement, une absence des espèces plus profondes appartenant aux genres *Pelagodiscus*, *Hispanirhynchia*, *Terebratulina*, *Gryphus*, *Megerlia* et *Macandrevia* qui se rencontrent normalement dans les archipels tels que Madère, les Canaries et les îles du Cap-Vert, ainsi que le long des côtes ibérique et africaine.

## MOTS CLÉS

Brachiopoda,  
actuel,  
SEAMOUNT 2,  
Atlantique Nord-Est.

## INTRODUCTION

The SEAMOUNT 2 oceanographic expedition in 1993 to Meteor, Hyères, Irving-Cruiser, Plato, Atlantis, Tyro and Antialtair seamounts in the north-eastern Atlantic, west of Madeira and the Canary Islands and north and south of the Azores, sampled 165 stations (Gofas 1993). Of these, forty-eight stations (29%) yielded brachiopods. This proportion is comparable to those for brachiopods described from other Atlantic and Caribbean collections (Cooper 1977; Logan 1983, 1988) and confirms once again that they are not a common constituent of bottom samples except in high latitudes (Foster 1974). The location of all sampling stations is shown in Figure 1.

At the time of the study, the fifteen stations sampled off the western side of Grand Canary Island had not been sorted for brachiopods. Two out of forty-six stations (4%) on Meteor seamount yielded a total of three species, five out of twenty-

four stations (21%) on Hyères seamount yielded a total of four species, thirteen out of thirty-five stations (37%) on Irving-Cruiser seamounts yielded four species, eight out of fourteen stations (57%) on Plato seamount yielded six species, fourteen out of twenty-one stations (67%) on Atlantis seamount yielded eight species, four out of six stations (67%) on Tyro seamount yielded five species and two out of four stations (50%) on Antialtair seamount yielded five species of brachiopods.

The following brachiopods have been recorded from the SEAMOUNT 2 Expedition and appear in the systematic section below:

*Neocrania anomala* (Müller, 1776);

*Dyscolia wyvillei* (Davidson, 1878);

*Abyssothyris atlantica* Cooper, 1977;

*Stenosarina davidsoni* n.sp.;

*Eucalathis ergastica* Fischer et Oehlert, 1890;

*Platidia anomioides* (Scacchi et Philippi, 1844);

*Phaneropora incerta* (Davidson, 1880);

*Dallina septigera* (Loven, 1846).

## SYSTEMATICS

The supra-ordinal classification of Williams *et al.* (1996) has been used in this report, and, in accordance with usage in the forthcoming revised treatise on brachiopods, the terms "dorsal" and "ventral" are used for "brachial" and "pedicle" when describing the two valves. Since most species have been fully described elsewhere, only brief notes, illustrations of salient characteristics

and a citation to a recent reliable description have been given here. Synonymies are therefore partial except for the newly-named species *Stenosarina davidsoni* Logan, which has been fully redescribed and illustrated. All types and figured specimens are deposited in the collections of the Muséum national d'Histoire naturelle (MNHN) in Paris, France. The exact location, depth and species identified at each station are shown in the Appendix.

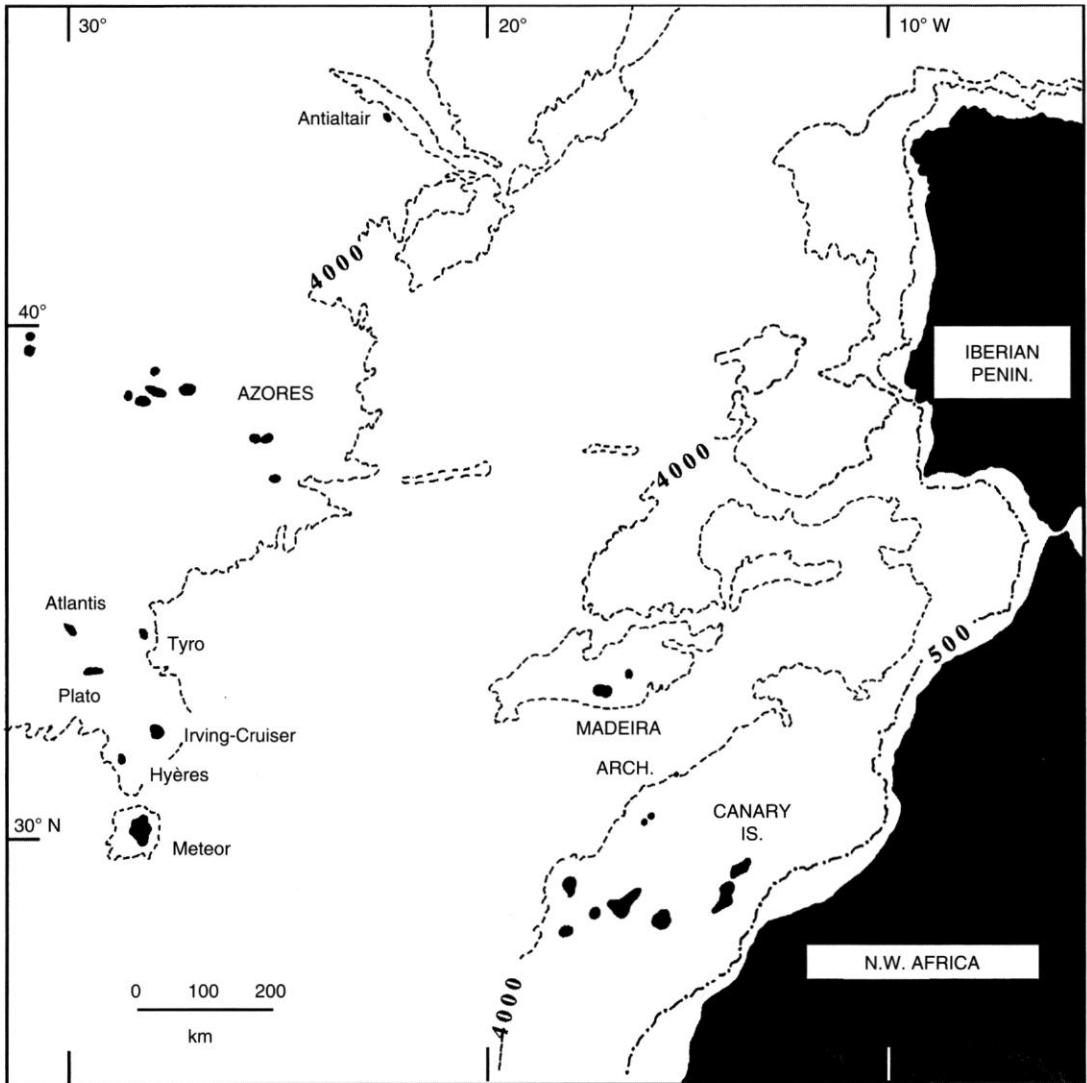


FIG. 1. — Map of the south-east North Atlantic to show the location of the seven seamounts from which brachiopods were obtained by the SEAMOUNT 2 expedition.

