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TEXAS CONCHOLOGIST, Vol. XXVI, No. 1, October, 1989

IN MEMORIAM: Harold Geis

On August 1, 1989, Harold Geis died on his property in Paige, Texas. It was more than 25 years ago that I received a telephone call from him to look at some shells he had collected while scuba diving in the Gulf of Mexico. I then discovered that everything he undertook, he did well. He took up scuba diving when he was close to fifty years of age, and became an excellent diver. The shells collected during his forays into the Gulf were of outstanding quality, and several were not known, at that time, to live in the Northwest Gulf of Mexico.

Harold then and there took the initiative to collect a mollusk collection for the Museum of Natural Science in Houston. Together with Tom Pulley who was then Museum director, a program was outlined. Harold organized and coordinated all the collecting trips. Three of those were with the cooperation of the United States Navy, which made destroyers available to a large party of scuba divers with their equipment such as air compressors and a decompression tank. Reports of these trips were published in the early issues of the Texas Conchologist.

Harold also went out many times with the Gus, a research vessel of the Bureau of Commercial Fisheries stationed at Galveston. On these trips, hundreds of samples were obtained in a depth range of 10-50 fms offshore. I accompanied him a few times on these trips in which much hard work had to be done, sometimes with an awful sinking feeling in one's stomach. With his good friend Sydney Stubbs, he many times went on private trips to such places as Sabine Bank and the drowned offshore beach ridges off Freeport.

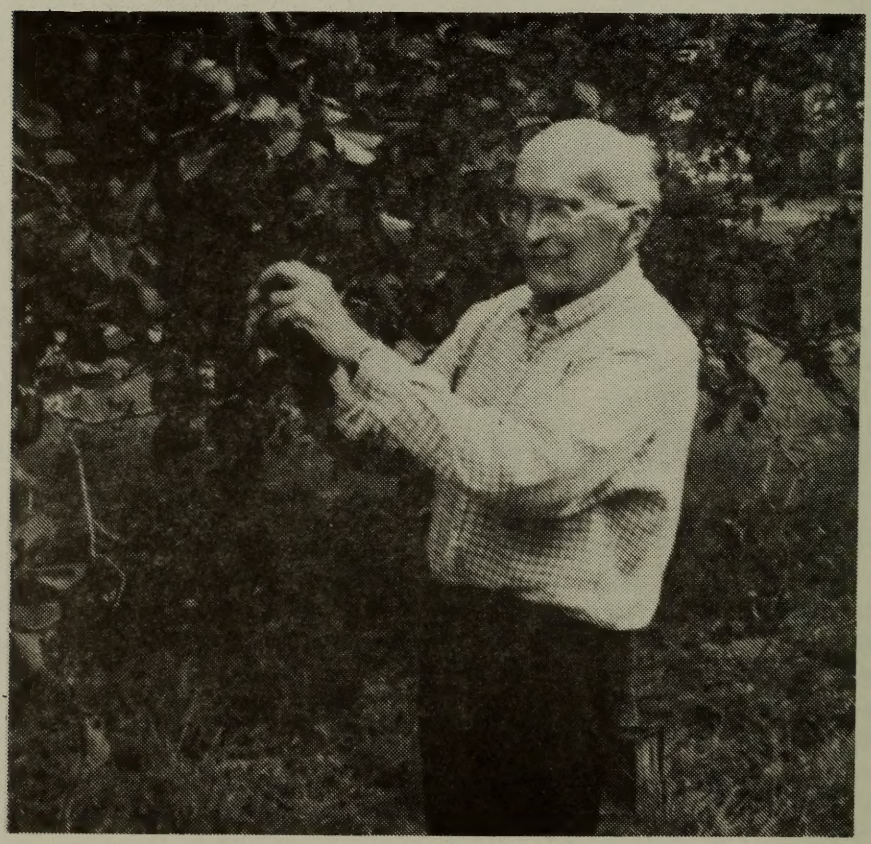
All the collected samples -- many also were obtained from outside sources such as the Texas Game and Fish Commission and oil companies -- were carefully washed and dried, usually at Harold's home, and picked almost exclusively by Harold and myself under the microscope. His training as a geologist-palaeontologist and a natural ability allowed him to do this work quickly and efficiently.

Preliminary cataloguing was done during the, now in retrospect, famous Sunday morning and afternoon sessions at his home. Many members of the Houston Conchology Society cooperated and together more than 15,000 lots were catalogued. Harold, always the perfect host, cooked a gourmet meal for us while we were at work.

About 13 years ago, Harold retired -- he was president of his own oil company -- and bought 80 acres near Paige, Texas, where he started an experimental farm trying to prove that one could easily be self sufficient without harming the environment. He planted fruit trees, worked a vegetable garden, and bred fish in a large fish pond. He was buried there under one of the pecan trees he had planted himself. We are all richer for having known this remarkable and charming man.

The family has indicated that memorials for Harold can be made to the permanent endowment fund (malacology division) at the Houston Museum of Natural Science, 1 Hermann Circle Drive, Houston, Texas, 77030.

Helmer Ode'



Harold Geis at his farm near Paige, Texas.

SEARCH AND SEIZURE By CONSTANCE E. BOONE

DROWNING IN SHELLS

This column is just to let you know that S&S will continue, sporadically, in the future issues of TC - if you want more shell stories and adventures from me.

Meanwhile, I know it is time for me to organize and attempt to clean up identifications of my collections from around the world. Sometimes lately, I feel that I am drowning in shells!

For the last few years I have been extremely busy acting as curator of malacology at the Houston Museum of Natural Science. The collection there contains not only the significant collection of mollusks in the Northwest Gulf Mollusk Population Survey that Ode monographs in Texas Conchologist, but old and sometimes new worldwide collections that tax my powers to identify and properly place specimens in systematic order. The excellent malacological library at HMNS is invaluable for this purpose.

Since I have continued to travel also, the backlog of my material to be worked has grown until I am ashamed to look in most of the rooms in my home and simply can't cram any more shells into the workshop. Some of this is cleaned; some is not. Some is catalogued; much is not. Everything I tell members to do is what I need to take time to do myself.

Therefore, what I hope to do in the months to come is to get my own collection in order.

In some ways, it is easier to do today than it would have been 10 years ago. There are more books on the market to help me - I know more from working through the museum collections - I have seen more living material to verify identifications. Figures in books and descriptions sometimes are quite frustrating. I like Cypraea, for instance, and some species are very variable. Also, most popular books simply leave out the wonderful minute shells I collect like mad and adore. I pick them all out from beach samples, scrape under rocks for live ones, lie flat on my tummy with my head lens down to examine debris, dredge material, etc.. I worry over identifications for months, even years, and still come up with tentative names, sometimes just family placement.

My task is pleasurable for me, I must say. It's almost addictive. I promised myself I would catalogue an average of 10 species per day. Sometimes it takes one or more days to figure out ONE, if I'm lucky. The list of unknowns does

grow. I'm only human! The main thing is that I am trying. You can catalogue with collecting data only. At least, do this. I once bought a fine collection which was all numbered and listed in a catalogue with data, but had no names. I am just now attacking this collection. Since it was catalogued, I simply put it aside since I really had much of the material also, but not from that particular island in the Caribbean.

There is a glowing satisfaction in working out what a species is (or may be, at least). I hope you'll make yourself do this , too, or at least try. It would really be a shame to keep on going on field trips and not learning about what you collect and not recording it properly.

TEXAS CONCHOLOGIST, Vol. XXVI, No.1, October,1989

URBAN GASTROPOD RECORDS FROM THE HIGH PLAINS AND ROLLING PLAINS OF TEXAS

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Few records of living terrestrial gastropods were available from the High Plains and Rolling Plains of Texas before this author began a series of field studies, some of which have been published (Neck 1982, 1984, 1987b). Records of living species have been utilized to assist in reconstruction of environmental conditions in this part of Texas during the late Pleistocene and Holocene (Johnson et. al. 1982; Neck 1987). During the field studies that produced the above published articles as well as several unpublished manuscripts, some collections were made in urban residential localities. The resulting records are presented below. The only published records of urban populations of snails in the present study area known to this author are two species reported for unspecified localities in Lubbock (Neck 1977).

STUDY SITES

The following study sites were sampled from living terrestrial gastropods (population figures from Texas Almanac):

1) Haskell, Haskell County - 16 September 1987; a single residence with substantial tree cover and shading from the house and other yard structures was sampled (1980 population - 3831);

2) Lubbock, Lubbock County - gastropods were sampled from two residences with moderate tree cover and the Lubbock Lake Landmark State Historic Park located along the northwest municipal boundary of Lubbock (1980 population - 178,529);

3) Quitaque, Briscoe County - 30 May 1981: a single residence and adjacent unpaved alley with minimal tree cover was sampled (1980 population - 696); and

4) Tulia, Swisher County - a single back yard and adjacent alleyway with no tree cover was sampled (1980 population - 4477).

GASTROPOD FAUNA

A total of 14 terrestrial and one freshwater gastropod species were collected in the five localities (see Table 1). Additional native populations of land snails are known from Lubbock Lake Landmark State Historic Park (Neck, unpub. data), but only survey results of the urbanized portion of this tract of land are reported herein.

Five of the terrestrial gastropods are not native to North America: Limax flavus, Limax valentianus, Milax gagates, Rumina decollata and Helix aspersa. The first three of these species are slugs native to Europe that have established populations in numerous urban areas in North America. Both R. decollata and H. aspersa have been reported from Lubbock (Neck 1972). These two species, which are native to western Europe and the Mediterranean rim, respectively, are shelled gastropods that develop dense populations in many locations. R. decollata at Quitaque is a low-density population under scattered wood on the soil surface at the boundary between a residential yard and alley.

Vallonia pulchella is a Holarctic species which has a native range in the United States from Maine to South Dakota south to North Carolina and Missouri (Hubricht 1985: 63, map 26). Introduced populations in Texas have previously been reported from Galveston, Williamson, El Paso and Randall counties (Pilsbry 1948: 1023; Strecker 1935; Metcalf 1968; Hubricht 1985: 63). V. pulchella is known from scattered Middle Pleistocene fossil assemblages in the High Plains and Rolling Plains of Texas - Crosby, Hartley, Knox, Randall and Roberts counties (Leonard 1950; Johnston and Savage 1955; Frye and Leonard 1957; Getz and Hibbard 1965).

The other species present in these samples are native to at least a portion of the High Plains/Rolling Plains of Texas. No published records of living Zonitoides arboreus in either the High Plains or Rolling Plains of Texas are known to this author. However, I have located a living population in Randall County, Texas (Neck, unpublished data). Populations of Z. arboreus in Lubbock and Haskell are both recent introductions due to anthropogenic alterations in the environment.

ACKNOWLEDGEMENT

I thank Dorothea Franzen for identification of Catinella avara (as Succinea avara, in litt., 3 May 1983).

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Table 1. Occurrence of living nonmarine gastropods from urban localities in the High Plains and Rolling Plains of Texas. Species not native to this geographic area are designated by an asterisk (*). Locality abbreviations refer to the study sites specified in the text.

	URBAN LOCALITIES				
SPECIES	H	L	LL	Q	T
Physella virgata			X		
**Vallonia pulchella*		X			
Pupoides albilabris			X		
Gastrocopta cristata			X		X
Gastrocopta procera		X			
Catinella avara			X		
Helicodiscus inermis		X			
**Limax flavus*	X				
**Limax valentianus*	X				
Deroceras laeve			X		
**Milax gagates*		X			
Zonitoides arboreus	X	X			
**Rumina decollata*	X	X	X	X	
Polygyra texasiana	X				
**Helix aspersa*		X			

TEXAS CONCHOLOGIST, Vol. XXVI, No.1, October,1989

MONOGRAPH BY H. ODE'

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Superfamily CERITHIOPSIOIDEA

Family CERTHIOPSIDAE H. and A. Adams 1954

Small cerith-like shells with a beaded or corded sculpture arranged in spirals. There is a thin horn-colored operculum and short siphonal canal. This commonly assumed that most species live on sponges. Usually this family is considered to be a subfamily of the Cerithiidae, but Dall (1889) remarked that the existence of a retractable proboscis in Cerithiopsis was sufficient reason to split the genera Seila and Cerithiopsis off as a separate family.

Until a few years ago little modern work had been done on this group. Marshall (1978 and 1983) considers them sufficiently different from the Cerithioidea to place them in a different subfamily. Vaught (1989) places them in the suborder Heteroglossa with such groups as Triphoroidea, Epitonioidea and Eulimoidea. In the survey collection are only the genera Seila, Eumetula and Cerithiopsis. For identification of the many species, one is dependent on not always reliable information. I have used:

Dall, 1889; Bull. Mus. Comp. Zool., Vol. 18.
Dall and Bartsch, 1911; Proc. U.S. Nat. Mus., Vol. 40.
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Hertlein and Strong, 1951; Zoologica, Vol. 36, pp.67-120.
Olsson and Harbison, 1953; Monogr. 8, Acad. Nat. Sci., Philadelphia.
Keen, 1968; Veliger, Vol. 10, pp.389-439.

Genus Seila A. Adams, 1861

Slender, turritellid-looking shells with a shiny, smooth nucleus of 3-5 whorls. Spiral sculpture between the cords. Small, vertical wrinkles which differ in intensity from specimen to specimen. The Atlantic specimens are not as diversified as their Western U.S.A. counterparts. (See DuShane and Draper, 1974)

293. Seila adamsi (H. C. Lea, 1845); [Cerithium], Trans. Amer. Philos. Soc., 2nd ser., Vol. 9, p. 42.

This is an easily recognized species with an extended nuclear shell of about 3-5 smooth and shiny whorls beginning with a somewhat bulbous tip. The earliest whorls of the teleoconch start immediately with two pairs of spiral ridges of which three ridges will show on the outside. In between there are vertical wrinkles. In some specimens the suture is visible as a very thin extra ridge above every fourth spiral ridge. Some populations contain specimens with color banding: a darker brown spiral winds around the shell at the base of the winding.

The species is widespread along the Texas-Louisiana coast in the coastal bays and commonly offshore to 25 fm. Also on the coral reefs (Flower Gardens) and shale banks (Stetson) and not uncommonly collected alive on clumps of oysters in South Texas bays. This live collected bay material is dark reddish-brown in color and live-collected offshore material, especially from the reefs, is much lighter in color. Also found in the mudlump fauna. C. B. Adams named the species twice Cerithium terebrale (1840, Boston Journ. Nat. Hist., Vol. 3, p. 320-321, pl. 3, fig. 7) and terebellum (1847, Cat. Genera, Species in coll. C. B. Adams, p. 19). Both names were preoccupied.

Records HMNS: 64 lots of which 20 contain live-collected material.
Depth range: 0-25 fms; alive 0-11 fms. Offshore on shelly rocky bottoms.
Geographical range: "Massachusetts to Florida, Texas and Brazil, Bermuda," (Abbott, 1974).
Maximum size: 10.3 mm.
Eastern Pacific Analogue: Seila assimilata (C. B. Adams, 1852) "Gulf of California to Panama" (Keen, 1971)

Genus Eumetula Thiele, 1912

Straight conical shells with a rather small nucleus of three whorls, two of which are ribbed. The nucleus is darker in color than the teleoconch. Eumetula Thiele, 1912 was overlooked by Iredale, 1918 when he introduced Laskeya for the preoccupied Eumeta Morch, 1868.

294. Eumetula emersonii (C. B. Adams, 1838); [Cerithium], Boston Journal of Nat. Hist., Vol. 2, pp. 284-285, pl. 4, fig. 10.

This, the largest of all Texas cerithiopsids, is readily recognized and separated, even when minute, from all other species in the family. The teleoconch starts out with two spiral rows of beads and gradually a thin ridge between them develops which only in the largest specimens finally appears as a smaller third row of beads. The other rows are strongly beaded and the upper row is somewhat darker colored than the lower one. An excellent figure of the nucleus can be found in Olsson and Harbison, 1953.

Rarely found on the beach (Galveston, Port Aransas) and rare in the bays (Palacios in Matagorda Bay and Aransas Bay); offshore to 30 fms. Also in the mudlump fauna. More slender and somewhat coarsely beaded material, insufficient for analysis, was obtained at 40 and 51 fms.

Records HMNS: 25 lots of which two contain live-collected material.
Depth range: 30 fms.; alive 10 fms.
Geographical range: "Massachusetts to the West Indies and to Brazil" (Abbott, 1974)
Maximum size: ± 16 mm. (top broken)
Eastern Pacific Analogue: not determined.

295. Eumetula crystallina (Dall, 1881); [Cerithiopsis?]; Bull. Mus. Comp. Zool., Vol. 9 (2), p. 89. Also 1889, Bull. Mus. Comp. Zool., Vol. 18, p.254, pl.20, fig.3.

This species can hardly be considered part of the N.W. Gulf of Mexico fauna. Only a single lot was obtained off the Mississippi delta where the species apparently reaches its most westerly extension. It is fairly widespread off West Florida but is unknown off Texas. It is a snow white rather large, beautifully conical species, somewhat more slender than emersonii. The nucleus is quite small and in the survey material is usually eroded but enough has remained visible in some specimens to place the material in Eumetula.

Records HMNS Survey Collection: 1 lot, no live-collected material.
Depth range: 133 fms.
Geographical range: "Both sides of Florida and the West Indies" (Abbott, 1974)
Maximum size: 14.5 mm.
Eastern Pacific Analogue: not determined.

296. Eumetula bicolor (C.B. Adams, 1845); [Cerithium], Proc. Boston. Soc. Nat. Hist., Vol. 2, p. 5-6; see also: Clench and Turner, 1950, p. 295, pl. 37, fig. 15.

A single lot of this different species was obtained from the mudlump fauna. It is a typical straight-sided Eumetula with a slightly incomplete nucleus, having a rather bulbous last whorl. The whorls of the teleoconch have three equal rows of beads as shown by Clench and Turner's figure. Our incomplete specimen is old and has lost all color. To be noted is that Bartsch described a Cerithiopsis bicolor --quite a different shell-- from the Galapagos Islands.

Records HMNS Survey Collection: 1 lot, no live-collected material.
Depth range: probably in about 30-40 fms, but collected at the surface.
Geographical range: "Caribbean" (Abbott, 1974)
Maximum size: incomplete, not measured.
Eastern Pacific Analogue: not determined.

Genus Cerithiopsis Forbes and Hanley, 1853

In the western Atlantic this genus has been little studied so that its surprisingly many species are difficult to identify. Not only are there many ill-defined species, several of which have never been properly figured, but also the variability of each so-called species is unknown. The shape of many of these species does not appear to be constant, but varies from barrel-shaped, often somewhat pupoid shells, to more elongate forms with many whorls. Many species display color patterns which are supposed to have specific value. Species are said to live on sponges, but their biology is practically unknown.

Most of the N.W. Gulf of Mexico species are strongly sculptured by nodular or beaded sculpture. I have arranged the rich material collected during the Survey into several categories based on structure of the nucleus:

1.) A styliform, smooth or finely ribbed, white or brownish nucleus. Joculator Hedley, 1910.
2.) A smooth, white and shiny and extremely sharply proscribed nucleus of about 5-7 whorls of conical shape.

3.) A smooth, white and shiny, but blunt nucleus of about 3-5 whorls of conical or near conical shape: Cerithiopsis s.s.

Bartsch (1911) based his subdivision, which I will not use, also on the characteristics of the nucleus as follows:

a.) Completely smooth nucleus (Cerithiopsis s.s.)
b.) Early portion smooth, later portion axially ribbed: Cerithiopsina.
c.) Early portion smooth, second portion ribbed, followed by a portion with two axial chords: Cerithiopsida. This is probably the same as Metaxia.
d.) Early portion smooth, followed by finely ribbed portion with intercostal spaces finely spirally lirate: Cerithiopsidea.

I suspect that Joculator is synonymous with Cerithiopsis s.s. Metaxia is quite different and is triphoid. The large number of poorly described and compared species in the genus testifies to the great diversity of shape and color. A much more thorough investigation than I can make here is necessary to clarify the relationships of this very difficult group of species.

The principal categories, other than nucleus, used in the identification are color, shape and sculpture. Different nuclei are often combined with such similar color patterns and/or shapes, that one may question the specific value of the nuclear geometry. Another difficulty in the identification of material is the fact that juvenile shells display a different structure of the base than mature ones. The colors often fade in dead shells. In several cases dwarf forms occur which are smaller than half the normal mature size. Unfortunately practically nothing is known about the biology and little about their anatomy.

Especially striking for the Texas coastal and offshore waters is the occurrence of several species described from the Pliocene fauna of South Florida. First will be listed the species in the subgenus Joculator Hedley, 1910.

Usually these are barrel-shaped,heavily beaded, small shells with a narrow many-whorled styliform nucleus. In populations of the same species, smooth and finely ribbed nuclei can occur, but no difference in teleoconch can be discerned. Probably Joculator is not more than a section of Cerithiopsis. I suspect that often it is merely shortened specimens of normally longer species.

In spite of several statements in the literature claiming the gender of Cerithiopsis is neuter, its gender must be considered feminine.

297. Cerithiopsis (Joculator) lata (C. B. Adams, 1850); [Cerithium], Contr. to Conchol., no. 7, p. 122. See also: Clench and Turner, 1950, p. 303, pl. 38, fig. 5.

This beautiful, small, barrel-shaped shell has a dark brown row of beads as upper spiral on the whorl. Below is a slightly offwhite to light brown band of nodules and below that the third spiral of beads is snow white. The nucleus is styliform, white and smooth; a figure of this species which resembles most of our material closely is given by Clench and Turner (1950). The species lives on most of the offshore Texas coral reefs (e.g., Flower Gardens) and some of and some of the Miocene shale banks (Sonnier Bank off Louisiana). The next species is different although Abbott (1974) considers it the same.

Records HMNS Survey Collection: 9 lots of which contain live-collected material.
Depth range: 10-36 fms.; alive 15-24 fms.
Geographical range: "Greater Antilles and Central America" (Abbott, 1974)
Maximum size: 3.3 mm.
Eastern Pacific Analogue: not determined.

298. Cerithiopsis (Joculator) cruzana Usticke, 1959; Checklist Marine Shells St. Croix; p. 42, pl. 2, fig. 17.

The figure given by Usticke depicts exactly a few shells which are quite different from C. lata. The general shape is somewhat more pupoid, the beading is more subdued and the yellow color band is quite narrow and restricted to the suture and upper row of beads. Both lower rows of beads are snow white. I am convinced that this is not the same as lata but a good species. It is rare offshore Texas and has only been found on the coral reefs and in deep water off Louisiana.

Records HMNS Survey Collection: 5 lots, no live-collected material.
Depth range: 30-55 fms.
Geographical range: Virgin Islands.
Maximum size: 3.3 mm.
Eastern Pacific Analogue: not determined.

299. Cerithiopsis (Joculator) ara Dall and Bartsch, 1911; Proc. U.S. Nat. Mus., Vol. 40, pp. 277-288.

This short barrel-shaped, very dark red-brown species with a spiral row of whitish nodules forming the upper row on the whorl, is so far only known from Bermuda. It is a quite characteristic species of which even

small fragments can be recognized. The nucleus is formed by four, finely ribbed, brown whorls, but is sometimes smooth and whitish. The ribbing of the nucleus is very different from that in the genus Metaxia and spiral ridges are absent. The species is restricted to the offshore coral environment of Texas. I suspect that in spite of its peculiar shape and coloring this species is nothing more than a short color morph of a normally somewhat longer species.

Records HMNS Survey Collection: 9 lots of which 4 contain live-collected material.
Depth range: 13-30 fms; alive 15-30 fms.
Geographical Range: Bermuda.
Maximum size: 3.1 mm.
Eastern Pacific Analogue: not determined.

300. Cerithiopsis (Joculator) brassica Olsson and Harbison, 1953. Monograph 8, Acad. Nat. Sci., Phila., pp. 299-300, pl. 45, fig. 5.

This purely white barrel-shaped species lives in small numbers on the Flower Garden coral reefs. It can be differentiated from the other species in the section by its very coarse, decussate sculpture. There is a deep suture, and the whorls of the teleoconch are somewhat inflated. In some specimens a faint brownish band can be seen at the suture. The nucleus is typical for Joculator: smooth, shiny and styliform.

DeJong and Coomans (1988) claim -- incorrectly in my opinion -- that C. brassica is a synonym of fusiforme C.B. Adams.

Records HMNS Survey Collection: 4 lots, no live -collected material.
Depth range: 24-36 fms.
Geographical range: Only known from the Pliocene of South Florida.
Maximum size: 3.2 mm.
Eastern Pacific Analogue: not determined.

301. Cerithiopsis (Joculator) sp. indet. A

This small somewhat more slender Joculator can be i-identified immediately by its peculiar brown grayish color and the somewhat purple band at the suture. Its shape varies from barrel shape to slightly elongate. As in many Joculator species the nucleus is often broken off. In many specimens the middle row of beads- there are three of these- is often the best developed. Like Joculator ara, this "species" may be a short whorled morph of a normal somewhat more elongate species, in the iota - flavum complex of species. It

297. Cerithiopsis (Joculator) lata (C. B. Adams, 1850); [Cerithium], Contr. to Conchol., no. 7, p. 122. See also: Clench and Turner, 1950, p. 303, pl. 38, fig. 5.

This beautiful, small, barrel-shaped shell has a dark brown row of beads as upper spiral on the whorl. Below is a slightly offwhite to light brown band of nodules and below that the third spiral of beads is snow white. The nucleus is styliform, white and smooth; a figure of this species which resembles most of our material closely is given by Clench and Turner (1950). The species lives on most of the offshore Texas coral reefs (e.g., Flower Gardens) and some of and some of the Miocene shale banks (Sonnier Bank off Louisiana). The next species is different although Abbott (1974) considers it the same.

Records HMNS Survey Collection: 9 lots of which contain live-collected material.
Depth range: 10-36 fms.; alive 15-24 fms.
Geographical range: "Greater Antilles and Central America" (Abbott, 1974)
Maximum size: 3.3 mm.
Eastern Pacific Analogue: not determined.

298. Cerithiopsis (Joculator) cruzana Usticke, 1959; Checklist Marine Shells St. Croix; p. 42, pl. 2, fig. 17.

The figure given by Usticke depicts exactly a few shells which are quite different from C. lata. The general shape is somewhat more pupoid, the beading is more subdued and the yellow color band is quite narrow and restricted to the suture and upper row of beads. Both lower rows of beads are snow white. I am convinced that this is not the same as lata but a good species. It is rare offshore Texas and has only been found on the coral reefs and in deep water off Louisiana.

Records HMNS Survey Collection: 5 lots, no live-collected material.
Depth range: 30-55 fms.
Geographical range: Virgin Islands.
Maximum size: 3.3 mm.
Eastern Pacific Analogue: not determined.

299. Cerithiopsis (Joculator) ara Dall and Bartsch, 1911; Proc. U.S. Nat. Mus., Vol. 40, pp. 277-288.

This short barrel-shaped, very dark red-brown species with a spiral row of whitish nodules forming the upper row on the whorl, is so far only known from Bermuda. It is a quite characteristic species of which even

small fragments can be recognized. The nucleus is formed by four, finely ribbed, brown whorls, but is sometimes smooth and whitish. The ribbing of the nucleus is very different from that in the genus Metaxia and spiral ridges are absent. The species is restricted to the offshore coral environment of Texas. I suspect that in spite of its peculiar shape and coloring this species is nothing more than a short color morph of a normally somewhat longer species.

Records HMNS Survey Collection: 9 lots of which 4 contain live-collected material.
Depth range: 13-30 fms; alive 15-30 fms.
Geographical Range: Bermuda.
Maximum size: 3.1 mm.
Eastern Pacific Analogue: not determined.

300. Cerithiopsis (Joculator) brassica Olsson and Harbison, 1953. Monograph 8, Acad. Nat. Sci., Phila., pp. 299-300, pl. 45, fig. 5.

This purely white barrel-shaped species lives in small numbers on the Flower Garden coral reefs. It can be differentiated from the other species in the section by its very coarse, decussate sculpture. There is a deep suture, and the whorls of the teleoconch are somewhat inflated. In some specimens a faint brownish band can be seen at the suture. The nucleus is typical for Joculator: smooth, shiny and styliform.

DeJong and Coomans (1988) claim -- incorrectly in my opinion -- that C. brassica is a synonym of fusiforme C.B. Adams.

Records HMNS Survey Collection: 4 lots, no live -collected material.
Depth range: 24-36 fms.
Geographical range: Only known from the Pliocene of South Florida.
Maximum size: 3.2 mm.
Eastern Pacific Analogue: not determined.

301. Cerithiopsis (Joculator) sp. indet. A

This small somewhat more slender Joculator can be i-identified immediately by its peculiar brown grayish color and the somewhat purple band at the suture. Its shape varies from barrel shape to slightly elongate. As in many Joculator species the nucleus is often broken off. In many specimens the middle row of beads- there are three of these- is often the best developed. Like Joculator ara, this "species" may be a short whorled morph of a normal somewhat more elongate species, in the iota - flavum complex of species. It

appears to be restricted to the coral reefs off the Texas Coast and close by Stetson Bank.

Records HMNS Survey Collection: 7 lots of which 3 contain live-collected material.
Depth range: 24 - 50 fms; alive 24 - 36 fms.
Geographical range: Unknown.
Maximum size: 3.4 mm.
Eastern Pacific Analogue: Not determined.

302. Cerithiopsis (Joculator) aralia Olsson and Harbison, 1953; Monograph 8, Acad. Nat. Sci., Phila., (Pliocene Moll. S. Florida) p.299, pl. 43, fig. 6.

I have attached the name of this Pliocene fossil to a number of lots containing typical specimens of Joculator. These shells have a small, often quite theliform nucleus which in most instances is strongly ribbed. The slenderness of the nucleus is variable, but I have refrained from separating various forms as different "species". In old and worn material, the ribbing of the nucleus can disappear. (See text fig. 1).

Fig. 1. Nuclei of Joculator aralia Olsson and Harbison, 1953.

The color of live-collected material is light coffee brown, quite uniform without banding, or a uniform light brownish-gray. If the nucleus were not ribbed, was less strongly sutured (as in gemmulosa and fusiforme) and less slender, it would be impossible to separate some specimens of C. aralia from gemmulosa. Therefore, it is absolutely necessary that anatomical investigations of the soft parts and radulae of these species are made to establish essential differences - if they exist - between Joculator and Cerithiopsis s.s. This species has been found on the Holocene beach ridges south of Freeport, rarely on the offshore reefs (both coral and Miocene banks), but is widespread over shell bottoms offshore in 10 -30 fms.

Records HMNS survey collection: 17 lots of which 4 contain live-collected material.
Depth range: 8 - 55 fms; alive 10 - 30 fms.
Geographical range: Known only from the Pliocene of southern Florida.
Maximum size: 2.8 mm.
Eastern Pacific Analogue: not determined.

303. Cerithiopsis (Joculator) sp. indet. G

This yellow-brown, deep-water species is uniformly colored. It differs from the also uniformly colored C. aralia by a different shade of brown color, in its habitat, which is deep water and by its sculpture, which is rather coarse but very regular. Unfortunately, the survey collection possesses only a single lot of four specimens, taken in deep water (55 fms) off Western Louisiana.

Records HMNS Survey Collection: 1 lot, collected rather fresh.
Depth range: 55 fms.
Geographical range: unknown.
Maximum size: 2.7 mm.
Eastern Pacific Analogue: not determined.

The species in Cerithiopsis s.s. are very difficult to classify. The shape of many of these often closely similar "species" varies from pupoid to oval to elongate. Also the size of mature specimens varies greatly. As can be expected the survey material contains many species resembling those described by Olsson and Harbison from South Florida and many of the forms named by C. B. Adams from Jamaica. There is little doubt that there exists a good correspondence with species of the Panamic faunal province, but no special effort to relate species in both faunal provinces has been made. This has a simple reason. For such a comparison I have to rely on species descriptions which are totally inadequate for comparing species even though they are quite detailed and extensive. They often either describe properties of specimens or go into details of general properties of the subgenus. Moreover, many species are based on only one or two specimens without a nucleus. Only when a wealth of material is available is it safe to define species in this family.

For the time being, I have arranged my material with a relatively large number of labels, but it is quite possible that this is too narrow a view and that species in this group are more variable than I allow them to be here.

First a species that stands by itself is treated.

304. Cerithiopsis (Cerithiopsis?) pupa Dall and Simpson, 1901; Bull. U. S. Fish Comm., Vol. 20, pt. 1, p. 424, pl. 53, fig. 16. (Puerto Rico)

This rare species has only been taken on the offshore coral reefs and in deep water off the Louisiana coast. It is a heavily beaded species with only two rows of beads per whorl. The lower row of beads just above the suture is brownish yellow in color. The shell has a typical bottle shape in outline. (See text fig. 2) Its nucleus is unknown because it is missing in all our material, but I believe that this species is a true Cerithiopsis.

Records HMNS Survey Collection: 3 lots, no live-collected material.
Depth range: 10-55 fms.
Geographical range: "Greater Antilles and Western Caribbean Bermuda" (Abbott, 1974).
Maximum size: 4.3 mm.
Eastern Pacific Analogue: not determined.

Fig. 2. Cerithiopsis pupa Dall and Simpson , 1901.

According to their nucleus, species of Cerithiopsis may be arranged in three groups: 1). Those with a very large,somewhat bloated nucleus, very sharply pointed of 5-7 whorls (text fig. 3); 2). those with an intermediate size nucleus of 3-5 whorls (note flava group), and finally those with a rather small nucleus of 2-3 whorls (greenii-vinca group).

305. Cerithiopsis (Cerithiopsis) c.f. hero Bartsch, 1911, Proc. U. S. Nat. Mus., Vol. 40.

This straight-sided conical species has the largest nucleus of any Cerithiopsis on the Texas-Louisiana continental shelf. This species is quite acute, white, rarely brown, shiny,composed of seven inflated whorls,

the last of which carries an incipient ridge. In most specimens the very sharply acute point is broken off, leaving only 3 to 4 whorls to the nucleus. A similar apex is shown by Theriot-Quie (1980) identified with a question mark as Cerithiopsis hero Bartsch, 1911 (See also text fig. 3). A few specimens with blunter apexes may belong to a different species, but I cannot make a convincing case for that idea because their sculpture and shape are quite similar.

The suture is rather deep. The sculpture is strongly quadrate but the beading at the intersections of spirals and radials is much subdued. The species is widespread along the Texas and Louisiana coast on sand and shelly bottoms, but is rarely found on the algal reefs and shale banks. Also in the mudlump fauna. Previously reported (Tex. Conch., Vol. 9, p. 63, as spec. L (1963)).

Records HMNS: 20 lots of which 2 contain live-collected material.
Depth range: 8-55 fms; alive 25-40 fms.
Geographical range: if this is indeed C. hero: Bermuda.
Maximum size: 5.0 mm.
Eastern Pacific Analogue: not determined.

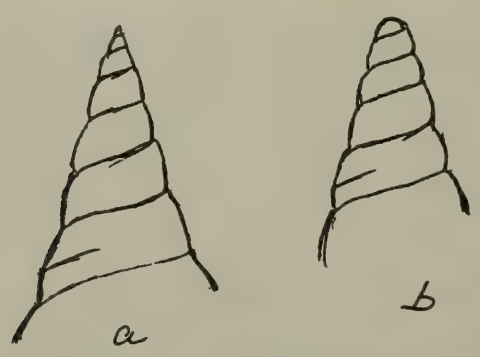

Fig. 3. a) Nucleus c.f. hero Bartsch, 1911, and b) Nucleus C. flava (C. B. Adams, 1850) represented at same scale. Both show an incipient keel on the last whorl.

Next will be treated a very difficult complex of several "species". Seen separately in small numbers there is no difficulty in splitting the material in several "species" but once several thousand specimens are available for study it becomes virtually impossible to name any because it is discovered that they all merge into one another in the most astounding manner. Neither color nor shape nor sculpture appears to be fixed. Even worse is the fact that immature material has a form of the base different from mature shells. Compare for instance, figures 10 and 16 of plate

37 in Clench and Turner's papers of C. B. Adams types. Figure 10 is the immature base, and figure 16 shows the mature aperture.

In this complex I list the species iota, pesa, flava and sp. C, which all are of doubtful validity (one single very variable species?) Most are related to each other by intermediate forms and the boundaries between them, as I have chosen, are quite arbitrary.

306. Cerithiopsis (Cerithiopsis) iota (C. B. Adams, 1845); [Cerithium] Proc. Boston. Soc. Nat. Hist., Vol. 2, p. 5. See also Clench and Turner (1950), p. 295, pl. 37, fig. 16.

I have taken this species as the central form of the complex. It is a fairly straight conical species. On each whorl there are three rows of beads of equal strength. The color pattern is mostly uniform and seldom banded. It appears to merge without clear limits into several other "species" of this group. Mostly found in deeper water, but also on the shallower shale banks (Stetson) and sometimes on shelly bottoms. Rarely in a calcareous environment.

Records HMNS: 12 lots of which one contained live-collected material.
Depth range: 15-63 fms; alive at 25 fms.
Geographical range: described from Jamaica.
Maximum size: 3.8 mm.
Eastern Pacific Analogue: not determined.

307. Cerithiopsis (Cerithiopsis) flava (C. B. Adams, 1850), [Cerithium], Contrib. to Conch., no. 7, p. 122; See also Clench and Turner (1950), p. 282, pl. 37, fig.11.

Rather straight-sided, conical mostly of an even brown color. The middle and lower spirals are practically continuous spirals with only minor beading. In shape quite close to pesa and connected to it by intermediate forms. Some specimens show a decussate sculpture without heavy beading which usually becomes much reduced in intensity on the later whorls. The species has been dredged from Heald Bank (7 fms) and over shelly bottoms off Galveston and Freeport. Also on Stetson Bank, The Flower Garden reef and offshore Louisiana in deep water (55 fms).
Records HMNS Survey Collection: 22 lots of which 1 contains live-collected material.
Depth range: 7-55 fms; alive 24 fms.
Geographical range: described from Jamaica.
Maximum size: 4 mm.
Eastern Pacific Analogue: not determined.

308. Cerithiopsis (Cerithiopsis) c.f. pesa Dall and Bartsch, 1911; Proc. U. S. Nat. Mus., Vol. 40.

This straight conical species occurs in several forms and color shades all of which are characterized by the large, beaded middle spiral of white color between an upper and a lower spiral band of beads all brown or brownish in color.

When fresh this is a very shiny shell. The nucleus is medium sized, smooth, shiny, white or reddish brown. In some specimens the whorls are somewhat inflated. When mature specimens remain very small - this happens in Cerithiopsis - this species merges into sp. indet. C. In most specimens the whorls are perfectly straight and conical. The beading may vary considerably in intensity. When the beading becomes subdued on the later whorls and the color becomes uniform, this species approximates C. flava C.B.Adams. C. pesa has been found exclusively on the calcareous reefs and Miocene shale banks off the Texas and Louisiana coast.

Records HMNS Survey Collection: 21 lots of which 5 contain live-collected material.
Depth range: 10-55 fms; alive 15-40 fms.
Geographical range: Bermuda.
Maximum size: 3.9 mm.
Eastern Pacific Analogue: not determined.

309. Cerithiopsis (Cerithiopsis) sp. indet. C

A minute dwarf form of this complex; almost barrel shaped with slightly deeper suture than pesa, but spiral sculpture and overall color pattern rather the same. I have set it apart because it is so small and more inflated. Probably it is no more than the extreme end of the size variation in the iota-flava complex. In spite of its small size it is still variable as far as color and depth of the suture are concerned.

Records HMNS Survey Collection: 6 lots, no live-collected material.
Depth range: 12-36 fms.
Geographical range: unknown.
Maximum size: 3.0 mm. but most material is under 2.5 mm.

There is another complex of species in Cerithiopsis, namely the "greenii-gemmulosa" complex, a complex just as baffling as the iota-flava complex. In this complex, the nucleus is somewhat smaller than in the iota-flava complex. Most of these species are closely related to C. greenii, which is a species adapted to the habitat of the coastal bays. It may be noted here that we discovered another species of Cerithiopsis living in Christmas Bay (Galveston West Bay System)

which I interpret as a descendant of the Pliocene C. vinca from Southern Florida. This species has been collected in quantity, dead in Aransas Bay along the old Causeway where it was probably derived from Holocene and Pleistocene deposits disturbed by channel-dredging operations.

Many species of Cerithiopsis, and in particular C. greenii, show a noteworthy peculiarity. All live collected material of C. greenii and most of the dead shells of that species display a repaired aperture. That is, the regular sculpture of beads on the whorls stops way short of the outer rim of the aperture and is replaced by a smooth calcareous material (see text figure 4). These species have two spiral rows of beads on the first whorl of the teleoconch and by gradually splitting the upper bead into two parts insert a third row. It must be noted, however, that in some dwarfed specimens a third row never appears.

310. Cerithiopsis (Cerithiopsis) greenii (C. B. Adams, 1839) [Cerithium]. Journ. Boston. Soc. Nat. Hist., Vol.2, pp.287-288, pl. 4, fig.12. See also Clench and Turner, 1950, p. 289, p. 37, fig. 17-18.

