

HAWAII'S SEA CREATURES

Changes/corrections to the 2006 Revised Edition. These changes appeared in the 5th printing, April 2010.

p. viii, lower caption, 4th line from bottom:

large red [Yellowmargin](#) Spanish Dancer sea slug (*Hexabranchnus sanguineusaureomarginatus*) was photographed....

p. xi: What's in a Name? 2nd paragraph:

Binomial names are often, but not always, composed of descriptive Latin or Greek words. [Callistoctopus](#) is a genus of the family Octopodidae. Both names mean "eight arms." The species name *ornatus* indicates precisely which octopus we mean, in this case the Ornate Octopus. following the two-part name is the name of the biologist(s) who first formally described the species and the year in which the description was published. Thus we have [Callistoctopus ornatus](#) Gould, 1852

p. xiv: upper left photo caption: (*Cypraea Cribrarula gaskoini*)

ALSO p. 134 bottom caption, same change.

p. 4: WHITE LEUCETTA:

[one of](#) the large Spanish Dancer nudibranchs, *Hexabranchnus sanguineus* spp. (p. 172-3), reportedly feeds on it. Usually no more than 2 in. long. Worldwide in warm waters. Photo: Pūpūkea, O`ahu. 30 ft.

p. 30: WINGED BOX JELLYFISH

~~*Carybdea alata* Reynaud 1830~~ [Alatina moseri](#) (Mayer, 1906)

Class Cubozoa. Family ~~Carybdeidae~~ [Alatinidae](#)

· Colorless and transparent, these cubozoans have elongated bells up to about 3 in. high and 2 in. wide. ~~Outside Hawaii they may be 10 in. high.~~ Four tentacles up to ~~2 ft.~~ [4 1/2 in.](#) long hang from the edge of the bell, one from each corner. In the water these animals resemble floating plastic bags and are difficult to see. Surprisingly strong swimmers, they move towards light at night and sometimes plague south-facing O`ahu beaches seven to ten days after a full moon, ~~in relation to a breeding cycle~~ [when they come inshore to spawn](#). Hundreds or thousands can wash up during a single night. They occur most often at the surface but can also swim in midwater and can be found a mile or more offshore. Contact with their tentacles results in an immediate and intense burning sensation equal to or exceeding that of the Portuguese Man-of-War, p. 24, (a colonial hydroid, not a [true](#) jellyfish). The pain usually subsides by itself in less than an hour, but can linger as long as eight. If weakness, cramps or breathing difficulties occur the victim should seek emergency medical treatment. ~~The species name means "winged," possibly in reference to the speed at which they swim. They occur in warm seas around the world.~~ [Alatina moseri was originally described from Waikīkī, O`ahu, and has also been found in Australia, thus it may have an Indo-Pacific distribution. The common name comes from an older scientific name, *Carybdea alata*; *alata* means "winged," in reference to winglike projections at the bases of the tentacles that probably serve as keels when the animal swims.](#) Photo: David B. Fleetham. Molokini Islet, Maui. 60 ft.

p. 31: **RASTON'S SMALL** BOX JELLYFISH

Carybdea ~~rastoni~~ Haacke, 1886 arborifera Maas, 1897

The transparent, cubelike bells of these box jellies are about 1 in. on a side; a tentacle hangs from each corner. Contact with the tentacles results in a burning sting; delayed reactions (usually itching) can occur one to four weeks later. Generally less common in Hawai'i than ~~*C. alata*~~ [Winged Box Jellyfish](#) (above), these are usually seen only at night; some observers suggest that they rest near the bottom during the day. [This species was long confused with Raston's Box Jellyfish \(*C. rastoni*\), an Australian cubozoan.](#) †Two even smaller box jellyfishes occur in Hawai'i, one with red tentacles, the other with banded tentacles. The bells of these tiny creatures are usually less than 1/4 in. across. One of these animals—~~*Carybdea*~~[Copula sivickisi](#) (Stiasny 1926), with banded tentacles—is visible in the lower right corner. ~~Indo-Pacific.~~[Possibly endemic.](#) Photo: Waikiki, O'ahu. Surface of Natatorium.

p. 37: PROLIFIC ANEMONE:

Replace text:

· This anemone occurs in shaded crevices, often in dense assemblages, but is common only in certain areas. It has up to 60 slender white tentacles atop a column that bears a ring of branching outgrowths and bulbous brownish or greenish swellings. Because the white tentacles are often retracted, the brownish branches and swellings may be the most visible parts of the animal (although they are not present on juveniles). The anemones carried by the Pom-Pom Crab, *Lybia edmondsoni* (p. 281), are said to be juveniles of this species, but this needs to be confirmed. Polyps attain a height of about 1/2 in. in Hawai'i (but may grow to 3 in. elsewhere) and pack a powerful sting. Indo-Pacific. Photo: South Point, Hawai'i. 50 ft.

p. 56: LOBE CORAL: 24 lines up from bottom: ~~*Maldivia*~~ [Jonesius triunguiculatus](#)

p. 61: OVAL MUSHROOM CORAL

Add: [Tiny parasitic snails, *Epitonium ulu*, sometimes colonize this coral, laying their eggs on the underside and perhaps feeding on its mucus, and an unidentified gall crab, *Fungicola* sp., lives in elongate burrows on the upper side.](#)

p. 62: OCELLATED BLACK CORAL, last line: change ~~*Leptastreaa bottae*~~ to [Cyphastraea agassizi](#).

p. 69: **BRANCHING HAWAIIAN** BLACK CORAL

Antipathes sp. [griggi](#) Opresko, 2009

~~This black coral, formerly identified as the Indo-Pacific species *Antipathes dichotoma*, is now thought to be undescribed. The species name honors Richard W. Grigg, champion big wave surfer and professor of oceanography at the University of Hawai'i.~~ Large trees attain a height of about 4 ft. ~~Indo-Pacific~~[Endemic](#). (The slightly deeper-dwelling *A. grandis* has finer terminal branches and grows to at least 6 ft. It is otherwise similar.) Photo: Lehua Rock, Ni'ihau. 40 ft.

p. 100: last line: ~~*Theodoxus*~~[Clithon neglectus](#)

p. 109: Family photo: Leviathan Cowries (~~*Cypraea*~~[Lyncina leviathan](#)). Lāna'i Lookout, O'ahu. 15

p. 109:

There are about 200 species of cowries worldwide, with at least 35 known from the Hawaiian Islands. Among these are ~~eight~~ [a number of](#) endemic species, highly prized by shell collectors worldwide. The list has changed over time [and is not universally agreed upon](#), but, ~~as currently recognized,~~ [at a minimum](#) the Hawaiian endemic cowries ~~are~~ [include](#) ~~*Cypraea burgessi*,~~

~~C. gaskoini, C. granulata, C. mauiensis, C. ostergaardi, C. rashleighana, C. semiplota, and C. sulcidentata.~~ [Gaskoin's Cowry](#), the [Maui Cowry](#), the [Granulated Cowry](#), the [Half-Swimmer Cowry](#), the [Groove-Tooth Cowry](#), [Rashleigh's Cowry](#), [Ostergaard's Cowry](#) and [Burgess's Cowry](#). All are described and pictured on the following pages except ~~C. burgessi~~ [Burgess's Cowry \(*Talostolida latior*\)](#), ~~(which is found mainly most common in the Northwestern Hawaiian Islands)~~ and the rare, deep-dwelling ~~C. ostergaardi~~. The [Money Cowry \(*C. moneta*\)](#), ubiquitous in the Indo-Pacific, is rare in Hawai'i. In olden times white Money Cowry shells were sometimes held over smoke to give them an ivory hue. Cowries so treated were called **leho`uala**, or "sweet potato cowries." Queen Kapi`olani wore a lei of such shells in London when she attended Queen Victoria's Jubilee in 1887.

In the Hawaiian language cowries are called **leho**. Traditionally they were eaten and their shells used for scrapers or octopus lures. An older man eying young women would provoke the comment "The octopus notices the little cowries." To escape detection, people said "**Moe a leho**" ("Lie still as a cowry.")