Sub-phylum CRANIIFORMEA  
 Popov, Bassett, Holmer *et* Laurie, 1993  
 Class CRANIATA Williams, Carlson,  
 Brunton, Holmer *et* Popov, 1996  
 Order CRANIIDA Waagen, 1885  
 Suborder CRANIIDINA Waagen, 1885  
 Superfamily CRANIACEA Menke, 1828  
 Family CRANIIDAE Menke, 1828  
 Genus *Neocrania* Lee *et* Brunton, 1986

***Neocrania anomala*** (Müller, 1776)  
 (Fig. 2A-C)

*Crania anomala* – Logan 1979: 27, figs 4, 5; pl. 1, figs 1-10.

STATIONS. — Irving-Cruiser: DW 215-216, DW 237; Plato: DW 240, DW 248; Atlantis: DW 254-257, DW 265, TS 270, DW 274; Tyro: 275, DW 277; Antialtair: DW 281, DW 283.

DEPTH RANGE. — 270-1665 m.

REMARKS

This species, one of the commonest brachiopods in the SEAMOUNT 2 collections, is a typical member of the brachiopod fauna of the eastern Atlantic (Fischer & Oehlert 1891; Brunton and Curry 1979; Anadon 1994), being found as far south as the Cape Verde Islands (Logan 1988) and ranging greatly in depth (Cooper 1981; this report). It is also common throughout the western Mediterranean, where it again ranges considerably in depth, although occurring most commonly in cryptic habitats in shallow water (Logan 1979; Logan & Noble 1983; Templado & Luque 1986). It is easily recognizable by its cone-shaped upper (dorsal) valve, subcircular outline, concentric growth lines and endopunctate shell, while internally the adductor muscle scars of both valves are arranged in pairs, posteriorly and anteriorly, on white callus pads, with a centrally-placed brachial protractor scar in the upper valve and a prominent median muscle scar in the very thin attached (ventral) valve. The shape of the shell, and particularly the attached valve, is variable, since it is strongly influenced by the irregularities of the substrate to which it is cemented (Fig. 2C). This substrate consists mainly of coarse sedimentary, volcanic or bioclas-

tic material in the SEAMOUNT 2 collections. All specimens examined showed the typical dorsal valve internal characteristics of *N. anomala* rather than *N. turbinata* (Poli, 1795) which Brunton (1988) redescribed from the eastern Mediter-ranean.

Order TEREBRATULIDA Waagen, 1883  
 Suborder TEREBRATULIDINA Waagen, 1883  
 Superfamily TEREBRATULACEA Waagen, 1883  
 Family DYSCOLIIDAE Fischer *et* Oehlert, 1891  
 Genus *Dyscolia* Fischer *et* Oehlert, 1890

***Dyscolia wyvillei*** (Davidson, 1878)  
 (Fig. 2D-F)

*Dyscolia wyvillei* – Cooper 1977: 56, pl. 15, figs 1-10.

STATIONS. — Meteor: DW 173; Hyères: DW 186, DW 203; Atlantis: DW 264.

DEPTH RANGE. — 795-1520 m.

REMARKS

This very large species occurs in the eastern Atlantic (Fischer & Oehlert 1891; Logan 1983; Saiz Salinas 1989) and the Caribbean (Cooper 1977) where the shells are usually collected in a very worn state. The loop of the brachial skeleton is rarely preserved in Recent specimens and the soft parts almost never, so the nature of the lophophore is uncertain, although one of Fischer & Oehlert's figures (1891, pl. 6, fig. 3i) suggests that it is trocholophous (see Cooper 1983 for further discussion). The specimens from SEAMOUNT 2 are all badly worn and show no brachial loops but the size and thickness of the shell, the large foramen and the distinctive fine radial ornamentation allow a positive identification to be made.

Family TEREBRATULIDAE Gray, 1840  
 Genus *Abyssothyris* Thomson, 1927

***Abyssothyris atlantica*** Cooper, 1977  
 (Fig. 2G-M)

*Abyssothyris atlantica* Cooper, 1977: 58, pl. 20, figs 1-10.