This is the common Bay species of the Atlantic coast. It lives in many of the Texas coastal bays (Galveston Bay to the Laguna Madre at South Padre Island) but is seldom found in the open sea where it is replaced by two closely related species. As is often the case, the bay form is darker and has much coarser sculpture than the offshore species. In most specimens the aperture is repaired (see text fig. 4). Also in other species such repaired apertures occured, but it is most common in greenii. C. greenii is a rather variable species varying between barrel shaped -- and then rarely with an almost styliform but small nucleus as in Joculator -- and elongate forms as in C. vinca. Its color is invariably dark brown, its sculpture very coarse, and its nucleus mostly quite small, although we have one bay lot containing specimens having a four-whorled nucleus. Its suture is somewhat excavated and squarish in outline. In some species the upper row of beads is slightly darker than the other one, thus indicating a relationship with C. fusiformis, where the color difference in fresh specimens is usually easily observed. It is possible that C. virginica (Henderson and Bartsch, 1914) is merely a form of C. greenii.

Records HMNS Survey Collection: 18 lots of which 5 contain live-collected material.
Depth range: 0-11 fms.; alive 0-2 fms.
Geographical range: Cape Cod to both sides of Florida, Bermuda, Brazil (Abbott, 1974).
Maximum size: 3.7 mm.
Eastern Pacific Analogue : not determined.

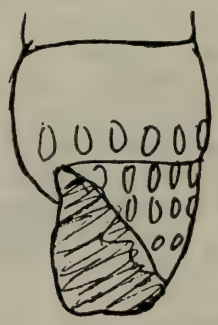

Fig. 4. Side view of repaired outer lip in C. greenii.

311. Cerithiopsis (Cerithiopsis) fusiformis (C. B. Adams, 1850) [Cerithium]; Contr. to Conchol., no. 7, pp. 120-121. See also Clench and Turner, 1950, p. 285, pl. 38, fig. 4.

This small, dark brown, offshore species of shallow coastal waters is the most common and widespread species along the Texas coast. It is clearly related to both greenii and gemmulosa: the differences are:

1). A quite shallow suture, which in both greenii and gemmulosa is well developed.
2). The upper row of beads is often - not always - of a darker brown color than the remainder of the shell, while in the rarer gemmulosa the shell is evenly colored a light to darker reddish brown (depending on the habitat?)
3). The shape is mostly somewhat barrel shaped, but also more elongate forms occur. We have included in this species a number of lots containing straight-sided conical specimens, which may be erroneous.

C. fusiformis is rarely found on the beach (jetties Port Aransas, Matagorda Beach and at San Luis Pass, Galveston), but is widespread over shallow sand bottoms offshore Galveston and Freeport. Often specimens of this species are misidentified as C. greenii. It is less common on the offshore coral reefs. Some probably Holocene and Pleistocene specimens were taken in Aransas Bay.

Records HMNS Survey Collection: 50 lots, of which 13 contain live-collected material.
Depth range: 0-5 fms.; alive 0-24 fms.
Geographical range: "Gulf of Mexico; West Florida, shore to 90 fms" (Abbott, 1974).
Maximum size: 3.2 mm.

312. Cerithiopsis (Cerithiopsis) gemmulosa (C. B. Adams, 1850); [Cerithium]; Contrib. to Conchol., no. 7, p. 120. See also Clench and Turner, 1950.

This much less common species has been found in shallow offshore waters and in a few bays. I believe that this species is more closely allied to greenii than the ubiquitous fusiformis. It normally has a rather elongate-oval shape with a white, sometimes reddish, but always a small shiny nucleus, which is of the small type (± 3 whorls). The differences from greenii are:

1). Its color is more reddish and lighter, and its sculpture is finer.
2). The suture is deeply excavated and rectangular in cross sections.
3). Mature specimens are larger than greenii.

Its shape is usually somewhat pupoid, but varies slightly as in all species of cerithiopsids. Abbott (1974) gives the date as 1847,but according to Clench and Turner (1950) that early name is merely a nomen nudum. Its distribution is quite different from that of fusiformis: once from Matagorda Beach, from East Matagorda Bay and West Galveston Bay and from the Holocene beach ridges south of Freeport. One lot from 50 fms off Texas, and also from Stetson Bank.

Records HMNS Survey Collection: 13 lots, one of which contains live-collected material.
Depth range: 0-50 fms; alive 8 1/2 fms on drowned Holocene beach ridge south of Freeport.
Geographical range: "West Indies to Brazil" (Abbott, 1974).
Maximum size: 5.7 mm.
Eastern Pacific Analogue: not determined.

313. Cerithiopsis (Cerithiopsis) vinca Olsson and Harbison, 1953. Monograph 8, Acad. Nat. Sci. Phil., p. 297, pl. 48, fig. 2.

The last species in the greenii-gemmulosa complex is another Miocene fossil from Florida. Although dead material of both fusiformis and gemmulosa has rarely been obtained in the bays, C. vinca is known from the bays only. It was once taken alive in Christmas Bay

(Galveston West Bay System). This is a simple specimen, relatively small, grayish in color, rather slender and with the typical small nucleus of the complex. Material closely resembling the figure given by Olsson and Harbison (1953) has been obtained from dredged mud in Aransas Bay - possibly Holocene or older - along the old causeway at the second bridge, now for many years replaced by a new causeway. Old worn material has also been dredged in Matagorda Bay. Among our material appear to be several morphs which all have the essential structure of the complex. Some resemble C. dauca Olsson and Harbison (1953) but I have not split them off because I believe they fall within the range of variation of C. vinca. C. vinca differs from C. greenii in its much finer sculpture and its much slenderer form and greater size.

Records HMNS Survey Collection: 6 lots, of which one contains live-collected material.
Depth range: 0-2 fms.
Geographical ranges: only known from the Pliocene of Southern Florida.
Maximum size: 5.4 mm.
Eastern Pacific Analogue: not determined.

314. Cerithiopsis sp. indet. E.

This species resembles greenii very much, but is more slender, lighter in color, and less heavily sculptured. It lives on the Holocene drowned beach ridges offshore Freeport and on the offshore coral reefs (Flower Gardens). Its color is a uniform reddish brown. This could be merely an offshore form of greenii, but the shells look sufficiently different to me to report separately.

Records HMNS Survey Collection: 4 lots, one of which contains live-collected material.
Depth range: 8-36 fms.; alive 8 fms.
Geographical range: unknown.
Maximum size: 3.8 mm.
Eastern Pacific Analogue: not determined.

Finally I must report here two species which cannot be placed in any subgenus known to me. Both are extremely minute species, probably so far overlooked. In one Cerithiopsis? sp. indet. D the nucleus is typical cerithiopsid but in the sculpture of the teleoconch, radial elements are missing. The other Cerithiopsis sp. indet. F is a glossy colorless shell of less than 2 mm in length.

315. Cerithiopsis (?) (unknown subgenus) sp. indet. D

It is doubtful that this is a true cerithiopsid. Although its nucleus belongs in the family, the sculpture of the teleoconch places this shell closer to Seila than Cerithiopsis. The spirals, however, show thickened parts and differ from those in Seila. The grooves between the spirals are completely smooth and glossy. Hence the appearance is that of a rather vitreous Seila with a faint beading on the spirals. It is a rather small shell of elongate shape and was obtained in 10 fms off the Louisiana coast (Sonnier Bank).

Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 10 fms.
Geographical range: unknown.
Maximum size: 2.0 mm.
Eastern Pacific Analogue: not determined.

316. Cerithiopsis (unnamed subgenus) sp. indet. F

Two lots of an extremely minute species were discovered among two lots of Finella dubia. They are full grown shells with all the characters of the genus. They are completely colorless and flossy white. I believe that these specimens merit a special subgeneric status because they differ in several respects from all other species in the genus. The nucleus is quite small and somewhat compressed. The post nuclear whorls are rather inflated so that the suture appears deep. The body whorl is sculptured by three very nodulose spirals, but looking through the glossy shell material the surface appears cancellate.

Records HMNS Survey Collection: 2 lots, no live-collected material.
Depth range: 10-15 fms (coral reef) and at 25 fms off Galveston on sand bottom.
Geographical range: unknown.
Maximum size: 1.4 mm.
Eastern Pacific Analogue: not determined.

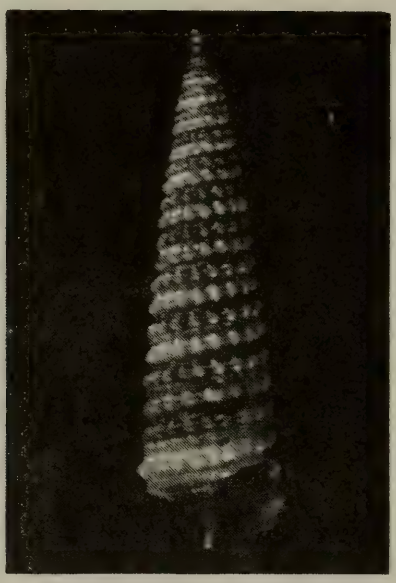

Fig. 5. Eumetula emersonii (C.B. Adams, 1838), 6.8 mm, collected by divers Geis and Pierce at Seven Sisters, 2 miles south of #1 Buoy, Heald Bank, 12 fms, 31 mi ESE of Galveston, Texas, August 22, 1966.

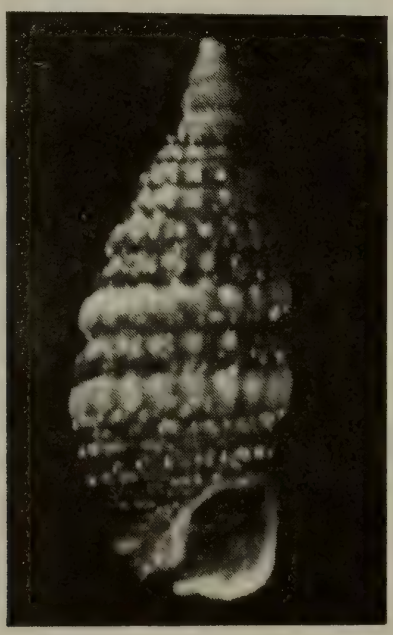

Fig. 6. Joculator lata (C.B. Adams, 1850), 3.1 mm, East Flower Gardens coral reef, 103 mi SE of Galveston, Texas, by divers off USS Haynsworth DD700, October 6, 1967.

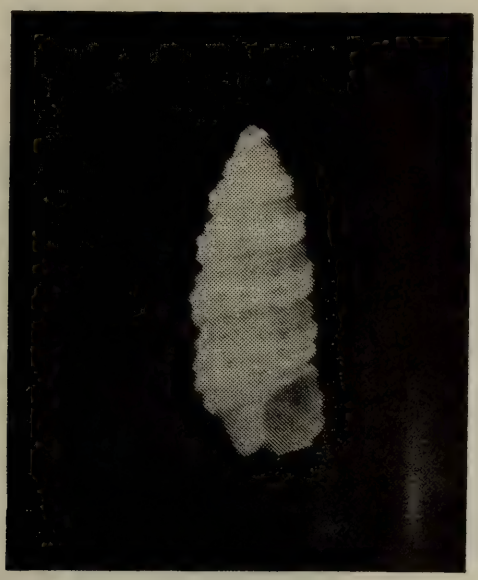

Fig 7. Joculator brassica Olsson and Harbison, 1953 2.8 mm, collected at the "24 fm lump, " 113 SE of Galveston, Texas, by divers off USS Haynsworth DD700 October 7, 1967.

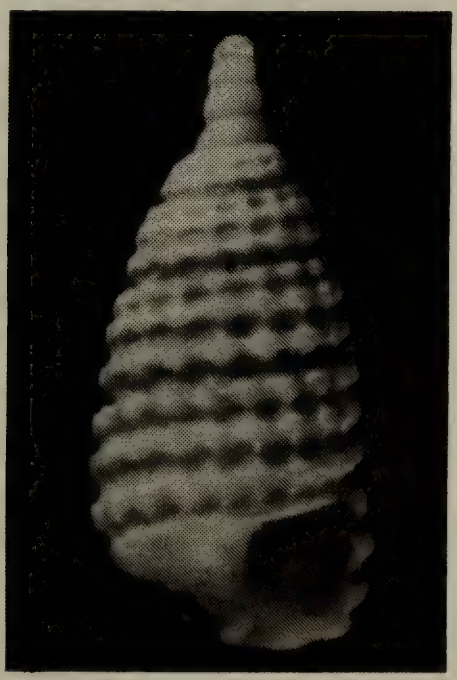

Fig. 8. Joculator aralia Olsson and Harbison, 1953, 2mm, trawled by the Bureau of Commercial Fisheries, 32.5 mi N of Port Isabel, Texas, Aug.10-25 trip,1965.

Fig. 9. Cerithiopsis c.f. hero Bartsch, 1911, 5 mm, collected by divers off USS Haynsworth DD700, 103 mi SE of Galveston, Texas, Oct. 6, 1967.

HCS GOES TO COA IN S.D. CA

The Houston Conchology Society had solid representation at the Conchologists of America annual meeting this summer in San Diego, California. Attending were Dee Balderas, Jim and Sandy Clark, Jerry and Lucy Clampit, and Ronald and Lauretta Marr (and perhaps others unknown to this writer). Pictured below are Dee, Lucy and Sandy, all set to go shelling at the San Diego Zoo. They didn't find a Mollusk House, but they did have better luck with shell drift at San Diego Harbor. Lucy has informed us that next year the COA convention will be held in Melbourne, Florida.

THIS SPACE FOR "LEASE"

Actually, we are giving the space away each issue that the editor doesn't receive enough articles. I need short fillers such as book reviews, field trip reviews, poems, or seafood recipes. A photograph of a friend grovelling in the muck and the mud (hopefully digging for angel wings) along with a paragraph on why he/she didn't destroy the negative would be a perfect "filler." In case you have not noticed, TC's format requires that we have pages in multiples of four. Thus, when we have an issue like this one that ends up with 30 pages of text, the editor has a headache! PLEASE HELP THE EDITOR AVOID HEADACHES!! Send more short articles and spel your words rite.

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TEXAS CONCHOLOGIST, Vol. XXVI, No. 1, October, 1989

TABLE OF CONTENTS

IN MEMORIAM: Harold Geis
By Helmer Ode' 1

SEARCH AND SEIZURE
Drowning in Shells
By Constance E. Boone 3

URBAN GASTROPOD RECORDS FROM THE
HIGH PLAINS AND ROLLING PLAINS OF TEXAS
By Raymond W. Neck 5

DISTRIBUTION AND RECORDS OF THE
MARINE MOLLUSCA IN THE NORTHWEST
GULF OF MEXICO (A Continuing Monograph:
Superfamily CERITHIOPSIOIDEA)
By H. Ode' 10

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TEXAS CONCHOLOGIST, Vol. XXVI, No. 2, January, 1990

NON-RANDOM PLANKTONIC DISPERSAL: ONE KEY TO MARINE MOLLUSCAN SUCCESS

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INTRODUCTION

Marine benthic invertebrates rank among the most successful organisms on earth if geological longevity is used as the measure of success. One feature common to a majority of marine invertebrate taxa, including mollusca, is a planktonic larval stage. Thorson (1950) and Mileikovsky (1971) estimate that 70% of marine bottom dwelling invertebrates possess planktonic larvae.

It is generally assumed that having planktonic larvae is an adaptive advantage particularly for sessile epifauna (that is, attached, non-mobile animals such as barnacles, mussels, and oysters). Categorical advantages for having planktonic larvae have been proposed by Mileikovsky (1971): 1) wide geographic dispersal and subsequent wide distribution of adult populations, 2) potential quick recovery of populations following catastrophic disturbance, 3) potential expansion or colonization of habitats new to the species, and 4) food availability for growth of each young individual which decreases the energy expenditure per progeny by the parent and thus, potentially, increases number of offspring.

Of these proposed advantages, the most widely accepted advantage is the provision of wide geographic dispersal. A tacit assumption of this provision is that planktonic dispersal is random. Larval dispersal has been likened to sowing of wind blown seeds (Koehn et al., 1973), with the success of each seed being a chance, or random event. However, just as terrestrial biologists have shown that seed dispersal is not a totally random process (for example, packaging seeds in fruit, which attracts animals to eat, and subsequently disperse the seeds now packaged in fertilizer, or manure), marine biologists have reached similar conclusions regarding the randomness of planktonic larval dispersal. In this article, I will discuss three methods by which marine invertebrates (primarily using molluscs as examples) help control the outcome of planktonic dispersal: 1) spawning rhythm, or timing, 2) larval swimming behavior before settling out of the plankton and beginning a sedentary adult life, and 3) larval settlement behavior, or selection of an adult home.

SPAWNING RHYTHM

The term spawning shall be applied in its broadest definition -- the **release** of gametes, eggs, larvae or brooded juveniles. Seasonal patterns of spawning by marine invertebrates have been noted by naturalists for many years (see reviews by Thorson, 1950; and Naylor, 1976), although the causes of seasonal limitations and the exact natural of spatial limitations are not always well documented. However, two common patterns of tidally synchronized spawning rhythms emerge: 1) neap tide (lowest monthly tides at first and fourth quarter moon) high water spawn, and 2) spring tide (highest monthly tides at new and full moon) high water spawn.

The first pattern, neap, high water spawning, tends to curtail dispersal (Naylor, 1965; Berry, 1986). In a study of the reproductive behavior of a tropical, shoreline gastropod Umbonium vestiarium, Berry (1986) describes a spawn of eggs at neap, high water. In 3 to 6 hours, the pelagic, or floating egg of Umbonium develops into a trochophore larva, which metamorphoses into a veliger within 6 to 8 hours. The veliger reaches settling stage within 36 to 48 hours following spawn. Since the life cycle of Umbonium is only slightly longer than one year, the newly settled juveniles and the adults do not significantly compete for the same resources during the brief overlap of age classes. Berry concludes that curtailed dispersal is necessary to maintain the population of this species.

Other examples of neap water spawning is found in the European oyster Ostrea edulis (Naylor, 1976), the calcarius tube worms Spirorbis borealis (Knight-Jones, 1951) and S. marioni (Rothlisberg, 1974) and the lugworm Arenicola marina (Duncan, 1960). This rhythm of reproduction would seem to be especially well-suited to oysters, such as Crassostrea virginica, which grow and survive optimally at a narrow range of salinity in the mid-estuary. Limited dispersal is also suited to Spirorbis which is spatially restricted to the lower intertidal zone. One might expect a trend towards neap tide release of eggs or larvae in organisms which have narrowly defined habitats in terms of substrata preference, shoreline height, and position in estuaries.

On the other hand, spring tide release of eggs or larvae tends to enhance or broaden the area of dispersal. Spring tide spawning has been observed in intertidal and supratidal (areas above the reach of normal high tides) gastropods (Lysaght, 1941; Berry and Chew, 1973) and decapod crustaceans (DeCoursey, 1979; Saigusa, 1981). In the case

of some supratidal, mangrove dwelling snails, such as Littorina angulifera, spring tide spawning may be as much a function of opportunity to place aquatic life stages in the water as a function of dispersal control. Since these gastropods normally live well above mean high tide, L. angulifera may only get close enough to water to spawn an spring high tides, although this is not confirmed in the literature reviewed by this author. I have seen L. angulifera thriving on mangroves that were so high on the shore, that the gastropods would only be over the water part of each lunar month.

This type of lunar cycle aids another facet of survival in the pulmonate gastropod Melampus bidentatus, which lives in the upper reaches of the salt marsh. The adult of this species deposits its young into the water during the spring high tide; the larvae then take 14 days to develop, and reach the settling stage just in time to be deposited high within the marsh on the next high spring tide (F. Fisher, personal communication). In larval dispersal of this pattern, the significance of synchronizing spawning with a lunar phase is the enhanced recruitment of juvenile snails into an acceptable adult habitat.

Finally, lunar spawning activities may continue in a population where the rhythm is no longer adaptive, at least in the process of dispersal of young. The supratidal gastropod Littorina neritoides has been observed spawning in two microhabitats -- supratidal crevices and supratidal pools (Lysaght, 1941). L. neritoides has a planktonic egg capsule which it releases into the water from September through April on a lunar cycle corresponding to spring tides. Lysaght noted that individuals from both microhabitats maintained the same rhythm of egg release, even though the pool inhabiting individuals did not need to wait for spring tides for access to water. The effect on dispersal is different for the two groups, for in the crevice group, spring tides act to disperse the eggs and subsequent young along the shore, whereas in the pool group, the progeny are confined to the pool.

PLANKTONIC LARVAE DEVELOPMENT AND BEHAVIOR

Colonization by larvae has been described as having three phases: development, testing and settlement (Keough and Downes, 1982). Other investigators have used the terms "development period," and "delay period" (Scheltema, 1971). Regardless of terminology, every planktonic larva has a period of physiological growth and development followed by a phase (usually of shorter duration than development) of searching for, and selecting a suitable substrata for

settlement. Physiological development and behavioral adaptations may affect dispersal of the larvae at either end of the planktonic period.

The most obvious way to affect the dispersal pattern of a free-floating larva is to change the duration of development or the period of delay. Carriker (1967) has suggested that estuarine organisms should generally possess a briefer planktonic stage than marine species in order to avoid being swept out of the estuary before maturation. Evidence to support this idea is not readily available in the literature. However, evidence of long-distance dispersal in marine species is available. Scheltema (1971) showed that the length of development in six of ten tropical gastropods (with pelagic stages ranging from 100 to 300 days in duration), was sufficient to account for the trans-Atlantic distribution of these shallow water molluscs. Scheltema concluded that pelagic dispersal was important in terms of marine zoogeography, or the distribution of organisms in the seas. This conclusion might seem obvious, except that other mechanisms of dispersal are alternative explanations for distribution, such as adult dispersal (for example, pelagic forms such as Janthina spp.) or man-derived dispersal (either purposeful as in the case of many oyster species, or accidental as in the case of many oyster predators).

Behavior of larvae early in the development stage also affects final distribution of the adult population. For example, oyster larvae maintain their position in the estuary by increased swimming activity during the flood tide (when the net flow of water is into the bays), and by decreased swimming, thus settling to the bottom on the ebb tide (when net water flow is out of the estuary) (Naylor, 1976). Similar behavior has been observed in the barnacle Balanus improvisus (Crisp, 1976). Since these microscopic larvae are incapable of swimming against a strong current, this simple behavior of controlling vertical position in the water column significantly aids the survival of species which cannot compete in the open marine environment.

LARVAL SETTLING BEHAVIOR

Larval behavior in selecting a place to settle down also greatly affects final dispersal patterns. One of the first investigators to notice the effect of presence/absence of substratum upon larval development of marine invertebrates was the Danish biologist, Mortensen. He noted the failure of certain echinoderm larvae to metamorphose properly in the absence of bottom sand; successful metamorphosis was stimulated to completion by the addition of sand (see Scheltema, 1974). Some years later, D. P. Wilson

independently observed the importance of bottom sediments to the larval development of a polychaete worm, Owenia fusiformis. Wilson and his collaborators continued to explore this phenomena through a series of laboratory experiments on polychaetes during the 1930's and 1940's (Scheltema, 1974).

Concurrently, Gunnar Thorson studied distribution patterns of planktonic larvae in the marine environment and related this to the distribution of adult populations (Thorson, 1950 and 1957). Eventually, Thorson summarized much of his work in a statement known as Thorson's rule -- there is a decrease in numbers of species possessing pelagic larvae from Equator to the Poles, and from shallow water benthos to deep water benthos (Mileikovsky, 1971). Exceptions to this rule have been noted, but the pattern of decreased pelagic larvae with increasing latitude has held up particularly well in prosobranch gastropods, lamellibranch bivalves, and echinoderms (Mileikovsky, 1971). Perhaps this pattern of pelagic larvae explains, in part, the apparent increase in numbers of tropical marine species compared to higher latitude marine species.

The pioneer work of the above investigators can be summarized in the following conclusions: 1) many marine invertebrate larvae depend on a cue from the substratum in order to settle and complete metamorphosis, 2) in many cases this cue is related to the presence of conspecific adults (that is adults from the same species), 3) some larvae have the ability to delay metamorphosis until the proper cue is received, and 4) some species and populations show heterogeneity in settlement response. The above observations appear to provide evidence that larval dispersal patterns are genetically controlled, and thus, in-part nonrandom. The final two conclusions provide a mechanism whereby larval recruitment into conspecific adult populations is maintained while colonization of new habitats is encouraged in other instances.

Larval recruitment into conspecific adult populations has been shown in a number of studies. Knight-Jones (1971) has shown that the calcareous serpulid polychaete worm Spirorbis borealis prefers to settle on substrata among adults of the same species. Several investigators have shown gregarious settling behavior in oysters (Crassostrea virginica; Crisp, 1967; and Ostrea edulis; Cole and Knight-Jones, 1949). Gregarious behavior has also been demonstrated in barnacles, gastropods and reef forming sabellid worms (Scheltema, 1974). In cases where the planktonic development period is short and tidal movement restricted, gregarious behavior may curtail dispersal and increase recruitment to the parental population, thus enhancing maintenance of this population.

However, in most cases, planktonic larvae, however short-lived, provide some dispersal, and gregariousness is more aptly a cue of acceptable habitat.

In several instances, interesting interactions in settling behavior among congeneric species (that is, different species in the same genus) have been observed. Based upon field work, Petraitis (1978) observed that juveniles of Mytilus californianus and M. edulis are found more often with conspecific adults; he attributed this to selective settlement of the larvae. However in laboratory testing of settling preference, M. californianus selectively settled onto byssal fibers of either Mytilus species (Suchanek, 1981; Paine and Suchanek, 1983). These seemingly contradictory results might be explained as follows. M. californianus is always competitively dominant over M. edulis (a smaller, quickly growing species). The preference of M. edulis larvae for conspecific settlement, or for settlement on algae (also shown by Peterson, 1984), agrees with observed ecological succession patterns. Thus, when M. edulis arrives first, it quickly colonizes a rocky shore; however when M. californianus arrives, it indescriminently settles among neighbors or relatives and soon outcompetes any nearby blue mussles for space.dulise

CONCLUSIONS

Random processes, such as current direction and speed, and spatial and temporal presence of suitable habitat "downstream" from the point of larvae release, undeniably affects the distribution of benthic organisms. However, the process of larval dispersal may not be as random as was commonly believed in the past. Intuitively, a primary goal of any dispersal process is to place progeny in a habitat where they can grow and reproduce. Thus, any time "randomness" in dispersal can be reduced by genetically controlled behavior, a species should benefit by increased survival. In this review paper, I have presented evidence that marine benthic invertebrates control larval dispersal by spawning periodicity, by larval behavior during planktonic development and delay periods, and by complex settling behavior.

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NEW RECORDS OF ANODONTA SUBORBICULATA SAY FROM TEXAS

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In surveying mussel faunas of several drainage systems in Texas, the authors have discovered several new localities for Anodonta suborbiculata Say, 1831. The few previous reports of the species are confined to two drainage systems in the state. Johnson (1980) reported one collection locality at Ward's Prairie Lake, near Romayor, Liberty County in the Trinity River system and Neck (1982) reported two new localities, Possum Kingdom Reservoir in the Brazos River system and Lake Livingston in the Trinity River system.

Our records include the following: SABINE RIVER, backwater area near U.S. Highway 59 crossing, N of Carthage, Harrison County, 19 August 1984, C.M. Mather and J.A.M. Bergmann: NECHES RIVER SYSTEM, Shirley Creek Park, Sam Rayburn Reservoir, Nacogdoches County, 15 October, 1976, Angelina River, Selma Snider; SAN JACINTO RIVER, east side of Lake Conroe (West Fork of San Jacinto River), Walker County, 13 miles SSW of Huntsville, shoreline S of FM 1375 crossing, 28 December 1988, C.M. Mather and Jerry W. Davis; SAN JACINTO RIVER, west side of Lake Conroe (West Fork of San Jacinto River), Montgomery County, Peach Creek, 8 miles NE of Montgomery, 13 January 1989, Jerry W. Davis; SAN JACINTO RIVER SYSTEM, East Fork arm of Lake Houston, Lake Houston State Park, Harris County, 23 September 1982, Raymond W. Neck.

In addition, specimens were collected in a Red River flood-plain pool at Oklahoma State Highway 78, Bryan County, OK, on 3 October 1984 by Raymond W. Neck.

This report increases the known Texas distribution to include the Sabine, Neches and San Jacinto River systems. It should also be expected to occur in the Red River below Lake Texoma.

It should also be noted that Vaughan (1893) reported A. suborbiculata from the Louisiana side of Caddo Lake and Gordon (1984) and Mather (in press) have reported it from the Oklahoma side of Lake Texoma.

Specimens from Lake Conroe are deposited in the Mollusk Collections of the University of Science and Arts of Oklahoma, and the Sabine River specimen is in the private collection of J.A.M.Bergmann.

Specimens of A. suborbiculata may be overlooked during field collections by workers who are expecting no other species of the genus Anodonta than the nearly ubiquitous Anodonta grandis and Anodonta imbecilis. A. suborbiculata exhibits characters of both of these other two species of Anodonta in that it possesses prominent nodules on the umbo (as in A. grandis) and has the umbo restricted to the area at or below the hinge line (as in A. imbecilis). A. suborbiculata differs from the other two species in its general shell outline, which is oval to circular (orbiculate) in outline. The general shell outline and the presence of a sculptured umbo below the hinge line is sufficient to identify A. suborbiculata, at least in south central North America (see figure 1).

Acknowledgement. We thank Jerry W. Davis for his collection of specimens from Lake Conroe and William J. Wardle for providing access to the freshwater bivalve collection at Texas A & M University at Galveston (Sam Rayburn Reservoir specimens).

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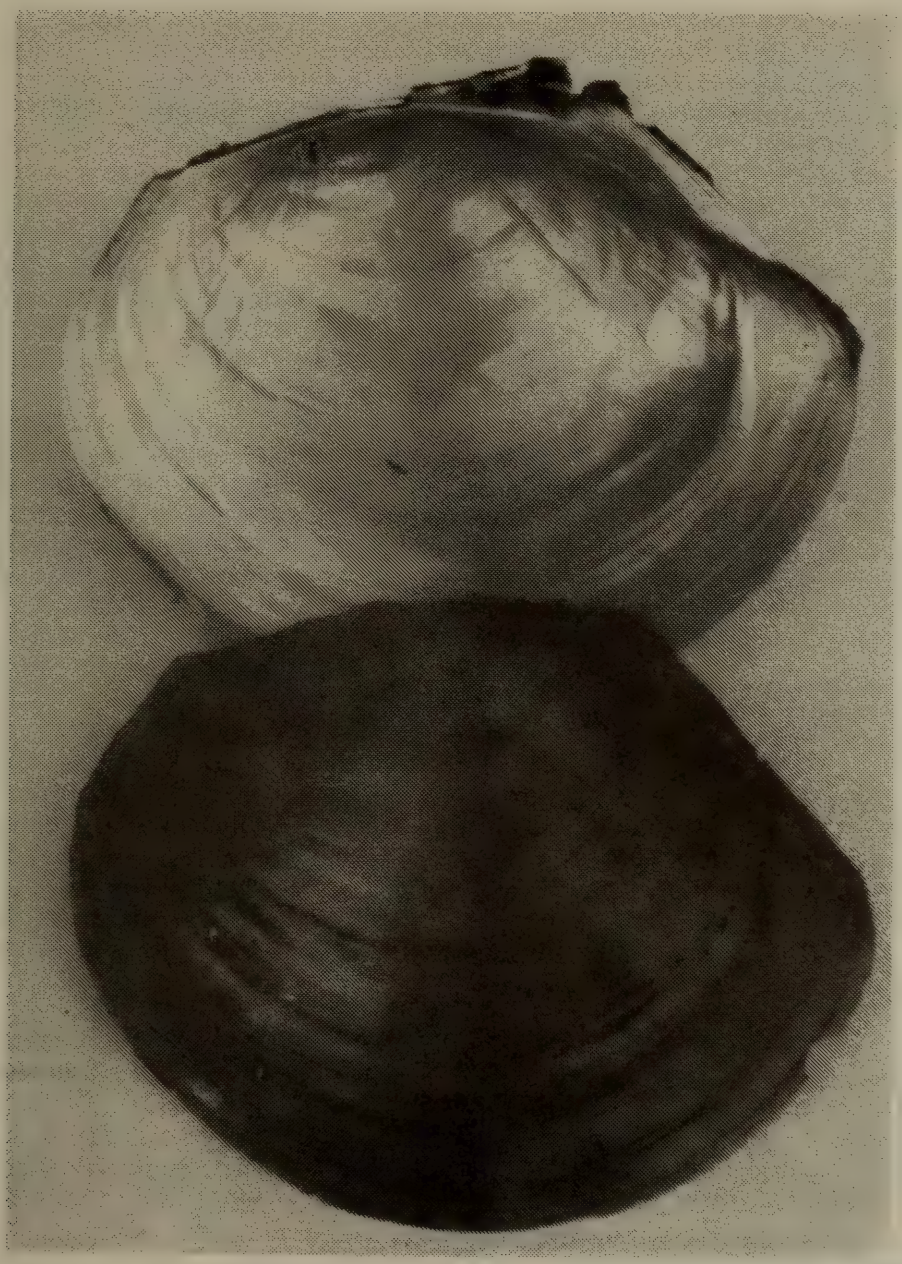


Fig. 1. Anodonta suborbiculata collected in a floodplain pool in Red River Valley at OK 78, Bryan County, OK, October 3, 1984, by R.W. Neck.
Photo by C. Boone

SEARCH AND SEIZURE BY CONSTANCE E. BOONE

TWO NEW COFFEE TABLE BOOKS

Did Santa bring you one of the new coffee table books for Christmas? One arrived at my home for the holiday, and the other got there just a day or so after December 25th. The publisher's information sent from American Malacologists pretty well outlines the differences between the two, and I will quote some of this for you. I will add a few of my own comments so that you can decide if you want to have one or both of the books in your home. They really are not meant to be library books to use for identification, although each one can add to your knowledge of mollusks if you read all the information offered. We hope that you take the time to do this.

Shells--Jewels from the Sea by M.G. Harasewych. 224 pp., 211 plates, Rizzoli International Publ., N.Y., $45.00. 10 x 11 in.

"The magnificent colored photographs, with interesting backgrounds, and some of William Bledsoe's collection, are done by the well-known photographer Murray Alcosser...."
..."ten pages of text are meaty discussions of the Origins of the Molluscan Shell, the Formation of the Molluscan Shell, an account of how coiled shells have adapted to new environments...."

The ten pages of text are by Dr. Harasewych, curator of mollusks at the Smithsonian Institution. Two classes are added to the Phylum Mollusca for a total of nine. Stating that today the knowledge of molluscan evolution is far from complete, Harasewych outlines some of the current research in the evolution of these unique animals. It is interesting to note that he discusses the necessity these animals found to develop shells to cover their soft organs through history and that now they are evolving to have reduced shells once again. Although the book is a picture book of shells, Harasewych discusses the animals in his beginning text and in his remarks under the species depicted. You will not see pictures of living animals.

The two classes added to the seven we have known recently are divisions of two classes because of differences found in the animals. Aplacophora is divided into two classes of primitive animals. According to the text, these worm-like animals are represented by the class Caudofoveata, a lineage that has never evolved a shell and which are covered with a

cuticle, a sheet of hair-like protein, in which mineralized scales of calcium carbonate are embedded. Some are said to reach six inches, but most are less than one inch. They burrow in muddy sea bottoms where they graze on fine sediments rich in organic debris and microscopic organisms. The second class is the Solengastres, primitive worm-like animals that do not burrow but crawl along the surface of firmer sea bottoms. Neither class is common but each represents landmarks in the transition of primitive shell-less mollusks from burrowing to crawling habitats, according to Harasewych.

The author also discusses two lineages in the class Monoplacophora, one a class of low conical shells we know mostly as Neopilina and still living and the other a class extinct but thought to represent the progenitor of all the remaining classes of mollusks living today. This extinct class had "voluminous conical shells that became coiled." A fossil rostroconch that lived in Texas and Oklahoma during the Late Pennsylvanian is thought to have evolved from the extinct class of conical shells.

Aside from the ten pages of text, we remark that the photographs are of some of the 600 shells sent the photographer from the Smithsonian. Included are some of the shells in the collection of the late Bill Bledsoe of California. Through the years we knew Bill and saw him yearly at the meetings of the American Malacological Union, we looked forward to seeing some of the special rare shells he would bring to share with us. Bill had the means and the desire to amass a superb worldwide collection. He had many shells that we saw nowhere else. I am pleased to know that his collection is now housed at the Smithsonian Institution. The book also has photographs of some of the new Columbarium described in recent years by Harasewych. The photographs are arranged in systematic order, and the mollusks are numbered and described in text grouped in pages throughout the book, sandwiched in between the photographs. Two plates on Muricidae are switched to numbers.

Pertinent remarks are added to the specific data. I found these interesting. Since Dr. Harasewych has studied, is studying, and hopefully will continue to study Busycon, I did look to see what he might have about the left-handed whelk. There is one plate depicting a right-handed Busycon carica and Busycon perversum, both specimens with the exaggerated ridge and somewhat mirroring each other. His discussion concerns the fact that mutants (or opposite opening specimens) occur from time to time but that such mutants cannot mate with the normal specimens. Therefore, he states that the Perverse Whelk, which is normally left-handed, is really the product of a "fortuitous encounter

between two mutant left-handed whelks." It is a mind-boggling thought to realize that the whole range of left-handed whelks got started in such a manner. Having looked through countless egg cases to find a right-handed perversum, or a left-handed Busycon plagosum, it seems a once in a lifetime event!

You will find the latest nomenclature employed, and other comments by Harasewych will expand your knowledge of the molluscan world.

NOTE: Dr. Abbott has kindly offered members of the Houston Conchology Society the opportunity to purchase this book through American Malacologists, P.O. Box 1192, Burlington, MA 01803, for a 20% discount. It can be autographed for you and will be sent postage free, I am told. Payment must be sent with the order.

Shells--Nature in Photography by R. Tucker Abbott. 202 pp., 160 color plates. Portland House, N.Y. $19.95. 11 x 13 in.

This second book of mollusks in photographs was advertised as having "unique views of shells and luscious collecting lagoons in the South Pacific." ..."16 page text is simpler and more for the beginner, including such subjects as the Life Span of Mollusks, the Homelands of Shells, Shells Among American Indians, Rare Shells, Fakes and Freaks, and Today's Great Shell Collections.

The book is exactly as stated above. A number of photographs of live mollusks are used. Several photographers included their best photos of mollusks to make this picture book beautiful. There are not many rare mollusks shown, but there is a fine photograph of the new Pleurotomaria charlestonensis in its habitat off South Carolina. You will recall that this new slit shell was described in recent issue of Nautilus. It was retrieved by a submarine used by researcher. Dr. Harasewych showed videos of doing this at a recent AMU meeting.

There is no attempt in the book to present mollusks in a systematic order. Instead, there are plates of shells from several regions of the world. Some of the photographs are immense! Information about the shells accompanies the photographs. I like this, but the information is not very complete. Some of the introductory plates for the regions do not match the area to be depicted. Often this plate will

be a blow-up of many beautiful shells in a family or a class or just repeats of a species that may have several designs. The book has some reminders of a huge calendar, but it is a feast of beautiful shells.

I thank Dr. Abbott for including the Houston Museum collection in his discussion of important museum collections. We are classed along with such museums as San Diego, Los Angeles, Gainesville, Florida, etc.

As usual, Dr. Abbott tied together many facts about mollusks that the shell collector wants to know. You learn something about the world's great collectors and early voyages for shells. There is information, brief but concise, about cameos and carvings, about pearls, about uses of shells for money and in ritual and religion, about rate of growth and sizes of shells. The features that I appreciated in the out-of-print Kingdom of the Seashell by Abbott are abbreviated, not all repeated, for this new book. Material has been updated and made available for a new generation of shellers.

Besides the remarks made above, we remind you that this book is much less expensive than the Harasewych book! Order it, autographed, from American Malacologists also. Postage is free.

Both books will catch the eye of a visitor to your home. I guarantee this.

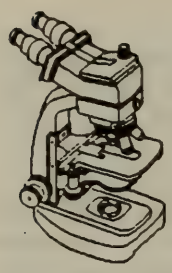
THE QUEEN

She sang a siren's song to me
Of happy faces having fun
Reflected palm trees in the sun
On island currents in the sea.

Her beauty matched the song she sang;
A glance at her would thrill my heart
And whisk me to a world apart
In exotic colors like meringue.

Enchanted with the dream she gives
I follow on a lifelong path
Bedecked with storm strewn aftermath.
The Queen Conch, in my heart, she lives.

By Jean Holman



UNDER THE MICROSCOPE

Self collectori

HOLOTYPE: DARWIN ALDER
By Jean Holman

There are many species of shell collectors. Ones that specialize in only a family or two, armchair collectors - the darling of collectors who want shells of only one color or one size. But the collector who truly delights in self-collecting is probably a descendent from the earliest manifestation of shell collectors. He has evolved since man first arrived on the scene and plucked the first shells from the shore keeping the prettiest for decoration.

The Self collectori loves finding, cleaning, displaying and treasuring even the homeliest of shells if there is a story behind its discovery. He revels in mist-shrouded mornings and treats ill weather as a signal for migration to the beach.

Our holotype specimen is Darwin Alder. His genuine love for shell collecting causes him to display all of the typical characteristics of the species. He is an avid collector of his own material and the haunts he finds most productive are St. Joseph Island, the scallop dumps in Florida, and various beaches in Florida which he visits at least once a year.