[Malacologists used to place all cowries in the single genus *Cypraea*. In recent years, however, \(and not without controversy\) the cowries have been split into a number of genera, based on visible differences in shell structure and analysis of their DNA.](#)

p. 110: SNAKEHEAD COWRY

~~*Cypraea*~~ [Monetaria caputserpentis](#) (Linnaeus, 1758)

p. 110: TRANSLUCENT COWRY

~~*Cypraea*~~ [Talostolida pellucens](#) (Burgess, 1983)

Family Cypraeidae

Replace text:

· The back of this slender cowry's shell is whitish covered with irregular brown flecks and blotches. There is a large, sometimes squarish brown blotch near the center. The sides are white with a few brown spots mostly near the base. The slightly translucent mantle is red to orange-brown with widely spaced papillae. The foot has pale spots. When attacked the animal sheds the rear section of the foot to facilitate escape (like a lizard shedding its tail). This is a shallow-water cowry found both on reef flats and rocky walls. It eats algae. *Cypraea alisonae* is a recent synonym. (Many authorities continue to use *alisonae* as a subspecies name for the Hawaiian animals, with the common name, Alison's Cowry.) Burgess's Cowry (*T. latior*), a Hawaiian endemic found in the Northwestern Hawaiian Islands, is similar. To about 1 1/2 in. Indo-Pacific. Photo: Kahe Point, O`ahu. 30 ft.

p. 111: CHINESE COWRY

~~*Cypraea*~~ [Ovatipsa chinensis](#) (Gmelin, 1791)

p. 111: FRINGED COWRY

~~*Cypraea*~~ [Purpuradusta fimbriata](#) (Gmelin, 1791)

p. 112: GASKOIN'S COWRY

~~*Cypraea*~~ [Cribrarula gaskoini](#) (Reeve, 1846)

3rd line from bottom: (The Waxy Cowry, ~~C.~~ [Erosaria cernica](#), is similar...

Add at end of text: [\(See also p. xiv.\)](#)

p. 113: GRANULATED COWRY

~~Cypraea~~[Erosaria granulata](#) (Pease, 1863)

p. 114: HONEY COWRY

~~Cypraea~~[Erosaria helvola](#) (Linnaeus, 1758)

p. 115: ISABELLA'S COWRY

~~Cypraea~~[Luria isabella](#) (Linnaeus, 1758)

p. 115: LEVIATHAN COWRY

~~Cypraea~~[Lyncina leviathan](#) (Schilder & Schilder, 1938)

Replace text:

· This is the largest of two similar cowry species occurring in Hawai`i. Both have creamy brown, cylindrical shells marked with darker red-brown bands. *Lyncina leviathan* is best identified by its size and the large tufted "shaving brush" papillae (unique to the species) sprouting from the mottled gray and white mantle of the living animal. Shorter spikelike or branched papillae occur as well. In Hawai`i it inhabits caves and crevices, usually 30 ft. deep or less. The slightly smaller and less common Carnelian Cowry (*L. carneola*) has similar shell coloration but differs in size and form of the papillae. In old Hawai`i, shells of large Leviathan Cowries were sometimes used as octopus lures. An octopus captured with such a lure was said to have exceptional medicinal value. The Hawaiian name means "narrow-chested." To about 3 in. Indo-Pacific. Photos: a) Pūpūkea, O`ahu, 30 ft. (mantle extended); b) "Amber's Arches," south shore, Kaua`i. 60 ft. (See also p. 109.)

p. 116: RETICULATED COWRY

~~Cypraea~~[Mauritia maculifera](#) (Schilder, 1932)

p. 116: MAUI COWRY

~~Cypraea~~[Pustularia mauiensis](#) (Burgess, 1967)

· This tiny cowry is found infrequently throughout the main Hawaiian Islands, but breeding colonies seem to occur ~~only~~[mainly](#) on the leeward sides of Maui and the Big Island. Because of its shallow, restricted habitat it ~~has been subject~~[is vulnerable](#) to over-collecting and [for that reason, or some other](#), is now quite rare. The shell is cream [or yellow](#) with sparsely scattered light brown spots. The live animal is yellow. [A separate subspecies, *P. mauiensis wattsi*, is recognized from O`ahu.](#) To about 1/2 in. Endemic. Photo: Scott Johnson. Olowalu, Maui

p. 117: HUMPBACK COWRY

~~Cypraea~~[Mauritia mauritiana](#) (Linnaeus, 1758)

p. 117: POROUS COWRY ~~delete photo and text~~

Add new species:

OSTERGAARD'S COWRY

Erosaria ostergaardi (Dall, 1921)