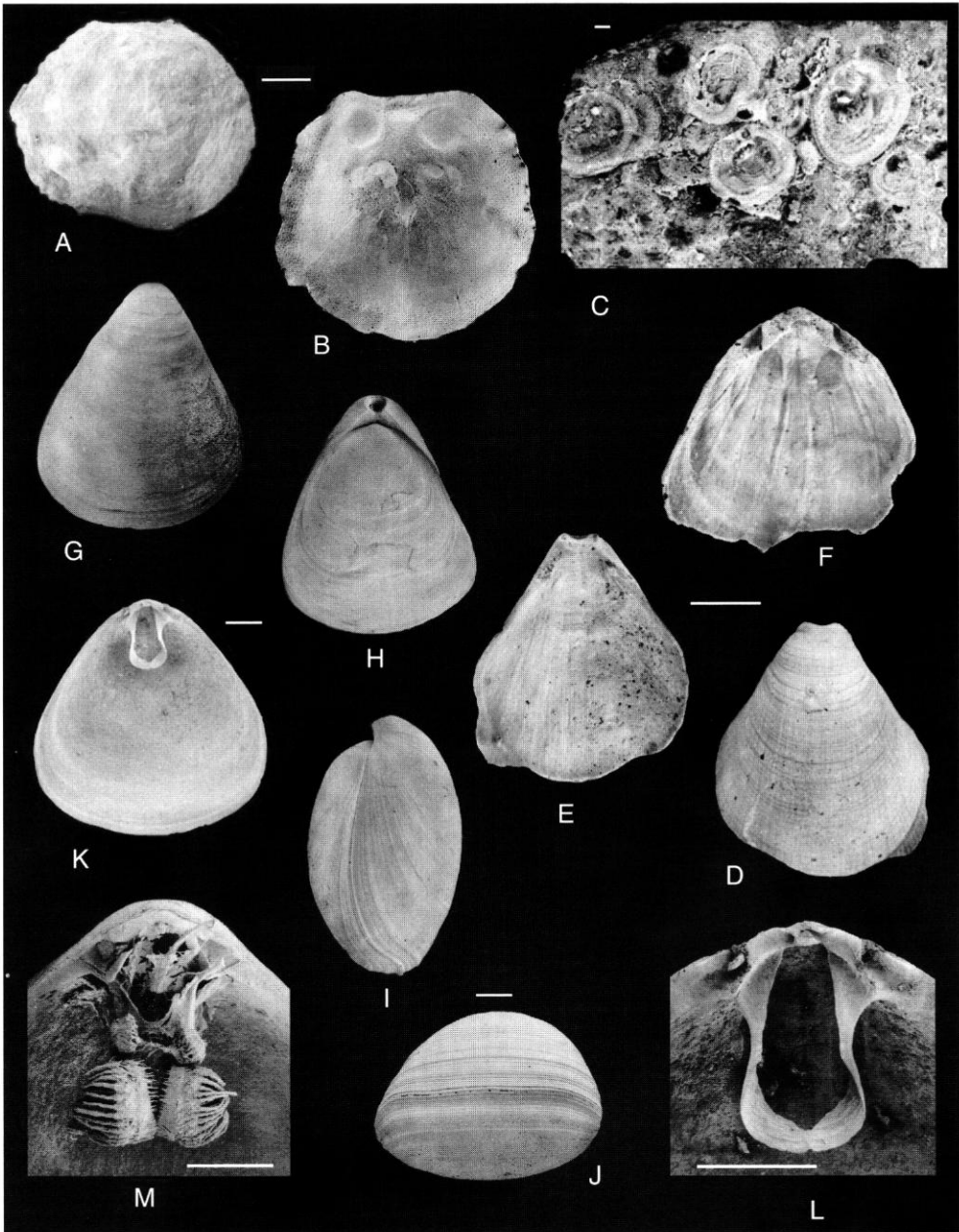


FIG. 2. — **A-C**, *Neocrania anomala* (Müller); **D-F**, *Dyscolia wyvillei* (Davidson); **G-M**, *Abyssothyris atlantica* Cooper. **A, B**, SEMs of exterior and interior of upper (dorsal) valve, the latter showing details of the muscle scars, DW 274, 280 m, Atlantis seamount, MNHN LBIMM-BRA-2781, 2782; **C**, fragment of volcanic rock with several attached lower (ventral) valves, DW 256, 340-345 m, Atlantis seamount, MNHN LBIMM-BRA-2783; **D-F**, ventral valve exterior showing fine radial ornamentation, ventral valve interior of same specimen showing worn hinge teeth and dorsal valve interior showing sockets and adductor scars, DW 173, Meteor seamount, 920 m, MNHN LBIMM-BRA-2784, 2785; **G-J**, SEM ventral, dorsal, side and anterior views to show external ornament and slightly sulcate anterior commissure, DW 279, Tyro seamount, 760-805 m, MNHN LBIMM-BRA-2786, 2787, 2788, 2789; **K**, SEM of dorsal valve interior to show loop of brachial skeleton, same locality and depth as previous specimen; **L**, enlargement of previous specimen, MNHN LBIMM-BRA-2790; **M**, SEM of dorsal valve interior with plectolophous lophophore covering loop of brachial skeleton, same locality and depth as previous specimen, MNHN LBIMM-BRA-2791. Scale bars: A, B, C, 1 mm; D-F, 1 cm; G-J, K, L, M, 1 mm.

STATIONS. — Meteor: DW 173; Plato: DW 241; Atlantis: DW 258; Tyro: DW 277-279.

DEPTH RANGE. — 420-1070 m.

#### REMARKS

This species was first described from over 2500 m depth, off Cape Fear, South Carolina, by Cooper (1977) who named it for very small elongate *Abyssothyris* with a broadly sulcate anterior margin. Specimens from SEAMOUNT 2 are less sulcate than the types but otherwise similar enough to the western Atlantic examples to be identified with them. The loop of *Abyssothyris* is rounded anteriorly with a slight median angulation. The plectolophous lophophore is small and tightly coiled (Fig. 2M) but lacks the median connecting band illustrated by Cooper (1983) for *A. elongata* and said to be typical of the genus. However, Cooper's illustrated specimen (*op. cit.*, pl. 16, fig. 19) came from depths of over 3600 m, whereas *A. atlantica* from SEAMOUNT 2 occurs at much shallower depths. Members of the genus typically occur in deep water and the development of the lophophore may be related to the effects of great depths, such as hydrostatic pressure and oxygen content (Zezina 1975). This is the first record of the genus from the eastern Atlantic.

Genus *Stenosarina* Cooper, 1977

***Stenosarina davidsoni* n.sp.**  
(Fig. 3A-J)

*Terebratula vitrea* var. *sphenoidea* [not Philippi, 1844] – Jeffreys 1878: 404, pl. 22, fig. 6?

*Liothyris sphenoidea* [sensu Jeffreys, 1878] – Davidson 1886: 12, pl. 2, figs 17, 18 only.

*Terebratula (Liothyris) sphenoidea* [sensu Jeffreys, 1878] – Fischer & Oehlert 1891, p. 58, pl. 3, fig. 8a-m.

*Liothyris sphenoidea* [sensu Jeffreys, 1878] – Blochmann 1908: 619, pl. 37, fig. 11; pl. 38, fig. 19a-c; pl. 39, fig. 23a-b.

*Dallithyris?* aff. *D.?* *sphenoidea* [sensu Jeffreys, 1878] – Cooper 1981: 15, pl. 2, figs 36-38.

*Stenosarina sphenoidea* [sensu Jeffreys, 1878] – Cooper 1983: 272, pl. 14, figs 15-19.

*Stenosarina sphenoidea* [sensu Jeffreys, 1878] – Logan 1988: 64.

MATERIAL EXAMINED. — Atlantis seamount, DW 258, holotype MNHN LBIMM-BRA-2778, paratypes MNHN LBIMM-BRA-2779, 2780.

STATIONS. — Hyères: DW 184, DW 186, DW 197, DW 203; Irving-Cruiser: DW 218-219, DW 225-227, DW 229, DW 231, DW 237-238; Plato: DW 241-242, DW 246-248, DW 251; Atlantis: DW 254-256, DW 258-259, DW 263, DW 265, DW 271; Tyro: DW 277-278; Antialtair: DW 283.

DEPTH RANGE. — 275-1715 m.

#### DESCRIPTION

##### *Exterior*

Shell white, thin and translucent, rarely exceeding 20 mm in length and 15 mm in width; elongate oval in outline, widest point just anterior to mid-valve, with anterior margin gently rounded. Both valves more or less evenly convex, with lateral commissure weakly concave towards ventral side near mid-valve; anterior margin rectimarginate. Beak suberect, labiate; foramen moderate in size, permesothyrigid.

##### *Interior*

Ventral valve interior with small, narrowly elongate teeth; short pedicle collar. Dorsal valve with narrow, parallel-sided loop which occupies about one third the length of the valve. Cardinal process small, socket ridges curved, flanking a socket roofed at its proximal end. Outer hinge plates triangular and concave, extending anteriorly to join crural bases. Crura typical for the genus, as described and illustrated in detail by Cooper (1983: 271, 272).