Darwin grew up in Utah where his family still resides. He moved to Texas in 1973 to attend the University of Texas in Austin. He has been actively shelling since then, although the first beach he recalls going to was in Oregon, beautiful with live sand dollars and crashing surf. It left a lasting impression and spurred him to take his first real vacation to the East Coast where he made his way down to Myrtle Beach, SC. While there he met a man collecting live olives who showed him how to capture the olives too! The man's wife became upset at her husband sharing the information because they were collecting them for use in making key chains and she thought Darwin might cut in on their action!

Darwin moved to Dallas, and then eventually to Houston to be only 50 miles from Galveston and 75 miles from Freeport. He currently works for a florist in the River Oaks area where he displays a few of his specimens on a shelf in his office. He also displays some examples of his fine needlepoint. The example which we have seen is the Florida State and Shells Picture, probably his favorite.

Darwin's maturation as Self collectori dates from 1981 and his first trip to St. Joseph Island. It was "perfect shelling weather," freezing, raining, bleak. Darwin found his first Epitonium mitchelli which he described as a handsome shell, although he didn't know what he had. Teresa Stelzig from the Corpus Christi club asked if he wanted to sell it and he knew at that point, although he had a shell he liked, her offer indicated he had a shell that had some worth to someone else. He told her that he wouldn't sell it, and it is the corner stone of the collection that he has amassed today.

On one of his early trips to St. Joseph Island, he ran into several members on a HCS field trip, his first exposure to our club. Joe Deering encouraged Darwin to come over and meet everyone, including Connie Boone and Dr. Pulley. While talking with Dr. Pulley, Darwin mentioned that he had an old, beat up Busycon in his car trunk which interested Dr. Pulley very much. Darwin had discovered the shell in Louisiana, and it was a form normally found only in Campeche or South Texas. As Dr. Pulley was looking over the shell, Joe Deering snapped his photograph holding the Busycon perversum. Darwin ended up giving the shell to him, and it is currently cataloged at the Houston Museum of Natural Science. The snapshot was eventually the one used in the Texas Concholgist in the memoriam to Dr. Pulley.

The scallop dumps in Florida have given Darwin the opportunity to collect deep water species that would not be easily available to him even diving for them. He has between 75 to 80 Scaphella junonia in relatively good condition found at the dumps! This is one of his favorite and most productive spots and where he scheduled the first field trip of the 1989-1990 year. How fortunate we are to have him as our Field Trip Vice-President -- a collector willing to share all of his favorite collecting spots! St. Joseph Island is the best place he has found for a variety of shells in Texas, where he has collected between 50 and 60 species!

On the field trip to St. Joseph Island in November, 1989, the area was deluged with monsoon-like weather that intimidated even the fishermen who boat over to the island daily. They stayed in the comparative comfort of the bait shop while Darwin, Lynn Blair and her son, ferried over eager to explore the potential of a deserted beach. As you can see, one of the characteristics of a Self collectori is an oblivious nature towards the weather.

Another characteristic is unflagging enthusiasm and energy in traveling to the beach. Darwin led the club trip to Belize in 1989, where he utilized every moment to shell in

an exotic location. Most members returned to relax a little before going back to work. Darwin immediately set out for FLORIDA!! He probably wondered why waste even a few hours before he had to report back to work!

The best find of shells he ever made was at Quintana Beach in January, 1987. He had to look for a new apartment that day, but he figured that also gave him a half a day to spend on the beach. He rushed down and found OVER 2,500 EPITONIUMS! What an incredible discovery! Second to that ranks the weekend that he found three A. mitchelli, or the time that he had live Tonna galea wash ashore and he acquired about 25 juveniles. But, as gratifying as these finds are, they have only whetted his desires.

Darwin's favorite shell is always "his next shell" and his goal is always "one more shell." It is this gusto, this rare unquenchable enthusiasm for collecting his own material that sets Darwin apart. His eyes sparkle and his entire demeanor radiates happiness whenever he talks about his "next trip" and what he expects to find there. Robert Louis Stevenson must have envied a Self collectori's joy when he said that "it is perhaps a more fortunate destiny to have a taste for collecting shells than to be born a millionaire" . . . and we know the holotype of who he had in mind!

S. collectori in his natural habitat.

TEXAS CONCHOLOGIST, Vol. XXVI, No. 2, January,1990

MONOGRAPH BY H. ODE

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Superfamily ACTEONACEA

Family ACTEONIDAE d'Orbigny, 1842

In this family the animals have an external strong shell, usually with a short spire and relatively large body whorl, ornamented by fine rows of small pits. In the N.W. Gulf of Mexico only the genera Acteon and Rictaxis are found.

Genus Acteon Montfort, 1810

Columella with a strong or weak fold, prominent spire and operculum. The suture of all species in the N.W. Gulf of Mexico is a narrow gutter. The species on the Texas-Louisiana shelf and their forms are poorly known. A much more complete study than I can make at present is necessary to clarify the relationships in this difficult group of gastropods.

Of some value in the identification is the development of the nucleus which differs considerably in shape and size in various species. Of less specific value are, in general, the shell shape and the thickness of the shell wall and ornamentation by spiral grooves. In fact, there are few species along the Texas coast that are more variable in shape than the two of the Texas species. Sketches of most of our material are included.

317. Acteon punctostriatus (C.B. Adams, 1840)

This common Texas species lives mainly in the inlet areas of the coast, but seldom penetrates the bays and is largely replaced offshore by another similar species. It is unfortunate that Abbott's discussion (1974) of both A. punctostriatus and A. candens gives the impression that A. candens is a shallow water species, while for A. punctostriatus a depth range of "low tide to 60 fms" is quoted. The material in the survey collections leads me to very different conclusion.

Acteon punctostriatus remains thin-walled until it reaches maturity. Then, instead of growing further in size, it begins to thicken the shell wall, by which time most specimens have become much more cylindrical in outline and are less inflated. These varying shell shapes (from the same population) are shown in figs 1a,b,c,d and e. In the HMNS survey collection, the species varies gradually in shape between figures 3887 and 3888 in Abbott (1974), and the more cylindrical the shape, the thicker the shell wall. Large, senile specimens develop a very thick inner lip within the aperture, which can reach, when extreme, a "toothlike" dimension.

There are, however, different species in our area. One of these I will denote as A. candens, Rehder, but I do not know whether it is the same as the species described by Rehder. The figure of A. candens by Abbott (1974, #3888) is, in my opinion, nothing else than a senile A. punctostriatus (similar to my figure 1b).

The difference between punctostriatus and candens resides mainly in the nucleus, the spire and the faint color patterns. It is possible that these differences are merely a consequence of oceanic versus coastal inlet environment, but I do not think that is true. A. punctostriatus has a more tightly wound body whorl so that of specimens of equal size (± 5mm), and having the same size body whorl, A. punctostriatus has one whorl more than A. candens. Fully grown A. punctostriatus, which in Texas can reach 7.5 mm but seldom does, has about 5.5 - 6.5 whorls, while fully grown candens has no more than 4.5 - 5 whorls. The latter never reaches in Texas the size quoted by Abbott (1974). The most obvious difference is the nucleus. That of A. punctostriatus is smaller than that of A. candens and the early whorls of its teleoconch are more tabular. A. candens is a bit glossier and its nucleus somewhat pitted. There is also a color difference: A. punctostriatus in Texas is very seldom suffused with brown (except a very small form, see later), but is mostly slightly grayish yellow with rarely some darker, but still very faint flecks. In contrast, A. candens is very faintly brownish colored and often has a color pattern of three faint brown bands, also mentioned in the original description by Rehder (1939). In the genotype A. tornatilis from Europe those bands are broad and well developed. A. candens is thicker shelled at an earlier age than A. punctostriatus. A. candens and A. punctostriatus are often confusingly similar and are difficult to separate especially in immature or

worn material. Surprisingly. both species have a close relative on the Texas- Louisiana Shelf.

Records HMNS: 24 lots, of which 6 contain live-collected material.
Depth range: 0-12 fms; alive 0-10 fms.
Geographical range: "Cape Cod to the Florida Keys to Texas and to Argentina, Bermuda" (Abbott, 1974).
Maximum size: 7.5 mm.

318. Acteon punctostriatus, endemic Texas form.

In Matagorda Bay and Christmas Bay (Galveston West Bay system) lives a very small morph of A. punctostriatus that so far has escaped detection. Like other species of the genus it is rather variable in shape but differs in several respects from the regular punctostriatus. Full-grown it is rather slender and much smaller than A. punctostriatus and often strongly shouldered. When fresh, many specimens are colored a deep brown with a whitish band just below the suture, and an indistinct band halfway down the body whorl (see fig.2). Most specimens are about 2 mm in size and have a rather blunt and tabulated spire.

In spite of its color, this is not related to A. candens but represents an endemic form adapted to the changing conditions of the Texas and Louisiana coastal bays. There is little doubt that it was derived from A. punctostriatus, to which it here is assigned. It has never been collected together with the normal form of punctostriatus. This is a true ecological morph, and can be considered an extreme form of figure 1a. It is surprisingly widespread in Matagorda Bay. Several live-collected samples were also dredged from Christmas Bay, ans a single lot of a very small specimens, presumably this species, comes from Timbalier Bay, La.

Records HMNS: 26 lots, of which 12 contain live-collected material.
Depth range: 0-1.5 fms; alive 0-1.5 fms.
Maximum size: 2.8 mm, but most specimens under 2 mm.
Geographical range: Unknown.

319. Acteon candens Rehder, 1939

This the common offshore Acteon on the shallower parts of the continental shelf and seldom enters the bays. In spite of its widespread distribution, it is surprising that hardly any live material was encountered during the survey. Almost all our material comes from the sandy and muddy bottoms off the Texas coast. Most of

it is immature and looks old and worn. Also in the mudlump fauna. Figure 3 shows a three-banded shell in which the color is grossly over-emphasized. The differences with A. punctostriatus have been discussed above. Juveniles of A. candens are somewhat more bulbous and have a somewhat flattened and pitted nucleus which is larger and blunter than in juveniles of A. punctostriatus of the same age. Along the Port Aransas and South Padre Island causeways a few old, worn specimens have been collected. These are undoubtedly Pleistocene fossils. Rehder (1939) has suggested a possible relationship with the fossil A. chipolanus Dall, 1896 (Trans. Wagner Free Inst. Sci., vol.3, pt.6, p.1632, pl.59, fig 11, 1896). Perhaps that species still lives in a Louisiana bay and will be discussed next.

Records HMNS: 42 lots, of which 3 contain fresh juveniles.
Depth range: 0-27 fms, alive 7-11 fms off Galveston.
Geographical range: "North Carolina to Southeast Florida and Cuba" (Abbott, 1974).
Maximum size: 6.1 mm.

320. Acteon candens (large nucleus)

This massively developed thick shelled form appears different from the previous species. It is here considered to be a form of candens but differs from that species in having a lower spire, a very large, flat nucleus and a thick-walled shell. One lot of two live-dredged specimens from Timbalier Bay, La.,is in outward form exactly like all the other lots of it, but differs in color and surface sculpture. The color is straw yellow and its surface is scaly and rough with well-developed growth ridges. The other material of this form, obtained offshore, is shiny and smooth, but exactly the same in form: large nucleus and depressed spire.

Only 2 lots come from the algal reefs, all others (except one from Timbalier Bay) from sandy bottoms of Galveston and Louisiana. Also in the mudlump fauna. Figured in figs. 4a,b,c.

Records HMNS: 24 lots, one alive at 8 ft in Timbalier Bay.
Depth range: except for one lot, 16-75 fms.
Geographical range: unknown.
Maximum size: 5.6mm.

321. Acteon sp. indet. A

A single lot of a small, thin-shelled species was obtained at 55 fms off Cameron, La. Its columellar plica is quite subdued, there are many spiral grooves on the body whorl, and its shape is squarish with a blunt spire. More material is needed for identification. Figure 5 presents a sketch of it.

Records HMNS: 1 lot, no live material.
Depth range: 55 fms.
Geographical range: unknown.
Maximum size 2.2 mm.

322. Acteon sp. indet. B

In deep water on mud bottoms off the Texas coast, a long slender species is obtained that at first glance could be mistaken for a species in the genus Rictaxis (see figure 6). However, the structure of the columella is as in Acteon and does not possess the truncation required in Rictaxis. Our species is probably closely related to the Panamic A. castus (Hinds).

There is a very minute fold on the columella and a thinning of the columella towards the lower lip so that this species approaches Rictaxis. The nucleus is somewhat bulbous, but fairly small. Also in the mudlump fauna.

Records HMNS: 14 lots, no live-collected material.
Depth range: 50-450 fms.
Geographical range: Unknown.
Maximum size: 6.0 mm.

Genus Rictaxis Dall, 1871

The structure of the columella is different from that in Acteon. There is no fold and the lower part of the pillar is truncate.

323. Rictaxis sp. indet. A

There is only a single lot in the HMNS survey collection, obtained by dredging on Stetson Bank. The single specimen is unfortunately in poor condition and better material is needed for a definite identification. The entire body whorl is deeply grooved by pitted spirals. (See fig. 7).

Records HMNS: 1 lot, no live material.
Depth range: ± 20 fms.
Geographical range: Unknown.
Maximum size; 5.3 mm.

(To be continued)

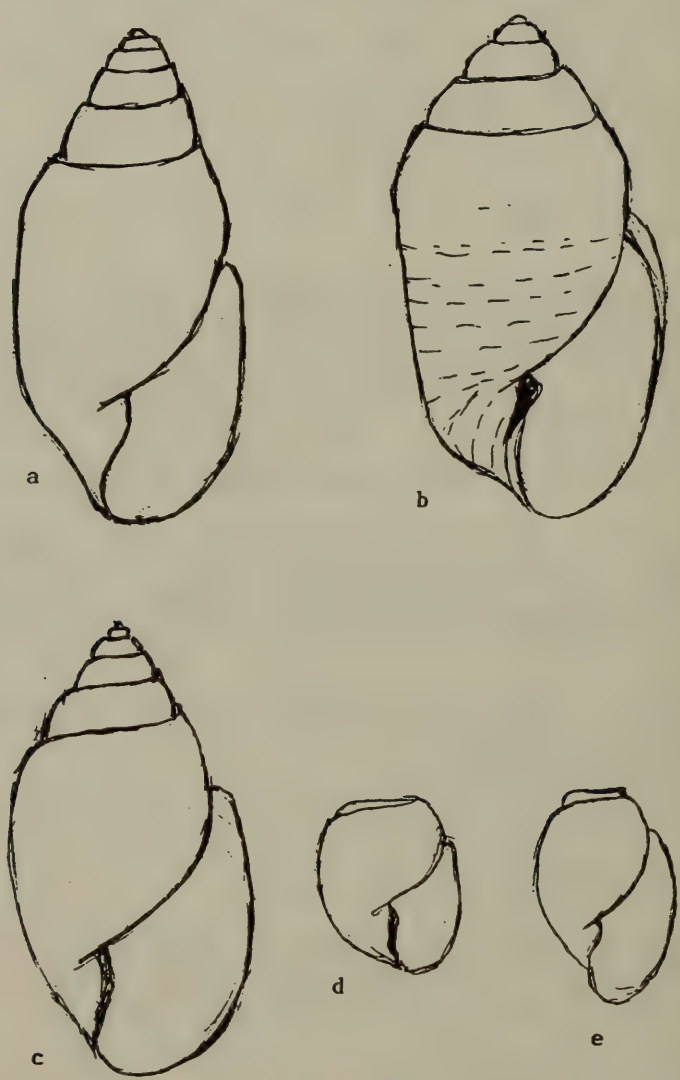


Fig. 1. Acteon punctostriatus a,b and c are three forms from the same population in Aransas Bay. e, and d are two juveniles from Matagorda Beach.

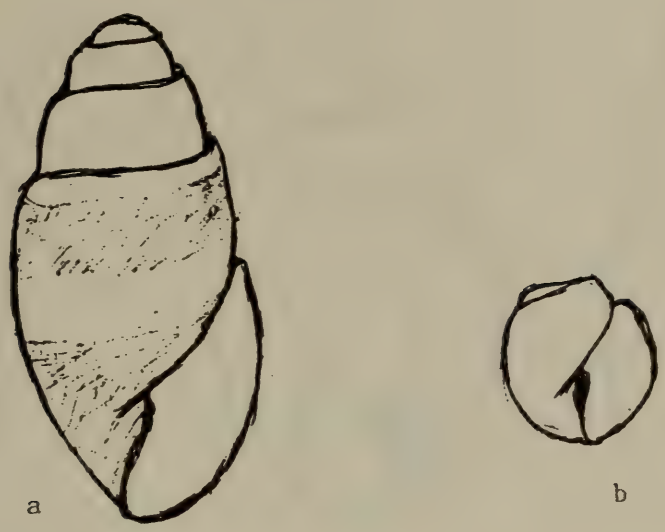


Fig. 2. Acteon punctostriatus a) live collected specimen from Matagorda Bay (+2.5 mm) b) juvenile from Matagorda Bay (0.6 mm).

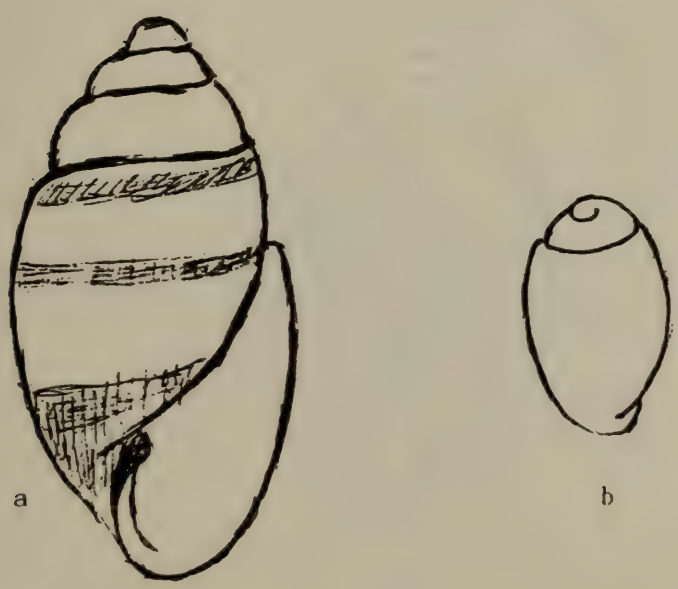


Fig. 3. Acteon candens a) from 26 fms off Freeport (4.1 mm) b) juvenile from Aransas Pass Causeway (1.2 mm).

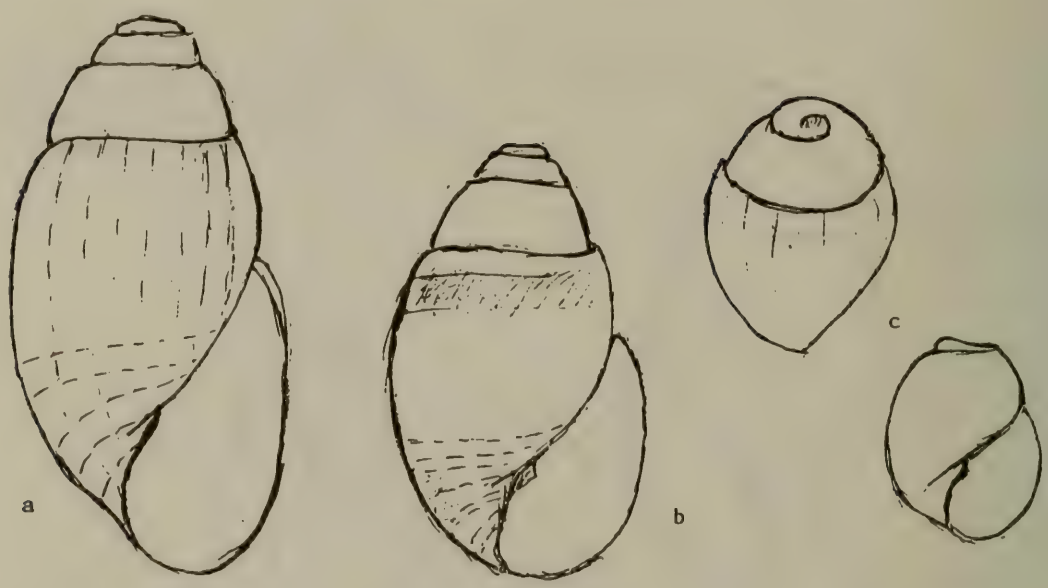


Fig. 4. Acteon candens (large nucleus) a) live specimen from Timbalier Bay, Louisiana (5.3 mm) b) specimen from off Galveston (4.3 mm) c) two juveniles from off Galveston (1.5 mm).

Fig. 5. Acteon sp. indet. A Specimens from 55 fms off Cameron, Louisiana (2.2 mm).

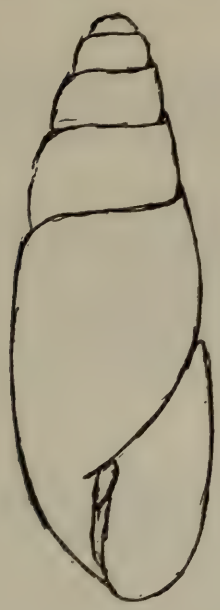


Fig. 6. Acteon sp. indet. B Specimen from 50 fms off Galveston (6 mm).

Fig. 7. Rictaxis sp. indet. A Specimen from Stetson Bank (8.3 mm).

AN EXCURSION TO THE FABLED LAND OF FLORIDA

By NIWRAD TNARG REDLA

The late morning sun glinted off a blue vehicle bearing Texas tags, moving east along IH 10. "Call out all the forces!", came the cry from Neptune, as it became crystal clear to him what was happening. It could only mean one thing - an invasion of the beaches of Florida and its nearby shallow waters. Neptune sent out a red alert to all the denizens of the shore as the assault resumed on the underwater inhabitants.

The inhabitant of the van, a short, plump, cover-all clad Invader, launches a supreme effort against the mollusks of Florida. He is clad various ways in strange armor: if not cover-alls, then shorts, with his hands ending in nets, flashlights, banners, bags or other equipment. Strains of The Messiah or a strange Gregorianesque chant: pleuroploca-giganteaamaeamitchellistrombuscostatusepitoiumangulatummur-exfulvescenscharoniavaregata...emerges from the van. It is not a monk or affiliate of a religious order, but the Invader speaking a strange form of Latin. What could it mean?

Our Invader has arrived at the Florida Turnpike which will lead him south to the fabled city of Miami, gateway to the Florida Keys and some of the best shelling in Florida. Dania is the first stop our Adventurer makes on his way to the Keys.

Phoebus raises his brilliant disk skyward as our sheller awakens and begins his sojourn. The bridge and causeway near Card Sound are the first places of battle. Our Invader collects Nerita peloronta, Marginella apicina, Cerithium atratum and Astraea phoebia, to name a few. He is truly an apparition with his net, collecting bag, and oiled skin.

Along the causeway to Key Largo, Melongena corona fall prey to the sheller. At a fishing camp on Key Largo, our Invader requests permission for more prey, which he is granted and adds some Tectarius muricatus and some chitons to his haul.

The appetite of our Searcher has just been whetted by the sacrificial victims. He diligently searches the shallow water and shores of Whale Harbor, Indian Key Fill, West Summerland Key, Lignumvitae Key Boat Ramp, Ohio Missouri Key and Channel, Cudjoe Key, Caloosa Cove Marina, Marathon, Cocoa Plum Rd. and Key West.

West Summerland Key, Lignumvitae Key Boat Ramp and Ohio Missouri Channel are the most productive locations. Our

Invader finds: Pleuroploca gigantea, Strombus raninus, Codakia orbicularis, Linga pennsylvanica, Thais deltoidea, Astraea phoebia, Cerithium muscarum, Colubraria sp. and a host of others.

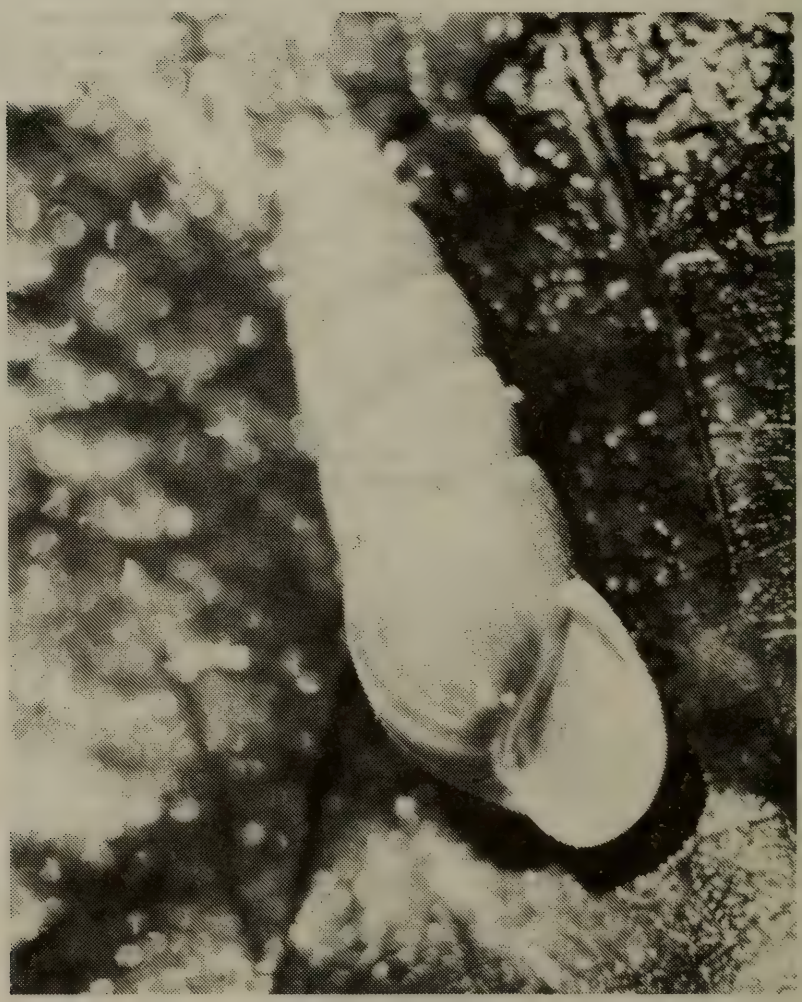
The noble Searcher next headed toward John Lloyd State Park, where he found over 45 different species in the dredged materials. That was probably his single best location. He would scoop up a netfull of material which weighed about 10 pounds. He must have done this over 10 times which meant he processed over one hundred pounds of materials, but it was totally worth it.

Our sheller finished out this trip with visits to Sanibel, Marco Island, Tampa Bay, Dunedin and Caladesi Island. Time was running out, so our sheller had little time to spend at any one location.

The combined forces of Neptune, Apollo and Zeus conspired to halt him in his tracks, but aside from a minor sunburn and a few minor scrapes, our sheller made it home with a bounty of over 200 different species, eagerly awaiting his next foray into the fabled land of Florida or parts unknown.

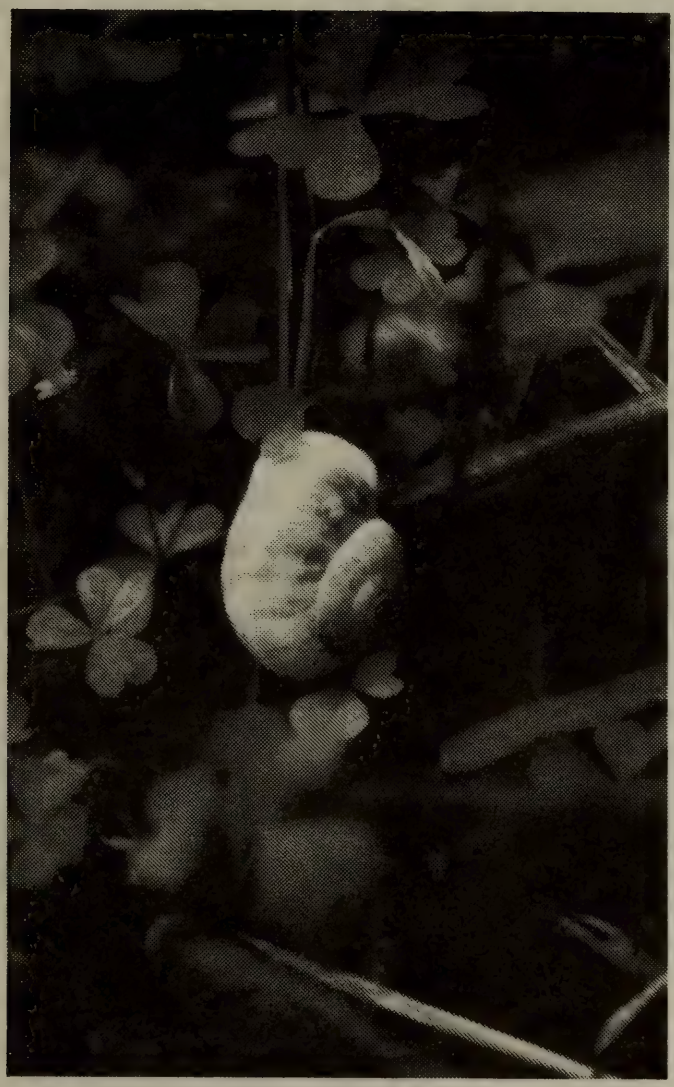
HAPPY SNAILS TO YOU!

THREE LAND SNAILS INTRODUCED TO TEXAS:
Photo Story Presented
By Raymond Neck



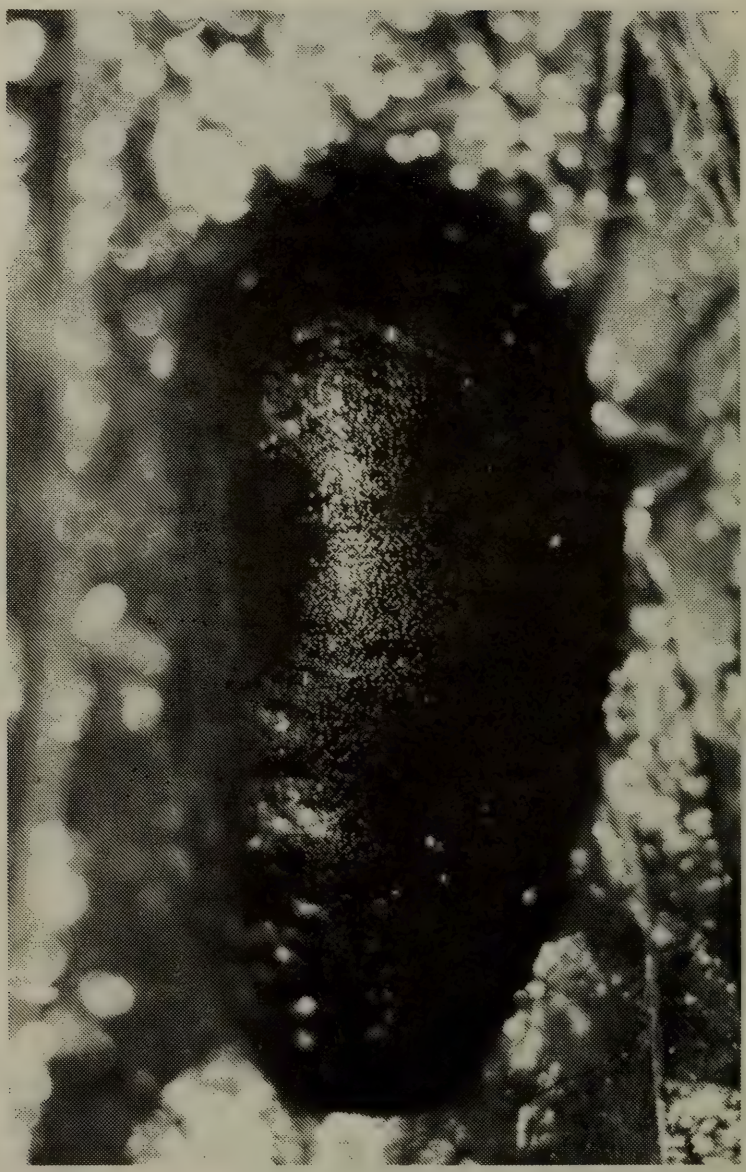
Rumina decollata (Linnaeus, 1758)

The decollate snail is native to land areas surrounding the Mediterranean. In Texas this species is most abundant in central and southcentral portions of the state, although it is known from almost all large cities.



Otala lactea Muller, 1774

The milk smail is related to true escargot and is native to Spain and northern Africa. Texas populations are known from central and coastal regions of the state.



Angustipes ameghini Gambetta, 1923

The black velvet slug is native to Paragua. Introduced populations are known from southern Texas.

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1989-1990

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TEXAS CONCHOLOGIST, Vol. XXVI , No. 2, January, 1990

TABLE OF CONTENTS

NON-RANDOM PLANKTONIC DISPERSAL:
ONE KEY TO MARINE MOLLUSCAN SUCCESS
By Richard M. Yuill 33

NEW RECORDS OF ANODONTA SUBORBICULATA SAY
FROM TEXAS
By Charles M. Mather, Joseph A.M. Bergmann,
and Raymond W. Neck 41

SEARCH AND SEIZURE
Two New Coffee Table Books
By Constance E. Boone 44

THE QUEEN
By Jean Holman 47

UNDER THE MICROSCOPE
Self collectori
Holotype: Darwin Alder
By Jean Holman 48

DISTRIBUTION AND RECORDS OF THE
MARINE MOLLUSCA IN THE NORTHWEST
GULF OF MEXICO (A Continuing Monograph:
Superfamily ACTEONACEA)
By Helmer Ode' 51

AN EXCURSION TO THE FABLED LAND
OF FLORIDA
by Niwrad Tnarg Redla 60

A CARTOON
"Happy Snails to You"
By Bruce Snider 61

PHOTO ESSAY
Three Land Snails Introduced to Texas:
By Raymond Neck 62

Texas CONCHOLOGIST

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The TEXAS CONCHOLOGIST accepts contributions for publication from amateurs, students, and professionals, subject to approval by the Editor. Manuscripts should be typed, double spaced and should be in the hands of the Editor the first day of the month preceding publication dates. Photos accompanying articles are welcomed.

LIFE IN A BUSYCON BOWL

By Jan Hobbs

During October 1988, Lonnie and I were walking on the beach at Quintana just as the tide was turning to come back in. We found exposed in the sand, slightly above the tide line, three live pear whelks (Busycon spiratum plagosum), which I decided to bring home.

I had intentions of boiling them out of their shells, but I procrastinated for some time. I kept them in the beach water in which I had brought them home. I did separate them into different, shallow containers, but none of the animals were completely covered in water and none of the containers had lids, so evaporation was changing the salinity of the water daily. After two whole weeks of no food, no fresh water (and little of the original water), they were still moving about freely.

Lonnie convinced me that they deserved a chance to live after all that, so we bought a small aquarium and gave them a home. I had no idea what kind of water to prepare, so we took the simple approach and drove down to the beach for a couple of buckets of beach water. I chose to put one of the three whelks back into the sea and hope that he survived. I had a bucket full of beautiful, white Florida sand, so I put it in the bottom of the tank. We put in the little filter/aerator that came with the aquarium and left it at that.

Would you believe that after more than a year and eight months, the whelks are still alive and growing? We have had much pleasure in observing them. I hoped that one of them might lay some eggs in the spring, but thus far they have disappointed me.

We drive down to the beach every two or three weeks for fresh sea water, and I completely change the water in the tank. Only one time have we had a serious problem with water quality. During that trip to the beach, the wave action was pretty rough, so Lonnie dipped the water out of the ship channel between the jetties at Quintana. There was lots of boat traffic that day, and we wound up with oil or something in the water. When I put it in with the shells, they soon climbed up the glass walls of the aquarium and stuck their siphons up into the air. Then they became very lethargic, and it was apparent that something was wrong with them. I had to place the whelks back into the old water until we could return to the Gulf for more sea water.

We have always returned to Quintana for water, and have only given the whelks water from the place where they were found. I do nothing else to care for the water like people do for fish in aquariums.

When first placed in the aquarium, the whelks crawled around and around the tank like a caged tiger measuring its enclosure. They climbed up and down the glass walls of the tank. They still climb up regularly and stick their siphons out of the water for varying lengths of time. It would appear that they are breathing air. The majority of the time, they are buried under the sand.

All I have fed the whelks is dead shrimp (cut into pieces) and scallop muscle. The whelks seem content with that. We have watched as their siphons detected the "smell" of food in the area, and as the shells "popped up" out of the sand. Sometimes we can see some action as they are eating, but mostly they appear to be sitting very still over the piece of food. When they move aside, there is only a little bit of debris and a bunch of slime left behind. Then we have watched as they buried themselves again after eating.

We have photographed the Busycons at intervals, and have kept a record of how much shell has been added since we collected them. The larger specimen is now 3 29/32" long, having grown very nearly one inch in length. During a year and eight months, he has added 2 12/32" of new shell along the perimeter at the shoulder.

The smaller whelk measures 3 14/32" long, having added a little over 1 6/32" to his length. He has added a whopping 3 8/32" additional shell at the shoulder. Each time the whelks come back out of the sand, we can tell they have added some more shell. We have been enthralled with observing them.

We tried once, only fairly successfully, to videotape them as they ate. They were like children. Once we got the camera trained on them, they would not perform! It was two hours before they paid any attention to that food.

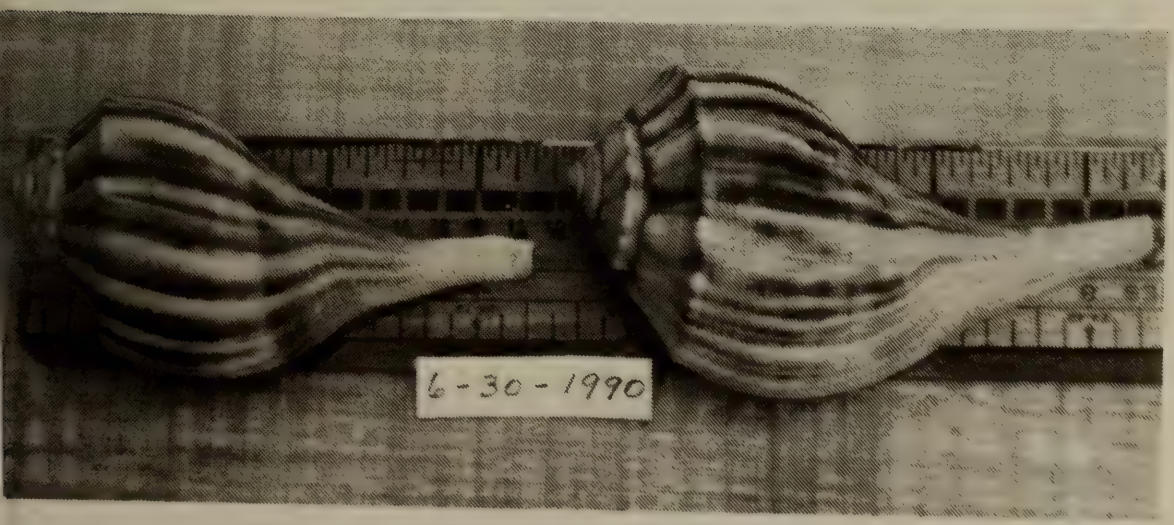
In June, 1989, we found a small lightning whelk (B. perversum) which we added to our tank. His outer lip was damaged pretty badly. In fact, his whole shell was a history of a hard life. In over a year, this whelk has grown only a very small amount, barely adding enough shell to the edge to make a smooth lip again.

The same day we found the lightning whelk, I picked up a couple of small, live arcs that appeared to be healthy. I was looking for something live that the whelks might eat. After the arcs had been in the aquarium about four months, I

discovered the bigger pear whelk resting his siphonal canal on the gaping, empty valves of an arc. The next day, one of the whelks ate the other arc.

If any reader is studying the whelk family, particularly the pear whelk, we would be happy to share our observations. I have made fairly extensive notes of our captives' activities. Also, if any reader has suggestions regarding experiments with food or such, I would be glad to give it a try.

Two Busycon spiratum plagosum, collected from Quintana, Texas, after one year and eight months growth in captivity. Arrows indicate the position of the outer lip at time of acquisition.



Side view of captive pear whelks, June 30, 1990.

SHELLING IN TEXAS By Darwin Alder

1. The Tip of Texas

I have divided Texas into 10 major and somewhat arbitrary shelling regions. This is the first of 10 articles about these regions.

The Tip of Texas is that portion which begins at the Port Mansfield Cut of Padre Island and extends south to the mouth of the Rio Grande. It includes the southern section of the Laguna Madre, South Padre Island, Port Isabel, Boca Chica, Brazos de Santiago Jetty, South Padre Island Jetty, and the mouth of the Rio Grande. This area has the best potential for finding some of the mollusks endemic to the tropical waters of the southern Gulf of Mexico.

To get there from Houston, take US 59 south to Victoria and connect with US 77 which continues south via Refugio and ends up in Brownsville. Once you get in the Valley, SH 100 leads to Port Isabel and then, via the Queen Isabella causeway, to South Padre Island. In South Padre, you may go south to the Jetty or north to the State Park. SH 4 is the southernmost access to the beach in Texas. It goes out of Brownsville about 25 miles until it comes to the Gulf. If you go north about 5 miles you will come to the Brazos de Santiago Jetty. If you go south about 2 miles, you will come to the mouth of the Rio Grande.