Family Cypraeidae

This attractive Hawaiian endemic has a light brown shell sprinkled with chestnut brown spots. The sides and the base are white. (The similar Honey Cowry, above, has an orange-brown base.) Although extremely rare in the main Hawaiian Islands, where it is usually found deeper than 60 ft., it is somewhat more abundant in the northwestern chain. The name honors Danish immigrant

Jens Matthias Ostergaard (1879-1969), who as a young man worked as conductor on the old Mānoa trolley line. He enrolled at the nearby University of Hawai'i, eventually becoming a professor of zoology and a leading authority on Hawaiian molluscs. To about 3/4 in. Photo: Keoki Stender. 60 ft.

p. 118: SCHILDER'S COWRY

Cypraea Lyncina schilderoorum (Iredale, 1939)

· This species is similar in color to the more common Groove-Tooth Cowry ([below p. 116](#)). The back of the shell is marked with brown bands on a light background; the sides are thick, solid and without bands. The base is pure white and the teeth are separated by fine grooves. The mantle of the live animal is mottled with black, brown and white, with lighter papillae. Although generally uncommon, in some years this cowry is reported to be almost abundant in Hawai'i. [It is named for German malacologists Franz and Maria Schilders](#). To 1 3/4 in. Central and far Western Pacific. Photo: Pūpūkea, O'ahu. 15 ft.

p. 118: GROOVE-TOOTH COWRY

Cypraea Lyncina sulcidentata (Gray, 1824)

· This is probably the most abundant of the Hawaiian endemic cowries. The rounded shell is marked with four indistinct brown bands on a lighter background. At the base the sides are creamy brown to deep purple and finely marbled. The underside is light tan. The mantle of the live animal is tan marked with many fine, dark brown longitudinal lines. The many-branched papillae are broad, flat and white. The foot is light tan to white, the tentacles dark gray. This cowry is found under stones and ledges from depths of a few inches to at least 90 ft. The species name, meaning "grooved tooth," derives from the unusually deep grooves between the teeth that extend partly across the base. Schilder's Cowry ([above p. 115](#)) is similar; it has a pure white underside and fine grooves between the teeth. To about 1 1/2 in. Endemic. Photo: Pūpūkea, O'ahu. 30 ft.

p. 118: [Add new cowry, 2 photos and text](#)

MONEY COWRY

Monetaria moneta (Linnaeus, 1758) · **leho puna**

· Although the most abundant cowry in much of the Indo-Pacific, the Money Cowry is rare in Hawai'i. Look for it in tidepools and on protected reef flats. The shell is white, sometimes with a gold ring; the mantle is very finely striped with gray or black. In olden times white Money Cowry shells were sometimes held over smoke to give them an ivory hue. Cowries so treated were called **leho `uala**, or "sweet potato cowries." Queen Kapi`olani wore a **lei** of such shells in London when she attended Queen Victoria's Jubilee in 1887. In many parts of the world outside Hawai'i these cowries were traditionally used as money, hence the name. Photos: a) Nuku Hiva, Marquesas b) Kahalu`u Beach Park, Hawai'i. 1 ft.

p. 119: HALF-SWIMMER COWRY

Cypraea Staphylaea semiplota (Mighels, 1845)

Family Cypraeidae

3rd and 2nd line from bottom: ...are sometimes called *C.S. annae* Roberts, 1869.

To [almost 1 1/2](#) [about 3/4](#) in. Endemic.

p. 119: MOLE COWRY

Cypraea Talparia talpa (Linnaeus, 1758)

p. 120: CHECKERED COWRY

Cypraea [Luria tessellata](#) (Swainson, 1822)

Replace text with:

· The best specimens of this unusual cowry have three large, dark, squarish spots set corner to corner, checkerboard fashion; more often there are only two with fainter squares at the corners. Either way, the pattern is unique. The back is lightly banded. The mantle is smooth and translucent, the shell markings showing through clearly. This cowry occurs from shallow water to depths of at least 200 ft., often far back under ledges. It is uncommon and much sought after. Although for many years considered endemic to Hawai`i, Checkered Cowries have recently been found in deep water in the Austral Islands, Japan, Taiwan and the Philippines. The Hawaiian Islands, however, seem to be the only place where they occur within scuba depths. The species name means "inlaid with small square stones" or "mosaic." To about 2 in. Photo: Mākua, O`ahu. 15 ft.