#### REMARKS

This species, the commonest brachiopod in the SEAMOUNT 2 collections, has in the past been assigned to the genera *Terebratula*, *Liothyris*, *Liothyris*, *Dallithyris?* and *Gryphus* by earlier authors, prior to *Stenosarina* by Cooper in 1983, under the specific epithet *sphenoidea*. Davidson (1886), Fischer & Oehlert (1891), Blochmann (1908), Dall (1920), Muir-Wood (1959), Cooper (1981, 1983) and Logan (1988) have all discussed the problems that have arisen from



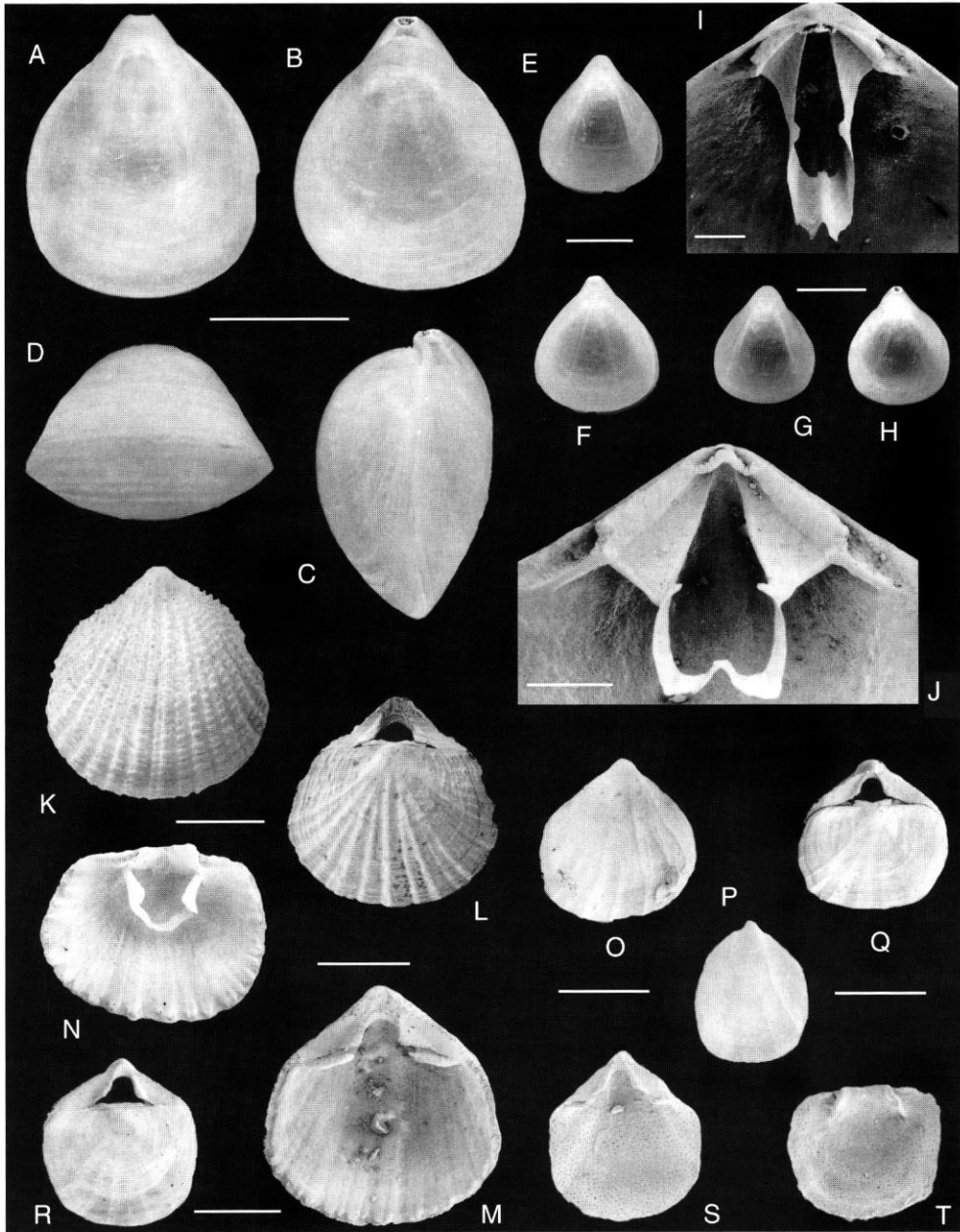


FIG. 3. — **A-J**, *Stenosarina davidsoni* n.sp.; **K-T**, *Eucalathis ergastica* (Fischer *et* Oehlert). **A-D**, ventral, dorsal, side and anterior views of holotype to show external ornament and rectimarginate anterior commissure, DW 258, Atlantis seamount, 420-460 m, MNHN LBIMM-BRA-2778; **E, F**, ventral and dorsal views of paratype 1, MNHN LBIMM-BRA-2779; **G, H**, ventral and dorsal views of paratype 2, same locality and depth as previous specimen, MNHN LBIMM-BRA-2780; **I, J**, SEM enlargements of loop of brachial skeleton of dorsal valve, straight and tilted, to show V-shaped notch in transverse band, same locality and depth as previous specimen, MNHN LBIMM-BRA-2792; **K, L**, SEMs of exterior of ventral and dorsal valves to show ornament, DW 264, Atlantis seamount, 795-830 m, MNHN LBIMM-BRA-2793, 2794; **M, N**, SEMs of interior of ventral and dorsal valves to show dentition and brachial skeleton, DW 283, Antialtair seamount, 1175-1210 m, MNHN LBIMM-BRA-2795, 2796; **O-T**, SEMs of exterior and interior of ventral and dorsal valves of juvenile specimens to show subdued ornament and rudimentary brachial skeleton, DW 274, Atlantis seamount, 280 m, MNHN LBIMM-BRA-2797 to 2802. Scale bars: A-D, E, F, G, H, 1 cm; I, J, K, L, M, N, O-T, 1 mm.

Jeffreys' misidentification of the eastern Atlantic Recent form with Philippi's (1844) Pliocene species *Terebratula sphenioidea*. Dall (1920), Muir-Wood (1959) and Cooper (1981, 1983) have pointed out the main differences, which need not be repeated here, between the Pliocene and modern form. The above synonymy contains only those references where good descriptions and/or illustrations ensure identification with the modern form.

Several authors (Muir-Wood 1959; Cooper 1981) have called for the establishment of a new species name to avoid further confusion of modern and Pliocene forms. Jeffreys (1878) recognized two varieties of *Terebratula vitrea*, for which he used two names established by Philippi (1844): *minor* and *sphenioidea*. Neither is an appropriate designation for the modern eastern Atlantic form. A further complication is that Jeffreys' figure is faintly costellate, a condition that I have not seen in typical eastern Atlantic *Stenosarina* and which Muir-Wood (1959) feels is represented erroneously. Enough material has been found in the present study to warrant a redescription of this species as a new taxon, which I here propose to call *Stenosarina davidsoni* in honour of the eminent brachiopod palaeontologist Thomas Davidson.