There is a good representation of the molluscan fauna of Texas in this region. It is about 350 south of Houston and is a 7-8 hour trip, depending on how you travel. One note: on the way back from Brownsville, before Kingsville, there is a border station. They may or may not check your vehicle, depending on their mood.

Some of the species that can be found in this region are: *Hexaplex fulvescens*, *Oliva sayana*, *Terebra taurina*, *Fasciolaria lilium*, *Architectonica nobilis*, *Lyropecten nodosa*, *Tellina alternata*, *Polinices duplicatus*, *Pisania tincta* and *Sinum perspectivum*, to name a few.

SEARCH AND SEIZURE By Constance Boone

TWO NEW MUSEUM EXHIBITS

Two temporary exhibits at the Houston Museum of Natural Science will interest shell club members. One, titled Collector's Legacy, presents four early Houston collectors who helped found the museum. The other, titled "A Gift From a Friend: Sailor's Valentines from the Strong Museum", is an exhibition of the shell mosaics that were popular in the mid-1830s to about 1920 when sailors visited the Caribbean.

Collector's Legacy explores the collections presented to the museum by Henry P. Attwater, for whom the now endangered Prairie Chicken is named; Sigmund Westheimer, philanthropist who had an interest in building the museum with natural curiosities and who purchased collections to do so; J.T. Milsaps, a Salvation Army officer who travelled to the Philippines and Hawaii and amassed many natural history objects; and A.T. McDonald, a successful oilman and rancher whose main interest was in North American Indian artifacts, including some from Spiro Mound and Plains Indian beadwork.

This exhibit opened March 31 and will remain in Jones Gallery until October 7.

Each of the collectors provided shells to the museum. Some will be featured in the exhibit. There will be an opening panel discussing early museums and employing old artifacts related to the Houston Museum's history, as well as displaying early books showing collecting and beginning museums around the world.

A final room of the exhibit will talk about collecting today. Some of the current laws and prohibitions of collecting shells will be discussed. The guide to collecting shells prepared by the American Malacological Union will be presented. There will be a case of shells which are endangered in the world and shells that cannot be collected in certain areas of the world. This room, of course, will examine collecting of other natural history specimens.

The exhibit on Sailors' Valentines opened on May 19 and will continue through July 14. Sailors' valentines were made in the West Indies from the middle of the ninteenth century to the early twentieth century. They were, traditionally, a pair of octagonal shadow boxes, outlined with wooden frames, covered with glass and hinged so that they would open like a book. Within the boxes were intricately designed floral arrangements and patterns of shells from the West Indies. Sentiments were sometimes added such as "A Gift From a

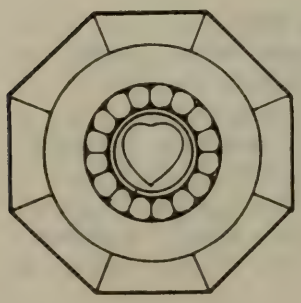
Friend", "Think of Me", "For My Mother", etc. The mottoes were always in English which suggests the boxes were made by English-speaking sailors (if sailors actually made them originally) and natives preparing them for sailors to take home to loved ones.

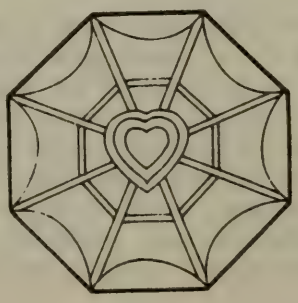
It is thought the design derived from the elaborate cabinets of shell collectors of the eighteenth century. Many think the sailors' valentines known today were made in Barbados where there was a thriving establishment which produced all kinds of shellwork and fancywork and which sold natural curiosities. Relics from the sea provided Victorian Americans with an endless source of romantic fascination as well as an important commication link with the world beyond their shores. Many Americans were whalers in those days and made their living from the sea. Sailors' valentines were treasured objects on the walls of Victorian homes.

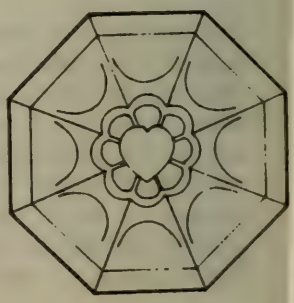
True to the spirit of the early Silor's Valentines, there were four contemporary octagonal boxes filled by club members during the first week of the exhibit. Bill Oakes labored to make the hinged boxes used during the demonstrations. There were handouts on making the valentines for visitors.

Demonstrations were handled by Helen Eberspacher, Mary Martin, Darwin Alder, Lynn Blair, Elizabeth Smith, Luana Huggins, Helen Cornellisson, Natalie Howard and Constance Boone. Emily Oakes provided some of the tiny Caribbean shells we used. Other shells were given by Natalie Howard, Helen Eberspacher and Darwin Alder.

Several years ago I received a phone call from a curator at the Strong Museum located in Rochester, New York. The museum had a collection of some 50 of the Sailors' Valentines. The curator wanted to know if the American Malacological Union had any information about the valentines which could be helpful in preparing an exhibit for that museum. I asked if the exhibit would become a travelling one and was told the curator would let me know. Eventually, the Houston Museum of Natural Science was able to get the exhibit for this year. It has been on tour and presented mostly in maritime museums.







MONOGRAPH

BY H. ODE'

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Superfamily ACTEONACEA d'Orbigny, 1842

Family RINGICULIDAE Philippi, 1853

Minute, rather inflated, almost spherical white shells, which superficially resemble miniature Phalium. There are at least two columellar plicae. This family is placed by Abbott and Dance (Compendium of Seashells) in the superfamily RINGICULACEA. The Panamic faunal province Ringicula is replaced by the genus Microglyphis which resembles Ringicula in several respects., such as the strongly developed plicae.

Genus Ringicula Deshayes, 1838

Strongly developed apertural outer lip and well developed columellar plicae and often a parietal tooth. On the Texas shelf, two species.

324. Ringicula semistriata d'Orbigny, 1842

A small, rather thick-shelled, spherical species with a clearly developed plica above the two plicae on the columella, which is missing in immature specimens. The base is grooved by about 4-6 narrow grooves. Mature specimens have about 3 1/2 to 4 whorls. The nucleus is small, smooth and flat. The outer lip of the mature shell is very strongly developed and extra thickened in the middle, forming what Abbott calls a "tooth". R. semistriata is smaller, thicker shelled and more globose than the other species. Found all over the Texas-Louisiana shelf on sandy bottoms; also in the mudlump fauna (see Fig. 1).

Records HMNS Survey Collection: 31 lots, no live material, but some fresh looking shells.
Depth range: 23-152 fms, but mostly between 23-75 fms. One lot at 152 fms.
Geographical range: "North Carolina to Southeast Florida and the West Indies." (Abbott, 1974).
Maximum size: 2.2 mm.

325. Ringicula nitida Verrill, 1873

This somewhat larger species resembles R. semistriata closely, but differs in several respects: 1) The spiral grooving on the base is finer (10-16 grooves) and developed higher on the whorl than is R. semistriata. 2) It is a larger and thinner shelled species. 3) The outer lip is less heavily developed than is R. semistriata. 4) The third plica on the parietal wall is not or hardly developed in mature specimens. 5) Its habitat is in deeper water than is R. semistriata. This species has been taken in deeper water along the Texas and Louisiana coast. Also in the mudlump fauna.

Records HMNS Survey Collection: 11 lots, no live material.
Depth range: 60-167 fms.
Geographical range: "Maine to the Gulf of Mexico; Bermuda" (Abbott, 1974).
Maximum size: 3.9 mm.

Family SCAPHANDRIDAE Sars, 1878

SCAPHANDRIDAE is used here to include acteocinids and cylichnids which in the past were classified in their own families (ACTEOCINIDAE and CYLICHNIDAE). Dall (1899) in the Blake Report uses TORNATINIDAE for most smaller species. Modern research has shown that many of the groups of cephalaspids are more closely related to each other than could be expected on the basis of external shell morphology (See Gosliner, 1979; and Mikkelsen and Mikkelsen, 1984). Nowadays, they are placed in the same genus forms with clearly exposed hyperstrophic protoconch and forms which are involute, i.e. the last whorl envelopes the previous ones completely. Thus, the latter present a completely different aspect and in the past were classified separately. Their close relationship is well supported by the study of radulae and gizzard plates. A clear and condensed statement may be found in Mikkelsen (1985) in this publication.

Most of the material of the genera Acteocina Gray and Tornatina A. Adams of the Survey Collection has already been expertly discussed by P. Mikkelsen to whose interpretation I can add little. Here I will merely restate the results of her work and report it in the same form as was done for the families already treated. Mention will be made of material not identified by Mikkelsen.

Sources:

Wells, H.W. and M.J. Wells. 1962. Nautilus vol. 75(3): 87-93.
Gosliner, T.M. 1979. Nautilus vol.92 (2-3): 85-92.
Mikkelsen, P.S. and P.M. Mikkelsen. 1984. Veliger vol. 27 (2): 164-192.
Mikkelsen, P.M. 1985. Tex. Conch. vol.21(2): 62-72.

Mikkelsen, P.M. and P.S. Mikkelsen. 1987. Nautilus vol. 10 (2): 51-58.

Genus Acteocina Gray, 1847

This genus is defined by Mikkelsen (1985) as follows: Shell with exposed or involute spire; with at least one columellar fold. Lateral radular teeth, with one row of denticles, often on an expanded "wing". Gizzard plates consisting of one deltoid, unpaired plate and two smaller, nonidentical paired plates. In the material Mikkelsen has identified for the museum, no less than six different species are present. I propose here to use Cylichnella as a subgeneric designation for those acteocinids which have an involute spire and a double columellar fold.

Utriculastra Thiele, 1925 is a full synonym of Acteocina Gray, 1847.

326. Acteocina canaliculata (Say, 1826)

This widespread coastal bay and inlet species is common along the Texas-Louisianna coast. It can be collected alive on the intertidal mudflats at San Luis Pass and Port Aransas and lives in all coastal bays from South Padre Island to Timbalier Bay, Louisiana.

Mikkelsen (1985) described it as thick-shelled, somewhat pyriform, with rounded shoulder and a lightly impressed subsutural band. Offshore it is replaced by the closely similar A. candei. (for differences, see A. candei).

Specimens of A. canaliculata obtained from offshore locations (Pleistocene beach ridges south of Freeport, Heald Bank and Stetson Bank) are probably Pleistocene in age and lived at those locations at lower sea level stages. Most of those specimens are extremely worn and many cannot be identified with certainty.

In several lots, the spires of the shell (live-collected) are coated with a black substance whose origin is unknown to me. Most likely it is a bacterial deposit. Several species of gastropods in our area exhibit such deposits (terebras, some rissoids).

Juvenile specimens are often sharply shouldered. In fully grown material, the apical angle is quite variable. Sometimes the body whorl descends rapidly making the spire tabular and the apical angle relatively small.

Records HMNS Survey Collection: 53 lots of which 23 contain live material.

Depth range: 0-27 fms; alive 0-2 fms.
Geographical range: "Nova Scotia to Florida, Texas and the West Indies" (Abbott, 1974).
Maximum size: 5.4 mm.

327. Acteocina candei (d'Orbigny, 1841)

Very similar to canaliculata, but different in several respects (see Mikkelsen, 1985): 1) protoconch somewhat larger; 2) shell shape more uniformly cylindrical; 3) spire height in general somewhat greater; 4) subsutural band strongly impressed with distinct axial ribbing; 5) maximum size in Texas much smaller than that of canaliculata.

Overall, A. canaliculata, the bay species, is a more solidly developed shell, as is often the case in Texas, than A. candei, the open ocean species. There is also a difference between the radula of each species, first mentioned by Wells and Wells. Records for both species, as given in the regional literature for Texas, are quite mixed because these species have often been confused. It is now certain from the many trustworthy data, that each species lives in an entirely different habitat. In our area, A. candei is common to offshore waters, especially in the Galveston-Freeport area. Specimens can be collected in Aransas Bay, but are no doubt fossil.

Records HMNS Survey Collection: 36 lots of which 3 contain live-collected material.
Depth range: 0-24 fms; alive 8-23 fms.
Geographical range: "Widespread throughout the Caribbean and overlaps the range of A. canaliculata from Cape Hatteras to the Texas Coast," (Mikkelsen, 1985).
Maximum size: 3.6 mm.

328. Acteocina recta (d'Orbigny, 1941)

This small species is fairly common on the offshore shelf off Galveston and Freeport, but also has been collected off Port Isabel (South Texas), Port Aransas and Timbalier Island, Louisiana.

Mikkelsen (1985) has characterized it well as: "thin walled, translucent, cylindrical with nearly parallel sides and finely striate throughout its length." In her characterization it is important to note: "shoulder with two distinct keels: one adjacent to the suture, the other at the shoulder; the two keels separated by a trough." I mention this here because there is an Eastern Pacific species A. carinata (Carpenter, 1857) "with a double carina at the shoulder" (see Keen,1971).

A. recta is a much smaller species than the previous ones. In the past, I have reported several lots as Retusa sp. undet. A (Ode', Tex. Conch. vol 9, p.70, 1973). It is also found in the mudlump fauna of the Mississippi delta. In view of its widespread occurrence, it is surprising that Abbott does not mention it. One small correction should be made to Mikkelsen (1985). She stated average length 2 mm. For our material, this should be approximately 1.4 mm.

Records HMNS Survey Collection: 39 lots of which two contain live-collected material.
Depth range: 8-70 fms; alive 20-23 fms.
Geographical range: "Ranges from central eastern Florida to Texas and throughout the Caribbean to southeastern Brazil," (Mikkelsen, 1985).
Maximum size: 1.8 mm.

329. Acteocina bullata Kiener, 1834

This species was reported as "species J" by MIkkelsen (1985), awaiting confirmation of the above identification by inspection of the type material. So far this material has not been located. The material at hand, which includes some specimens in addition to those Mikkelsen has inspected and identified, resembles exactly the figure of Retusa bullata figured by Warmke and Abbott (1961), pl. 27, fig. f. All our material derives from the South Texas coast, south of Port Aransas in fairly shallow water.

A. bullata is one of the largest members of the genus in our area, but does not reach the reported size of 9 mm cited by Mikkelsen (1985). The species differs further from all other species in our area in having a direct developing protoconch in contrast to a planktonic type in the other species. Remarkable is the sequence of dark and light vitreous growth increments. Shells of bullata thus appear somewhat banded along the growth lines.

Records HMNS Survey Collection: 5 lots, no live-collected.
Depth range: 6-21 fm.
Geographical range: "Florida Keys, South Texas, the Caribbean and Central America," (Mikkelsen, 1985).
Maximum size: 5.0 mm.

330. Acteocina sp. indet A.

This species was reported by Mikkelsen (1985) as "species G." It is a thin-walled, cylindrical form, with a horizontal subsutural band. Incised spiral lines are inconsistently recorded. Little is known

about it, but Mikkelsen states that it is found frequently enough to warrant continued separation. I believe that Mikkelsen is correct when she surmises that ultimately this form will turn out to be a morph of A. candei.

Records HMNS Survey Collection: 2 lots, no live material (Galveston, and the other lot from Hospital Rock, off Port Aransas in about 200 feet).
Depth range: 8-33 fms.
Geographical range: Unknown in detail, but overlaps that of A, candei (Mikkelsen, 1985).
Maximum size: not measured.

331. Acteocina lepta Woodring, 1928

In the survey collection is a single lot of a different deep water species dredged off Cameron, Louisiana. I had previously listed (Ode', 1973, Tex. Conch., vol.9, p.70) this "Retusa sp. B," but recently the Mikkelsens (1987) have discovered its identity.

This is an Acteocina completely flat at the top with only the heterostrophic protoconch, which is very small, sticking out and slightly falling sideways. In common with A. bullata this species shows faint vitreous banding paralleling the growth increments. Those bands can be seen faintly in figure 10 of Mikkelsen and Mikkelsen, 1987. For the benefit of our readers, I have appended a sketch of one of the two specimens in the survey collection (see Fig. 2).

Records HMNS Survey Collection: 1 lot of two fresh specimens from offshore Cameron, La.
Depth range: 40 fms.
Geographical range: "Bermuda; North Carolina to the Florida Keys and to Louisianna; throughout the Caribbean including the Greater and Lesser Antilles, the Bahamas, Yucatan and to northern Brazil," (Mikkelsen and Mikkelsen, 1987).
Maximum size: 4.0 mm.

332. Acteocina (Cylichnella) bidentata (d'Orbigny, 1841)

This common species used to be known as Cylichnella, but anatomical investigation (Gosliner, 1979) has shown that it is cogeneric with Acteocina. Radulae and gizzard plates are as in Acteocina. Since the shell presents a completely different aspect, because the heterostrophic nucleus becomes enveloped by the windings, I prefer to retain Cylichnella as a subgenus of Acteocina, defined by the enveloped heterostrophic nucleus and two - not one - columellar folds.

Some of our material was not sent to the Mikkelsens, but fortunately was easily identifiable. It is a common species often picked from beach drift along the entire Texas coast. It also enters the coastal bays, although not frequently (Port Aransas and Christmas Bay, Galveston). The usual size is about 3-4 mm, but some large specimens can reach over 5 mm in length. Most of our material comes from rather shallow offshore samples. Because a totally different species lives in deep water, it is perhaps helpful to present here a sketch of bidentata (fig.3); also the sketch by Mikkelsen (1985) is somewhat stumpier than most Texas material.

A. bidentata is slightly pyriform, with spiral grooving visible on the lower part of the shell; however, in some specimens, the top may also show faint spiral grooves and I have seen - under the correct lighting- a specimen grooved over its entire length. Some specimens show vitreous banding.

Small as it is, the species suffers predation by boring gastropods. In some lots, a considerable number of specimens exhibits holes bored by predators, presumably naticids.

Records HMNS Survey Collection: 32 lots, of which 3 contain live-collected material.
Depth range: 0-30 fms; alive 0 (Mustang Island Beach)-11 fms (30 miles south of Galveston).
Geographical range: "North Carolina, Florida, So. Texas and to Brazil," (Abbott, 1974).
Maximum size: 5.2 mm.

Genus Tornatina A. Adams, 1850

I will repeat here Mikkelsen's (1985) definition of this genus: "shell with exposed spire; with one collumellar fold. Lateral radular teeth with two rows of denticles. Gizzard plates consisting of one unpaired plate and two nonidentical paired plates." In the N.W. Gulf of Mexico, only a single minute species, that at first glance could be confused with A. recta, belongs in this genus.

333. Tornatina inconspicua Olsson and McGinty, 1958

This small species differs from A. recta by its much less truncate top, more rounded shoulders and relatively wider aperture. Most specimens found on the Texas-Louisianna shelf are thin-walled and translucent. These have a less perfectly straight, cylindrical shape than A. recta. They are without subsutural bands, but have a deeply channeled suture. The species is apparently widespread in the western Atlantic, but was

only rather recently recognised as a separate species. In the N.W. gulf of Mexico it is so far only known from the Heald Bank area off East Texas.

Records HMNS Survey Collection: 10 lots, no live material, but some fresh looking shells.
Depth range: 8-9 fms.
Geographical range: "From Cape Hatteras to Texas and through the Caribbean to Uruguay," (Mikkelsen, 1985).
Maximum size: 2.1 mm.

Genus Cylichna Loven, 1846

At this moment, I am not certain about the status of this genus and I am not aware of anatomical studies which could clarify its precise position in a modern system of classification. Thus, the genus Cylichna Loven will be placed here in the SCAPHANDRIDAE.

The only species treated here differs in several characters from A. bidentata: there is only a simple columellar plica and the aperture is somewhat different.

334. Cylichna c.f. verilli Dall, 1889

The sparse material in the HMNS survey collection conforms exactly with fig. 3944 in Abbott (1974) and also with Dall's description. The shell is much more straightly cylindrical than A. bidentata. Its top is somewhat more deeply excavated and the hollow there appears much deeper. Rios (1985) reports it also for Brazil, but also figures a very similar species C. discus Watson, 1883. Comparison with authenticated, or type material is necessary before I can attach a more definite label to our material.

Records HMNS Survey Collection: 5 lots, no live material.
Depth range: 4 lots come from deep water 50-70 fms off Galveston. One lot was obtained in 7 fms on Heald Bank which, I suspect, must be an incorrect label.
Geographical range: "Off North Carolina to the West Indies, 50-124 fms," (Abbott, 1974).
Maximum size: 3.7 mm.

Genus Scaphander Montfort, 1810

Shell having a somewhat attenuated "bulla shape," finely grooved, with spiral rows of fine punctations. Only a single species on the Texas Shelf area.

335. Scaphander watsini Dall, 1881

This is a widespread and fairly common species in the deeper waters of the Texas-Louisianna Shelf area.

There are regularly spaced spiral rows of punctations on the shell. At the posterior, narrow end, these rows are closer together and deeper incised. Often, in between two deeply incised rows, one finds a shallow and much narrower groove. At the narrow top, there is a shallow pit. The outer margin of the aperture is slightly indented where the spiral rows reach it. Most of our material is quite old, but one very fresh, but empty shell was obtained at 110 fms off East Texas.

Records HMNS Survey Collection: 29 lots, no live collected material.
Depth range: 23-170 fms, but usually below 40 fms.
Geographical range: "Cape Hatteras to Florida, 63-324 fms., to Barbados and Venezuela," (Abbott, 1974).
Maximum size: 42.5 mm.

Family RETUSIDAE Thiele, 1926

In this family are brought together several genera possessing a "bulla-shaped" shell, often somewhat cylindrical. The columella is without folds. The animal lacks jaws and radula. In the N.W. Gulf of Mexico are the genera: Sulcoretusa, Pyrunculus and Volvulella.

Genus Sulcoretusa Burch, 1945

Small, rather cylindrical shells, with clearly visible fine vertical threads on the entire body whorl.

336. Sulcoretusa sulcata (d'Orbigny, 1842)

Only two lots were obtained in the entire survey: one from Hospital Rock off Port Aransas in 33 fms, and the other in 40 fms off Cameron, La. It is a typical retusid species without columellar folds and with the characteristic mid-shell narrowing seen in so many members of this family. Its spire is deeply sunken and its outer surface is covered by closely spaced fine threads.

Records HMNS Survey Collection: 2 lots; no live material.
Depth range: 33-40 fms.
Geographical range: "North Carolina to Southeast Florida and the West Indies," (Abbott, 1974).
Maximum size: 3.0 mm.

Genus Pyrunculus Pilsbry, 1894

Shape clearly pyriform, with a long narrow aperture, which widens anteriorly. This genus is not found in the Panamic Province.

337. Pyrunculus caelatus (Bush, 1885)

This is a very common and ubiquitous retusid on the Texas-Louisianna shelf. Because it also has been found (although rarely) along the North Carolina - Florida coastline, it may be considered a "Carolinian" species. Small juveniles are much more "bulla shaped" than mature ones and only after considerable growth does the shell acquire its pyriform shape.

P. caelatus is immediately recognized by its sculpture on the narrow end of the shell. The spire is sunk in a very deep and relatively wide pit. Around this pit the shell is strongly ribbed and in some specimens the ribbing appears to continue very weakly down the body whorl. At the broad base are a number of distinct spiral grooves. On some rare specimens, these grooves are regularly spaced over the entire length of the body whorl. Often the ribbing changes into vitreous color banding so that dark and white vitreous, axial bands form the body whorl. Rarely, there is a narrow umbilical slit. In some populations very large specimens may reach over 4 mm.

P. caelatus is very common on sandy mud bottoms but is rarely found in other environments such as coral reefs and Miocene shale domes. It has been collected in shallow water at the base of the Freeport jetties, but its main depth range is 15-30 fms. It has also been found below 50 fms. It is quite common in the mudlump fauna.

Records HMNS Survey Collection: 66 lots, of which 6 contain live-collected material.
Depth range: 4-85 fms.; alive, 8-55 fms.
Geographical range: "North Carolina to Southeast Florida; Texas," (Abbott, 1974).
Maximum size: 4.2 mm.

Genus Volvulella Newton, 1891

Somewhat spindle shaped, small white shells, pointed at one end and rounded at the other. The nucleus is sinistral (two whorls), but covered completely by the later whorls (involute). On the basis of the soft anatomy (i.e. no radula is present), Marcus and Marcus have placed the genus in the RETUSIDAE. Harry (1967) has reviewed the western Atlantic species of the genus and compared them with other members of the genus in Europe and the eastern Pacific. There are two subgenera: Volvulella s.s. and Paravolvulella Harry, 1967.

Species in Volvulella s.s. are quite variable in shell morphology and consequently have received a number of

unnecessary names. I will follow Harry's interpretation, although I have some slight reservations that will be mentioned. The survey collection possesses extensive material, which if only a tenth of it were present could easily be split into 5-6 "species". The more than one thousand specimens show several types defined by outward shape, development of spiral or transverse striae, length of the spire, umbilicus, etc. Paravolvulella differs in the development of a sinus at the apical end of the outer lip.

Sources: Harry, H.W., 1967, Veliger, vol.10, pp.133-147.

338. Volvulella (Volvulella) persimilis (Morch, 1875)

V. persimilis is a somewhat narrow form, ovately cylindrical when fully mature (more spindle shaped when juvenile) with a relatively subdued spire, although in some populations the spire gets more heavily developed. There are essentially two basic shapes in V. persimilis. The most common I have sketched in fig.4 (apertural view and back view). This is a regularly spindle shaped shell which never gets as large (maximum size ± 3 mm) as the more cylindrical shaped one (sketched in fig.5) which may reach over 4 mm in length. The latter was descibed as V. oxytata by Bush (1885) and is the close analogue of the Panamic V. cylindrica Carpenter. In some populations, juveniles of the cylindrical form differ visibly from those of the spindle shaped ones; in other populations they are related by perfect intermediates. In our material are also present a small spindle shaped morph, almost entirely without a spire, and a large cylindrical form with an acute spire, resembling the European V. acuminata Brug.

I believe that it is best to retain all these morphs, as Harry (1967) did, in the single species V. persimilis, until it is possible to prove specific difference by more convincing arguments than slight changes in shell morphology.

V. persimilis is widespread over the Texas-Louisiana Shelf area on sandy bottoms, but has been rarely collected on the coral reefs or Miocene shale domes. It has been dredged once in Galveston West Bay. Only few specimens have been collected from beach drift: South Padre Island, and at San Luis Pass, Galveston. The species is quite common in the mudlump fauna.

Records HMNS Survey Colection: 62 lots of which 2 contain live-collected material.
Depth range: 0-36 fms; alive 8 1/2 - 23 fms.

Geographical range: "North Carolina to Florida and Texas to Brazil; Bermuda," (Abbott, 1974).
Maximum size: 4.2 mm.

339. Volvulella (Volvulella) recta (Morch, 1875)

This species was named by a lapsus calami of Morch but the name is quite valid because Bulla acuta d'Orbigny is preoccupied by a fossil named by Grateloup.

In general, V. recta can be separated from V. persimilis by several characters:

1) V. recta is plumper than V. persimilis (see fig.6).
2) V. recta has transverse striae at the apex which are missing in V. persimilis.
3) V. persimilis is often more regularly cylindrical; i.e. its widest point is in the middle of the shell, while in V. recta it is closer to the apex. (see fig.7).

However, this slender form is rare. Harry (1967) indicates that for V. recta the development of the spire is variable. In our material, however, it is without exception strongly developed. It is possible that V. recta corresponds to the eastern Pacific V. californica Dall, 1919 (see Harry, 1967) which is not reported by Keen (1971) for the Panamic provinces. Although V. californica lacks the transverse striae, it appears very close to some specimens I have labelled earlier as Volvulella sp. A. (see Ode', Tex. Conch., vol.9, p.3, 1973) and which I have now, with some hesitation, labelled V. recta (see fig. 8). I cannot exclude the possiblity that these shells constitute a "good" species. Some of them have spirals over most of the body whorl and have hardly any visible transverse striae.

V. recta is much less common over the Texas-Louisiana Shelf area than V. persimilis and is found, generally, in much deeper water. One location in Timbalier Bay at 1 1/2 fms undoubtedly is an old mudlump.

Records HMNS Survey Collection: 22 lots of which one contains live-collected material.
Depth range: 22-167 fms, but mostly below 50 fms; alive 40 fms.
Geographical range: "North Carolina to Florida and Alabama and the West Indies," (Abbott, 1974).
Maximum size: 3.4 mm.

340. Volvulella (Volvulella) paupercula (Watson, 1883)

This is also a deep water species, somewhat unusual in the survey collection, probably because of poor sampling in the deeper water depths. Almost all our material retains a vestige of the spire, is fairly spherical and is thick-shelled and small in size. The species has been taken mainly off East Texas and the Louisiana coast on mud bottoms. The largest material in the survey collection is slightly more elongate than our figure (fig. 9).

Records HMNS Survey Collection: 6 lots, no live material.
Depth range: 55-75 fms.
Geographical range: "North Carolina to Florida and the Caribbean," (Abbott, 1974).
Maximum size: 2.9 mm.

341. Volvulella (Paravolvulella) texasiana Harry, 1967

This long, cylindrical species has been taken often along the entire Texas coast to western Louisiana. It is also known from the mudlump fauna (Pleistocene) of the Mississippi Delta and from a shallow spot in Timbalier Bay, probably an old mudlump. A few specimens are also known from beach drift at South Padre Island.

The structure of the apical spire is quite different in this subgenus. There is a deep sinus at the apical end of the outer lip, which is shown in figure 10, sketched from a juvenile, live-collected specimen off Galveston. V. texasiana is another species that sometimes is found stained by rusty discoloration and is apparently restricted to the Texas-Louisiana Shelf area. There is, however, a very close Pacific analogue; it is not known whether the species lives along the mid-American coast. It is not listed by the Vokes' in their study of the mollusk fauna of the Yucatan platform.

Records HMNS Survey Collection: 25 lots of which 2 contain live-collected material.
Depth range: 0-76 fms; alive, 8-28 fms; usual range 15-25 fms.
Geographical range: Western and Northwestern Gulf of Mexico from northern Mexico to western Louisiana.
Maximum size: 5.1 mm.

Fig. 1. Ringicula semistriata Specimen dredged 86 mi off Freeport, Texas, in 110 fms, mud, by H. Geis and S.Stubbs, July 18, 1967 (3.55 mm).

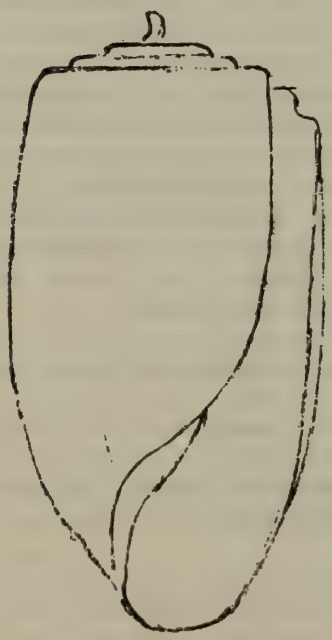


Fig. 2. Acteocina lepta

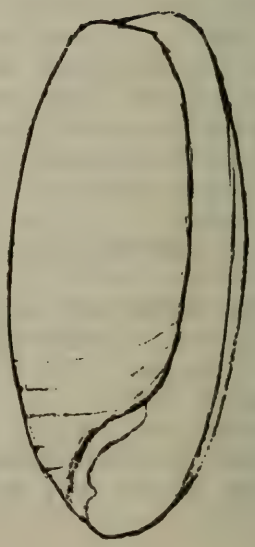


Fig. 3. A. bidentata

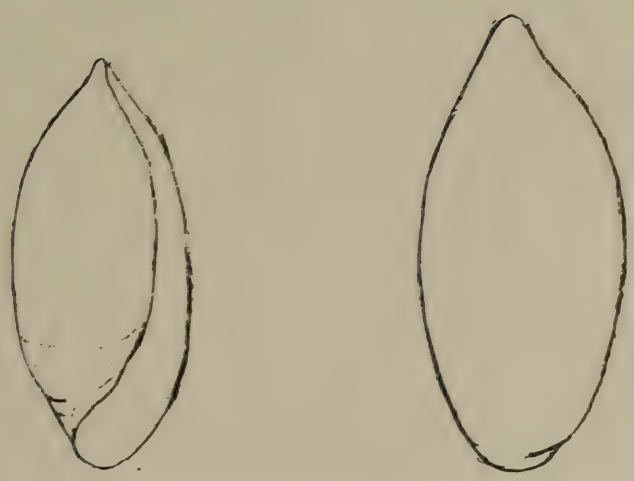


Fig. 4. Volvulella persimilis a) apertural view b) back view showing spindle shape.

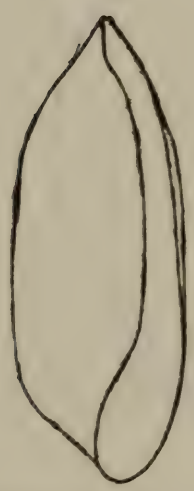


Fig. 5. V. persimilis Cylindrical form.

Fig. 6. Volvulella recta "Plump" form.

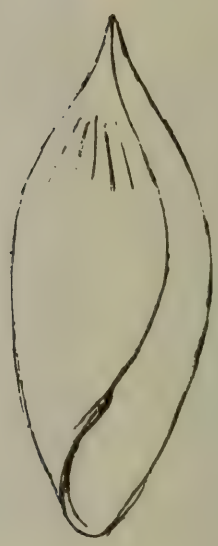


Fig. 7. V. recta Cylindrical form.

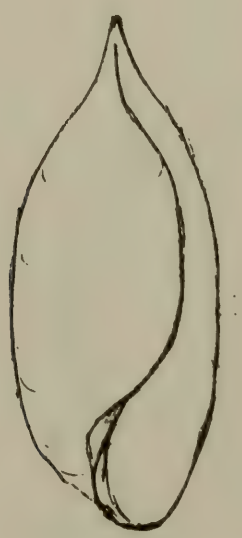


Fig. 8. V. recta? Form with spiral lines and without visible transverse striae.

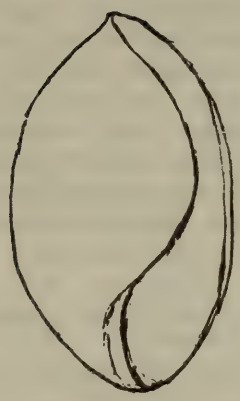


Fig. 9. Volvulella paupercula

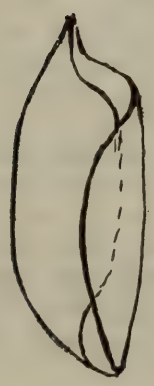


Fig. 10. V. texasiana Juvenile (approx. 1.3 mm)

RAINED ON

by Darwin Alder

A report on the weekend of February 17&18, 1990

As the sun rose over the horizon, preparations were being made for a trip to Galveston Island for the celebration of Mardi Gras and the Hoo-Dah parade. Several members of the Houston Conchology Society were going to participate in the festivities. They had each prepared an elaborate headdress to wear as a salute to Carnival do Brasil. There were as many different styles of headdress as there were participants. The parade took place from 4:00 to 5:00 pm. We did a routine based on Gilligan's Isle. Our group didn't win any prizes, but had lots of fun. (Kathy Betley did win honorable memtion for her artwork made from beach trash - which was the club's gift to the King at the end of our routine and was on tour with a travelling exhibit. SWC)

Sunday morning dawned misty and rainy. When we arrived at Bolivar for the field trip, we thought there would be a respite from the rain, but it was not to be. By the time we arrived at the road to the beach once called "Garbage Dump Road", it was sprinkling. By the time we got ready to shell and had all of our gear on, it started to rain. It rained all day. We had a good time and each of us found some nice shells, but not as many as we had hoped to find. There was *Tellina alternata*, *Tellina versicolor*, *Tellina iris*, *Polinices duplicatus*, *Dosinia discus*, *Mulinia* sp., *Anadara brasiliana*, *Melampus* sp., *Busycon perversum*, and *Busycon spiratum plagosum*, to name a few. We then went to McNeal's at Rollover Pass. There, we all had good shelling in a warm, comfortable location. We all found things of great interest. Lynn showed us how to find minute shells among the refuse of the organ pipe corals. Cheryl got some things for the auction and we all added some to our collections.

We separated for home or whatever. I took Dorothy with me and headed for Louisiana and Sea Rim. We found many good shells. It rained on us all day. We were soaked, but had a good time. I found some additional species at Sea Rim: *Epitonium rupicola*, *Epitonium angulatum*, *Nassarius acutus*, *Thais haemastoma floridana*, and *Busycon perversum pulleyi*. We returned to Houston, pleased but not satisfied, while we planned the next expedition.

HCS MEETING - PROGRAM NOTES By Sandra Clark

January - Texas Land Snails by Raymond Neck

Who would have thought a talk about slugs would involve beautiful slides and that land snails could be funny ? Raymond Neck showed us how - with his presentation on Texas land snails. We learned that geological formations often determine the species of snails present in certain locations since these formations determine plant species and lime deposits found there. Raymond also told us that snail and slug populations can be introduced by flood ditches, trash and nursery stock. Some species of slugs predominate certain areas due to resistance to drought and cold temperatures.

Among the amusing anecdotes Dr. Neck related, the one about the love darts caught the attention of this writer. Apparently love darts are a part of the courtship procedure, are species specific, and may be a species recognition mechanism.

As we left the meeting, who did we see lurking in the shrubbery outside the building - Raymond Neck, of course, just checking out the land snail populations!

February - Richard Yuill - written by Dr. John McHenry

In February, Richard Yuill gave us an interesting and informative program on getting the most out of shell books. After explaining the basic concept of the binomial classification system as set out by Linnaeus in 1758, he urged reading the introduction and the text in the books.

He explained anatomy and gave a hand-out explaining some of the details of the nomenclature and standard terms in literature. As usual, it was very informative and educational.

He also set out basic rules on the taxonomy of gastropods and bivalves to arm us with a broad base to better understand our hobby.

March - What's New in Murex ? by Emily H. Vokes

This was a rare treat - Dr. Vokes' humor and enthusiasm enlivened what could have been a rather dry subject and thus initiated the most unlearned (Murex-wise) into the world of Muricinae (the subfamily which includes, among others, Murex and Muricopsis). Since 1980, 120 new Murex s.s. (sensu stricto) species have been named. After long study, it

became evident that two groups could be consistently distinguished: Murex s.s. and Haustellum. Dr. Vokes described the characteristics of these two genera and showed that indeed there are no Murex s.s in the New World; those species previously thus named are actually Haustellum.

Other genera have increased as well - Aspella (vividly described as the Aspelloid explosion), Dermomurex and Rissomurex. The talk ended with slides of a collecting trip to Tierra Del Fuego with delightful commentary by Dr. Vokes.

Details of this presentation can be found in American Conchologist, vol. 18, no.1 March 1990 (which is included in the HCS Library collection).

ANNOUNCING AN IMPORTANT NEW BOOK

By H. Ode'

A Classification of the Living Mollusca by K. C. Vaught, edited by R. Tucker Abbott and K. J. Boss. 195/2. American Malacologists Inc. Melbourne, Florida, 32902 U.S.A.

This extremely useful book is a compilation of familial and generic taxa in use for Recent Mollusca. Only those readers who have searched the literature will appreciate the backbreaking work in compiling a list like this and the frustration which results from later hearing "but you forgot thus and so!" Of course, there will be many omissions, both of valid genera and of synonyms, but at least now a reasonably complete list is available.

To my pleasure, I saw that a great many of the generic labels I have adapted in the Monograph "Distribution and Records, etc." are also considered full genera in this new reference. Of course, I also found some surprises: Cyclostremiscus went to a different family than that to which I had it assigned. In a quick check of genera, only Vioscalba was missing in the book; hence, I still do not know where it might be classified. Most important is the inclusion of a great number of references.

All in all, this book is extremely useful for both professionals and serious enthusiasts.

FLORIDA'S SALTWATER FISHING LAWS -- RESTRICTIONS ON SHELLING FOR LIVE MOLLUSKS

By Richard M. Yuill

This information is derived from Florida's brochure on saltwater fishing licenses and from an article on the subject in the March-April 1990 issue of "The Shell-O-Gram," edited by Charlotte M. Lloyd. Basically, this new law, which went into effect January 1, 1990, requires a license to take or attempt to take live mollusks. The license is required to take marine fish including finfish and marine invertebrates. Marine invertebrates are defined as including "snails, whelks, clams, scallops, shrimp, crab, lobster, sea stars, sea urchins and sea cucumbers."

Fees for a Florida resident license are $12 for a one-year license, plus $1.50 Tax Collector's fee plus $0.50 for a Subagent's fee. Fees for non-residents are $15 for a seven-day license, or $30 for a one-year license, plus the $2 Tax Collector's and Subagent's fees.

Exemptions from needing a license include:

1) any individual under 16 years of age.
2) any individual fishing or diving from a vessel issued a Vessel Saltwater Fishing License.
3) any individual fishing from a licensed fishing pier.

All the rest of the exemptions deal with Floridians only (persons 65 or older, members of the Armed services, the permanently disabled, residents fishing from fixed piers etc.)