p. 120: RASHLEIGH'S COWRY

Cypraea [Talostolida rashleighana](#) (Melvill, 1888)

Family Cypraeidae

· Rare in the main Hawaiian Islands, this endemic cowry resembles *C. alisonae* [the Translucent Cowry](#) (p. 110 above), but is smaller, rounder and has more brown spots on the sides. Like *C. semiplota* [the Half-Swimmer Cowry](#) (p. 120), it seems to occur in cycles, present some years and absent in others. A more stable population may exist in the cooler northwestern chain. It usually occurs at depths of 50 ft. or more. Melvill named the species for his shell enthusiast friend, Jonathan Rashleigh (1845-1872). To about 1 in. [Endemic](#). Photo: Scott Johnson. Hale`iwa, O`ahu. 50 ft.

p. 122: CALF COWRY

Cypraea [Lyncina vitellus](#) (Linnaeus, 1758)

p. 124: TRITON'S TRUMPET Replace photo and text:

· The shells of these giant triton snails are relatively smooth, marked with spiral ribs and low varices. Although often obscured by coralline algae, their variegated pattern has been compared to the plumage of pheasants. The large aperture is reddish orange, its inner edge (columella) beautifully striped dark brown and white. The spotted animals feed on a variety of [sea stars and urchins](#) [echinoderms](#) including the Cushion Star, the Crown-of-Thorns Star, [the Black Sea Cucumber](#) and the Red Pencil Urchin, [and it is not uncommon to encounter one consuming its prey](#). Sometimes divers find ~~them sitting on a mass of eggs, bright red when freshly laid or deep rust when about to hatch~~ [a female sitting with and tending her eggs—hundreds of elongated bright orange capsules attached to the ceiling of a crevice or cave](#). With a maximum length of almost 20 in., this species' shell is the second largest in the Indo-Pacific....

p. 124: NICOBAR TRITON

Cymatium ([Monoplex](#)) [nicobaricum](#) (Roding, 1798)

p. 125: HIDDEN TRITON

Delete photo and text, replace with:

ORANGE HAIRY TRITON

Cymatium (Monoplex) aquatile

(Reeve, 1844)

Hawai'i has three look-alike "hairy tritons," identifiable mainly by their undersides. This one has a light orange opening (aperture) with an orange and white inner lip (columella). The endemic Hawaiian Hairy Triton (*C. intermedius*), the most common of the three, is similar, with a black and white banded columella. The plain jane Hairy Triton (*C. pileare*) has a brown and white columella with an orange aperture. Each has a beautifully spotted animal that paralyzes its echinoderm prey with a potent mix of venoms, including acids, protein enzymes, and peptide toxins. This species and *pileare* attain about 3 1/2 in., *intermedius* is somewhat smaller. Indo-Pacific. Photo: Pauline Fiene. St. Anthony wreck, Maui. 65 ft.

p. 131: MAUI SPINDLE

Fusinus sp. [mauiensis Calloman and Snyder, 2006](#)

· This large spindle lives on [mud and](#) sand bottoms, usually in groups, and is ~~most common off endemic to~~ the southwest shore of Maui. [Most a](#)Active in the late afternoon and evening, it feeds on worms. ~~Although resembling the Indo-Pacific spindle *Fusinus undatus*, it may be undescribed.~~ *Fusinus sandvicensis*, a deepwater Hawaiian endemic, is ~~also~~ similar. ~~Yet a~~ [Another large unidentified](#) Hawaiian spindle, [F. michaelrogersi](#), ~~has been reported~~ [occurs](#) off O'ahu and Kauai, [and F. midwayensis occurs at Midway Atoll](#). To about 7 in. Photo: Mike Severns. Ma'alaea Bay, Maui. 60 ft.

p. 144, 3rd paragraph:

~~There are an estimated 2,000 opisthobranch species worldwide. Dr. E. Alison Kay, in her book Hawaiian Marine Shells, lists over 150 from the Islands. A great many more are known to exist, some lacking scientific names. Sixty-four~~ of the most common, colorful or interesting of Hawai'i's opisthobranchs are shown below.