The species occurs in the eastern Atlantic as far south as the Canary and Cape Verde Islands (Logan 1988). Cooper (1981) is in error in stating that it occurs in the Mediterranean.

Family CANCELLOTHYRIDIDAE Thomson, 1926  
Subfamily EUCALATHINAE Muir-Wood, 1965  
Genus *Eucalathis* Fischer et Oehlert, 1890

***Eucalathis ergastica*** Fischer et Oehlert, 1890  
(Fig. 3K-T)

*Eucalathis ergastica* – Cooper 1981: 12, pl. 1, figs 1-8.  
– Logan 1983: 173.

STATIONS. — Meteor: DW 136; Hyères: DW 203; Plato: DW 249; Atlantis: DW 255, DW 258, DW 261, DW 264, TS 270, DW 274; Tyro: DW 278; Antialtair: DW 283.

DEPTH RANGE. — 280-1800 m.

#### REMARKS

*Eucalathis ergastica* and its closely related congener *E. tuberata* (Jeffreys), originally described from the south-east North Atlantic by Fischer & Oehlert (1891), are common brachiopods in the SEAMOUNT 2 and CANCAP collections (Logan 1983, 1988, this report). Cooper (1981) and Saiz Salinas (1989) have also recorded this species from the Bay of Biscay and Anadon (1994) from the coast of Asturias, northern Spain. The differences between the two species are mainly in their size, shape and ornament, *E. tuberata* being smaller and more rounded, with more numerous beaded radial costella. Juveniles of *E. ergastica* (Fig. 4E-J) have a more subdued ornament of less closely-spaced costellae than the adult forms. The species occurs off the Azores and the Canary Islands, the north coast of Spain and the Moroccan coast (Cooper 1981).

Suborder TEREBRATELLIDINA  
Muir-Wood, 1955  
Superfamily TEREBRATELLACEA King, 1850  
Family PLATIDIIDAE Thomson, 1927  
Genus *Platidia* Costa, 1852

***Platidia anomioides*** (Scacchi et Philippi, 1844)  
(Fig. 4A-D)

*Platidia anomioides* – Cooper 1977: 122, pl. 20, figs 11-19; pl. 33, figs 15-17. – Logan 1979: 60, figs 17, 18; pl. 7, figs 1-11.

STATIONS. — Irving-Cruiser: DW 209, DW 225; Plato: DW 242; Atlantis: DW 254-258, DW 262-265, TS 270, DW 274; Antialtair: DW 281.

DEPTH RANGE. — 275-1160 m.

#### REMARKS

This heavily-spiculate species is relatively common throughout the North Atlantic, particularly on its eastern side (Brunton & Curry 1979; Cooper 1981; Logan 1983; Saiz Salinas 1989; Anadon 1994). It also occurs in the Caribbean region (Cooper 1977) but is commonest in the Mediterranean (Logan 1979) where, as in the