Additional restrictions apply to specific species or marine invertebrate groups. Briefly, these restrictions are as follows:

1) Bay scallops -- Unlawful to use mechanical harvesting gear in waters less than three feet deep....
2) Hard clams -- Unlawful to take, possess or transport clams on the water from one-half (1/2) hour after official sunset to one-half (1/2) before official sunrise. Unlawful to use any rake, dredge or other mechanical devices to harvest hard clams in any grass bed....
3) Oysters -- May only be taken from approved shellfish harvest area.
4) Queen conch -- Unlawful to take or harvest any queen conch from the land or waters or to possess or transport any queen conch so taken or harvested. [Ed's Note: Florida game wardens will not necessarily be able to distinguish between various *Strombus* species, so be wary of live

collecting large juvenile milk conchs that resemble queen conch "rollers" to the uninitiated.]
5) Coral -- Unlawful to take, possess or destroy sea fans, hard corals or fire corals unless it can be shown by certified invoice that it was imported from a foreign country.

Finally, be aware that additional restrictions/prohibitions may limit live collecting shells in local sites (for example, Sanibel Island). Be aware of local laws and be conservation-minded wherever you collect.

NOT LATIN -- NOT GREEK!!!

H. G. Adams in Beautiful Shells, 1871, wrote as follows concerning the word "shell":

> "Shell from scyll or scell as our Saxon forefathers called it. Schale as Germans then called it. Not Latin -- not Greek, just good old Saxon tongue, somewhat rough and rugged, perhaps, but stout and sturdy, and honest and serviceable."

THE ARCHITECT, FRANK LLOYD WRIGHT, ON SHELLS

At the end of a lecture with his students, after contemplating a collection of his shells, Frank Lloyd Wright, the master architect who used the designs of shells so effectively in his work, said:

> "Here in these shells we see the housing of the life of the sea. It is the housing of a lower order of life, but it is a housing with exactly what we lack -- inspired form. In this collection of houses of hundreds of small beings, who themselves built these houses, we see a quality which we call invention. The beauty of their variations is never finished. It is not a question of principle of design. This multitudinous expression indicates what design can mean. Certainly Divinity is here in these shells in their humble form of life."

From The Shell, Five Hundred Years of Inspired Design

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TEXAS CONCHOLOGIST, Vol. XXVI , Nos. 3-4, July, 1990

TABLE OF CONTENTS

LIFE IN A BUSYCON BOWL
By Jan Hobbs 65

SHELLING IN TEXAS
1. The Tip of Texas
By Darwin Alder 68

SEARCH AND SEIZURE
Two New Museum Exhibits
By Constance E. Boone 69

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO
(A Continuing Monograph: Superfamily ACTEONACEA)
By Helmer Ode' 71

RAINED ON
By Darwin Alder 88

HCS MEETING -- PROGRAM NOTES
By Sandra Clark 89

ANNOUNCING AN IMPORTANT NEW BOOK
A Classification of the Living Mollusca
By Helmer Ode' 90

FLORIDA'S SALTWATER FISHING LAWS -- RESTRICTIONS ON SHELLING FOR LIVE MOLLUSKS
By Richard M. Yuill 91

NOT LATIN -- NOT GREEK!!! 92

THE ARCHITECT, FRANK LLOYD WRIGHT, ON SHELLS 92

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The TEXAS CONCHOLOGIST is the official publication of the Houston Conochology Society, Inc., and is published quarterly at Houston, Texas. It is distributed as part of the dues to all members.

The Society holds regular meetings the fourth Wednesdays of the following months: August,September, October, January, February, March, April, and May. The meeting is held the third Wednesday in November.

Meetings are held at Southside Place Club House, 3743 Garnet, Houston, Texas. Meetings begin at 8:00 pm.

The TEXAS CONCHOLOGIST is published October, January, April and July. It is mailed postpaid to regular members in U.S. postal zones. Overseas members will be charged additional postage. Only one copy will be mailed to a family membership.

Dues extend from the begining of the fiscal year of June 1 through May 31. However, the July issue of the TEXAS CONCHOLOGIST each year is the fourth quarterly due on the regular dues year begining June 1 of the previous year. Memberships will be accepted throughout the year but will receive quarterlies of that fiscal year. Members receive meeting Newsletters and have all other privileges provided by the Society's by-laws.

RATES AND DUES

Family membership	$12.00
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The TEXAS CONCHOLOGIST accepts contributions for publication from amateurs, students, and professionals, subject to approval by the Editor. Manuscripts should be typed, double spaced and should be in the hands of the Editor the first day of the month preceding publication dates. Photos accompanying articles are welcomed.

TEXAS CONCHOLOGIST, Vol. XXVII, No. 1, October, 1990

SEARCH AND SEIZURE By Constance E. Boone

NEW MUSEUM EXHIBITS

Recent Acquisitions from collections are exhibited in a temporary display at the Houston Museum of Natural Science. Through January, 1991, some very rare and unusual shells will be shown in a case on the atrium on the north side near the entrance to Strake Hall of Malacology. We think members of HCS will be interested in this exhibit, which also includes material from other disciplines represented in the museum's collections.

A live-taken Cypraea fultoni Sowerby III, 1903, is one of the prized recent acquisitions. The specimen comes from 100-150 meters off South Mozambique, East Africa, trawled by Russian trawlers in 1990.

Until recently, specimens of this rare Cypraea were available only after having been extracted from the digestive tract of the black musselcracker fish, Cymatoceps nasutus trawled from deep water off Southern and Northern Natal and sometimes off Mozambique, Africa. The cowrie would have to be retrieved soon after the fish had eaten the animal so that stomach acids would not destroy the shiny surface of the shell. Many specimens were marred by acids or even marked with holes from teeth crushing the shells.

In 1987, two large specimens of this famed cowrie, known as the Maltese Cross Cowrie, were trawled by a Russian fishing vessel operating at an undetermined locality off Mozambique. They sold for a hefty price (about $25,000, we were told).

One live specimen, dredged from 90 meters from a reef off Natal, has been photographed and studied. Its stomach contents indicated that this species is a spongivore.

The species belongs to an ancient cypraeid lineage which flourished during the Pliocene Epoch and is regarded as a relict species living now only in deep water. It has not been taken by SCUBA, and beach specimens are rare.

Although some specimens did come into the states this year and have been on the market from $7,000 to $15,000, depending on quality, the question of whether they will continue to be available remains to be seen. All those we know about have come through the Russian trawling efforts.

Other shell acquisitions on display include a volute, Festilyria festiva (Lamarck, 1811) trawled by Taiwanese fishermen off Samalia, East Africa. It is one of the aristocrats of this popular family.

An excellent, bright orange specimen of Pterynotus loebbeckei (Kobelt, 1879) is displayed and represents a fine addition to the Muricidae in HMNS collections.

Cones are represented by two species. Conus milneedwardsi Jousseaume, 1894, is one of a trio of classic rarities (Conus gloriamaris and Conus bengalensis are the others) we now add to the museum collections. And after seeing Dr. McHenry's collection of cones recently at the downtown library, we indicated to him that we would be happy to have Conus thailandis da Motta, 1978, for the museum. He was kind enough to give HMNS two specimens, which are on display.

Other shells displayed include Cypraea rosselli Cotton, 1948, and both a large, purple specimen and an albino of the cockle, Plagiocardium pseudolima (Lamarck, 1819) from Zanzibar.

One of the very interesting acquisitions displayed is the tube of a shipworm from the Philippines. Kuphus polythalamia (Linnaeus, 1767) is a mixed-up kind of bivalve that manufactures a calcium carbonate tube in which it lives and is partially attached to although it can move in the tube. The museum specimen is 47 inches long. Drawings explain the parts of the bivalve mollusk.

Think of the teredos you find in riddled wood on the seashore and remember the calcareous tubes you find there for the animals which eat up and destroy the wood. The animal making the huge tube from the Philippines is related to our common shipworms.

Kuphus polythalamia is a mud dweller and probably derives food from the mud as well as from plankton from the water drawn in through the incurrent siphon. It is one of the more primitive of the teredinids. The bivalve shell is very small and operates to push the animal through the mud at the anterior end of the tube. The posterior end would house the incurrent and excurrent siphons, and they are above the surface of the mud. This animal has been known a very long time. A drawing exists in D'Amboinsche Rariteitkamer by Rumphius (1705) where it was identified as Solen arenarius. Linnaeus thought it was Serpula.

We have our member Natalie Howard to thank for acquiring this tube for the museum's collection. One of her customers came in to see her specimens and saw a broken tube she had of this shipworm which I had identified for her. She was able to tell the customer what is was. He had acquired one tube in another shop and then opted to give the museum his tube. Natalie has had her broken tube replaced. The first

one I ever saw was owned by Jean Holman, and I had no idea what it was, but I did find out!

All the shell acquisitions were made possible by gifts of money or specimens to the museum. (There are still other shells we would like to acquire.)

A second display on the south atrium on the second floor near the south entrance to the shell hall will also be of interest to members. The story of marine life on oil rigs will be told in enlarged photographs and a 25 minute video, prepared by Exxon Corporation, and entitled Aquariums Without Walls.

For years, fishermen and scuba divers have known that oil rigs in the Gulf of Mexico made good habitat for marine life. The legs, or support structure, are huge and make handy, hard substrates for marine animals seeking places to settle in an area where there aren't many rocks or reefs. Those of us who have a acquired some of the beautiful *Spondylus americanus* from the rigs know that these are rather prolific on some of the rigs, and although they are flat-bottomed, they are exceedingly brightly colored and well spined on the top valve.

The steel legs provide the homes for sponges, feather-duster worms, starfish, corals, mussels, gorgonians, hydroids and bryozoans, and attract fishes as a result.

Exxon and other oil companies are beginning to make artificial reefs with the used steel legs. Until recently, oil companies were required to dismantle the used platforms and to bring them to shore. The artificial reef idea began off Louisiana where Exxon has taken the legs of the platforms, towed them to designated places, turned them over, and made artificial reefs. These reefs will be marine laboratories for scientists and provide areas for divers and fishermen to visit for many years. The treated steel legs are said to have a life of at least a hundred years.

The museum exhibit will explore the project and also discuss what lives on working rigs. Rigs in California waters are still in use. However, there the multitude of life on the rigs is wonderful to see. Interesting also is the prolific development of the edible mussel, *Mytilus edulis*, on those rigs. This has become a mariculture industry today. Divers have contracts to collect the mussels for sale to restaurants. Currently, a TV commercial shows a special mussel dish available at a popular restaurant in California. This introduced mussel cannot live on rigs in the Gulf of Mexico. The waters, presumably are too warm.

A number of the photographs in the exhibit were made by someone known to our society. Dick Zingula has become expert in underwater photography.

COUNTDOWN COA By Lucy Clampit

The 1990 Conchologists of America convention was hosted by the Astronaut Trail Shell Club, July 9-13, in Melbourne, Florida. Conventioneers enjoyed many activities from the welcome party to the banquet. Many participated in a trip to Kissimmee for a medieval feast complete with jousting knights. Some toured the Kennedy Space Center. A shuttle launch was scheduled, but fuel leaks caused its cancellation. Some nice shells were found by those who went on the dive trip off Lake Worth Inlet. Many convention goers visited the hotel beach late at night to watch the sea turtles come in to lay their eggs. The oral and silent auctions and the Dealers' Bourse provided a wide selection of shells for purchase. Dr. R. Tucker Abbott, Dr. Emily Vokes, Dr. E. C. Rios from Brazil, and S. Peter Dance from England were a few of the speakers who presented outstanding programs.

Mark your calendars now for the next COA convention. The 1991 convention will be July 8-12 in Long Island, New York.

BEACH TRASH SCULPTURE: YOUR DINNER IS SERVED

By Cathy Betley

Did you know that during a nationwide 3-hour beach clean-up in 1987, in Texas alone, volunteers collected: 31,773 plastic bags, 30,295 plastic bottles, 15,631 plastic six-pack rings, 28,540 plastic lids, and 1,914 disposable diapers? Around the nation the volunteer clean-up crews picked up a total of 2 million pounds of debris... in just three hours! These totals were taken from the book 50 Simple Things You Can Do To Save The Earth by the Earth Works Group. I chose to do the 51st simple thing to do to help save the Texas Coast. I picked up beach trash and created a sculpture as an entry in the Annual Beach Trash Sculpture Contest sponsored by the Texas Arts Council and the Texas General Land Office in the early Spring of 1990.

The sculpture started with a tray that was put together to look like a restaurant meal and was presented to Nash D'Amico at the 1990 Hou-Dah Parade. Nash is our annual host for the parade and allows meetings and parties to be held at his restaurants in Houston and Galveston. The Hou-Dah committee thought that a "trashy tribute" would be an appropriate salute to "Nash, Nash, King of Brazilian Trash".

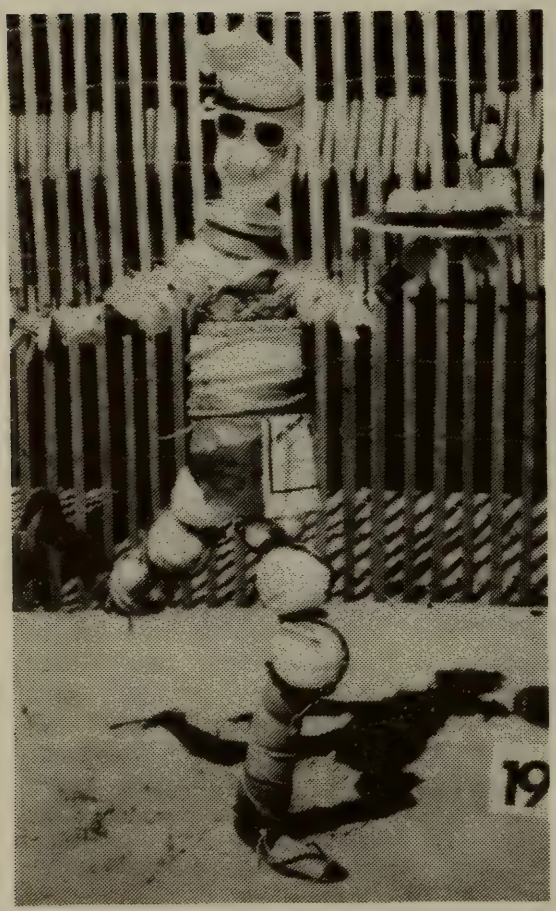
Thanks to Nash, I was able to retrieve the tray and use it as the focal point for my sculpture idea -- Restaurant Waiter. I had a metal fabrication company weld 1/2 inch square tube steel into the "stick" shape of a running waiter carrying a meal tray. By adding various floats, pieces of plastic, cut-up plastic milk cartons, plastic gloves, shoes, fishing line, sunglasses, and pieces of rope, the restaurant waiter "came to life" and was ready to serve the meal of trash back to anyone and everyone who had put the trash on the beach in the first place.

In the past few months, in my quest for raw materials for my next sculpture, I have picked up at least 1000 pounds of trash. Some I save, some (the glass and cans) go to the recycling center, and some trash is discarded in the dumpster at my apartment complex. Maybe I should tag some of the trash items in a scientific fashion and see what shows up on the beach in future months. Besides the usual ropes, nets, and floats, I have found everything on the beach from small oil-coated plastic toys, to a giant plastic funnel, to all sorts of light bulbs including 4-foot fluorescent tube lights.

Now don't get me wrong. I enjoy finding unusual items for my sculpture even if it is just trash. But I also relish the thought of a trashless Texas coastline.

Many thanks for picking up what you can; and remember to spread the word:

DON'T MESS WITH TEXAS BEACHES!!!



"Restaurant Waiter" and his fabulous trashy cuisine.

MICROSHELL COLLECTING AMONG BALD EAGLES By H. Ode'

In the spring of 1989, my wife and I traveled with some friends in Alaska where we enjoyed the scenery so much that there was hardly any time left to do some serious collecting. Halfway through our trip, we flew from Anchorage to Sitka. During the first morning of our stay, we visited a small exhibit showing the tourist all the attractions of the area. Included in it was a small display of local marine mollusks. Upon inquiry for some good shell beaches or other collecting spots, the lady in charge told me that she was unfamiliar with shelling but would get me in touch with one of her good friends, who was a sheller. Without waiting for an answer from me, she proceeded to the telephone, and after a brief conversation handed it to me. In that manner, I was introduced to Mary Servelo, who lives in Sitka and is a collector of the local molluscan fauna. In the afternoon, Mary picked us up and gave us a personalized tour of the island and after that we visited with her and her husband in their home, where I inspected her most remarkable collection. When we arrived at her home, which is located at the water's edge, her husband greeted us with the words: "You are 5 minutes late; a school of whales just passed a few minutes ago!".

The next morning we went shelling on some mudflats not far away. During our visit, I had told Mary about micro mollusks and the methods to get them. Of course, she wanted to see how to collect them. Nothing, in fact, is more simple. Just scoop up some good looking shell grit in a plastic bag, wash it thoroughly but tenderly to remove all traces of salt, dry it and then, when it is really bone dry, put it under the microscope and start picking, using a fine, soft watercolor brush.

That morning, the mudflats presented a unforgettable setting for shell collecting: densely forested mountain slopes rising from the water's edge, with a slight fog creeping up along their sides. Behind us, at the upper tideline, four bald eagles were feasting on the carcass of a young seal.

It is not necessary to report here the larger shells, of which there were plentiful specimens distributed over the mudflats. I shall limit this note to the micro mollusks. After Mary's grandson, who carried a spade, had made some, mostly unsucessful, digs where I thought there might be some clams, I finally scraped together some muddy grit from under a rock and filled a small plastic bag with it. When this material was collected absolutely no shell, except some white shelly fragments, were visible in this boring, somewhat smelly mud. Later even after washing in Mary's home, hardly any evidence of small mollusks was visible in the sieve bottom. This is not surprising, because in clean, but still wet shell grit, micro mollusks are extremely

difficult to spot. Later, in Texas, after the material had properly dried, it was another matter. Although the number of species is not large - the amount of material was rather small - the results are interesting enough to report. These reinforce my opinion that to do faunal studies of mollusca properly, it is necessary to pay much more attention than is usually done to the micro mollusca, i.e. mollusca in the range of 1/50 to 1/8 of an inch. The following material, now deposited in the Houston Museum of Natural Science, was obtained from a single handful of mud scraped together from under one of the millions of rocks on the mudflat. It is located in a small public park north of the town of Sitka.

1. Scissurella soyoae (Habe, 1951). 2 specimens; 0.8 mm.
2. Lepeta caeca (Muller, 1776)? 2 small specimens, clearly finely cancellate.
3. Margarites pupillus (Gould, 1849). Several specimens in the range of 2.0-4.5 mm.
4. Lacuna variegata Carpenter, 1864. Most abundant gastropod all in the range of 0.7-3.0 mm. The very small juveniles have a wide open umbilicus.
5. Moelleria sp. (?) Abbott's definition of this genus includes fine axial plicae. Our material lacks them and is smooth and shiny so that at first sight, they resemble Vitrinella. Several specimens, of which the largest measures 1.6 mm in diameter.
6. Littorina sitkana Philippi, 1846. Small juveniles (from 2 mm up) abundant and a few larger ones.
7. Littorina scutulata Gould, 1846. Small juveniles common. Most about 4-5 mm.
8. Alvania compacta Carpenter, 1864. Common, several alive. The largest specimen, +2.5 mm.
9. Cingula sp. 3 worn specimens. Abbott cites several species for the North Pacific, but gives no figures.
10. Barleeia sp. 2 small specimens.
11. Brochina sp. 2 specimens; 2.3 mm. Abbott does not list this caecid genus for Alaska. Our specimens appear close to B. johnsoni or B. glabrum.
12. Bittium eschrichtii (Middendorf, 1849). Common; 2 live ones. This is one of the larger gastropods in the sample (up to 16 mm).
13. Cerithiopsis stephensae Bartsch, 1909 (?). 2 rather worn and incomplete specimens.
14. Nitidella gausapata Gould, 1850. 3 quite juvenile specimens alive, the largest 3.5 mm.
15. Nassarius mendicus (Gould, 1849). A single specimen and one of the larger gastropods obtained. 12 mm.
16. Granulina margaritula (Carpenter, 1857). A few small specimens, the largest being 3.3 mm.

17. Odostomia sp. A few specimens, too worn for proper identification. 1-2 mm.
18. Odostomia tenuisculpta Carpenter, 1864. 1 specimen with very outspoken tooth.
19. Diaphana minuta (Brown, 1827); 1 specimen, 1.6 mm.

The bivalves all were very small and not a single one belonged to such well known families as the MYTILIDAE, CARDIIDAE or TELLINIDAE.

20. Mysella tumida (Carpenter, 1864). Common, lives attached by byssus to solid objects such as rocks or shells. Maximum size in our sample: 3.2 mm.
21. Lasaea cistula Keen, 1938. A single valve (1.5 mm) with the typical coloration (dark carmine around the dorsal margin area, see Abbott, 1974).
22. Two small valves, probably forming a complete specimen, of a very small leptonid species with cancellate sculpture. It belongs in a groups which appear to be worldwide. Extremely similar (if not the same ?) valves were obtained from the Yucatan platform (See Tex. Conchol. vol. 25/1, p.19, #190). I have material from the Persian Gulf at the Strait of Hormuz which also contains similar material.
23. Juvenile venerid (?) clam. Outwardly, the few specimens (largest 2.7 mm) resemble Cyclinella but Abbott does not list this genus for Alaska and thus I will leave it unnamed.
24. Juvenile valves with a myoid hinge close to Corbula (+ 1.5 mm). The upper surface is smooth. Abbott does not list Corbula for Alaska.
25. Hiatella arctica (Linnaeus, 1767). A few juvenile valves; one broken valve could have reached 3mm. The juveniles of this widely distributed species are slender and elongate and quite different in shape from mature specimens.

SHELLING IN TEXAS By Darwin Alder

2. Corpus Christi and Nueces Bays

This location, in the Coastal Bend of Texas, is comprised mainly of the areas around Corpus Christi, Nueces Bay, Portland, Ingleside, Indian Point Park, Padre Island National Seashore and the JFK Causeway and Bridge over Laguna Madre. This area is about 220 miles to the southwest of Houston.

To get there. take US 59 south from Houston, left on SH 172, which is the 2nd Ganado exit, south to SH 35, right to Aransas Pass and on to Corpus Christi. You will come to Gregory and then to Portland. To get to Indian Point Park, take the turn-around exit near Gunderland's at the Portland end of the Nueces Bay Bridge. Go under the freeway and turn right to the park. Part of the park consists of a pile of drift. If you are coming from Corpus Christi, take a right onto Indian Park Road.

In Corpus Christi, take the Crosstown Expressway to where it becomes South Padre Island Drive (SPID). Continue through the city and you will come to the JFK Causeway and Bridge. There is good shelling at both ends of the bridge in the grass and mud flats. Continue to the end of SH 358 (SPID) and you will come to Park Road 22 which goes to Padre Island National Seashore. There are several beach access points. There is an entry fee to all but the North Beach, unless they have changed since I was there last. You may also access portions of the bay near the Naval Airforce Station, but not on the Naval Airforce property, from SPID.

An alternate route to Corpus CHristi is to take US 59 from Houston, connect with US 77 at Refugio, turn left on FM 774, by the courthouse, go about 2 miles and turn right onto FM 2678 to Bayside, connect with FM 136 until you join SH 35/361 and then go through Portland to Corpus Christi. To get to Ingleside, take FM 1069 south were it crosses SH 361.

At the end of SPID, Park Road 22 goes to the National Seashore; Park Road 53 goes along Mustang Island to Port Aransas.

There is a wide variety of shells to be found in this region.

PEAR WHELK ACTIVITIES By Jan Hobbs

In my first story, I told of our two captive pear whelks (Busycon spiratum plagosum) and one lightning whelk (B. perversum) that my husband and I found on Quintana Beach, Texas, October 1988. They have now lived with us 2 years. Here are some of my observations of their actions and behavior.

I call my whelks "he" for lack of better knowledge. I don't know any way to tell the sexes apart, short of dissection. I believe they're all the same sex, though, since I haven't seen any sign of the mating process or egg laying.

The colors of the two pear whelks differ somewhat. The smaller one has a much whiter background and his axial stripes are darker and more distinct. The background of the larger one is a light orange-to-yellow color and the stripes are more brown and less well defined. As the large one gets bigger there is less and less color in the new stripes, so that he is adding mostly background color now.

The body and mantle of the pear whelk are white or slightly gray. The body of the lightning whelk appears black, but the underside of the foot is whitish.

The eye stalks are located on each side of the "head" of the snail. They are brown on top and white as the body underneath. They can stretch to be rather long and thin, or thay can compress and become short and stumpy. The snails appear to feel with them, to some degree. I have watched them touch food or each other with a movement similar to that of an insect's antenna. I have also seen them wrap around something from each side, much like a hug. The tiny eyes appear as dots on the eye stalks about one-fourth of the way out. We have observed that the eyes can at least see shadow and movement. If I move my head too close to the tank while they are pointed in my direction, or if a large shadow passes between the window and the tank, the head immediately jerks and draws in.

The normal position of the shell on the surface of the sand is with the aperture down, the foot extended an inch or so beyond the shell, and locomotion is in the direction of the siphonal canal. The whelks seem to have two distinct kinds of movement on the surface. When they are simply moving from one place to another, the foot glides along so smoothly, I can't help wonder how it executes the locomotion. It exhibits no sign of the humping movement that worms make. To turn a corner, they seem to raise the shell straight up, stretching the body (making it look more like a muscle than

a blob), then pivot the shell and move in the new direction. Thay can only move forward.

The second type of movement is searching for food. With this motion, the proboscis seems to be plowing beneath the surface of the sand, while the foot stays above. The movement is more jerky and slower and pushes the sand around more. This behavior tells us that it is time for feeding. They come out of the sand and feel around for food. The same action is noted when food is placed in the tank, and the smell has brought the animals to the surface.

"Pop up" is the common term used to describe how whelks come out of the sand. It is a very apt description, because they are invisible one moment and sitting on the surface the next. The siphonal canal tilts up and out of the sand first, and then the whole shell is thrust into the open.

These whelks turn themselves over when they are left lying with the aperture up. The body always crosses the columellar callus -- never across the outer lip. Once you see it turn over, you realize why that side is shaped the way it is. It eases the body's turning. The body extends far out and across the shell and the foot slides at an angle under the sand as far as it can get, stops, and gives a mighty heave that rapidly turns the shell back to its normal position.

At various times, all three whelks climb up the sides of the glass tank and stick the siphon well out of the water. They have remained in that position from a few minutes to many hours. The process of climbing up the glass appears to require much effort. The snail stretches the body/foot upward, raising the shell high above the sand. Then the foot begins to slide from the surface of the sand up onto the glass. The foot oozes up a way, letting the shell hang low. Then he hefts up the shell; "heft" seems an appropriate description. He seems to alternate moving the body and pulling the shell to catch up. It looks like it takes a great amount of energy. The distance climbed upward is approximately 6 to 7 inches to the water's surface. They can move, with difficulty, horizontally along the wall.

From the beginning of their captivity, the smaller whelk seemed able to bracket the direction he needed to go in order to find a piece of food. He moved the siphonal canal from side to side, going past the food in both directions, then proceeded to move himself directly toward the food. The larger whelk has only done this procedure once or twice. The larger one usually just "plows" along until he comes upon food.

The proboscis is the whelk's eating mechanism. It is a cylindrical projection approximately 3/8 inch in diameter

and can stretch as long as about 3/4 inch. It is a distinct pink in the pear whelks and very black in the lightning whelk. It projects out of the body just below and between the eye stalks. It wiggles around, much like an elephant's trunk. When withdrawn, i.e., not eating, it can not be seen. When the whelk encounters a piece of food, the proboscis comes forward and appears to exert suction upon it. I cannot see any sign of "teeth" or the radula, but perhaps that is what grasps the food. Which ever method - suction or grasping - is used, it is fairly powerful. We have seen two engaged in a tug-of-war with a piece of food. They pulled it back and forth for several minutes before one turned loose.

When I first began my observations, the smaller whelk seemed to hold his food down with the outer lip of the shell until the proboscis got a good grip on it. Then the mantle enfolded it. Now both snails seem to glide over the top of the food and completely enclose it within the mantle. There is often a small piece showing and jerking movements can be seen coming from under the mantle.

Sometimes while they are eating, they lose their balance on the surface of the sand and the shell tilts backward, leaving the aperture up. However, while they are engrossed in the eating process, the mantle hugs tight and continues to conceal that food and eating continues. Only when his dinner is finished does the animal bother to right himself.

At one sitting, each pear whelk can eat about a half-inch chunk of a medium-sized raw shrimp or about the same length piece of raw bay scallop. They have eaten more than just one piece in a day, but usually they are satisfied with just one. I have read that in the wild, whelks eat about once a month, but I usually offer food approximately every two weeks before I change the water.

I have experimented with the food to try to discover if the whelks prefer shrimp or scallops. Each time the conclusion has been that the pear whelks prefer shrimp when given a choice. I have seen one engulf a scallop and then eject it when the shrimp is discovered nearby. If shrimp and scallop are lying side by side, each time the scallop is left, and the shrimp is eaten. I have not seen the lightning whelk make this choice. They all do eat scallops if that is all that is offered.

Eating takes about 30 minutes or less; afterward the animals usually quickly bury themselves, though occasionally one will climb the wall first and remain for as long as a few hours.

The lightning whelk seems to prefer darkness when he eats. He comes out much sooner if I cover the tank against the

light. He does not climb up on and try to cover the food as the pear whelks do. He just reaches out the proboscis and starts pulling at it, leaving a hole into the meat when he is finished. He is not nearly as large a specimen as the pear whelks (approximately 2 1/8" compared to about 3 1/2" and 4"), but he is offered the same size pieces of food as the bigger whelks.

Most of the time when the two pear whelks encounter each other while crawling around, they simply draw back the eye stalks and foot and turn to a slightly different direction and move on. They seem to be ignoring each other. However, there have been incidents when there appeared to be some competition for food. One time the larger shell came along, and using his shell, shoved the smaller one off a piece of food and ate the food. The small one moved away and did not protest.

However, another time, the lightning whelk came along and grabbed onto the tail of a shrimp that the small pear whelk was in the process of eating. They pulled back and forth, both eating on it. The pear whelk let go only after he appeared to have eaten all he wanted.

The pear whelks had a duel one day. The small one was sitting beside the piece of food he had been eating. The larger one came along and bumped into the small one's shell. They both stood up tall on the foot and parried with the siphonal canals for several seconds before the small one fell over backward and the larger one moved on, ignoring the food. The small one righted himself, grabbed the food and continued eating.

One time I caught the lightning whelk and the small pear whelk wrapped together. "L.W.", as I call him, was upside-down with about one inch of the tip of his siphonal canal sticking out of the sand. The pear whelk was on top of him, with his tip very near "L.W."'s. Both moved, but I was afraid one was eating the other. Had they been the same species, I would have wondered about their mating. It might have simply been an accidental upset caused by burying too close together, but they seemed to be holding on to each other. I separated them because I didn't want to take a chance on losing one. The pear whelk promptly turned himself over and buried, but the lightning whelk took some time before moving.

One day the larger pear whelk located the position of food, but instead of taking a piece very near the small pear whelk, he attached his proboscis to the small one's piece. "Small" hung on for a minute or two, but "Big" was obviously stronger. It appeared as though "Big" bit him, because "Small" suddenly jerked away and tumbled backward, canal end over spire. He moved away jerkily, moving a part of the foot

like he was shaking it, looking as if he was saying, "Boy, that smarts!". He wasn't quite shaking the foot, but it was moving sporadically and jerkily. He moved off for a short time and then returned to eat the nearby, unclaimed piece of shrimp.

The burying process is interesting, also. Each whelk slips the foot at an angle into the sand. He gently scoops into the sand with the outer lip. Then he slightly rises up lengthwise and makes a jerking motion down. The foot makes a pocket under the sand where water can collect. Some how he propels this water to the surface of the sand and immediately pulls down on the shell. Between this"digging" +movement and the scooping, the sand is pushed over the back. Burial is completed in about ten of these cycles. There is generally about a 30 to 40 second rest period between cycles. The final resting position is horizontal, with the siphonal canal slightly elevated. However, since the sand is not deep enough (about 2 1/2 inches) for them to bury in a more upright postion, I can't say that they might not do that a nature.

While they are buried, they most often, but not always, have the whole shell covered with sand, except for the very tip of the siphonal canal. It usually sticks above the sand approximately a quarter of an inch. Only a small fraction of the siphon itself extends beyond the shell canal. However, the time that the siphon does extend high (perhaps a much as an inch) above the sand is when the food has been introduced into the water, and the snails seem to be smelling for it. They may stay buried for many days or come out, move around, and go back to "bed" every day or two. I can't seem to find a pattern, except when enough time has passed for them to be getting hungry. Then they do come out and move around on the sand frequently.

The lightning whelk's buried position is slightly different. His siphonal canal stays below the surface of the sand, and only a tiny black dot on the sand betrays the location of his siphon.

THE BAHAMAS--The Excitement Continues By Darwin Alder

Connie Boone, her husband and another couple were the first group from the Houston Conchology Society to visit Harbour Island, the Bahamas. We were the latest and largest group, and what a time we had! The other groups had stayed either at the cottage or the House, owned by the Coral Sands Hotel. Most groups had flown directly to North Eleuthra from Ft. Lauderdale, Florida and then taken a water taxi to Harbour Island. We took the Continental Funjet, which was a roundtrip charter flight from Houston to Nassau. One disadvantage of the Funjet is that the fare has to be paid 45 days in advance and another, the uncertainty of the availibility of an aircraft. All was well, however and we completed our flight to Nassau and stayed at the British Colonial Resort.

The Bahamas, consisting of about 700 islands, are about an hour's flight from Florida. Harbour Island is to the north of North Eleuthra. It is very small and most of the food and water is imported. Things are somewhat expensive. We went at the least expensive time but rooms ranged from $118 to $145 per night depending on accomodations, taxes and gratuities. Reservations for the boat were made after we arrived on the island. Edward, our taxi driver, was helpful to Connie in securing a boat. Since Herman's boat was too small, we secured the services of Andrew, his son, who had a bigger boat with a double motor. He charged us $100 for one half day, so it could have been quite expensive if there were only a few people in the group. One must remember that the Bahamas are a popular tourist attraction. The tides are usually low in June and this makes a great deal of difference in shelling. There appeared to be relatively little pressure from shellers, as we were the only ones there that we saw.

The Bahamas are very beautiful. There is fabulous scenery, beautiful water and excellent shelling. We explored a large variety of habitats. We went to grass and sand flats. We stopped by rocky shorelines. We explored sandbars and tidepools. In all there was a good selection of fauna from the Bahamas, much of it live and not too covered with coral or lime. Phyllonotus pomum were exceptionally clean.

One of the best places for shells was at the Narrows. It is a wave sculptured point of land, where the Caribbean and the bay waters come together. However, Bill and Emily Oakes had a close call with the currents and were nearly swept away. No one had any idea of their danger until later; it seemed as if they were just being adventuresome. Another good

place was Girl's Bay, which is a large sandbar when exposed at low tide. It is several miles long and about a mile wide. We collected great bivalves and Pat McElroy found a live Cymatium femorale (angulate triton) there. Our first, and one of the best, helmet was collected by Jim Clark on one of the grassy flats.

Andrew took us to dig for Asaphis deflorata (gaudy asaphis). He had shown us some good grass flats and everyone had found helmets but me (and Sandy Clark, Ed.), so I was sort of down in the mouth. Andrew didn't know what we were looking for or how to find it. We took our borrowed tools, dug trenches in the mangroves and were getting very disappointed. Connie saw some dead asaphis, started to dig around the rocks, shouted "Eureka" and saved the day. We found over 200 asaphis crowded in depressions on the rocky shore. Andrew gave up and went to sleep under a tree. My spirits rose to new heights and were even higher when I gathered a bag of drift which would yield over 50 species and over 3000 individual shells. Connie did as well or better with her drift.

Our last day on the boat was a banner day. Andrew took us to some deeper and rougher water. Connie achieved her goal of finding a live Charonia variegata (triton's trumpet) among the rocks. It was near a rocky point which had one of the prettiest coral gardens we saw. It was fabulous! Jim Clark found a smaller Charonia variegata. Andrew took pity on me and showed Bill Oakes where to dive for a helmet which he gave me. I said if I got more than one, I would give one to the auction in April. We stopped the boat, Andrew pointed me in the right direction. True to his word, I found not one, but three helmets in a row. After a while, I added two more. It was truly a banner day! Everyone else found helmets (except Sandy Clark). The only restriction on collecting live shells is that juvenile Strombus gigas (queen conch) cannot be taken. We took our caches home, had a delightful supper and exchanged stories.

On our last day we found some live Cymatium nicobaricum (gold mouthed tritons) in the grass flats. Cheryl showed us how it was done by finding the first one. It was a nice end to our shelling expedition. Mary tried to put the fear of God into some of the children who stole some of her shells. She didn't get the shells back, but the kids didn't come back either. I fell asleep on the bathroom floor while working on my shells. All in all it was great. We had our final supper at Angela's and packed for our flight home.

We explored Nassau and boarded our flight (Cheryl had her hair "corn-rowed" to look like a real "Island Girl"). We arrived in Houston, ready for our next trip to parts unknown.

Partial List of Shells from the Bahamas, June 21 - 28, 1990

GASTROPODA
Diodora cayenensis (Lamarck, 1822)
Diodora listeri (Orbigny, 1842)
Diodora minuta (Lamarck, 1822)
Diodora dysoni (Reeve, 1850)
Lucapina sowerbii (Sowerby, 1835)
Lucapinella limatula (Reeve, 1850)
Fissurella nodosa (Born, 1778)
Fissurella barbadensis (Gmelin, 1791)
Acmaea pustulata (Helbling, 1779)
Acmaea sp.
Cittarium pica (Linne, 1758)
Tegula fasciata (Born, 1778)
Tegula excavata (Lamarck, 1822)
Arene sp.
Astraea phoebia Roding, 1798
Astraea tecta americana (Gmelin, 1791)
Tricolia bella (M. Smith, 1937)
Tricolia spp.
Nerita peloronta Linne, 1758
Nerita versicolor Gmelin, 1791
Nerita tessellata Gmelin, 1791
Puperita pupa (Linne, 1767)
Smaragdia viridis (Linne, 1758)
Phenacolepas sp.
Littorina mespillum (Muhfeld, 1824)
Littorina meleagris (Potiez and Michaud, 1838)
Nodilittorina tuberculata (Menke, 1828)
Tectarius muricatus (Linne, 1758)
Echininus (Tectininus) nodulosus (Pfeiffer, 1839)
Rissoina bryerea (Montague, 1803)
Rissoina spp.
Zebina browniana (Orbigny, 1842)
Truncatella spp.
Vitrinella spp.
Caecum floridanum Stimpson, 1851
Caecum nitidum Stimpson, 1851
Caecum sp.
Vermicularia spirata (Philippi, 1836)
Vermicularia fargoi Olsson, 1951
Planaxis lineatus (da Costa, 1778)
Modulus modulus (Linne, 1758)
Cerithidea costata (da Costa, 1778)
Cerithidea spp.
Batillaria minima (Gmelin, 1791)
Cerithium atratum (Born, 1778)

Cerithium muscarum Say, 1832
Certhium litteratum (Born, 1778)
Certhium eburneum Bruguiere, 1792
Litiopia melanastoma Rang, 1829
Cerithiopsis greeni (C.B. Adams, 1839)
Cerithiopsis emersoni (C.B. Adams, 1838)
Seila adamsi (H.C. Lea, 1845)
Epitonium echinaticostum (Orbigny, 1842)
Epitonium spp.
Eulima sp.
Melanella spp.
Crepidula fornicata (Linne, 1758)
Crepidula maculosa Conrad, 1846
Strombus alatus Gmelin, 1791
Strombus gigas Linne, 1758
Strombus costatus Gmelin, 1791
Strombus raninus Gmelin, 1791
Cyphoma gibbosum (Linne, 1758)
Polinices lacteus (Guilding, 1834)
Sinum perspectivum (Say, 1831)
Natica livida Pfeiffer, 1840
Natica canrena (Linne, 1758)
Morum oniscus (Linne, 1767)
Cassis tuberosa (Linne, 1758)
Cymatium femorale (Linne, 1758)
Cymatium pileare (Linne, 1758)
Cymatium nicobaricum (Roding, 1798)
Cymatium muricinum (Roding, 1798)
Charonia variegata (Lamarck, 1816)
Tonna maculosa (Dillwyn, 1817)
Murex (Phyllonotus) pomum (Gmelin, 1791)
Murex (Chicoreus) florifer (Reeve, 1846)
Morula nodulosa (C.B. Adams, 1845)
Purpura patula (Linne, 1758)
Thais rustica (Lamarck, 1822)
Thais deltoidea (Lamarck, 1822)
Columbella mercatoria (Linne, 1758)
Columbella rusticoides Heilprin, 1887
Mitrella ocellata (Gmelin, 1791)
Ocenebra muricoides (C.B. Adams, 1845)
Colubraria lanceolata (Menke, 1828)
Nassarius albus (Say, 1826)
Fasciolaria tulipa (Linne, 1758)
Latirus sp.
Oliva reticularis Lamarck, 1810
Olivella sp.
Mitra spp.
Turbinella angulata (Lightfoot, 1786)

Marginella apicina Menke, 1828
Granulina ovuliformis (Orbigny, 1841)
Conus jaspideus stearnsi Conrad, 1869
Terebra (Hastula) hastata (Gmelin, 1791)
Turrid spp.
Pyramidella dolobrata (Linne, 1758)
Bulla striata Bruguiere, 1792
Bulla sp.
Pedipes mirabilis (Muhfeld, 1816)
Melampus coffeus (Linne, 1758)

POLYPLACOPHORA
Chiton spp.