[About 3,000 opisthobranch species have been described worldwide and many more remain to be named. On their website <http://seaslugsofhawaii.com>, Cory Pittman and Pauline Fiene illustrate about 500 species, both named and unnamed, that occur in the Hawaiian Islands. Seventy-six](#) of the most common, colorful or interesting of Hawai'i's opisthobranchs are shown below

p. 146-147: SWOLLEN BUBBLE SHELL, PAPER BUBBLE SHELL, WAVY BUBBLE SHELL:
Family ~~Hydatinidae~~ should be Family [Aplustridae](#) (3 places)

p. 147: WAVY BUBBLE SHELL *Micromelo undata* should be [Micromelo undatum](#)

p. 155: ORANGE GUMDROP *Berthellina* sp. [delicata \(Pease, 1861\)](#).
~~It probably preys on colonial tunicates.~~ [It feeds on various hard corals and sponges.](#)

p. 161: [Redo entire page. Add new nudibranch](#)

SCOTT JOHNSON'S NUDIBRANCH

Ardeadoris scottjohnsoni

Bertsch & Gosliner, 1989

Family Chromodorididae

This attractive white slug has black rhinophores and gills and a wavy margin finely rimmed with gold. Its gills vibrate as it crawls. The species name honors Scott Johnson, pioneering investigator and photographer of Hawaiian opisthobranchs, and co-author of the first illustrated book on the subject. To about 1 in. Hawai'i and Okinawa. Photo: Rob Whitton. "Hale'iwa Trench," O'ahu. 50 ft.

p. 162: Redo entire page.

add new species

MIDWAY NUDIBRANCH

Chromodoris sp. 2

Family Chromodorididae

The back of this white slug is covered with a red netlike pattern and its white gills are delicately outlined in red. The white mantle margin contains large red dots and is rimmed with gold. This spectacular animal was discovered at Midway Atoll, where it is not uncommon. It appears to be restricted to the Northwestern Hawaiian Islands and has yet to receive a formal description and scientific name. To about 2 in. Photo: "Chromis Corridor," Midway Atoll. 40 ft.

p. 163: RED-SPOTTED NUDIBRANCH

[This undescribed species is widespread in the Indo-Pacific.](#)

p. 163: TREMBLING NUDIBRANCH

~~It is usually considered endemic but may also occur in Okinawa.~~ [It also occurs in Japan and the Marshall Islands and is probably more widespread.](#)

p. 170: WHITE AND BROWN DENDRODORIS

Dendrodoris ~~*albobrunnea* Allen, 1933~~ [elongata](#) Baba, 1936

Family Dendrodoridae

Nudibranchs of the family Dendrodoridae possess a long sucking tube with which they feed on sponges; there is no radula. Some are quite large. This species is of moderate size, usually brownish or grayish with a double row of almost starlike white blotches along its back and a ring of smaller white blotches at the edges. ~~Outside Hawai'i it can be whitish with brown blotches. (These may be two distinct species.)~~ It occurs from the shallows to at least 50 ft. To about 3 in. Indo-Pacific. Photo: Kea'au Beach Park, O'ahu. 40 ft.

p. 170: BLACK DENDRODORIS replace text with:

Tide-poolers who turn over rocks will occasionally find this slug, often with its bright yellow egg coils nearby. It emerges at night and can be seen down to about 15 ft. along rocky shores. The soft, slimy body is black in adults, orange in juveniles. (Some adults retain an orange margin, or flecks of orange.) The numerous tubercles on the body are often tipped with white. To about 2 1/2 in., but usually smaller. This is a common sea slug throughout the Indo-Pacific. Photo: Kīpapa Island, O'ahu. 2 ft. (pair with eggs)

RED DENDRODORIS

Dendrodoris ~~*rubra* (Kelaart, 1858)~~ [sp.](#)

Family Dendrodoridae

This is a large red or brownish-red dorid with a yellow margin, white-tipped rhinophores and whitish gills. It ~~appears to be active both by day and~~ is usually seen at night or in shaded habitat and occurs in moderately exposed rocky areas at about 20 ft. or more. ~~In the Indian and Western Pacific oceans it is described as having black, gray or dark red blotches and no yellow margin. Specimens from Hawai`i and the Marshall Islands have a yellow margin but lack the blotches. Regional variation may account for this, or the species could be new. Although previously identified as *Dendrodoris rubra*, the species appears to be undescribed.~~ To about 3 in. Indo-Pacific. Photo: ~~Waimea Bay, O`ahu. 50~~ Pūpūkea, O`ahu. 25 ft.

p. 172-73: The Spanish Dancer is now split into two species. Redo both pages.