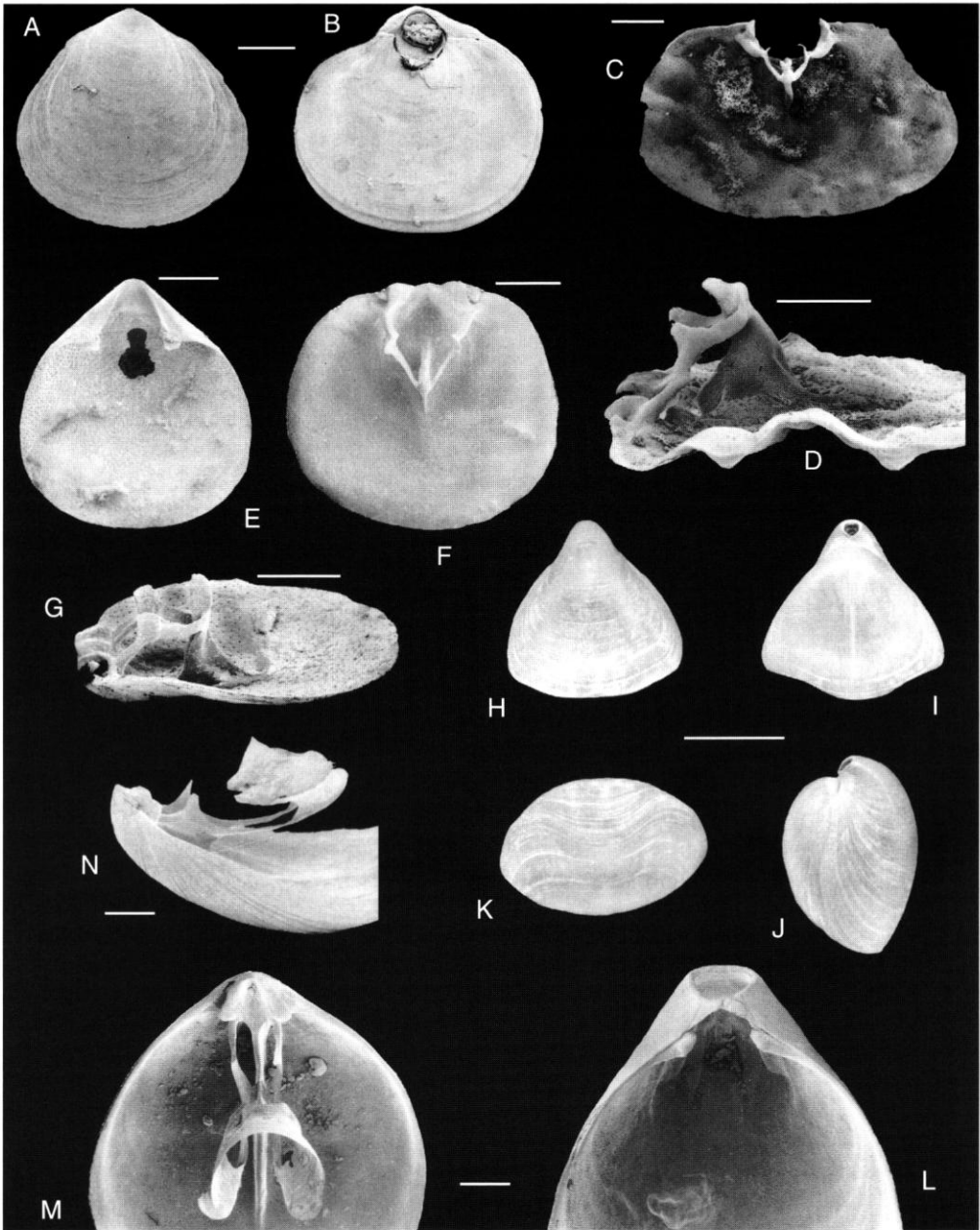


FIG. 4. — **A-D**, *Platidia anomioides* (Scacchi *et* Philippi); **E-G**, *Phaneropora incerta* (Davidson); **H-N**, *Dallina septigera* (Loven). **A, B**, SEMs of exterior of ventral and dorsal valves, to show convex ventral valve, flat dorsal valve, and amphithyridid pedicle foramen shared by both valves, DW 258 and 256, respectively, Atlantis seamount, 420-460 m and 340-345 m, MNHN LBIMM-BRA-2803, 2804; **C, D**, SEMs showing tilted dorsal and side views of interior of dorsal valve to show spicules and brachial support for lophophore, DW 264, Atlantis seamount, 795-830 m, MNHN LBIMM-BRA-2805; **E**, SEM of interior of ventral valve to show hinge teeth, DW 261, Atlantis seamount, 1190-1340 m, MNHN LBIMM-BRA-2806; **F, G**, SEMs of dorsal and side views of interior of dorsal valve to show sockets and brachial support for lophophore, same locality and depth as previous specimen, MNHN LBIMM-BRA-2807; **H-K**, ventral, dorsal, side and anterior views to show external ornament and sulcate anterior commissure, DW 241, Plato seamount, 695 m, MNHN LBIMM-BRA-2808; **L-N**, SEMs of ventral, dorsal and side dorsal views of two interiors to show teeth, sockets and brachial loop, DW 281, Antialtair seamount, 900 m, MNHN LBIMM-BRA-2809, 2810. Scale bars: A, B, C, D, 1 mm; E, F, G, 0.5 mm; H-K, 1 cm; L-N, 1 mm.

Atlantic, it is usually attached to bioclastic debris. Logan (1979) has shown that *P. anomioides* can be distinguished most reliably from its closely-related congener *P. davidsoni* (Deslongchamps) by slight differences in the configuration of the brachial skeleton. Removal of the lophophore of several SEAMOUNT 2 specimens to reveal this supporting structure has confirmed that they are indeed *P. anomioides*.

Family PHANEROPORIDAE Zezina, 1981  
Genus *Phaneropora* Zezina, 1981

***Phaneropora incerta*** (Davidson, 1880)  
(Fig. 4E-G)

*Phaneropora incerta* – Logan 1983: 177, pl. 1, figs 11-17.

STATIONS. — Atlantis: DW 255, DW 261, TS 270.

DEPTH RANGE. — 335-1340 m.

#### REMARKS

This species was redescribed and illustrated from Madeira, the Canary and Cape Verde Islands by Logan (1983, 1988), who discussed the differences between the Atlantic species and the type species *P. galathea* (Muir-Wood, 1965) from the Pacific. Davidson's species was questionably assigned to *Platidia* Costa by Fischer & Oehlert (1891) and, in fact, the internal skeletal characteristics of *Phaneropora* are not unlike those of *Platidia*, but externally the two genera are quite different in shape. Furthermore, the former genus lacks the large amphithyridid foramen shared by both valves, which results in a large hemispherical notch in each valve of *Platidia*.

Family DALLINIDAE Beecher, 1893  
Genus *Dallina* Beecher, 1893

***Dallina septigera*** (Loven, 1846)  
(Fig. 4H-N)

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

STATIONS. — Hyères: DW 200, DW 203; Irving-Cruiser: DW 219; Plato: DW 241-242, DW 248;

Atlantis: DW 258, DW 263; Tyro: DW 277-279; Antialtair: DW 281, DW 283.

DEPTH RANGE. — 420-1210 m.

#### REMARKS

*Dallina septigera* is a common species throughout the north-eastern Atlantic and has been well described and illustrated by previous authors (Davidson 1886; Fischer & Oehlert 1891; Atkins 1960; d'Hondt 1976; Brunton & Curry 1977; Cooper 1981; Logan 1983, 1988; Anadon, 1994). It has a distinctive triangular outline, is widest anteriorly and has a sulcate anterior commissure. The brachial skeleton forms a long loop with a wide hood-like transverse ribbon (Fig. 4M, N).

#### DISCUSSION

The earliest expeditions to make extensive collections of brachiopods in the eastern Atlantic island archipelagos were those of the French research vessels *Travailleur* in 1882 and *Talisman* in 1883 (Fischer & Oehlert 1891). Since then six Dutch CANCEP expeditions to the same regions between 1976 and 1982 have significantly added to our knowledge of brachiopods from this region (Logan 1983, 1988, 1993), although there is still a dearth of information on brachiopods from the Azores. In terms of biogeographic affinities, the SEAMOUNT 2 brachiopods are typical of the Mauritanian faunal province. The affinities of the Mauritanian brachiopods to those from the Lusitanian and Mediterranean faunal provinces have been discussed by Logan (1993). No species new to science have been described in this study, although the genus *Abyssothyris* has been recorded for the first time from the eastern Atlantic, and the former species *Stenosarina sphenodea* (Jeffreys) [not Philippi] has been renamed *Stenosarina davidsoni* n.sp. There is a gradual increase in the number of stations yielding brachiopods, and the number of species identified, from south to north in the cluster of six seamounts (Meteor-Tyro) south of the Azores. Nevertheless, diversity for the whole seamount region is low, only eight species of bra-

chiopods being identified in this study, compared to sixteen species in the Canary-Salvage Islands area (Logan 1993). This relative paucity is not believed to be an artifact of the sampling and sorting efficiency of the collectors; rather it may be, at least partially, explained by the depths, sampling methods and bottom types of the stations sampled. Depths range from about 300 m to over 3000 m, with most over 500 m, so that predominantly shallow-water species belonging to the genera *Argyrotheca* Dall, 1900; *Megathiris* d'Orbigny, 1847, *Thecidellina* Thomson, 1915; *Pajaudina* Logan, 1988, and *Lacazella* Munier-Chalmas, 1881, which were commonly obtained by the earlier CANCAP expeditions at depths of less than 600 m (Logan 1983, 1988, 1993), were not encountered in SEAMOUNT 2 samples. More difficult to explain, however, is the absence from the seamounts of deeper water species belonging to genera such as *Pelagodiscus*, *Hispanirhynchia*, *Terebratulina*, *Gryphus*, *Megerlia* and *Macandrevia*, which commonly occur around island archipelagos such as Madeira, the Canaries and Cape Verde Islands, as well as off the Iberian coast and the African mainland (Fischer & Oehlert 1891; d'Hondt 1976; Logan 1983, 1988; Saiz Salinas 1989; Anadon 1994). Most SEAMOUNT 2 bottom samples were obtained by either dredge or epibenthic sled (Gofas pers. comm.), whereas the CANCAP samples were obtained mainly by Van Veen grab (Logan 1983). It is possible that some small and/or fragile brachiopod shells might have been lost or damaged by the sampling methods employed by SEAMOUNT 2.