SCAPHAPODA
Dentalium spp.

BIVALVIA
Arca zebra (Swainson, 1833)
Anadara sp.
Barbatia cancellaria (Lamarck, 1819)
Glycymeris indata (Linne, 1758)
Glycymeris pectinata (Gmelin, 1791)
Pinna carnea Gmelin, 1791
Atrina rigida (Lightfoot, 1786)
Pinctada imbricata Roding, 1798
Isognomon alatus (Gmelin, 1791)
Isognomon bicolor (C.B. Adams, 1845)
Argopecten nucleus (Born, 1778)
Linga pensylvanica (Linne, 1758)
Codakia orbicularis (Linne, 1758)
Lucina nassula (Conrad, 1846)
Divaricella quadrisulcata (Orbigny, 1842)
Trachycardium isocardia (Linne, 1758)
Americardia media (Linne, 1758)
Laevicardium laevigatum (Linne, 1758)
Laevicardium pictum (Ravenel, 1861)
Tellina radiata Linne, 1758
Tellina listeri (Gray, 1838)
Tellina fausta Pulteney, 1799
Asaphis deflorata (Linne, 1758)
Periglypta listeri (Gray, 1838)
Chione cancellata (Linne, 1758)
Chione paphia (Linne, 1767)

MONOGRAPH By H. ODE'

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Family SIPHONARIIDAE Gray, 1840

This is the family of so-called false limpets which are air breathers and, as such, closely related to land snails. In Texas there are two genera: Siphonaria and Williamia.

Genus Siphonaria Sowerby, 1823

In the N.W. Gulf of Mexico there is only a single species, S. pectinata (Linnaeus, 1758) belonging in the subgenus Patellopsis Nobre, of which it is the type. The shells can be distinguished from those of true limpets by the completely different muscular impressions.

342. Siphonaria pectinata (Linnaeus, 1758)

This well known species occurs in Texas mainly on man made structures along the coast. Often it can be found in great profusion on the rocks of jetties at low tide. It also lives on those parts of the jetties which are never exposed to air. (Harold Geis found it in profusion at 20 feet below mean tide level at both sides of the jetty at South Padre Island). In the survey collection are lots obtained from St. Joseph Island, Freeport and Galveston jetties. It seldom enters the bays. Only once was a living specimen obtained from Christmas Bay (Galveston Bay system). Equally, it seldom ventures out onto the open sea: one very large specimen was obtained alive at a depth of 45 feet twelve miles off Galveston. We have no Louisiana material. Biological details for this species can be obtained from a paper by Voss (1959) in Bull. Mar. Sci. Gulf and Caribbean, vol. 9, 84-99.

Records HMNS survey Collection: 12 lots, all alive.
Depth range: 0-45 feet.
Geographical range: Eastern Florida, Texas, Mexico, and the Caribbean. (Abbott, 1974).
Maximum size: 32.5 mm (offshore at 45 feet).

Genus Williamia Monterosato, 1884

These are small limpet-like shells with a small nucleus bent over towards the back of the shell.

Family TROCHIDAE, subfamily PLANITROCHIDAE Knight, 1956

Somewhat out of context, we will treat here a very remarkable find. In looking through some unidentified material, I discovered specimens of the living fossil Planitrochus disculus (Dall, 1889). In the Blake Report, Dall (1889) described a small, very depressed, whitish, polished and widely umbilicated shell as Fluxina discula and placed it in the SOLARIIDAE (=ARCHITECTONICIDAE). Unfortunately, the assigned type of Fluxina turned out to be a Calliostoma so that Fluxina became a synonym of Calliostoma, and F. discula was in need of a new generic name. I follow here Abbott (1974) in placing this shell.

Genus Planitrochus Perner, 1903

I repeat here Abbott's (1974) description: "Depressed, trochiform, with sharp carinate periphery and wide umbilicus. This is an upper Silurian genus and the only known living species, provisionally placed here is Planitrochus disculus (Dall, 1889) from the Straits of Florida, 500 meters, and the lesser Antilles. The shell is 6 to 10 mm in diameter, and it has a nacreous iridescence within its white glossy shell."

343. Planitrochus disculus (Dall, 1889)

Our only two specimens are juveniles, barely 1.2 mm in diameter, but in shape exactly like the figure in the Blake Report, plate 23, figs. 5 and 6. The umbilicus is exactly like that of fig.6 and lacks the ornamentation of architectonicid shells. These two minute glossy specimens are so far the only ones obtained.

Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 167 fathoms, 65 miles S.E. of Freeport, Texas.
Geographical range: Straits of Florida and Lesser Antilles (Abbott, 1974).
Maximum size: 1.2 mm.

Family POTAMIDIDAE H. and A. Adams, 1854

These are somewhat elongate, medium sized shells, which mostly inhabit intertidal mudflats in the tropics.
Source: Bequaert, Johnsonia, vol. 1

Genus Batillaria Benson, 1842

Placed in the subfamily BATILLARIINAE Thiele, 1929, the shell resembles a small Cerithium, but it has a multispiral operculum.

344. Batillaria minima (Gmelin, 1791)

This common West Indian and Caribbean species is not a valid component of our fauna. More than 25 years ago, a single dead specimen was taken along the Port Aransas Causeway. In spite of a diligent search at many subsequent visits, the species was never found again, and I suspect that it was adventitious at that location which is along the ship channel used by shrimpers coming sometimes from as far as Yucatan. Also, a few beachworn shells, possibly fossils, have been collected at Port Isabel but are not in the HMNS collection.

Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 0 fms.
Geographical range: South half of Florida to Brazil; Bermuda (Abbott, 1974).
Maximum size: 12.6 mm.

Genus Cerithidea Swainson, 1840

These are elongate, well sculptured shells, with paucispiral operculums. They inhabit tropical, intertidal mudflats. In the N.W. Gulf of Mexico there is only a single species.

345. Cerithidea (Cerithideopsis) pliculosa (Menke, 1829)

This is the only widespread member of this family found in the N.W. Gulf of Mexico. It is a fairly common species living at locations along the bay margins in Texas. It has been found alive in Galveston West Bay, Port Lavaca, Indianola (Matagorda Bay) and all of the more southerly bays of Texas. It appears that the best developed specimens live deeper inland in the bays, away from the inlet areas. Dead specimens are sometimes found in beach drift on the outer beaches. Due to industrial and recreational encroachment, the habitat of Cerithidea is rapidly disappearing.

Old sandblasted specimens can easily be misidentified as C. costata da Costa, a species that does not live on the Texas-Louisiana coast.

Records HMNS Survey Collection: 14 lots, of which 7 contain live-collected material.
Depth range: 0-1 fms; alive: 0-1 fms.
Geographical range: "Texas-Louisiana and the West Indies; south of Tampico replaced by the subspecies veracruzensis Bequaert, 1942" (Abbott, 1974).
Maximum size: 66 mm.

346. Williamia krebsii (Morch, 1877)

This is a widespread species on the offshore coral and algal reefs, but it has also been taken, rarely, on shell and sandy bottoms. It is a small highbacked limpet-like shell of reddish brown color, sometimes with quite vague radial banding. The surface is smooth. The nucleus is extremely small, consisting of hardly a single whorl and points somewhat sideways. It is separated from the body whorl by a deep circular constriction. The profile of this species is sketched in the figure below. This shows that when the shell is placed with the opening down, the highest point of the shell is not the nucleus. In this manner, one can separate Williamia from the, in many respects, quite similar, but completely (?) unrelated Tylodina.

In our material is one very peculiar specimen which has all the shell characteristics of Williamia, but possesses a dark brown periostracum.

Records HMNS Survey Collection: 19 lots of which 3 contain live-collected material; mostly from coral and algal reef environment.
Depth range: 10-55 fms; alive at 11-36 fms.
Geographical range: South Florida, off Texas and the West Indies, Bermuda (Abbott, 1974).
Maximum size: 6.3 mm.

Family OXYNOIDAE H. and A. Adams, 1854

This is a family of slug-like snails, with a small shell, partially covered by the animal. In the N.W. Gulf of Mexico there is a single genus.

Genus Lobiger Krohn, 1847

There is an external small, but large mouthed shell. Abbott (1974) reports only a single species to which we will assign our only lot.

347. Lobiger sowerbii P. Fischer, 1857

In the survey collection, there is only a single minute shell which in shape corresponds well with the figure in Abbott (1974).

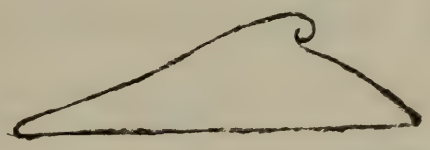
Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 24 fms.
Geographical range: South half of Florida to Brazil; Indo-Pacific, West Mexico.
Maximum size: 1 mm.

Family TYLODINIDAE Gray, 1847

The species in this family have limpet-like or very flat shells, with a sinistral nucleus, which are much smaller than the animal. Abbott (1974) places two species in the subfamily UMBRACULINAE, which Keen (1971) treats as a separate family.

Genus Tylodina Rafinesque, 1819

Rather small shells, limpet-like, which when dead resemble flatten Williamia shells. They have, however, a quite different profile (nucleus is highest point of shell, see sketch).



348. Tylodina americana Dall, 1890

A few juveniles of this uncommon species were picked out of several lots of Williamia krebsii, with which they were placed in the survey collection. A single, full-grown, fresh specimen was collected on the Stetson Bank. The profile of this species is quite different from that of Williamia. Dall described this species in the Blake Report, vol.II, 1889, p. 60, as Umbraculum bermudense (Morch?). The figure on plate 14 represents our material exactly. The apex is yellowish-orange in the large shell. In my opinion there are some objections to placing this shell in Tylodina. Both nucleus and muscular impressions are as in Williamia, and it would not surprise me that investigation of soft parts would remove this species from the TYLODINIDAE. Until this can be shown, I leave it in its original place. Of the 4 lots in the survey collection, one comes from the Flower Garden, 2 from the Miocene Shale Uplifts, and one from the mudlump fauna.

Records HMNS Survey Collection: 4 lots, no live-collected material.
Depth range: 10-30 fms.
Geographical range: Northern Gulf of Mexico to off Cuba, Bermuda (Abbott, 1974).
Maximum size: 13.0 mm.

Genus Umbraculum Schulimacher, 1817

The shells of the species in this genus are thick, flat plates in which, when full grown, no trace of whorls can be detected. The animal is large - to over 5 inches - and the shell may reach to over 2 inches.

349. Umbraculum umbraculum (Lightfoot, 1786)

In the past, we have reported this species as U. plicatulum (von Martens, 1881). It is fairly widespread along the Texas and Louisiana coasts. The dorsal shell is formed by a fairly thick, calcareous plate, often with rather coarse concentric growth rings. In the center, there is sometimes a button-like elevation. The interior is quite glossy.

Records HMNS Survey Collection: 6 lots, no live-collected material.
Depth range: 10-30 fms.
Geographical range: South Florida to off Texas and the Caribbean; Bermuda (Abbott,1974).
Maximum size: 55.7 mm.

Genus Hyalopatina Dall, 1889

In the Blake Report Dall described a very thin, bluish white, quite flat shell, with numerous radiating lines of extremely minute, slightly elevated points. Comparing the juvenile of this species with that of Umbraculum, it appears that Hyalopatina should be a full genus if shell characters mean anything. Abbott (1974) states that soft parts are unknown.

350. Hyalopatina ruthii Dall, 1889

Of this shell we have 2 lots. One, obtained off Louisiana, consists of a small, somewhat chipped, juvenile that agrees in all respects with Dall's description (Blake Report, vol.II, p.61, 1889). The other lot, obtained off Texas, contains a much larger, much thicker shell with close radial ribs of pustules. It is limpet-like and is, only with great doubt, placed here. It looks discolored and worn and may be a gerontic specimen of Hyalopatina.

In our juvenile specimen, the sinistral nucleus is almost completely immersed in the slightly elevated shell around it. Until now, this extremely rare species was only known from the type locality in the Bahamas at 30 fms. depth.

Records HMNS Survey Collection: 2 lots, no live-collected material.
Depth range: 10-36 fms.
Geographical range: Known only from off Great Isaac Light, Bahamas (Dall, 1889).
Maximum size: 9.3 mm.

Family PLEUROBRANCHIDAE Menke, 1828

This is a family of sluglike animals with an internal shell.

Genus Pleurobranchus Cuvier, 1804

Represented in the survey collection by a single small shell.

351. Pleurobranchus sp. indet. A

There are several closely related species in the western Atlantic (see Abbott, 1974). To identify a small spatula-formed shell with a minute whorl at one end is not possible; for the time being, we will leave the shell without a trivial name.

Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 24 fms.
Geographical range: Unknown.
Maximum size: 2.8 mm.

LIBRARY EXHIBIT

Special thanks to the following people who helped with the HCS displays at the downtown Houston Public Library: Darwin Alder - Texas and Gulf Coast shell; Lynn Blair - faux aquarium (underwater scene); Lucy and Jerry Clampit - Helmets, Tuns, and Strombus; Sandy and Jim Clark - Pecten and other bivalves; Dave and Lucille Green - Spondylus and Cowries; Mary Martin - worldwide beauties; Dr. John Mchenry - cones; Emily and Bill Oaks - shell craft and related items; Gary Olson - Murex; and Richard Yuill - shells on postage stamps, and Caribbean shells. The shells were on display during the month of July. The Library staff reported that it was one of their most popular exhibits.

Library patrons of all ages enjoyed the shell display.

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TABLE OF CONTENTS

SEARCH AND SEIZURE
New Museum Exhibits
By Constance E. Boone 1

COUNTDOWN COA
By Lucy Clampit 4

BEACH TRASH SCULPTURE
Your Dinner Is Served
By Cathy Betley 5

MICROSHELL COLLECTING AMONG BALD EAGLES
By Helmer Ode'. 7

SHELLING IN TEXAS
2. Corpus Christi and Nueces Bays
By Darwin Alder 10

PEAR WHELK ACTIVITIES
By Jan Hobbs 11

THE BAHAMAS
The Excitement Continues
By Darwin Alder 16

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO (A Continuing Monograph) Families SIPHONARIIDAE, TROCHIDAE, POTAMIDIDAE, OXYNOIDAE, TYLODINIDAE, and PLEUROBRANCHIDAE
By Helmer Ode' 21

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A THOUSAND AND ONE MICROSHELLS FROM ARABIA

by H. Ode'

Sometime ago I attended a meeting of the Austin Shell Club and acquired there a small plastic bag with some pinkish coral "sand". Mrs. C. Ramey had collected this material at the Strait of Hormuz in the United Arabian Emirates for use in shell craft projects. Upon being told that, in all probability, the microscope would discover some interesting microshells in this material, she graciously presented it to me.

The material was collected close to the hotel at Khor Fakkan where the beach had been cleaned by bulldozers so that hardly any shells could be found. However, there were mounds of scrapings full of shells. The coral sand was taken from one of these mounds.

When the first small heap of sand was put in a small black tray and looked at through the microscope, I nearly flipped. I thought Mrs. Ramey must be mistaken in her location. I saw several beautiful Schwartziella, a large Phasinella, some Litiopa, Cerithiopsis, Alvania and several small lucinids and many Ervilia. They were all very similar to their counterparts in the Caribbean.

After a while, however, it became clear that, although most shells looked extremely familiar, they differed in minor respects from the well-known Caribbean material which one can colllect on the Yucatan platform or in the Bahamas.

It is not the purpose of this note to list all species with full names that came out of this sample. I am too unfamiliar with this particular fauna to recognize most of these microshells and am not familiar with the juveniles of the larger species. Rather, I will dwell on two rather curious aspects of this sample of coral debris.

In the first place, there is a surprising similarity between the familial, and probably generic, composition of the Yucatan and Hormuz faunas, at least for the micromollusks. This similarity may even extend to lower catagories, because I suspect that a number of microgastropods and microbivalves of the coral reef and carbonate environment have a worldwide distribution, although such species are listed listed under different names for various faunal provinces.

It should be mentioned here that almost all specimens in the sample were smaller than 1/5 of an inch and that the majority of species probably never exceed 1/10 of an inch in maturity.

In the second place, the sample yielded some very curious bivalves which deserve special mention. They were so

remarkable that I called Mrs. Ramey and asked if there was any more material available. Fortunately, there was, and I obtained a small coffee can of coral grit so that a statistically more satisfactory comparison with the Yucatan fauna could be made. Differences between the two faunas can be immediately inferred from the foraminiferal content of the samples, but these cannot be discussed here.

A third observation is somewhat disconcerting. The picking of the sample showed ample traces of human caused pollution. Small worn shards of glass derived from soft drink and beer bottles were not rare. There were also numerous little tar balls, fortunately always covered by coral grit. They could be natural, but one must remember that the most intense tanker traffic in the world passes through these straits. Moreover, very recently a bitter war has been fought in and over these waters, which has caused some pollution by hydrocarbons. [Editor's note: this article was written before the current war and massive oil spill.]

Before listing the species in this extremely interesting sample, I may point out again that because I am not familiar with the particular species of that area, the interest of this enumeration is only in the overall composition of this sample and that some of the generic designations very possibly are erroneous. Most of this material has been deposited in the Houston Museum of Natural Science, so that in the future it will be available for a more detailed study.

GASTROPODA

Scissurella sp., common, variable in shape and sculpture.
Nesta(?) sp., very small limpet shaped, with nucleus sideways appressed. **Fig.1.**
Rimula sp., 1 specimen.
Emarginula sp., common.
Hemitoma(?)sp., a few specimens.
Fissurella sp., common.
Lepeta(?)(or similar genus), abundant, very finely and densely sculptured by medial grooves. Very small, often worn away, nucleus.
Trochid (?), very small, white, glassy, umbilicated; **Fig.2.**
Euchelus (?), white, no umbilicus.
Euchelus (?)
Solariella (?) sp.
Synaptocochlea sp., common, strongly colored.
Cyclostrematid (?), 5 specimens.
Arene sp., one fragmented shell.
Nerita sp., one juvenile shell.
Phenacolepas sp., 2 specimens.
Pachystremiscus sp., ± 10 specimens. Very finely ribbed and nodulose where they cross a few spirals. Circumferential rib very finely grooved; **Fig. 4.**

Pachystremiscus (?)sp., single specimen, somewhat trumpet like: flared at the mouth. Very fine spiral sculpture; **Fig.5.**
Alvania sp., deep suture. Somewhat inflated whorls.
Alvania sp., one specimen, thin shelled, conical.
Alvania sp., coarse, thick-shelled, abundant.
Zebina sp., three specimens.
Rissoina sp., common.
Schwartziella sp., abundant.
Schwartziella sp., one specimen, only a few coarse ribs and somewhat coronated whorls.
Schwartziella sp., abundant; a small species in the subgenus Pandalosia.
Phosinella sp., common, purely white.
Amphithalamus sp., a single specimen of a small slender species.
Barleeia sp., three specimens of a large, fat brown species.
Barleeia (?) sp., one specimen of a small slender species.
Barleeia sp., glassy, white small. Most abundant gastropod in sample. Some specimnens are faintly spirally sculptured, others are somewhat nodulose, still others have opaque spots in the glassy shell and many are completely smooth; **Fig. 26.**
Barleeia sp., 5 medium sized, pupoid specimens.
Elachisina sp., fairly common, finely spirally striated.
Unknown rissoid (perhaps in Alvania group); **Fig. 6.**
Unknown rissoid (perhaps rissoinid); **Fig. 25.**
Caecum sp., abundant, strong annuli.
Caecum sp., common; rounded much less strongly developed annuli. Strong varix.
Brochina sp., common; several first stage specimens.
Caecum (Elephantulum) sp., abundant. Strongly longitudinally ribbed.
Teinostoma (Idioraphe) sp., 4 specimens in Cryptospira group.
Teinostoma sp., a single specimen of Teinostoma s.s. (keeled and dome shaped).
Paroiturbo sp., a single specimen; belongs in Trochidae.
Cyclostremiscus sp., one juvenile specimen.
Cochliolepsis sp., common.
Truncatella sp., several fragments, densely ribbed species.
Truncatella sp., one specimen, coarsely ribbed, coronated whorls.
Rissoella sp., A few very small specimens. **Fig. 3.**
Omalogyrus sp., common. **Fig. 7.**
Vermicularia sp., abundant fragments.
Heliacus sp., one juvenile shell.
Architectonica sp., 2 juvenile shells.
Serpulorbis (?) sp., abundant.
Modulus sp., common, but very small. Quite unexpected.
Potamides (?) sp., one specimen.
Cerithium sp., short, white with small brown spots, rather large apical angle.
Certhium sp., juveniles of a deeply sutured species.
Cerithium sp., very smooth, hardly sculptured.

Cerithium (?) sp., only spirally sculptured. Probably not a Cerithium.
Finella sp., common, white.
Bittium (?) sp., a few specimens.
Litiopa melanostoma; abundant.
Alaba sp., one large specimen.
Metaxia sp., common, purely white.
Triphora sp., an even, brown, small species.
Triphora sp., flocked, close to T. decorata.
Triphora sp., similar to turristhomae.
Cerithiopsis sp., This is the most species rich group of small gastropods in the sample. It is often difficult to judge from our limited material whether species are different. More material is necessary to sort out the amazingly variable patterns of sculpture, color and nucleus. The first species listed here is slender, white with brown band at the suture.
Cerithiopsis sp., also with brown band, but with different sculpture.
Cerithiopsis sp., short, barrel shaped, with white band.
Cerithiopsis sp., dark brown, barrel shaped, white nucleus.
Cerithiopsis sp., relatively long, slender; even brown or light brown. Abundant.
Cerithiopsis sp., slender, very dark brown, shiny.
Cerithiopsis sp., rather purplish banded species. Fairly common.
Cerithiopsis sp., even brown species with extremely long white nucleus. Only a few specimens.
Cerithiopsis sp., very coarsely sculptured, brown species.
Cerithiopsis sp., barrel shaped, white banded species.
Cerithiopsis sp., very small, barrel shaped light brown species.
Cerithiopsis sp., very dark, almost black small species.
Cerithiopsis sp., purely white small species.
Cerithiopsis sp., large, coarsely sculptured species.
Cerithiopsis sp., a small, banded, somewhat barrel shaped species.
Cerithiopsis sp., a dark brown slender species. It is very well possible that some of the above "species" are merely natural extremes of a few truely different species. All were separated on purely morphological characteristics of the shell. Such criteria are in the absence of biological and anatomical studies often of little value.
Fragments of three different species of Epitonium, probably all unidentifiable.
Mellanella sp., (curved spire); a few specimens.
Eulima sp., several specimens. Resembles small E. jamaicensis.
Eulima sp., a small species with keeled base. One specimen.
Eulima sp., some very small specimens.
Eulima sp., fragment of another species (not retained).
Graphis sp., 2 capsules. In one an extremely small juvenile specimen > .5 mm, already needle shaped.
Calyptraea sp., one small shell.

Calyptraea sp., one very small complete specimen, ± .5 mm in diameter.
Tugurium (?) sp., small specimen with enormous keel and typical xenophorid underside. **Fig. 8.**
Megalomphalus sp., 2 small species. **Fig. 9.** Densely and sharply ribbed.
Lamellaria sp., 2 small specimens.
Trivia sp., fragment not retained.
Polinices sp., small white species of the lacteus, uberinus group. Juvenile, have a brown tipped nucleus. common.
Juvenile cassids; small white; abundant.
Mitrella sp., several fresh looking specimens with ocellate color pattern.
Columbellid fragment (not retained).
Anachis sp., fairly common.
Aesophus (?) sp. **Fig. 10.**
Nassarina sp., abundant.
Cystiscus (?) sp. 3 small specimens.
Prunum sp., small, white, abundant.
Volvarina sp., blunt, rounded apex.
Volvarina sp., more conical apex.
Vexillum sp., 3 small specimens.
Vexillum sp., 3 small specimans.
Thala sp., fairly common.
Terebra sp., one of the few larger shells. Related to the Caribbean cinerea.
Kurtziella sp., 1 specimen.
Nannodiella (?)sp., one specimen.
Glyphoturris (?) sp., one specimen.
Pyrgocythara (?) sp., common, purely white.
Eulimella sp., 3 specimens.
Eulimella sp., 2 specimens.
Juvenile pyramidellid; glassy clear with 2 ridges on the columella (Tiberia?).
Odostomia sp., 5 specimens of a smooth unadorned species.
Odostomia sp., 1 specimen with large columellar tooth.
Evalea sp., 5 smooth, somewhat shiny specimens.
Pyrgulina sp., one long, weakly ribbed, slender specimen; **Fig. 11.**
Cingulina sp., common; very close and probably identical with C. babylonia.
Eulimastoma (?) sp., about 10 specimens.
Miralda sp., several small specimens.
Chrysallida sp., common.
Egila sp., 2 specimens. **Fig. 12.**
Chemnitzia sp., several specimens of a small, white, densely ribbed species.
Chemnitzia sp., 2 specimens of a coarse ribbed species.
Mormula sp., 1 specimen, white.
Turbonilla (?) sp., several very inflated whorls. Probably not a Turbonilla. **Fig. 13.**
Pyrgiscus sp., very small, white species with coronated whorls.

Pyrgiscus sp., small, brown, very slender species.
Pyrgiscus sp., slender white species with shallow suture bordered by a brown band.
Acteon sp., 2 specimens resembling the Caribbean A. punctostriatus.
Acteon (?) sp., slender, cylindrical species with a strong columellar fold and spiral structure.
Juvenile acteonid; 1 specimen.
Ringicula sp., 3 specimens.
Acteocina sp., abundant; cylindrical form similar to candei.
Acteocina sp.,short barrel-shaped, with submerged nucleus.
Acteocina sp., similar, but with projecting nucleus.
Acteocina sp., somewhat fusiform with rounded ends; common.
Philine sp., 5 small specimens.
Atys (?) sp., 4 small specimens.
Haminoea sp., 1 specimen.
Small opisthobranch with cancellate sculpture. 4 specimens. **Fig. 14.**
Limacina (Thilea) sp., 2 small specimens.
Clio sp., several specimens.
Tylodina sp., one specimen.
Pleurobranchus (?) sp., 6 specimens.
Pleurobranchus (?) sp., 2 specimens.
Siphonaria (?) sp., several small specimens.
Williamia sp., 2 specimens.
Pedipes sp., 7 specimens.

BIVALVIA
Unknown bivalve; hinge cyrenoid ? Pallial sinus. **Fig. 15.** Sculpture: half of the surface is concentrically, the other half radially, ribbed.
Arca sp., several juveniles.
Barbatia sp., abundant; close to B. domingensis.
Barbatia (Fugleria) sp., a few juvenile valves.
Arcopsis sp., a few juvenile valves.
Glycymeris sp., a few juvenile valves.
Branchidontes sp., common; all juveniles.
Crenella (?) sp., 2 juvenile valves.
Lithophagia (?) sp., a single juvenile valve ± .5 mm.
Juvenile mytilid. Small juveniles with blunt apex.
Isognomon sp., one juvenile valve.
Lima sp., 3 small juveniles.
Limaria sp., 1 small juvenile.
Parilucina sp., 3 small valves.
Codakia sp., 3 small valves.
Chama sp., only a few juveniles.
Lepton (?) sp., Rather flat species with irregular pattern of growth lines. **Fig. 16.**
Kelliid (?), 2 small valves. **Fig. 17.**
Montacutid species, 3 small valves. **Fig. 18.**

Very small leptonid with cancellate sculpture; ± 10 valves. **Fig. 19.** In the figure, the cancellate sculpture which is visible through the glassy shell, is shown.
Cardita sp., 1 small valve.
Cyclocardia sp., 1 valve.
Condylocardia sp., fairly common.
Scambula (?) sp., 2 valves. **Fig. 20.** This is quite unexpected. In the Treatise, Scambula is only listed for the Upper Cretaceous of the U.S.A. (Texas). This is a genus close to Crassinella but with stronger hinge development, less trigonal form and denser surface structure.
Crassinella sp., 1 valve. **Fig. 21.**
Crassinella sp., several fragmented valves.
Trachycardium (?) sp., only fragments (not retained).
Papyridea sp., 1 juvenile valve.
Juvenile cardiids (in Fraginae ?), several valves.
Ervilia sp., somewhat unsymmetric, slender, common.
Ervilia sp., symmetric, rounded, triangular, common.
Tellina sp., a single juvenile.
Scissula sp., a single valve.
Scissula sp., a single very different valve.
Tellina (Acorylus) sp., 3 valves.
Angulus (?) sp., fairly common.
Macoma sp., 3 valves.
Strigella sp., common.
Semele sp., 2 juvenile valves resembling S. bellastriata.
Cumingia sp., common.
Bernardina (?) sp., several valves; very heavy hinge development and outspoken prodissoconch. **Fig. 22.**
Pitar (?) sp., juveniles and fragments.
Gouldia sp., juvenile valves, common.
Saxicava (?) sp., 3 valves. The genus of this myoid species is very uncertain.
Corbula sp., 2 valves.
Gastrochaena sp., two minute juvenile valves.
Sphenia (?) sp., some fragments.

SCAPHOPODA
Dentalium sp., 1 specimen; longitudinally ribbed.
Dentalium sp., 1 specimen of circular cross section.

POLYPLACOPHORA
Plates of chitons. Possibly 3 species.

Omitted here is all material so fragmented that identification is impossible. At a guess there are ± 30 species observed which cannot be listed here.

Finally, I list here two problematica:

Capulid (?), a single, very small, limpet-like shell. **Fig. 23.**
Unknown bivalve: 2 very small specimens. **Fig. 24.**

Legend

Fig. 1 Nesta (?) sp.
Fig. 2 Trochid (?) species
Fig. 3 Rissoella sp.
Fig. 4 Pachystremiscus sp. (2 views)
Fig. 5 Pachystremiscus (?) sp.
Fig. 6 Unknown rissoid
Fig. 7 Omalogyrus sp.
Fig. 8 Tugurium (?) sp.
Fig. 9 Megalomphalus sp. (2 views)
Fig. 10 Aesophus (?) sp.
Fig. 11 Pyrgulina sp.
Fig. 12 Egila sp.
Fig. 13 Turbonilla (?) sp.
Fig. 14 Opisthobranch
Fig. 15 Unknown bivalve (2 views)
Fig. 16 Lepton (?) sp.
Fig. 17 Kelliid
Fig. 18 Montacutid species
Fig. 19 Unknown leptonid
Fig. 20 Scambula sp. (2 views)
Fig. 21 Crassinella sp.
Fig. 22 Unknown bivalve
Fig. 23 Capulid (?)
Fig. 24 Unknown bivalve
Fig. 25 Unknown rissoid
Fig. 26 Barleeia sp.

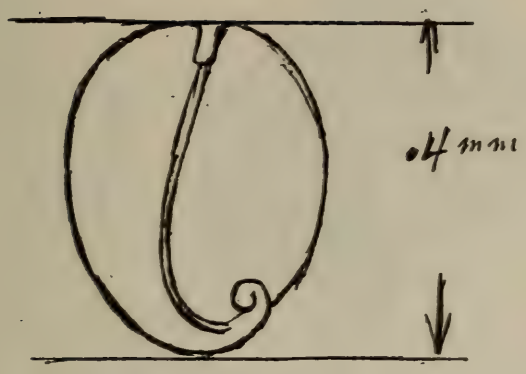


Fig. 1

Fig. 2

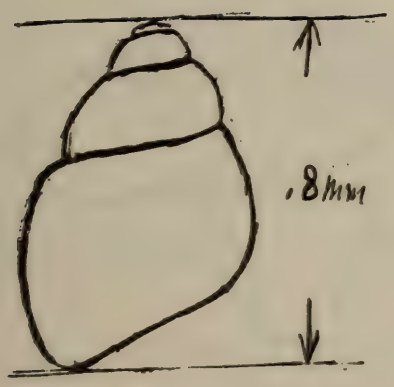


Fig. 3

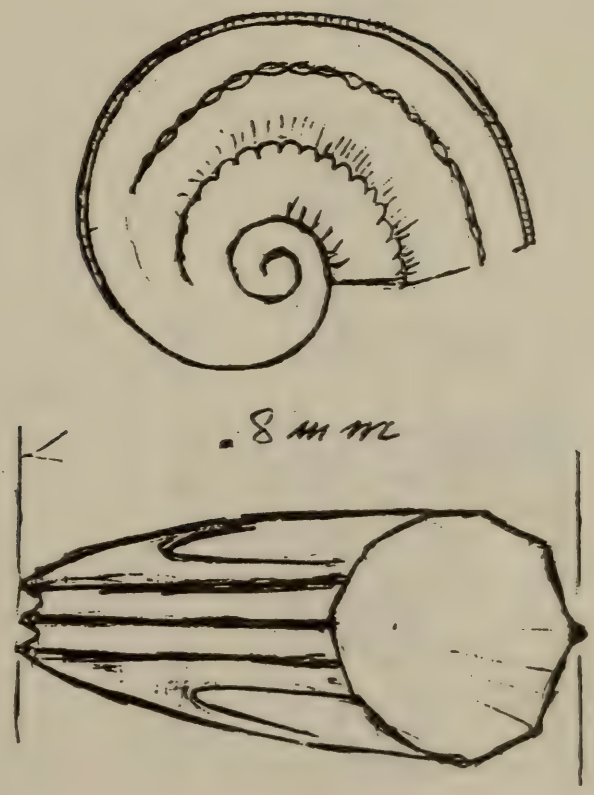


Fig. 4

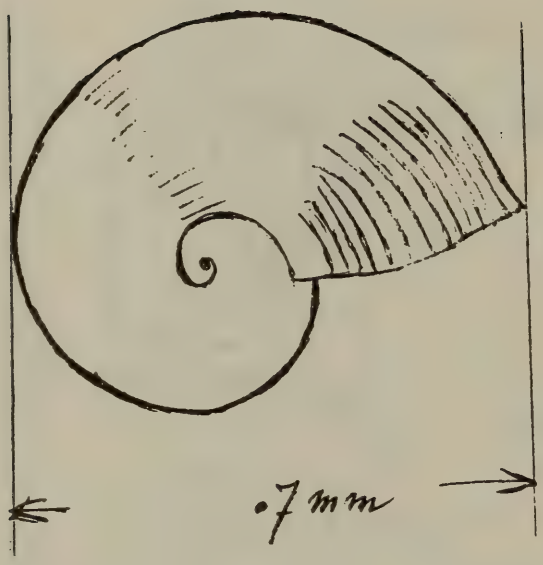


Fig. 5

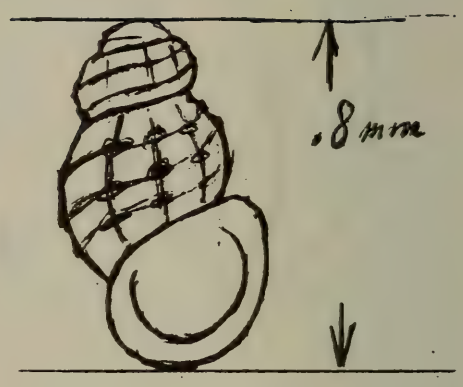


Fig. 6

Fig. 7

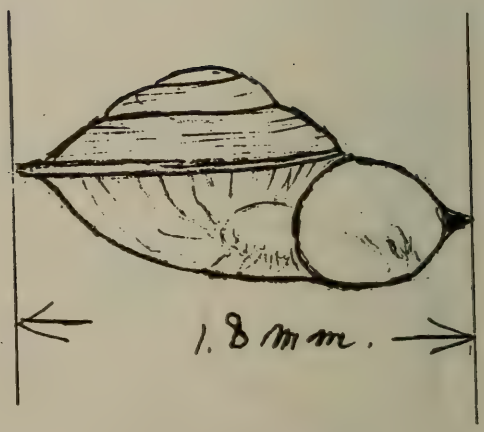


Fig. 8

Fig. 9

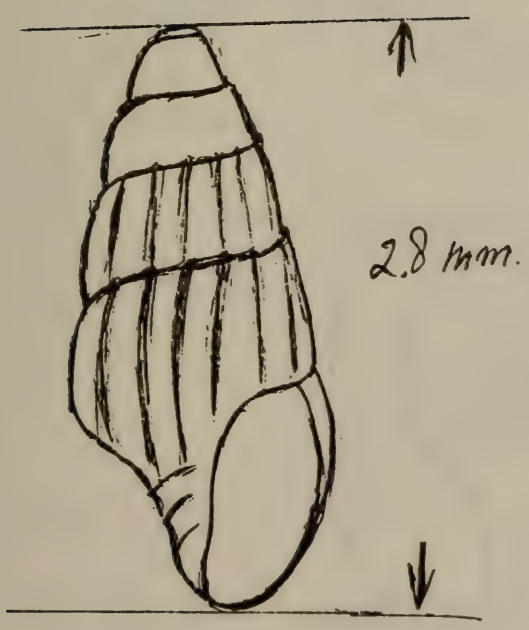


Fig. 10

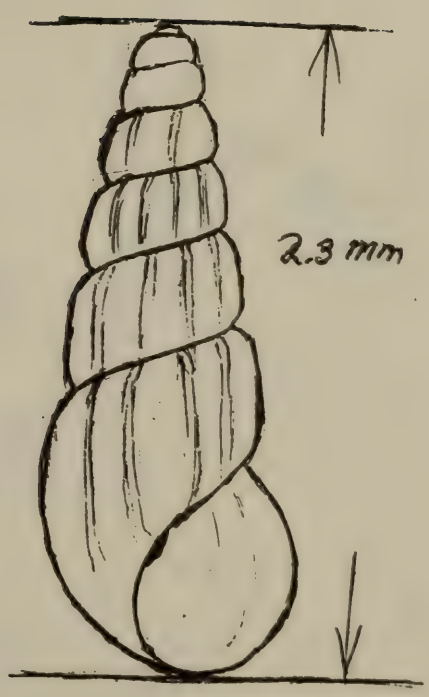


Fig.11

Fig. 12

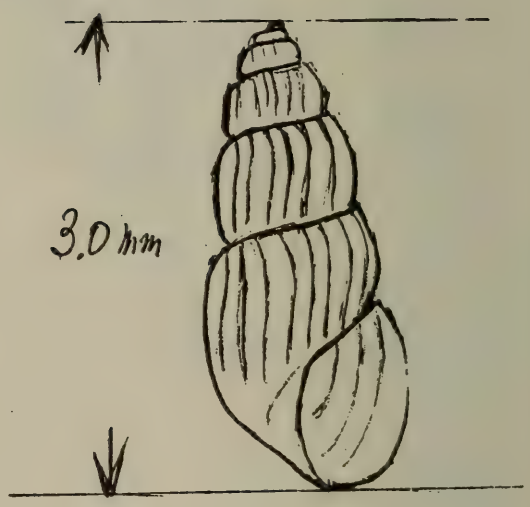


Fig. 13

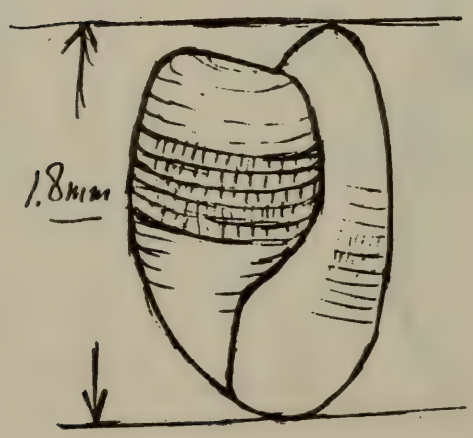


Fig. 14

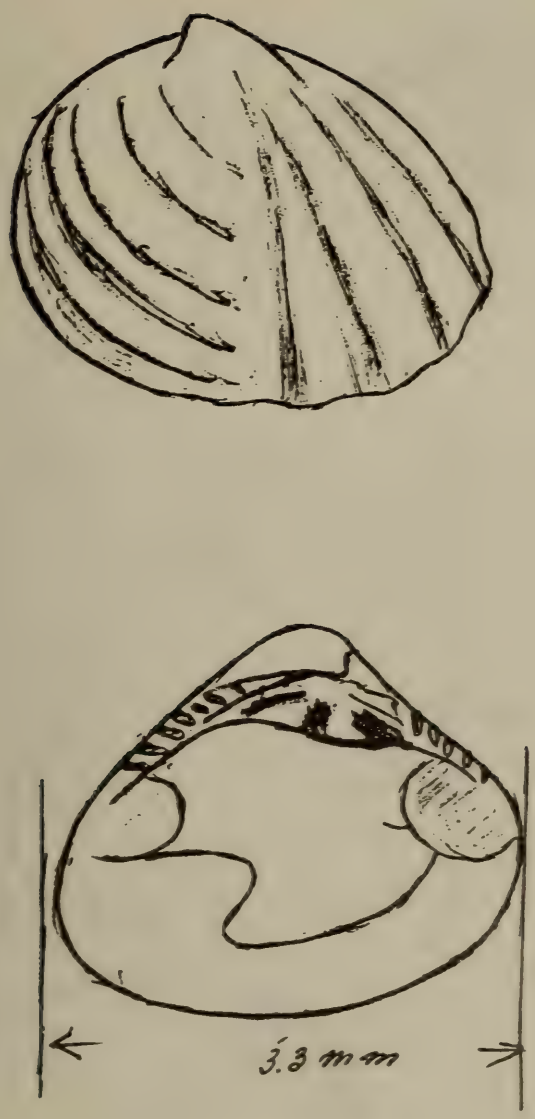


Fig. 15

Fig. 16

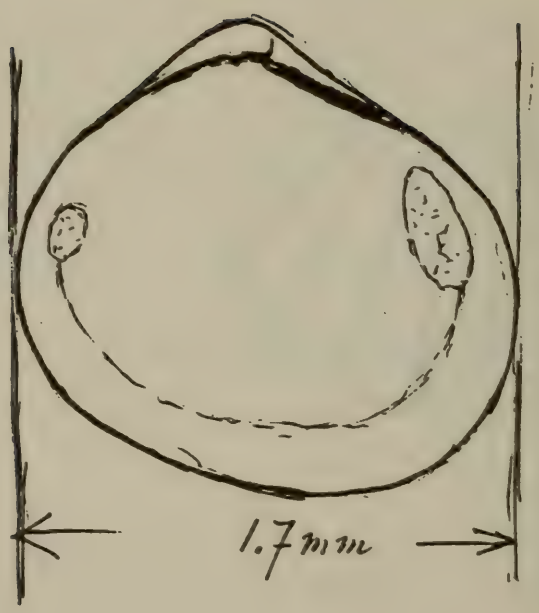


Fig. 17

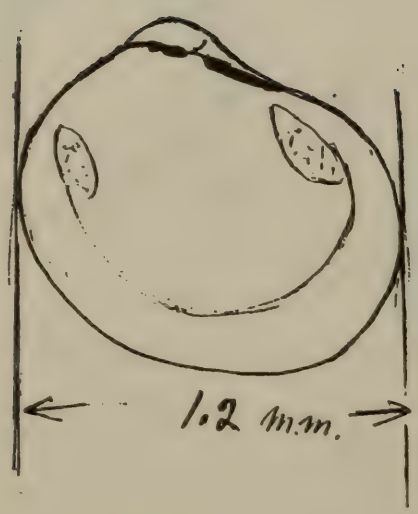


Fig. 18

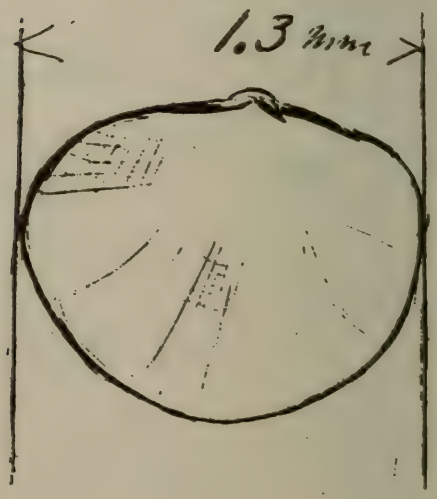


Fig. 19

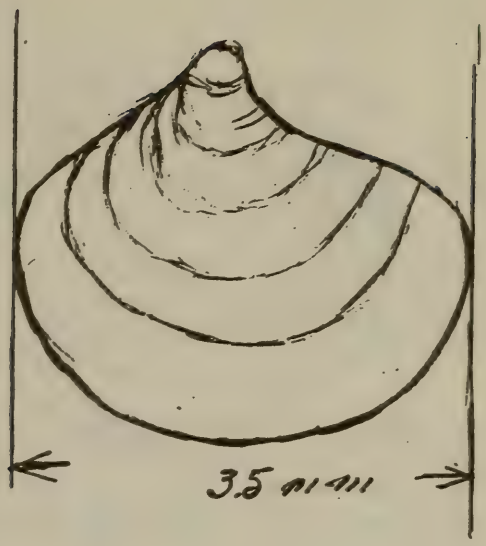


Fig. 21

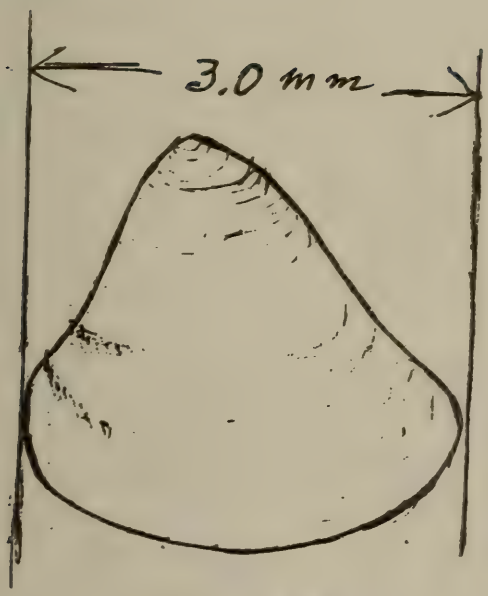


Fig. 20

Fig. 22

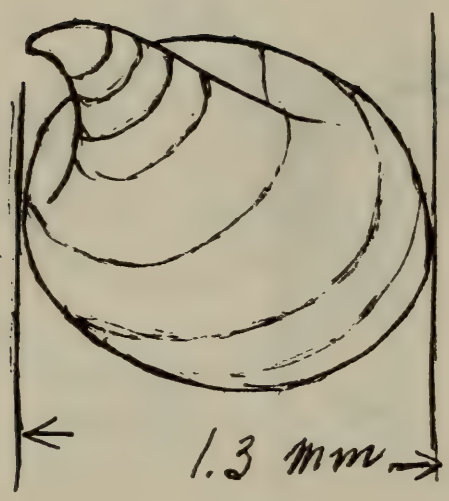


Fig. 23

Fig. 24

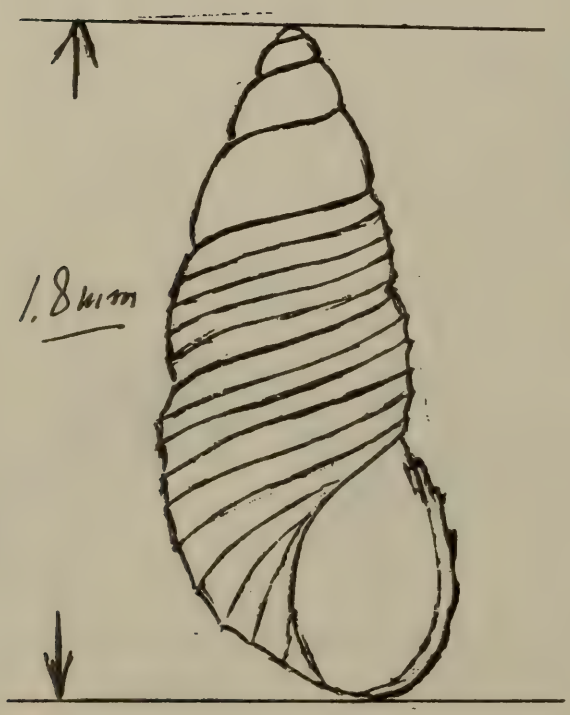


Fig. 25

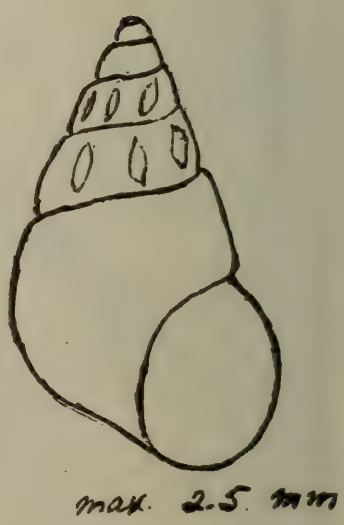


Fig. 26

SHELLING IN TEXAS by Darwin Alder

3. San Jose Island, Mustang Island
Laguna Madre (portions)

This my favorite location in the entire state. It has some of the best and most varied shelling

To get there, take US 59 south from Houston to SH 172 (the 2nd Ganado exit), then left to SH 35, right to Aransas Pass and left on 361 to go by the Aransas Channel and Bridge and to the free ferry to Port Aransas.

My favorite route is US 59 south to Victoria, US 77 south to Refugio. In Refugio, Take FM 774 left at the county courthouse for about 2 miles to FM 2678. Turn right towards Bayside, join with FM 136, turn left onto FM 881, continue east to the junction with FM 1069. If you turn right on 1069 you will go to Ingleside. FM 1069 straight ahead ends up at SH 35. Turn right and go to Aransas Pass. FM 1069 is near City by the Sea, as a point of reference. Take SH 35 to Aransas Pass, left on SH 361, then on to the ferry. When you cross the ferry, the jetty boat to San Jose Island is on the left by the traffic light. The cost is $7.50 per person. The boat starts to run at 6:30 a.m..

The mud flats near the Aransas Pass Bridge are a good place to start. When the tide is low, there is much exposed grass and mud. All along the channel there are many places to look. I have been around most of the islands accessible to the left side of the road going toward Port Aransas. The last road before the ferry (NL Industries) has some good grass and mud flats. San Jose Island is over 20 miles long. There is a fence about 1 mile down from the jetty boat landing. There is a wreck about 2 miles further along and another, about 2 more miles farther. There is a fence before the ranch, about 12 miles down and this is the farthest I have walked. South jetty is in the city of Port Aransas. There are good shelling locations the entire length of Mustang Island, especially Mustang Island State Park and Fish Pass.

To whet your appetite, here are some of the species to be found in this area: Amea mitchelli, Phallium granulatum, Hexaplex fulvescens, Busycon perversum pulleyi, Pinctada imbricata, Pteria colymbus, Cyphoma intermedium, Simnialena marfulera, Lopha frons, Tonna galea, Epitonium angulatum, Oliva sayana and Tellina alternata among many others.

'Common Objects at the Seaside', by John Leech, *Punch*, 1857

Fig. 1. The drawing of men, women, and children collecting marine animals and plants in tidepools in England reminds us the the stance for collecting remains the same today as is was in the mid 1800s, when there was a passion for stocking home aquaria. The drawing appeared in Punch in 1857 and was done my John Leech. This is copied from the book, "The Heyday of Natural History," (1980) by Lynn Barber.

SEARCH AND SEIZURE By Constance E. Boone

NOTES ON FIELD TRIPS OF THE 1800s

The passion for accumulating natural objects was at its height during the 1800s in Europe. Not only were people from all walks of life enjoying the outdoors and bringing in live material to observe, these people were also totally committed to learning about the plants and animals they collected. In fact, it was considered quite vulgar to collect and not become educated about the collection. Men, women, and children learned the Latin names and something of the life styles of whatever was collected!!

One of the first popular fashions for collecting was developed in the first part of 1800 in England after Nathaniel Bagshaw Ward invented the "Wardian case" which was a glass case in which plants could be grown successfully. Everybody developed a passion for collecting and growing ferns in this kind of case. It became, especially, a lady's craze.

Charles Kingsley reported patronizingly in Glaucus (1855) as follows: "Your daughters, perhaps, have been seized with the prevailing 'Pteridomania', and are collecting and buying ferns, with Ward's cases wherein to keep them (for which you have to pay) and wrangling over unpronounceable names of species, (which seem to be different in each new Fern-book that they buy) till the Pteridomania seems to you somewhat of a bore: and yet you cannot deny that they find an enjoyment in it, and are more active, more cheerful, more self-forgetful over it, than they would have been over novels and gossip, crochet and Berlin-wool. At least you will confess that the abomination of 'Fancy work', that standing cloak for dreamy idleness, ...has all but vanished from your drawing-room since the 'Lady-ferns' and 'Venus's hair appeared."

By the 1860s the fern cases began to seem a little dull. Then Robert Warington, a chemist, began to develop the aquarium principal beyond the gold fish bowl, and a new passion developed. It was not long before there were men, women, and children out in tide pools collecting animals and plants to put in home aquariums. Booklets on how to maintain such aquariums stated that it was not impossible for people in London to keep salt water aquariums, because you could just have a jar of sea water brought up once every couple of months. Raising algae was thought much more pleasing than pressing leaves in a book! Philip Henry Gosse did much to help this passion along with his experiments and

instructions in books for the public (like The Aquarium, 1854).

Edmund Gosse wrote of his father's pursuits as follows: "He conducted fashionable field classes in marine zoology, and I recall seeing a long desultory line of persons on a beach of shells. At the head of the procession, like Apollo conducting the Muses, my father strides ahead in an immense wide-wake, loose black coat and trousers, and fisherman's boots, with a collecting basket in one hand, a staff or prod in the other. Then follow gentlemen of every age, all seeming spectacled and old to me, and many ladies in the balloon costume of 1855, with shawls falling in a point from between their shoulders to the edge of their flounced petticoats, each wearing a mushroom hat with streamers."

G.B. Sowerby's Popular History of the Aquarium in the Lovell Reeve series of half-guinea illustrated natural history handbooks gave his readers the essential reassurance they always needed when embarking on a new pursuit: "Nor is it only for amusement that such parlour oceans and lakes are prepared and stocked; they are invaluable as a means of instruction." In describing the unfortunate tendency of most starfish to throw off limbs when put in a tank, he stated that "a slight dash of melancholy may be introduced occasionally to vary the amusements of a zoological tank."

Keep aquariums meant the middle class holiday visitors to seaside locations had reasons to collect objects in tide pools. Gosse and other authors extolling the virtues of aquariums gave purpose to finding specimens to stock their new aquaria at home. It was considered much more worthwhile than the old-fashioned custom of collecting pretty shells and seaweeds to make into decorative objects.

Mrs. Gatty advised the ladies in special dress and equipment as follows: Ladies should aim to wear a sort of 'yachting costume' modified by the addition of boys' shooting boots, short petticoats, stout gloves, and wool stockings. "Anyone really intending to work in the matter, must lay aside for a time all thought of conventional appearances" and "fancy millinery 'must and will' be laid aside by every rational being who attempts to shore hunt."

G.H. Lewes recommended that the serious shore hunter should carry a largish geological hammer, a cold chisel, an oyster knife, a paper knife, a landing net, a small crowbar, a large, flat-bottomed basket, various phials and bottles from the chemist's. He stated that short squat bottles, with wooden caps, then sold for tooth powder, were very convenient. He recommended using jam jars. Home equipment should consist of more pots and bottles, and an aquarium and a microscope with which to study the smaller organisms.

The craze for home aquariums finally did die out for awhile, but there were then established some fine museums for all the objects collected. Some of the museums were also major aquariums for the public.

All of this really does sound very familiar to this collector of mollusks. I am sure you feel the same. Especially, I note that early Europeans did feel that learning about the objects they collected was very important. I repeat: It was considered vulgar to collect and not become instructed about the objects collected!!!

The material for this article comes from a delightful book titled "The Heyday of Natural History" by Lynn Barber, published in England in 1980. It comes from the library of the late Dr. Thomas E. Pulley and was loaned to me by Mrs. Pulley.

AMU - WSM MEETING: JUNE 30 - JULY 5, 1991

A joint meeting of the American Malacological Union and the Western Society of Malacologists will be held June 30 - July 5, 1991 at the University of California Kerr Campus Conference Center, Berkeley, California. The scientific program includes three symposia: 1) Marine Bivalve Symposium organized by WSM President Paul Scott, Brian Morton, and Gene Coan, 2) Molluscan Taphonomy and Paleoecology Symposium organized by AMU President Carole Hickman and Mike Russell, and 3) Pacific Basin Molluscan Biogeography Sympoium organized by Dave Lindberg and Geerat Vermeij.

Information may be obtained from Dr. Hickman (415-642-3429) or Mr. Scott (805-682-4711) about the program, housing, and registration. There will be a package of information sent to Lucy Clampit, HCS librarian, in February.

1989/1990 ZOOLOGICAL RECORD

The new issue of Zoological Record (Mollusca) is out and at the Museum of Natural Science Malacology Department and again includes in its lists articles by H. Ode', Constance E. Boone, and Raymond Neck. This is very good advertisement of our publication to malacologists throughout the world.

SOME NEW SHELLING EXPERIENCES IN GEORGIA AND FLORIDA

By Helen Eberspacher

In two cars, five members of the Conchology Group of the Outdoor Nature Club left Houston on Saturday, May 5, 1990, and spent the first night in Pensacola, Florida. These five shellers included Elizabeth and Lernie Rathven, Mildred Elkins, Roberta Campbell, and the author, Helen Eberspacher. The next day we drove to Kingsland, Georgia, just north of Jacksonville, Florida, and spent the night. The next morning we drove about 8 miles to St. Marys, Georgia, where we boarded the Cumberland Queen for Cumberland Island, about a 45 minute boat ride. Cumberland National Seashore, our destination is a lovely area of dense, almost tropical growth of trees, palms, etc... We walked across the island to the Atlantic beach, a distance of several blocks, where we expected to find two species of whelks which cannot be found on the Texas or Florida Gulf coast -- namely the Knobbed Whelk (Busycon carica) and the Keiner's Whelk (Busycon carica subspecies eliceans).

Before we got on the boat, we were given a short talk by one of the park rangers who said we were not to take anything live back with us, and to us that meant no live shells. There were not many dead shells on the beach and only a few of the Knobbed and Keiner's Whelks. However, Mildred Elkins and I (who are both also members of the HCS) stumbled onto what seemed like a graveyard of these whelks way back from the beach, with just little pieces of the shells sticking up out of the sand. Before we left the spot, we had unearthed several dozen of these shells, all in very good condition and color in spite of the fact that they had probably been buried for a long time. There was no trace of the animals that once lived in them.

From Kingsland, Georgia, we drove the next day to Sanibel Island, Florida. We had reservations for six days at the Periwinkle Apartments where we had stayed several times in the past. The Gulf beach nearby was still as great as ever, with huge shell piles from which we picked up lots of craft shells, the kind one cannot buy in any shell shop. Sanibel also had restrictions on gathering live shells, permitting only two of any species per person per day. On the bay side of the Island, Mildred, Roberta and I found some live Lightning Whelks, Sunray Venuses and Quahogs, but were careful not to collect more than two apiece of these species. There is a fine if you are caught with more than this, but we never found out how this is enforced -- that is, if anyone comes around and checks. Lernie was in the right place at the right time to catch a couple of live Fighting Conchs, by standing in the surf on the Gulf side of the Island, just as the waves washed up these and other shells, such as Olives.

One day we went to Blind Pass between Sanibel and Captiva Islands, but a new bridge was being built there and the area was quite torn up, which eliminated some places that were productive in the past. We did walk the beach on Captiva, but it was unproductive, as was the Lighthouse area on the other end of Sanibel Island, and the Causeway where we have found live Horse Conchs on other visits.

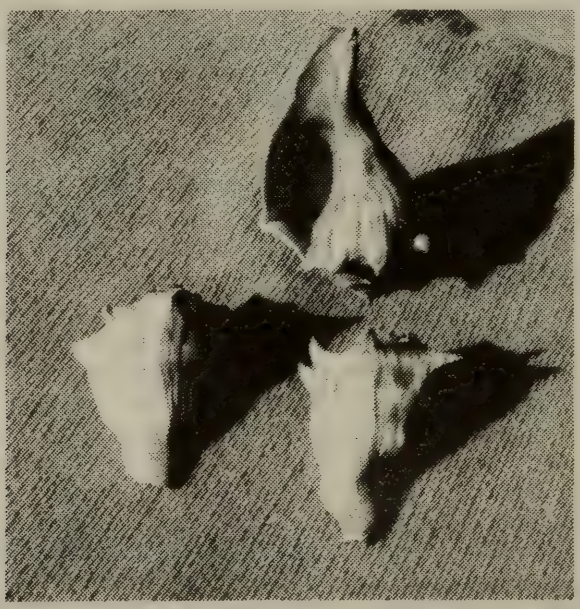
South Florida was in dire need of rain. Elizabeth and Lernie drove through Ding Darling Sanctuary on Sanibel Island and found the bays on both sides of the road practically dried up. They also went to the Everglades one day and found the same dry conditions.

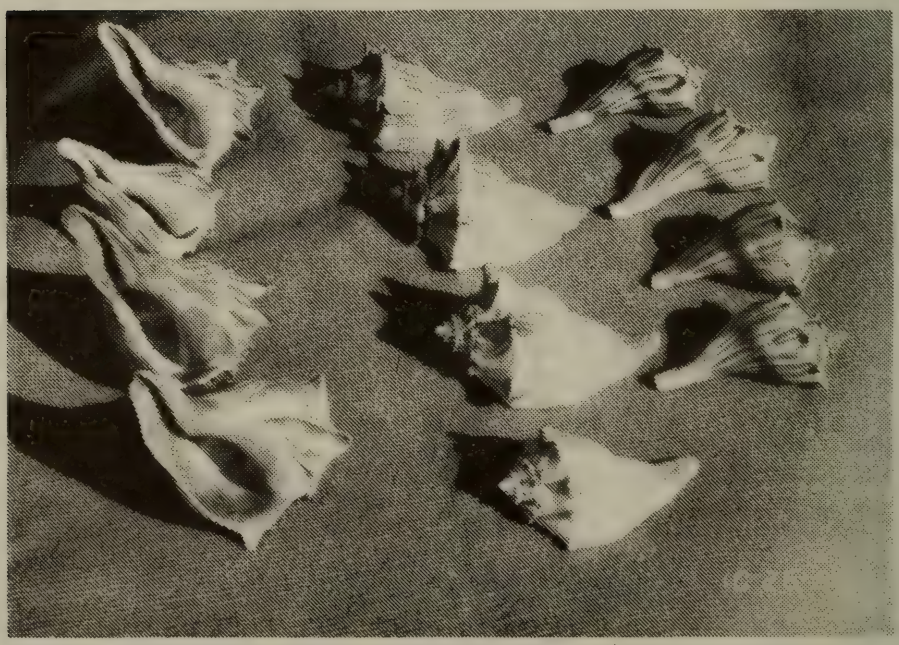
After leaving Sanibel, our next stop was Port St. Joe, which in the past, has been most productive, but this time we found very little, only a few crabbed shells and some egg cases of the Whelk and Apple Murex.

From there, we drove to Apalachicola, which is between Port St. Joe and Panama City, to try to find some scallop dumps which we had heard were there. As most of you know, a scallop dump is a pile of shells discarded by the scallop boats when the scallops are partially processed for the market. Most of the shells are scallop halves, but along with them are many goodies. We did find a dump and we were delighted to find 5 Junonias, a real thrill because it is a rare shell; many Distorsios, one Rose Murex, one Spindle, many Apple Murexes, Scotch Bonnets, Fighting Conches, Moon snails, Olives, Nutmegs, double Imperial Venuses, double Jewel boxes, Sun Dials, a few Murex fulvescens and some I have forgotten. We were fortunate that the shell pile we found was at least a year old and therefore not smelly like a fresh pile would be. The shells were cleaned of their animals and in very good color and condition. We spent a couple of hours there and would have stayed longer except for the fact that we had to get on to Panama City and claim our motel reservations.

The next day we took a boat out of Panama City over to Shell Island, a small island a couple of blocks wide. We found only a few dead Lace Murexes and Crown Conchs. That was disappointing, but the ride over was worth the money, with dolphins and seagulls accompanying us and interesting shorelines. After getting back from Shell Island, we went to a little spot on St. Andrew's Bay where we had shelled several times before and found many crabbed Tulips, Lace Murexes, Apple Murexes, Olives, Chestnut Turbans, Moon Snails, etc.. These shells took a lot of cleaning and had to be rid of the hermit crabs. The best way I have found to do this is to tie them up in a plastic bag and leave them outdoors for a day or two, after which the hermits will come out the shells and die.

From Panama City we came home, which was good thing because I don't believe we had room for one more shell.





Whelks from Cumberland Island, Georgia.

MONOGRAPH By H. ODE'

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Superfamily TROCHACEA Raphinesque, 1815

Family PHASIANELLIDAE Swainson, 1840

This is a tropical family of colorful, small gastropods of which there are only two species in the subfamily Tricoliinae that live in the N.W. Gulf of Mexico.

Sources: Robertson, 1958; Johnsonia, vol.3(37), pp.245-283.

Genus Tricolia Risso, 1826

Small and smooth, somewhat bulimoid shells, often ornamented by colorful patterns of dots and bands.

352. Tricolia affinis cruenta Robertson, 1958

Of the widely distributed T. affinis the subspecies cruenta reaches in south Texas, the western extremes of its range. The type locality is in Brazil, and the species occurs sparingly along the north coast of South America, middle America, and Mexico.

A few live specimens have been collected at South Padre Island (coll. Speers), but at Port Aransas only a few vividly colored, fresh but dead, specimens have been found. Most material is old and worn and probably is subrecent or Pleistocene in age. A few specimens have been dredged in Matagorda Bay. Once, old-looking material was dredged offshore Galveston in 16 fathoms. This probably derives from an old bay deposit.

Records HMNS Survey Collection: 10 lots, no live material.
Depth range: 0-16 fms.
Geographical range: "South Texas to Lower Caribbean to Brazil." (Abbott, 1974).
Maximum size: 6.5 mm, but fragments indicate the species may reach 7 mm.

353. Tricolia thalassicola Robertson, 1958

The second species of the genus Tricolia has only been taken in deep water off the Louisiana coast. It differs considerably from affinis cruenta: its initial whorls are clearly spirally striate, and most specimens

in our material are umbilicated by a rather narrow but open slit. All our material is rather old so that color patterns are quite unclear.

Robertson states (p.272) that this so-called "deep water form" of thalassicola could possibly be interpreted as a species separate from the shallow water form. The shallow water form lives on turtle grass (Thalassia) but the biology of the deep water form, which lives beyond the range of Thalassia, is unknown. Its present depth range elsewhere (10-35 fms) indicates that our material, dredged between 36-55 fms, probably lived at a time the sea level was considerably lower that at present.

In the past, this species was often labelled T. umbilicata d'Orbigny, 1842, but that name was considered too doubtful for use by Robertson.

Records HMNS Survey Collection: 6 lots, no live material.
Depth range: 36-55 fms, all in calcareous environment off the Louisiana coast.
Geographical range: North Carolina and Brazil; southern, western and northwestern Florida and Yucatan. (Robertson, 1958).
Maximum size: 2.6 mm.

Family LIMACINIDAE Blainville, 1823

Minute, sinistral gastropods, varying in shape between planorboid to bulimoid. These shells are found in small numbers far offshore in dredge samples.

Genus Limacina Bosc, 1817

Characteristics as above. Spiratella Blainville is a synonym and was used until recently. The subgenera Thilea Strebel, 1908 and Munthea van der Spoel, 1967 have been found on the Texas-Louisiana shelf. In Thilea the last whorl is much larger than in Munthea.

354. Limacina (Thilea) inflata (d'Orbigny, 1836)

The species is wide spread in dredge samples always obtained rather far offshore (>50 miles). It's shape is planorboid with a sharply pointed, hook-like extension of the outer lip. Collected along the entire Texas-Louisiana coastline and also in the mudlump fauna.

Records HMNS Survey Collection: 32 lots, no live-collected material.
Depth range: 20-500 fms. Samples from the shallow depth are from the offshore banks (Flower Gardens, etc.).
Geographical range: "Worldwide seas; Polynesia; North Atlantic to Florida to Brazil." (Abbott, 1974).
Maximum size: 1.7 mm.

355. Limacina (Thilea) lesueurii (d'Orbigny, 1836)

Less in numbers than the previous species, but fairly widespread in dredge samples taken far offshore (>70 miles). This species resembles a small, left-coiled, helicid land snail. Sometimes mixed with very similar looking dextral gastropods. These are juvenile atlantids.

Records HMNS Survey Collection: 21 lots, no live-collected material.
Depth range: Pelagic: 20-450 fms. The shallow samples have been obtained on the offshore banks.
Geographical range: "Off Massachusetts to Brazil to Europe; Eastern Pacific." (Abbott, 1974).
Maximum size:

356. Limacina (Munthea) bulimoides (d'Orbigny, 1836)

As the name indicates, the shape of this species is bulimoid, i.e. the shell is about twice as high as wide, with a well-defined suture, smooth without sculpture, and possessing a sharp and fragile lip. The color is light brown. Only in samples far offshore.

Records HMNS Survey Collection: 13 lots, no live-collected material.
Depth range: 20-450 fms. Only in clear offshore waters.
Geographical range: "New York to West Florida and southern Brazil; Far off Southern California southward." (Abbott, 1974).
Maximum size: 1.6 mm.

357. Limacina (Munthea) trochiformis (d'Orbigny, 1836)

Only a single lot of this species was taken in 63 fms close to the East Flower Gardens. It is a shorter shell than bulimoides.

Records HMNS Survey Collection: 1 lot, no live material.
Depth range: 63 fms.
Geographical range: "Massachusetts to the Gulf of Mexico to Brazil." (Abbott, 1974).
Maximum size: 1 mm.

1991 GOOD YEAR TO GIVE MUSEUM YOUR COLLECTION

According to a Governmental Affairs Bulletin from the American Association of Museums, a clarification policy on appreciated property will help donors of collectibles (which includes shells, of course) in taking advantage of the 1991 one-year-only restoration of the fair market value deduction for charitable donations of personal property. The 1990 Budget Reconciliation Act restored the market value deduction for 1991 only. The new clarification states that IRS has now ruled that there can be a carry-over when the 1991 deduction exceeds the percentage limitation on charitable deductions

The new ruling will help shell collectors to decide when best to give their collections to a museum. The rules do state that only collections to reputable, non-profit institutions that can make use of the donations will qualify for the 1991 rules. In other words, you can't give your collection to a park and expect to get the deduction at fair market value unless that park intends to set up your collection for display. A museum with a shell collection certainly would qualify.

SNAIL FARMING NOTES

Inquiries about raising snails do come to this publication occasionally. Therefore, the notes from the Snail Centre, Plas Newydd, 90 Dinerth Road, Colwyn Bay, Clwyd LL23 4 YH, England, are of interest.

Training courses in snail farming have been offered by the centre, and there are suggestions for one on snail processing and cooking.

A Snail Festival is planned for May 9-12, 1991, in Harrogate. There will be a one-day seminar, and exhibition of wares by snail farmers, suppliers to the industry, and snail cuisine. The information herein was taken from the Bulletin of the Malacological Society of London, August, 1990.

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TABLE OF CONTENTS

A THOUSAND AND ONE MICROSHELLS FROM ARABIA
By H. Ode' 29

SHELLING IN TEXAS
3. San Jose Island, Mustang Island
and Laguna Madre (Portions)
By Darwin Alder 45

SEARCH AND SEIZURE
Notes on Field Trips of the 1800s
By Constance E. Boone 47

AMU - WSM MEETING: JUNE 30 - JULY 5, 1991 49

1989/1990 ZOOLOGICAL RECORD 49

SOME NEW SHELLING EXPERIENCES IN GEORGIA
AND FLORIDA
By Helen Eberspacher 50

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE
NORTHWEST GULF OF MEXICO (A Continuing Monograph)
Families PHASIANELLIDAE and LIMACINIDAE
By H. Ode' 53

1991 GOOD YEAR TO GIVE MUSEUM YOUR COLLECTION 56

SNAIL FARMING NOTES 56

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SEARCH AND SEIZURE By Constance E. Boone

RECYCLING SHELL COLLECTIONS

In this age of everybody being coerced into recycling EVERYTHING, I thought that surely what I do with old collections at the Houston Museum of Natural Science and in my own home is indeed RECYCLING.

It takes an enormous amount of time to work out nomenclature for old collections. While you can just catalogue with the old names, you certainly do miss the evolvement of many species into new genera and even into new familes. As we so often say, malacology is certainly a fluid science that never does end. The more we know, the more changes are made.

So it's like a big mysterious game to pick up shells from places like Ceylon, Japan, Alaska, Okinawa, Korea, South America and Africa and try to find the species in the fine old books and then check the new books in the malacological library at the museum. From the time the shells were named, often with the wrong locality given in the early books, to the present day of such books as "Compendium" and to special books on families, the names may have changed several times, sometimes because they were already used, sometimes because the malacologist has decided the shells fit into new genera or subgenera. It is very slow work. I am very lucky if I find four or five names I feel comfortable with in one session of work.

Recently, in helping a high school setting up a small science resource workshop area, I found myself realizing just how hard it really is for the novice to determine shells from pictures in popular books. The students had really tried but simply didn't know enough to pick out correct names. I then recalled my junior high school son's first shell exhibit. Books were not easily available in the school library or even in the public libraries. He did the best he could. I recall that he had picked up various sun-bleached valves of pectens on the Freeport beach and named every one a different species. He had never seen a live-taken Texas bay scallop.

The whole point of this column today is to emphasize you are doing a very good deed to work out full-data material you acquire by purchase or gift or estate so that it can be recycled for the future. Some of the old collections have marvelous specimens in sizes that do not seem available today. Some of the species you may never have seen and may be important. It does appear to me that some of the early collectors were more intense in their collecting habits than some shellers are today. They didn't look just for beautiful

or big shells. The fascination for small mollusks did exist in the early days. Look in some of the wonderful old books and marvel at the amount of material they did find and write about.

There are a few key things to note, I believe. If you have a lot consisting of five shells with a name you are not familiar with, try to use first a current worldwide book's index to see if your generic name appears there. It may be an old name and you can be led to the new name in such a book as "Compendium". If the index says your name is on page 150, but you can't locate it immediately, you must then check every name on the page to see if your name appears in synonymy and is used no longer. If you initially do not find the genus you have, try looking up the specific name (the second part of the name) and see if this appears in the index. Unfortunately, it depends on how good you are here. You may have to look up four or five references to find a shell that looks like yours, since you may not have the faintest idea what the referenced genera are and whether one of them really refers to your shell. Conus and Cypraea usually stay as these genera. But, heavens, many other genera change and rechange and then get put into new families sometimes.

I have been reworking a fine old collection from West Mexico. I put it off because I have a lot of material from that area and thought it would be duplicated to a great extent. To my surprise, much of it is new to me and must be carefully researched. Some of the material was identified by professional and knowledgeable workers from the West Coast. Still, I have to look up every species and check into modern literature to be sure that I can catalogue it properly as of this date. Someone, ten to twenty years from now, will have to redo it, perhaps. Scientists have changed their minds through the years and always will.

Some of the specimens we get at the museum have old india ink numbers that have to be removed and new museum numbers put on the shells. I have no idea what kind of ink some of the early collectors used. It is often very hard to remove. If your collection is being recycled at home, get rid of all the "pretty" foam used in many of the specimen boxes. It does disintegrate and can mar shells. We use cotton for bottle plugs and I recommend it for specimen box filler.

I do not recommend making guesses at all. If the old name cannot be related to anything new for certain (as certain as you can be), it is best to leave the old name and catalogue it in that fashion with all the old information left with the lot. One collection at the museum has three or four labels in each box as the last owner either disagreed with the original designations or updated the old name with new literature.

Don't invent information when you recatalogue, please. There is a difference between "trawled" and "dredged" and if you don't know HOW at all, don't say so. If the specimens were collected by a certain person of note or if that person just sent the specimens, note these things. Many old labels don't say either way. If the specimen was purchased from a dealer, say so and leave the old labels in the lot.

It is really much easier to go out and collect your own shells and begin the nomenclature track on your own. You can fill in the all the required elements of a good lot of shells. Let's all try to do that on the upcoming trip to Costa Rica. Maybe we can have some sessions on figuring what we do collect. For instance, unless you read the Veliger, you will not know the name of the common Agaronia we will collect! It isn't in current books. (P.S., I know! What do you offer me for this name? Better still, start reading the journals in our library.)

MONOGRAPHS OF MARINE MOLLUSCA RESUMES PUBLICATION

After an interim of five years, the monographic series, Monographs of Marine Mollusca, formerly published by American Malacologists, Inc., will resume publication with Number 4 titled The Mitridae of the World, Part 2, the subfamily MITRINAE concluded and the subfamilies IMBRICARIINAE and CYLINDROMITRINAE, by Walter O. Cernohorsky. Trophon Corporation, the non-profit corporation that publishes The Nautilus, is publisher. The monograph issue will consist of 176 pages and contain four colored plates, as well as numerous black and white illustrations. The cost will be $35.00 U.S.

To order your issue, send the above amount to Monographs of Marine Mollusca, P.O. Box 7279, SIlver Spring, Maryland 20907.

SOME REMARKS CONCERNING LAND SNAIL COLLECTING IN TEXAS

By H. Ode'

Among shell collectors, the study of land snail fauna is, unfortunately, not as popular as the collecting of the more spectacular members of marine faunas. It cannot be denied that the North American land snail fauna is somewhat drab looking and, although an abundance of species has been described, many are difficult to identify and are often similar in outward appearance. In several groups, detailed anatomical studies - often of the reproductive organs - are necessary for proper identification. On the other hand, almost any spot on the map may yield astonishing surprises, and a determined student of the local fauna will soon learn to choose the right weather conditions and season for collecting. Because weather condtions play such an important part, it is difficult to organize trips long in advance, and often collecting trips must be taken on the spur of the moment, especially in climates prone to long spells of hot and dry weather.

Another hindrance to the study of land snails is the much lesser availability of up-to-date literature, although several excellent books and papers have been published. The Texas land snail fauna has been treated in a few papers which give an up-to-date overview of this fauna. I remind our regular subscribers of a paper published in many installments during 1970-71 in the Texas Conchologist by Paul McGee, in which the fauna off the coastal counties of Texas was discussed. Of course, the foundation of all land mollusk studies in North America is the monograph by Pilsbry (1939-1948). In the most recent and very useful study by L. Hubricht (1985), the reader can find the most recent information about the distribution of land snails in the eastern half of the U.S.A., including Texas. All reliably reported species are represented on maps. Additional papers on land snail fauna were authored by Cheatum and Fullington (1971 and 1973), and Fullington and Pratt (1974). In this quoted material the reader may find additional publications.

Hubricht's paper lists 146 species of land snails for Texas which are here listed by family and genus. The numbers signify that of all species listed for the eastern half of the U.S.A., only a few have been found in Texas.

HELICINIDAE	3 of 7
Helicina	3 of 5
POMATIOPSIDAE	1 of 2
Pomatiopsis	1 of 1
TRUNCATELLIDAE	1 of 5
Truncatella	1 of 5

CARYCHIIDAE	2 of 8
Carychium	2 of 8
COCHLICOPIDAE	1 of 4
Cochlicopa	1 of 4
VALLONIIDAE	5 of 9
Vallonia	5 of 7
PUPILLIDAE	35 of 68
Pupilla	3 of 3
Pupoides	3 of 4
Gastrocopta	16 of 23
Vertigo	10 of 31
Columella	1 of 3
Pupisoma	2 of 2
STROBILOPSIDAE	5 of 6
Strobilops	5 of 6
SUCCINEIDAE	9 of 33
Oxyloma	1 of 7
Succinea	7 of 17
Catinella	1 of 9
PHILOMYCIDAE	2 of 15
Philomycus	1 of 6
Megapallifera	1 of 3
DISCIDAE	2 of 19
Anguispira	1 of 11
Discus	1 Of 8
HELICODISCIDAE	9 of 23
Helicodiscus	9 of 22
PUNCTIDAE	2 of 5
Punctum	2 of 5
LIMACIDAE	2 of 2
Deroceras	2 of 2
ZONITIDAE	15 of 120
Nesovitrea	2 of 4
Glyphyalinia	3 of 25
Mesomphix	2 of 13
Paravitrea	1 of 39
Hawaia	2 of 2
Ventridens	2 of 21
Zonitoides	2 of 7
Striatura	1 of 4
HELICARIONIDAE	3 of 8
Euconulus	2 of 5
Guppya	1 of 2
HAPLOTREMATIDAE	1 of 2
Haplotrema	1 of 2
OLEACINIDAE	3 of 4
Euglandina	3 of 3
SAGDIDAE	2 of 4
Thysanophora	2 of 2
ACHATINIDAE	2 of 2
Lamellaxis	1 of 1
Beckianum	1 of 1
UROCOPTIDAE	4 of 6
Microceramus	1 of 2

Holospira	2 of 2
Metastoma	1 of 1
BULIMULIDAE	4 of 10
Rabdotus	4 of 4
POLYGYRIDAE	33 of 162
Polygyra	13 of 35
Stenotrema	3 of 35
Praticolella	6 of 10
Mesodon	5 of 41
Triodopsis	6 of 40

To generate some interest in land snail studies, the Austin Shell Club organized a collecting trip to Palmetto State Park in March 1990. Time and location proved to be well chosen because conditions ideal to collecting were created by several days of plentiful rains which passed through the area three days earlier so that all vegetation was fresh and the leaf mold in the wooded areas nicely moist. In spite of numerous warnings for snakes in the park, not a single snake was disturbed, but to compensate for this lack of excitement countless ants were stirred up.

It was for many participants a new experience to find small zonitoid land snails living almost in an ant heap. Also remarkable is that deep in the rotting wood (almost never pine, but always hardwood), which had almost completely lost its wood structure and is reduced to soft brownish pulp, one will find small living snails, such as Strobilops, Gastrocopta, etc. Although the number of species was not large, the number of individuals far exceeded my expectations. In the past, I had observed in Palmetto State Park (Gonzales County, Texas) only a few specimens of Rabdotus and a few succineid snails, but now the number of some of the larger Polygyrid land snails surprised me.

The list of the living species encountered is as follows:

Anguispira strongyloides (Pfeiffer, 1854), common.
Helicina orbiculata (Say, 1818), common.
Gastrocopta contracta (Say, 1822) (Ident. by Dr. Neck), a few specimens in wood pulp.
Praticolella berlandeliana (Moricand, 1833), one live specimen in a grassy spot and several dead shells.
Strobilops texasiana Pilsbry and Ferriss, 1906. Several live specimens in a decaying log.
Rabdotus dealbatus dealbatus (Say, 1821). Many live specimens on the ground and on tree trunks.
Polygyra texasiana (Moricand, 1833). One live specimen in a grassy area.
Euchemotrema leai aliceae . a single live specimen. This is a wide spread subspecies in eastern Texas and southeastern U.S., according to the identification by Dr. Neck.
Mesodon sp. Many specimens which I have not yet identified.