### Acknowledgements

I am indebted to the SEM unit of the University of New Brunswick for photography and UNBSJ Research Technical Officer Wilfred Morris for computerized improvements to the plates, using Photoshop. Research on Recent brachiopods is supported by the Natural Sciences and Engineering Research Council of Canada Research Grant OGP 4331 to the author. This is research publication number 9 of the Centre for Coastal Studies and Aquaculture of the University of New Brunswick.

### REFERENCES

- Anadon N. 1994. — Braquiópodos actuales de la plataforma y talus continental de la costa de Asturias (Norte de España). *Boletín de la Real Sociedad española de historia natural*, Madrid, Sección Biología 91 (1-4): 65-77.
- Atkins D. 1960. — A note on *Dallina septigera* (Loven) (Brachiopoda, Dallinidae). *Journal of the Marine Biological Association of the U.K.* 39: 91-99.
- Blochmann F. 1908. — Zur Systematik und geographischen Verbreitung der Brachiopoden. *Zeitschrift für wissenschaftliche Zoologie*, Leipzig, 90: 596-644.
- Brunton C. H. C. 1988. — Some brachiopods from the eastern Mediterranean Sea. *Israel Journal of Zoology* 35, 1988-1989: 151-169.
- Brunton C. H. C. & Curry G. B. 1979. — British Brachiopods: 1-64, in Kermack D. M. & Barnes R. S. K (eds), *Synopsis of the British Fauna* (N. S.), 17. Academic Press.
- Cooper G. A. 1977. — Brachiopods from the Caribbean Sea and adjacent waters. *Studies in Tropical Oceanography*. Rosenstiel School of Marine and Atmospheric Science, University of Miami Press, 14: 1-211.
- 1981. — Brachiopoda from the Gulf of Gascogne, France (Recent). *Smithsonian Contributions to Paleobiology* 44: 1-35.
- 1983. — The Terebratulacea (Brachiopoda), Triassic to Recent: a study of the brachidia (loops). *Smithsonian Contributions to Paleobiology* 50: 1-445.
- Dall W. H. 1920. — Annotated list of the Recent Brachiopoda in the collection of the United States National Museum, with descriptions of thirty-three new forms. *Proceedings of the United States National Museum* 57 (2314): 261-377.
- Davidson T. 1886. — A monograph of Recent Brachiopoda. *Transactions of the Linnaean Society of London* (2) 4, Zoology, Pt 1: 1-74.
- Fischer P. & Oehlert D-P. 1891. — Brachiopodes. *Expéditions scientifiques du "Travailleur" et du "Talisman" pendant les années 1880, 1881, 1882, 1883*: 1-140. G. Masson Éditeur, Paris.
- Foster M. W. 1974. — Recent Antarctic and Subantarctic brachiopods. *Antarctic Research Series, American Geophysical Union* 21: 1-189.
- Gofas S. 1993. — *Mission océanographique SEAMOUNT 2. Compte rendu et liste des stations*. Rapport non publié: 1-30.
- Hondt J.-L. d' 1976. — Sur quelques brachiopodes actuels (océan Atlantique, Méditerranée, Kerguelen). *Bulletin du Muséum national d'Histoire naturelle* (3) 350, Zool. 243: 1-13.
- Jeffreys J. G. 1878. — On the Mollusca procured during the "Lightning" and "Porcupine" expeditions, 1868-1870. *Proceedings of the Zoological Society of London*, 1: 393-416.
- Logan A. 1979. — The Recent Brachiopoda of the

- Mediterranean Sea. *Bulletin de l'Institut océanographique*, Monaco, 72 (1434) : 1-112.
- 1983. — Brachiopoda collected by CANCAP I-III expeditions to the south-east North Atlantic. 1976-1978. CANCAP-project, Contribution No. 34, *Zoologische Mededelingen Leiden* 57 (18): 165-189.
- 1988. — Brachiopoda collected by CANCAP IV and VI expeditions to the south-east North Atlantic. 1980-1982. CANCAP-project, Contribution No. 73, *Zoologische Mededelingen Leiden* 62 (5): 59-74.
- 1993. — Recent brachiopods from the Canarian-Cape Verdean region: diversity, biogeographic affinities, bathymetric range and life habits. CANCAP-project, Contribution No. 91, *Courier Forschungsinstitut Senckenberg* 159: 229-233.
- Logan A. & Noble J. P. A. 1983. — Recent brachiopods from Malta. *Central Mediterranean Naturalist* 1 (2): 33-39.
- Muir-Wood H. M. 1959. — Report on the Brachiopoda of the John Murray Expedition, in *The John Murray Expedition 1933-1934, Scientific Reports* 10 (6): 283-317. British Museum (Natural History).
- Philippi R. A. 1844. — *Enumeratio Molluscorum Siciliae* 2: 1-303. Halle, Germany.
- Saiz Salinas J. I. 1989. — Verzeichnis der rezenten Brachiopoden (Brachiopoda) von den iberischen Kusten und den angrenzenden Meeren. *Bonner Zoologische Beitrage* 40: 141-154.
- Templado J. & Luque A. A. 1986. — Braquiópodos de los fondos de *Corallium rubrum* (L.) próximos a la isla de Alboran (SE de España). *Boletín del instituto español de oceanografía* 3 (4): 11-114.
- Williams A., Carlson S. J., Brunton C. H. C., Holmer L. E. & Popov L. 1996. — A supra-ordinal classification of the Brachiopoda. *Philosophical Transactions of the Royal Society of London*, B 351: 1171-1193.
- Zeina O. N. 1975. — Deep-sea brachiopods from the south-west Pacific and Scotian Sea. *Akademia Nauk SSSR. Trudy Instituta Okeanologii* 103: 247-258.

Submitted on 26 September 1997;  
accepted on 24 March 1998.

## APPENDIX

### STATION LIST

Station	Location	Depth	Species
<b>METEOR</b>			
DW 136	30°01'N - 28°28'W	305 m	<i>Eucalathis ergastica</i>
DW 173	30°03'N - 28°43'W	920-1070 m	<i>Dyscolia wyvillei</i> , <i>Abyssothyris atlantica</i>
<b>HYÈRES</b>			
DW 184	31°24'N - 28°52'W	675-705 m	<i>Stenosarina davidsoni</i>
DW 186	31°26'N - 28°51'W	1520 m	<i>Dyscolia wyvillei</i> , <i>Stenosarina davidsoni</i>
DW 197	31°18'N - 28°33'W	1370-1480 m	<i>Stenosarina davidsoni</i>
DW 200	31°19'N - 28°36'W	1060-1100 m	<i>Dallina septigera</i>
DW 203	31°09'N - 28°43'W	845 m	<i>Stenosarina davidsoni</i> , <i>Dallina septigera</i> , <i>Dyscolia wyvillei</i> , <i>Eucalathis ergastica</i>

Station	Location	Depth	Species
<b>IRVING-CRUISER</b>			
DW 209	31°59'N - 27°56'W	435-460 m	<i>Platidia anomioides</i>
DW 215	31°53'N - 28°02'W	270-275 m	<i>Neocrania anomala</i>
DW 216	31°53'N - 28°02'W	270 m	<i>Neocrania anomala</i>
DW 218	31°52'N - 28°53'W	420-480 m	<i>Stenosarina davidsoni</i>
DW 219	32°00'N - 27°53'W	760 m	<i>Dallina septigera</i> , <i>Stenosarina davidsoni</i>
DW 225	32°08'N - 28°10'W	1030-1035 m	<i>Platidia anomioides</i> , <i>Stenosarina davidsoni</i> , ? <i>Terebratulina</i> sp.
DW 226	32°06'N - 28°08'W	580 m	<i>Stenosarina davidsoni</i>
DW 227	32°07'N - 28°08'W	695-730 m	<i>Stenosarina davidsoni</i>
DW 229	32°02'N - 28°24'W	1715 m	<i>Stenosarina davidsoni</i>
DW 231	32°01'N - 27°54'W	745-750 m	<i>Stenosarina davidsoni</i>
TS 234	32°00'N - 27°41'W	1860-1880 m	? <i>Pelagodiscus</i> sp.
DW 237	32°16'N - 27°31'W	670-715 m	<i>Neocrania anomala</i> , <i>Stenosarina davidsoni</i>
DW 238	32°17'N - 27°32'W	890-900 m	<i>Stenosarina davidsoni</i>
<b>PLATO</b>			
DW 240	33°12'N - 29°01'W	565-575 m	<i>Neocrania anomala</i>
DW 241	33°11'N - 28°59'W	695 m	<i>Dallina septigera</i> , <i>Stenosarina davidsoni</i> , <i>Abyssothyris atlantica</i>
DW 242	33°11'N - 28°56'W	690-710 m	<i>Stenosarina davidsoni</i> , <i>Platidia anomioides</i> , <i>Dallina septigera</i>
DW 246	33°13'N - 29°36'W	520-550 m	<i>Stenosarina davidsoni</i>
DW 247	33°13'N - 29°35'W	580-625 m	<i>Stenosarina davidsoni</i>
DW 248	33°13'N - 29°32'W	670-735 m	<i>Dallina septigera</i> , <i>Stenosarina davidsoni</i> , <i>Neocrania anomala</i>
DW 249	33°12'N - 29°15'W	1700-1800 m	<i>Eucalathis</i> sp. cf. <i>ergastica</i>
DW 251	33°13'N - 29°28'W	900-985 m	<i>Stenosarina davidsoni</i>
<b>ATLANTIS</b>			
DW 254	34°05'N - 30°13'W	275-280 m	<i>Platidia anomioides</i> , <i>Neocrania anomala</i> , <i>Stenosarina davidsoni</i>
DW 255	34°05'N - 30°15'W	335-340 m	? <i>Eucalathis</i> sp., <i>Platidia anomioides</i> , <i>Neocrania anomala</i> , <i>Stenosarina davidsoni</i> , <i>Phaneropora incerta</i>
DW 256	34°06'N - 30°16'W	340-345 m	<i>Neocrania anomala</i> , <i>Platidia anomioides</i> , <i>Stenosarina davidsoni</i>
DW 257	34°04'N - 30°15'W	330-338 m	<i>Neocrania anomala</i> , <i>Platidia anomioides</i>
DW 258	33°59'N - 30°12'W	420-460 m	<i>Stenosarina davidsoni</i> , <i>Platidia anomioides</i> , <i>Dallina septigera</i> , ? <i>Eucalathis</i> sp., <i>Abyssothyris atlantica</i>
DW 259	33°59'N - 30°11'W	635-665 m	<i>Stenosarina davidsoni</i>
DW 261	34°22'N - 30°27'W	1190-1340 m	<i>Phaneropora incerta</i> , <i>Eucalathis ergastica</i>
DW 262	34°23'N - 30°29'W	1000-1160 m	<i>Platidia anomioides</i>

Station	Location	Depth	Species
DW 263	34°26'W - 30°32'W	610-655 m	<i>Dallina septigera</i> , <i>Platidia anomioides</i> , <i>Stenosarina davidsoni</i>
DW 264	34°24'N - 30°31'W	795-830 m	<i>Dyscolia wyvillei</i> , <i>Platidia anomioides</i> , <i>Eucalathis ergastica</i>
DW 265	34°28'N - 30°35'W	540-545 m	<i>Neocrania anomala</i> , <i>Stenosarina davidsoni</i> , <i>Platidia anomioides</i>
TS 270	34°04'N - 30°14'W	330 m	<i>Neocrania anomala</i> , ? <i>Eucalathis</i> sp., <i>Platidia anomioides</i> , ? <i>Phaneropora</i> sp.
DW 271	33°54'N - 30°09'W	1220 m	<i>Stenosarina davidsoni</i>
DW 274	34°05'N - 30°13'W	280 m	<i>Platidia anomioides</i> , <i>Neocrania anomala</i> , <i>Eucalathis ergastica</i>
<b>TYRO</b>			
DW 275	34°03'N - 28°18'W	1590-1665 m	<i>Neocrania anomala</i>
DW 277	33°59'N - 28°20'W	945-1000 m	<i>Neocrania anomala</i> , <i>Abyssothyris atlantica</i> , <i>Stenosarina davidsoni</i> , <i>Dallina septigera</i>
DW 278	33°57'N - 28°22'W	890-925 m	<i>Dallina septigera</i> , <i>Stenosarina davidsoni</i> , <i>Eucalathis ergastica</i> , <i>Abyssothyris atlantica</i>
DW 279	33°55'N - 28°23'W	760-805 m	<i>Dallina septigera</i> , <i>Abyssothyris atlantica</i>
<b>ANTIALTAIR</b>			
DW 281	43°34'N - 22°25'W	900 m	<i>Dallina septigera</i> , <i>Platidia anomioides</i> , <i>Neocrania anomala</i>
DW 283	43°34'N - 22°19'W	1175-1210 m	<i>Stenosarina davidsoni</i> , <i>Dallina septigera</i> , <i>Neocrania anomala</i> , <i>Eucalathis ergastica</i>