Finally there are about three very small species of zonitoid land snails, all obtained from wood pulp in rotting logs (Raymond Neck says this is most likely M. thyroidus which is abundant out there).

Two weeks later I visited Jasper and Hardin Counties in East Texas and collected some shells at the Sandyland Preserve of the Nature Conservancy. The soil conditions are quite different from those in Palmetto State Park (much sandier) and in consequence the snail fauna is different. Only a few land snails were seen: Polygyra sp. and Rabdotus sp. (both dead). Alive and in almost completely rotted hard wood were again some zonitoid land snails and a single Euconulus. Two specimens of Triodopsis vultuosa (identified by Dr. Neck) were found on a wet log.

To conclude this short note, I express the hope that there are among the shell collectors in Texas, some that will become students of the, so far insufficiently studied, Texas land snail fauna.

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(According to Dr. Neck, you are required to have a collecting permit for state parks: write to David Riskind, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744. There is no charge.)

THE SOLOMON ISLANDS By Deanna Smith

After months of planning on the part of Ruth Goodson, seven of us enjoyed an unusual shelling trip to the Solomon Islands. We met at the L. A. airport on August 25, 1990 and flew Air New Zealand to Fiji, our first stop. Taxis took us from the airport at Nadi to our hotel, the Travelodge, which is set on lovely grounds and has the open lobby so characteristic of the tropics.

After breakfast, we went by hotel van to the airport for our new Solomon Airline flight which had superceded Pacific Airlines to the Solomons. Brian Bailey, our captain for the boat trip, said the seas had been so calm recently that he thought we should start off that day on our 14 day boat trip.

August 29. As luck would have it, the weather changed and our ride northwest to Sana Isabel Island, which took about 18 hours, was very choppy and the boat rocked from side to side all night and morning. The boat was 54 feet long, had a dining room/ kitchen area and 4 cabins. Our first stop was Palunuhukura harbor. Everyone felt immediately better and we decided to go snorkeling right away. We swam in mid-harbor in an area of shallow water, sand and coral heads. I found a Lambis lambis, two coralliophila, a cone, two tiger coweries, and other kinds of coweries.

August 30. It rained most of the morning in squalls, but eventually most of us went out in the dinghy to watch Brian and the crew dredge for shells. After lunch we snorkelled near the point demarcating the harbor and found many Murex brunneus, heavily encrusted, several kinds of drupes, an Angaria delphina, and vase shells. We threw most of the murex back. Brian and Kaumae dove for about 40 minutes and brought back miters, a rare Cymatium, and many other shells.

Aug. 31. We went back to the point and swam over beautiful gardens of coral, with colorful fish daring in and out. We found a few shells and vases, two small cones and a clean Turbo argyrosoma, and Conus virgo.

Sept. 1. After breakfast, Brian started the boat and we sailed southeast along Santa Isabel Island. We turned into a harbor called Papanga Island about 2:00 pm. Close to our boat were two pretty islands. We went snorkelling over the sand off one side of the island and found several cones, some Conus leopardus, and a C. virgo.

Sept. 2. We woke up to sunshine and a calm sea. We found some cones, trochus, a crabbed Colubraria, some money

coweries, and three fluted clams. I had a new underwater camera and of course it flooded beyond repair. The water was warm and we had brilliant sun as well as the beautiful coral and fish and we were happy with our morning's snorkel. After lunch four of us went up a river with the crew to get fresh water. We went a mile or so up the river, past mangroves and other jungle-like trees, until we were sure the water was pure. We saw beautiful butterflies, birds and orchids unknown to us. It was peaceful, remote, and beautiful. We went night shelling and the moon was almost full, so it was not eerie at all. I had good shelling: 4 cones, one Pleuroploca, and two Strombus. Brian came up from his dive close by with a bag full of all kinds of shells. He was scuba diving.

Sept. 3. We snorkelled three times today. It was great.

Sept. 4. Although it poured during the night, it had partially cleared by morning and we had a spectacular sunrise. After breakfast, the boat took off for a 6-hour run to St. George Island. We chose shells while the boat was sailing. There were some charming Strombus minimus in this batch. At St. George Island, we made two passes with the dredge but found only a mud bottom, so Brian decided to push on to Cockatoo Harbor. The body of water between St. George Island and Santa Isabel, where Cockatoo is located, is called Thousand Ships Bay, from the masses of ships sunk there during W.W. II. Cockatoo Island forms one side of the harbor named for it and as the name suggests, hundreds of cockatoos flitted from tree to tree, the beautiful white of their feathers showing up against the green of the trees. There were red and green parrots also, but they were harder to see. Here we found cones, large pen shells and one of us found a strange "top" shell. After dinner we cooked it and it turned out to be a large Chama cemented to the flat top of a Conus litteratus, and covered with moss and other growth from the water. Several people went night snorkelling and found alot more cones, Terebra, and Lambis.

Sept. 5. I awoke early and went on deck to watch the full moon set and the sky gradually lighten and to listen to the wonderful bird cries, songs and whistles. After breakfast we set out in the dinghy to visit a native village. A canoe, laden with copra, inched its way over the reef and a young man who was in the canoe with a boy and an old man, spoke to us in English. He invited us to his village. Ruth, who was talking to him, was invited into his canoe. Then we tied the canoe to the dingly and set off briskly to the village. It consisted of about 15 or 20 huts, a church, a rest house and a cooking house. When we met the man's grandmother, he explained she was 82 years old and that she owned all the village land. Furthermore, all the 80 or so people were her descendants. She was old, wizened, almost toothless and bare above the waist (the older women wore no

tops, but the younger ones did). Children were everywhere and most of the younger women had a babe in arms or were pregnant or both. The village paths were muddy; chickens and cats roamed freely. It was a bit depressing, but we noticed they did have fresh water brought down from a spring above the village. None of the men, aside from this villager, were around - they were probably tending their coconut trees. After a while, the women brought out shells from their huts and we traded beads, sunglasses, T-shirts, blue jeans, etc. for tritons, Cypraea, and Ovula ovum, among others. As we walked back to the dinghy, Cynthia felt something in the water and picked up a live thorny oyster. After lunch we went snorkelling on the same reef. The tide was still low and we swam close to coral, grasses, and sand. We found murex, several strombs, many Lambis including some with brilliant coloration, a turbo, and two cones.

Sept. 6. There was a spectacular sunrise as the boat started on its next leg. Our passage was fairly rough as we moved along the coast of one of the Florida Islands, but we reached Mboli Passage by three O'clock. Mboli Passage divides the largest Florida Island into north and south and we were at the northeastern end of the passage.

TENTATIVE LIST OF SHELLS COLLECTED FROM THE SOLOMON ISLANDS

by Cynthia Biasca

[ED.'s NOTE: Order is phylogenetic according to Compendium; only major family names are included]

GASTROPODA

Haliotis varia Linne
Diodora ?sieboldi
Chrysostoma paradoxum (Born)
Monilia belcheri Philippi
Umbonium vestiarum (Linne)
Trochus incrassatus Lamarck
T. maculatus Linne
Tectus fenestratus Gmelin
Turbo argyrostoma Linne
T. chrysostoma Linne
T. pletholatus Linne
Angaria delphina Linne
Nerita albicilla Linne
N. picea Recluz
N. plicata Linne
N. polita Linne
Littorina scabra Linne
Architectonica sp.
Phillipia radiata Roeding
Planaxis niger Q. & G.
Modulus tectum Gmelin
Terebralia palustris (Linne)

CERITHIIDAE
Cerithium nodulosum (Bruguiere)
C. ?ligatum or polygonum
Clypeomorus batillariaeformis
C. concisus (Hombron & Jacquinot)
Rhinoclavis aspera Linne
R. sinensis Gmelin
Pseudovertagus nobilis (Reeve)

Calyptraea tortilus Reeve

STROMBIDAE
Strombus bulla (Roeding)
S. canarium Linne
S. dentatus Linne
S. gibberulus gibbosus Roeding
S. lentiginosus Linne
S. luhuanus Linne
S. minimus Linne
S. plicatus pulchellus Reeve
Lambis chiragra Linne
L. lambis Linne

Varicospira cancellata Lamarck
Terebellum terebellum (Linne)

Trivia sp.

CYPRAEIDAE
Cypraea annulus Linne
C. bregerinana Crosse
C. circercula lienardi Jousseaume
C. ?coxeni Cox
C. eburnea Barnes
C. erosa Linne
C. lynx Linne
C. mauritiana Linne
C. moneta Linne
C. teres Gmelin
C. testudinaria Linne
C. tigris Linne
C. ursellus Gmelin
C. vitellus Linne

Diminovula bimaculata
Polinices sebae Recluz
P. tumidus (Swainson)
Natica euzonia Recluz
N. onca (Roeding)
N. violacea Sowerby
Cassis cornuta Linne
Phalium glaucum Linne
Tonna canaliculata Linne
Cymatium gutturnium (Roeding)
C. pileare aquatile (Reeve)
Gyrineum gyrinum Linne
Bursa bufonia Gmelin
B. granularis (Roeding)
B. margaritula (Deshayes)

MURICIDAE
Murex nigrispinosis Reeve
M. tribulus Linne
Chicoreus brunneus (Link)
C. microphyllus (Lamarck)
C. ramosus Linne
Cronia funiculus Wood
Thais buccinea (Deshayes)
T. mancinella Linne
Morula andrewsi E.A. Smith
M. concatenata Lamarck
Nassa serta (Bruguiere)
Drupa grossularia Roeding
D. ricinus Linne
D. rubisidaea Roeding
Drupella cornus Roeding
Muricodrupa jacobsoni Emerson and D'Attilio

Coralliophila neritoidea (Lamarck)
Pyrene ?testudinaria (Link)
P. turturina (Lamarck)
Mitrella ligula (Duclos)
Phos ?naucratoros Watson
P. roseatus Hinds
P. textum (Gmelin)
Colubraria muricata (Lightfoot)
Nassarius albescens (Dunker)
N. glans (Linne)
N. livescens
Pleuroploca filamentosa Roeding
P. trapezium (Linne)
Peristernia incarnata Kiener
P. ustulata (Reeve)
Fusinus colus (Linne)
F. perplexus A. Adams

OLIVIDAE
Oliva annulata amythystina Roeding
O. buloui Sowerby
O. carneola (Gmelin)
O. ceramensis Schepman
O. miniacea Roeding
O. oliva Linne
O. oliva longispira
O. parkinsoni Prior
O. reticulata (Roeding)
O. rufula Duclos
O. sericea (Roeding)
O. vidua Roeding
Olivella sp.

MITRIDAE
Mitra acuminata Swainson
M. fraga Quoy & Gaimard
M. retusa Lamarck
Neocancilla papilio (Link)
Cancilla filaris (Linne)
C. peasei Dohrn
Imbricaria olivaeformis (Swainson)

COSTELLARIIDAE
Vexillum exasperatum Gmelin
V. granosum Gmelin
V. mirabile (A. Adams)
V. patriarchalis (Gmelin)
V. sanguisugum (Linne)
V. transpositum (Dautz. and Bouge)

Vasum ceramicum Linne
V. turbinellus Linne
Cymbiola rutila (Broderip)

?Scalptia crossei Semper

TURRIDAE
Lophiostoma acuta (Perry)
Turris babylonia Linne
T. crispa Larmarck
T. zonalis

CONIDAE
Conus aculeiformis Reeve (?)
C. ammiralis Linne
C. arenatus Hwass
C. capitaneus Linne
C. conspersus Reeve
C. durcurtata Dautz
C. ebraeus Linne
C. eburneus Hwass
C. emaciatus Reeve
C. figulinus Linne
C. flavidus Lamarck
C. generalis Linne
C. glaucus Linne
C. leopardus (Roeding)
C. litteratus Linne
C. lividus Hwass
C. magus Linne
C. marmoreus Linne
C. miles Linne
C. monachus Linne
C. musicus Hwass
C. ochroleucus Gmelin
C. parius Reeve
C. pica A. Adams & Reeve
C. planorbis Born
C. quercinus Lightfoot
C. ranunculus Hwass (?)
C. sponsalis Hwass
C. striatus Linne
C. tessulatus Born
C. textile Linne
C. virgo Linne
C. vitulinus Hwass

TEREBRIDAE
Terebra affinis Gray
T. argus Hinds
T. columellaris Hinds
T. longiscata Deshayes
T. nebeculata Sowerby
T. nebulosa Sowerby
T. pertusa Born
T. subulata (Linne)
T. undulata Gray
Hastula lanceata Linne

H. strigilata Linne

BULLIDAE
Bulla ampulla Linne
Atys cylindricus (Helbling)

Siphonaria atra

BIVALVIA

ARCIDAE
Anadara ?subcrenata (Lischke)
Barbatia bicolorata Dillwyn

PINNIDAE
Pinna bicolor Gmelin

PTERIIDAE
Pinctada margaritifera (Linne)
P. mertensii

Malleus malleus (Linne)

Cryptopecten pallium (Linne)

SPONDYLIDAE
Spondylus multimuricatus Reeve
S. squamosus Schreibers
S. versicolor Schreibers

Lima ?vulgaris Link
Fimbria fimbriata (Linne)
Chama sp.
Glans sagamiensis (Pilsbry)
Fragum fornicatum (Sowerby)
Vasticardium transcendens
Tridacna gigas Linne
T. squamosa Lamarck
Tellina discus Hanley
Donax cuneatus Linne
Asaphis violascens (Forskal)

VENERIDAE
Periglypta puerpera (Linne)
Circe scripta (Linne)
Gafrarium tumidum Roeding
Dosinia histrio Gmelin
Chione sp.

NOTE: (?) Editor's question due to published geographic range or normal depth of habitation. Other ?s indicate author's uncertainty with identification.

MONOGRAPH By H. ODE'

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE NORTHWEST GULF OF MEXICO

(A Continuing Monograph)

Family CAVOLINIIDAE H. and A. Adams, 1854.

The uncoiled shells of the members of this family are most remarkable. It is the only family in the Order Thecosomata Blainville which is so formed. The LIMACINIDAE Blainville, 1823 have normal left coiled gastropod shells as do the PERACLIDIDAE in the superfamily Peraclidacea.

All Thecosomata are pelagic and in consequence their distribution is determined by currents, water temperature, and water particle content. Most are of wide distribution and several species listed here have also been collected in the Panamic faunal province. I have followed here the arrangement presented by Abbott (1974). The CAVOLINIIDAE (Abbott uses CUVIERIDAE) are split into three subfamilies: CLIONAE Jeffreys, 1889 with genera Creseis, Styliola, Hyalocylis and Clio; CAVOLINIINAE H. and A. Adams, 1854 with genera Cavolinia and Diacria; and CUVIERININAE Gray, 1840 with genus Cuvierina.

The first reports of pteropods for the N.W. Gulf of Mexico is by Burkinroad (1933) and a more recent one is given by LeRoy and Hodgkinson (1975). Extensive reports on Cavolinia are by Tesch (1946) and on the entire order by van der Spoel (1967).

Genus Cavolinia Abildgaard, 1791

The name used to be spelled "Cavolina", but Cavolinia is now a conserved name and thus is official.

The shell is rather bulbous with a broad but narrow opening. It appears to be formed out of two halves, one rather short inflated ventral part over which fits a longer part. The sides often carry spine-like elongations or wings. I have not found any explicit information about the origin of the peculiar shell form of the CAVOLINIINAE. In general a widening tube allows a mollusk to grow and when for added strength and stability the tube gets spirally twisted, nature has created a highly successful design. The complicated design of the Cavolinia shell seems to make growth impossible and I have found no explanation of its derivation from an undoubtedly simpler beginning.

Presumably they developed initially as the shells of Clio but at a later stage, the upper rims of the opening began to develop remarkably contorted lips. It is somewhat strange that in all dredged samples, such incomplete shells are never found.

The depth ranges at which the majority of the various species are found are surprisingly different.

358. Cavolinia longirostris (Blainville, 1821 ex Lesueur Ms)

This is after Creseis the most common pteropod of the Texas beach, but it is the most often collected species from dredge samples in the survey. It is rather variable in several respects. The snout varies in length and also in the angle at which it is bent forward. The ventral, bulbous part has concentric banding and the dorsal part is extended in a gutter-like beak which can vary enormously in shape. The side wings are often folded back. On the Texas-Louisiana shelf, the species never reaches a size in excess of 6.5 mm, and although there are thousands of specimens in the survey collection, not a single one reaches 9 mm (maximum size quoted by Abbott, 1974). Beach specimens are most easily collected by scraping fine shell grit together from the upper tideline and washing it in fresh water. Most of the little cavolinids then float to the surface. Also found in the mudlump fauna. Only rarely (Galveston) have live specimens been taken on the beach (that is, in the surf zone).

Records HMNS survey collection: 105 lots, no live-collected material.
Depth range: pelagic, but taken in dredge samples in a depth of 0-500 fms., but most often between 20 and 40 fms.
Geographical range: "Worldwide, pelagic 50° N - 50° S." (Abbott, 1974).
Maximum size: 6.2 mm

359. Cavolinia uncinata (Rang, 1829)

Much less common in beach drift than C. longirostris but occasionally mixed with it. The ventral tip is strongly bent backwards and often colored a light brown. The ventral inflated part is never as clearly concentrically banded as in C. longirostris and there are no side wings. Often there is also a brown spot on the ventral bulb close to the mouth. Found in small numbers on the beaches, but fairly common in dredge samples. Keen (1971) gives 11 mm as the maximum size, almost twice the size of the survey material.

Records HMNS survey collection: 51 lots, no-live collected material.
Depth range: pelagic, but found in beach drift and in dredge samples to great depth 0-500 fms., but most from 20 to 40 fms.
Geographical range: "Worldwide, pelagic, 45° N - 45° S, Newfoundland to Brazil", (Abbott 1974).
Maximum size: 6.1 mm.

360. Cavolinia tridentata (Niebuhr, 1775 ex Forskal, Ms)

This is the largest of all Texas-Louisiana cavolinids. Only one lot was obtained on the beach in the tideline at South Padre Island; all others were collected from deeper water, mostly off Louisiana and consist of fragmentary shells. The part best conserved is the dorsal flat part; the bulbous ventral part is usually gone (crushed by predatory fish or squid?).

Records HMNS survey collection: 20 lots, no-live collected material.
Depth range: 0-228 fms. All except 2 lots dredged below 50 fms.
Geographical range: "Worldwide (50°N to 45°S); Newfoundland to the Gulf of Mexico". (Abbott, 1974).
Maximum size: 14.0 mm.

361. Cavolinia gibbosa (d'Orbigny, 1836)

Only two lots of this species that could be mistaken for C. tridentata were collected. One is a poor, defective specimen encased in hard mud, quite old, from the mudlump fauna and the other is a single specimen dredged in 170 fms off the Mississippi delta. Thus, this species can hardly be included in the Texas-Louisiana shelf area fauna.

Records HMNS survey collection: 2 lots, no-live collected material.
Depth range: 170 fms off Southwest Pass, Mississippi delta.
Geographical Range: "Worldwide, pelagic (45°N - 38°S)". (Abbott, 1974).
Maximum size: 9.9 mm.

Genus Diacria Gray, 1847

In general concept, Diacria is very much the same as Cavolinia, but in Diacria, the dorsal lip is formed by a thickened ridge. There are two species, quite different in appearance, but the same in structure of the opening ("mouth") and coloration.

362. Diacria quadridentata (Blainville, 1821)

This is the smallest of the N.W. Gulf of Mexico cavolinids. Because there are hardly any spines and the inflation is considerable, this species appears to be more spherical than any of the others. The thickened pads around the "mouth" opening are light brown in color, but the shell itself is not colored. D. quadridentata is occasionally found on all Texas beaches and is fairly common in the dredge samples.

Records HMNS survey collection: 49 lots, no live-collected material.
Depth range: 0-228 fms.; most lots from 20 to 40 fms.
Geographical range: "Worldwide, pelagic, (40°N to 30°S)". (Abbott, 1974).
Maximum size: 3.0 mm.

363. Diacria trispinosa (Blainville, 1821)

This easily recognizable species resembles a Limulus-like crab in outline. Its "mouth " is very narrow and small and it has a long terminal spine which it loses later in life. Of all cavolinids, this is the flattest in our area and has mostly been obtained far offshore, either in shallow water (Flower Gardens, Stetson Bank) or dredged in water below 50 fms in depth. Also obtained from the mudlump fauna.

Records HMNS survey collection: 24 lots, no live-collected material.
Depth range: dredged between 15 and 500 fms far offshore; mostly dredged below 40 fms.
Geographical range: "Worldwide, pelagic (60°N to 41°S)" (Abbott, 1974).
Maximum size: ±9 mm.

Genus Hyalocylis Fol, 1875

Slightly conical tubes with a faintly curved tip and sculpted by transverse annulations. There is only one species in this genus.

364. Hyalocylis striata (rang, 1828)

A single lot of this easily recognizable species was obtained in 63 fms close to the Flower Gardens.

Records HMNS survey collection: 1 lot, no live-collected material.
Depth range: pelagic, dredged at 63 fms.
Geographical range: "Worldwide, pelagic. Nova Scotia to Gulf of Mexico and Brazil". (Abbott, 1974).
Maximum size: 4.5 mm.

Genus Styliola Lesueur, 1825

Long, slender, finely pointed open tubes, with a single groove running along the side, not straight down, but with a slight twist. There is only a single species in this genus.

365. Styliola subula (Quoy and Gaimard, 1827)

Fairly common in deeper water dredge samples. Most specimens are fragmentary and broken, chalky white. Such material cannot always be distinguished from equally poorly conserved material of Creseis virgula.

Records HMNS survey collection: 26 lots, no live-collected material.
Depth range: pelagic, dredged between 24 and 500 fms., but mostly below 50 fms.
Geographical range: "Massachusetts to the Gulf of Mexico to Brazil". (Abbott, 1974).
Maximum size: 7.2 mm.

Genus Creseis Rang, 1828

Long, slender tubes, unadorned, almost as thin as a needle. In the N.W. Gulf of Mexico there is probably only a single species because separation of species based on shell characters of these extremely simple shells probably means little. In this report, I split our material in three groups easily separable on shell characters. These are C. acicula, C. virgula and a very peculiar one having annulations varying both in the diameter and the opaqueness of the tube. In all probability, this is a pathological (?) form, and I will only report it as Creseis sp indet A.

366. Creseis acicula (Rang, 1828)

No shell has ever been more correctly named "acicula" (small needle). It is without doubt the most common pteropod of the Texas beaches, although it is often difficult to collect unbroken specimens from beach drift. On occasion, especially in the summer, the beach can be covered by astronomical numbers of glassy Creseis tubes ("Creseis bloom"). Small fragments of one or more millimeters are always present in the finest fraction of shell grit of either beach drift or of dredge samples. Abbott (1974) reports a size of 20-30 mm, which is twice the size of our material. Surprisingly, Keen mentions a size of only 6 mm. Probably those glassy tubes are too fragile to remain much over half an inch in length during dredging and washing.

Records HMNS survey collection: 76 lots, no live-collected material.
Depth range: pelagic, dredged 0-70 fms.
Geographical range: "Atlantic and Pacific; pelagic (50°N to 40°S), Baja California southwards". (Abbott,1974).
Maximum size: 13.5 mm., but usually about 6-8 mm.

367. Creseis virgula (Rang, 1828)

Among the survey material are only 6 lots assigned to this species. They are of broader shape than acicula and their tip is curved. However, it is not impossible that most are fragmented parts of Stylioa, because some look suspiciously like that species, although the characteristic groove of this species is absent. One lot from the beach of Mustang Island.

Records HMNS survey collection: 8 lots, no live-material.
Depth range: 0-70 fms.
Geographical range: "Atlantic and Pacific, 45°N to 40°S." (Abbott, 1974).
Maximum size: 3.4 mm.

368. Creseis sp indet A

A number of lots differ considerably from both previous "species". The difference is in the outline of the shell. The tube is clearly beaded. Also the degree of opaqueness varies along the length of several specimens. I believe that possibly these characters are pathological and probably have little specific significance. Most lots are from deeper water off East Texas and Louisiana. Also in the mudlump fauna.

Records HMNS survey collection: 13 lots, no live-collected material.
Depth range: pelagic, 50 -75 fms.
Geographical range: unknown.
Maximum size: 5.3 mm.

Genus Clio Linnaeus, 1767

Compressed triangular open tubes. Along the middle of the backside runs a ridge. At the top of this triangle there is a small embryonic shell, separated from the adult shell by a narrow constriction. Several species are listed by Abbott (1974), but almost all our material, although often defective, appears closest to C. pyramidata.

369. Clio pyramidata Linnaeus, 1767

Abbott (1974) lists several "forms" of this variable species. It is possible that some of the material is the form "lanceolata" Lesueur. Clio pyramidata is a

fairly common shell in dredge material. It has been found only a few times on the beaches of South Padre Island. Also in the mudlump fauna.

Records HMNS survey collection: 31 lots, no live-collected material.
Depth range: 0-450 fms. One lot from the beach, the others come from 30-450 fms, the majority from below 50 fms.
Geographical range: "Worldwide, pelagic. East and West United States" (Abbott, 1974).
Maximum size: 10.6 mm.

370. Clio recurva (Children, 1823)

A single fragment of a completely different Clio may be this species. Only a strongly curved tip is present with the embryonic shell, which is separated by a stronger constriction from the main tube than in C. pyramidata. More material is needed for a more certain identification.

Records HMNS survey collection: 1 lot, no live-material.
Depth range: dredged at 24 fms.
Geographical range: "Worldwide, warm water, pelagic. New York to the Gulf of Mexico, California" (Abbott,1974).
Maximum size: too fragmentary to measure.

Family PERACLIDIDAE C.W. Johnson, 1915

Small fragile sinistral shells covered with hexagonal reticulation. Strongly curved central axis.

371. Peracle reticulata (d'Orbigny, 1836).

A rather unusual species of which only a few per location are taken. The shells are light brown. The sinistral whorls are slightly tabulated. Both offshore Texas and Louisiana.

Records HMNS survey collection: 8 lots, no live-taken material.
Depth range: 50-500 fms.
Geographical range: "Worldwide, pelagic (40°N to 20°S)" (Abbott, 1974).
Maximum size: 2.1 mm.

Fig. 1. Diacria quadridentata 1.8 mm Taken in orange peel grab, Shelly mud, 75.5 mi south of Galveston, Tex. Collected by Bureau of Commercial Fisheries (BCF), April 17, 1966.

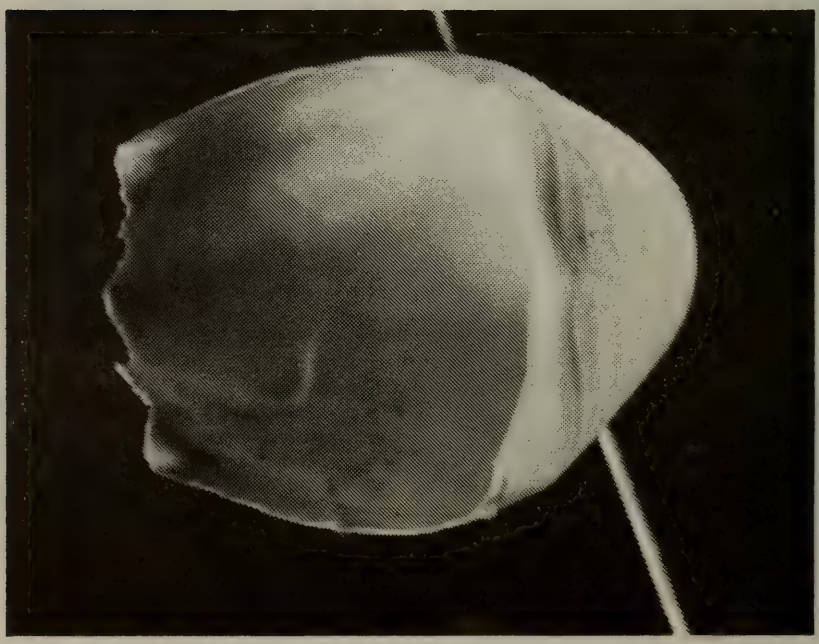

Fig. 2. Cavolinia gibosa 7.8 mm Van Veen grab, 450 fms, 99 mi SSE of Freeport, Texas. Collected by H. Geis & S. Stubbs.

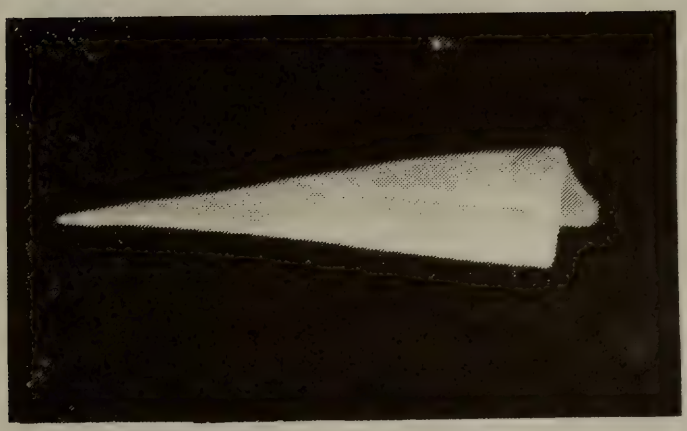

Fig. 3. Styliola subula 5 mm Van Veen grab, mud, 167 fms, 65 mi SSE of Freeport, Tex. Collected by H. Geis & S. Stubbs

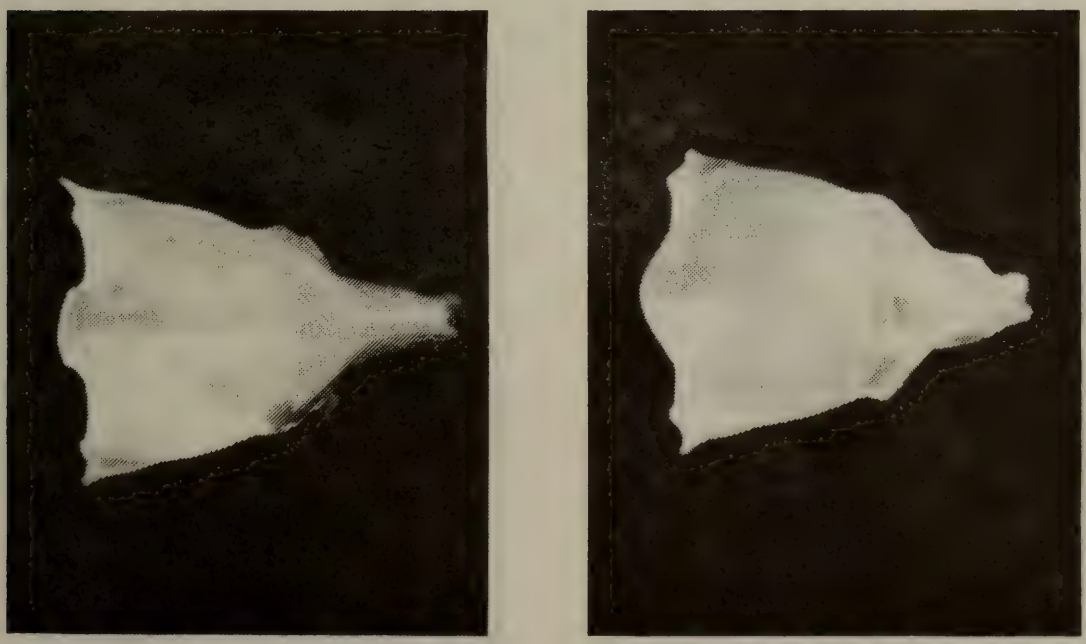

Fig. 4. Cavolinia longirostris 4.8 mm Van Veen grab samples, mud, 167 fms, 65 mi SSE of Freeport, Texas. Collected by H. Geis & S Stubbs.

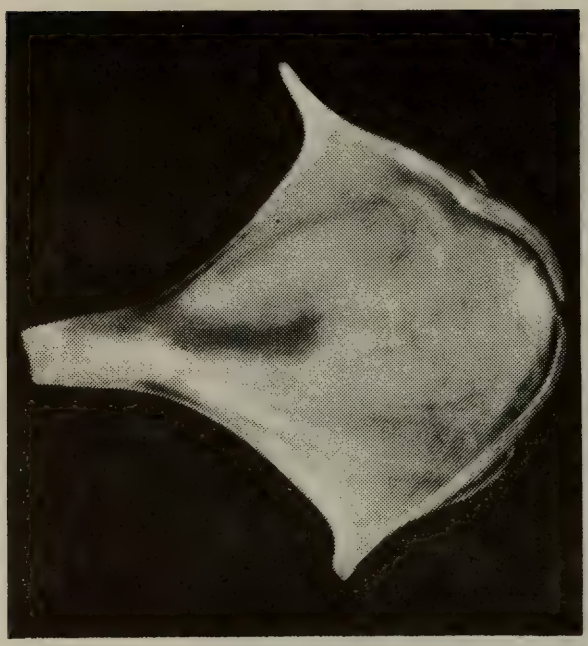

Fig. 5. Cavolinia trispinosa 6.65 mm Dredged in 110 fms, 86 mi SE of Freeport, Texas. Collected by H. Geis & S. Stubbs, July 18, 1967.

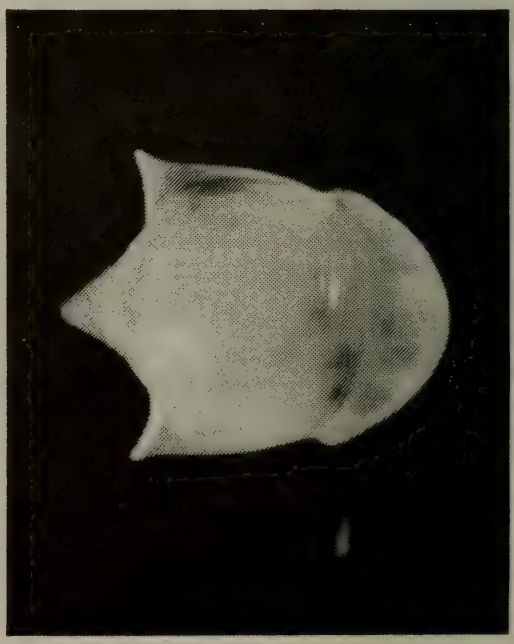

Fig. 6. Cavolinia uncinata 4.7 mm Dredged at Stetson Bank, 30 - 40 fms, 74 mi SSE of Galveston, Texas. Collected by T.E. Pulley & Paul McGee, 1963.

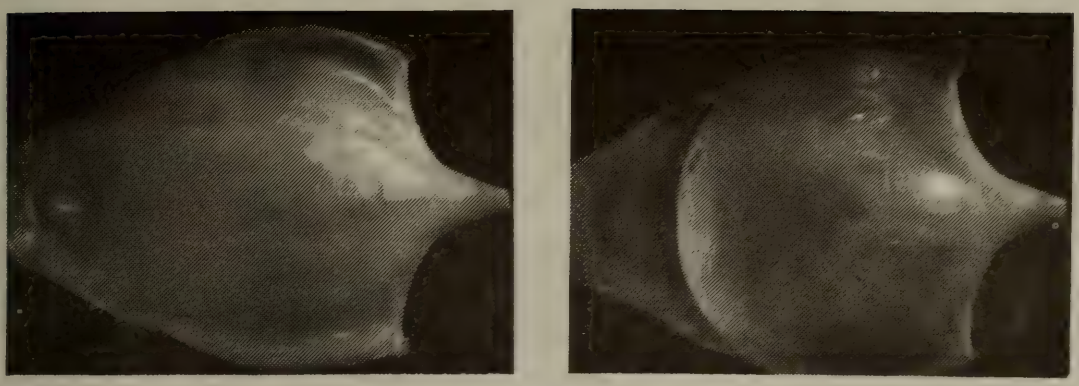

Fig. 7. Cavolinia tridentata 13.8 mm Trawled in 50 fms by BCF. 69 mi SSE of Freeport, Tex, Sept. 1, 1966.

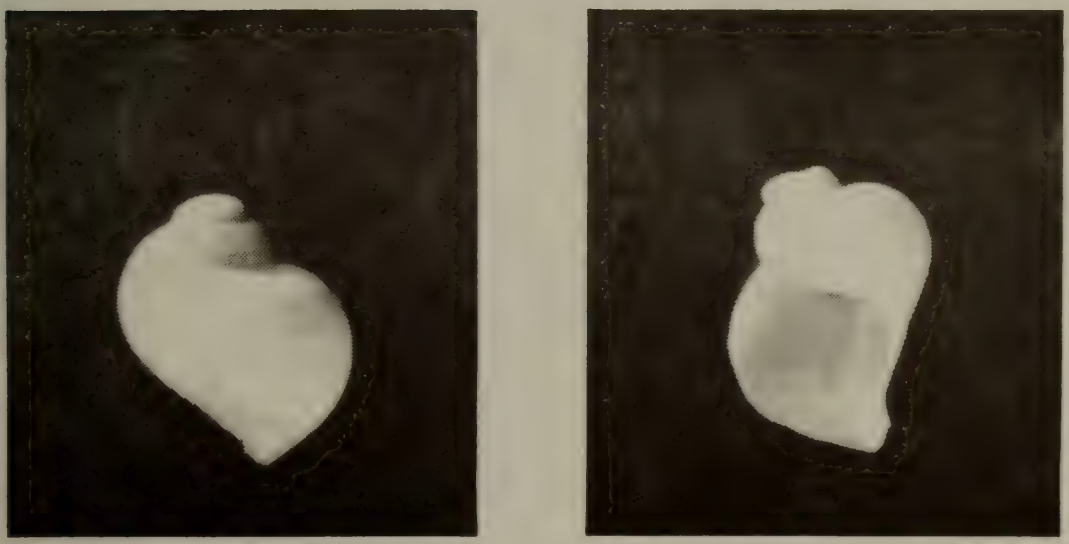

Fig. 8. Peracle reticulata 1.1 mm Van Veen grab, mud, 67 fms. Collected by H. Geis & S. Stubbs, 66 mi SSE of Freeport, Texas, June 14, 1967.

TEXAS CONCHOLOGIST ENDS PUBLICATION AFTER TWENTY-SEVEN YEARS

The Final Edition

After twenty-seven years of continuous publication, The Texas Conchologist regretfully announces the end of this publication. Although cost was a factor in the decision to suspend publication (it costs the Houston Conchology Society about $1800 to $2000 per year to publish the journal) the main problem was lack of publishable material.

Constance E. Boone, the immediate, past editor of eleven volumes of TC, noted "For the past several years, it seems as though no one reads the Texas Conchologist. It's not surprising then, that no one bothers to contribute articles for publication." When asked to comment on this, the final edition, former editor Helmer Ode', just shook his head, and struggled to hold back the tears. The current editor regrets that the journal reached its demise during his tenure.

How did the previous two paragraphs make you feel? Hopefully you will be relieved to know that the information is FALSE. (Will someone please resuscitate Helmer and Constance!!) TC will continue publication at least for another year. However, the scenario is not too far fetched. During the past three years, TC has gone from about 120 pages per volume to the 84 pages of this volume. The number of articles per issue has dropped from an average of six during Connie's final volume to the four valid articles in the current issue. Dr. Helmer Ode' and Constance E. Boone are the only regular contributors at the present time.

TC is circulated around the world -- from Singapore and the Philippines in the East, to Amsterdam and Israel on the Continent, then from South Africa back across the South Atlantic to Brazil and Uruguay in South America. The journal is mailed to Smithsonian Institute, the Australian Museum, the British Museum of Natural History, the American Museum of Natural History (NY), the Academy of Natural Sciences (Phil), the Field Museum of Natural History (Chi), and the Los Angeles County Museum, not to mention numerous college and university libraries. The interest among the readership is apparently intact. So why is interest in authorship so flagging?

This next year, won't YOU PLEASE HELP. Pick up a pen, pencil, or crayon, and write a short article about your shelling interests or observations. Your article doesn't have to be scholarly enough to go to the Smithsonian or the British Museum, but it will get there anyway.

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TEXAS CONCHOLOGIST, Vol. XXVII , Nos. 3-4, July, 1991

TABLE OF CONTENTS

SEARCH AND SEIZURE
Recycling Shell Collections
By Constance E. Boone 57

MONOGRAPHS OF MARINE MOLLUSCA RESUMES PUBLICATION
By Constance E. Boone 59

SOME REMARKS CONCERNING LAND SNAIL COLLECTING IN TEXAS
By H. Ode' 60

THE SOLOMON ISLANDS
By Deanna Smith 64

TENTATIVE LIST OF SHELLS COLLECTED
FROM THE SOLOMON ISLANDS
By Cynthia Biasca 67

DISTRIBUTION AND RECORDS OF THE MARINE MOLLUSCA IN THE
NORTHWEST GULF OF MEXICO
(A Continuing Monograph: Families CAVOLINIIDAE
and PERACLIDIDAE)
By Helmer Ode' 72

TEXAS CONCHOLOGIST ENDS PUBLICATION
AFTER TWENTY-SEVEN YEARS
The Editor 84