YELLOWMARGIN SPANISH DANCER

Hexabranchnus aureomarginatus *Ostergaard, 1955*

Family *Hexabranchnidae*

· Spanish Dancers are large, conspicuous nudibranchs found around the world in tropical seas. All can swim by flexing the body and undulating the outspread mantle, hence their common name. Although several species have been described, in 1972 all were officially lumped into one worldwide species (*H. sanguineus*) based on the similarity of preserved museum specimens. Divers and snorkelers in Hawai`i, however, can clearly distinguish two local species that are consistently different both in appearance and behavior. The Yellowmargin Spanish Dancer, the smaller of the two, is commonly seen by day, often in moderately exposed rocky areas. It is solid red with discrete white blotches of varying size and number, and the edge of the furled mantle is yellow. If disturbed, the animal flares out in a colorful display revealing bright white on the inside mantle edge. Its conspicuous pink egg coils are attached to rocky substrate and contain the same sponge-derived poisons as the nudibranchs themselves. The small red Imperial Shrimp, *Periclimenes imperator* (p. 224), sometimes lives commensally on the slug's body surface (and also on the Redmargin Spanish Dancer). To about 8 in. Probably endemic to Hawai`i. Photos: a) Pūpūkea, O`ahu. 20 ft. b) David R. Schrichte. Pūpūkea, O`ahu. (with eggs) (See also p. viii.)

Add:

p. 173: REDMARGIN SPANISH DANCER

Hexabranchnus pulchellus Pease, 1860

Family *Hexabranchnidae*

· Hawai`i's largest nudibranch, this animal is seen most often at night. It is red or pinkish with blotchy light markings, resembling fatty ground beef. If disturbed, it flares out its mantle revealing a bright red inner margin. Its conspicuous egg coils resemble red roses attached to the substrate (see p. 178) and contain the same sponge-derived poisons as the nudibranchs themselves. To about 12 in. Known for certain only in Hawai`i, but may have a wider distribution. The name *pulchellus* (meaning "beautiful") is used here provisionally. Photo: Ka`ohe Bay, Hawai`i. 15 ft.

p. 173: VARICOSE PHYLLIDIA.

3rd line from bottom: Two ~~Hawaiian species very close in appearance, a *Fryeria* and another *Phyllidia*, remain unnamed.~~ quite similar *Phyllidias* also inhabit Hawaiian waters, *P. exquisita*, and an unnamed species, both rare.

p. 174: POLKA-DOT PHYLLIDIA

~~At present known only from Hawai'i, the Banda Islands, Indonesia, and Okinawa~~ [Indo-Pacific](#).

Photo: Pūpūkea, O`ahu, 30 ft.

p. 177:

EOLIDS. SUBORDER AEOLIDACEA

Eolid nudibranchs lack gills. They are typically long, slender and "frilly," almost always bearing numerous pairs of tentacle-like protuberances (cerata) along the body. The head bears both rhinophores and cephalic tentacles. These slugs usually feed on hydroids, corals or other stinging animals, and many species incorporate the stinging capsules (nematocysts) of their prey for protection. Some also incorporate symbiotic algae (zooxanthellae) from their prey, thereby augmenting their food supply ~~through photosynthesis~~. [One species actually makes its own chlorophyll](#). A few eolids feed on barnacles or the eggs of other molluscs.

p. 177: DESIRABLE NUDIBRANCH

Replace text and photo with INDIAN NUDIBRANCH.

INDIAN NUDIBRANCH

Caloria indica (Bergh, 1896)

Family Flabellinidae

· This attractive slug feeds on hydroids, incorporating the stinging cells of its prey for its own defense. Its translucent light orange body is studded with white-tipped cerata. The cephalic tentacles (the longer pair at the front of the head) also have white tips, but the rhinophores (the shorter tentacles on top of the head) have orange tips with pale bands below. The orange rhinophores distinguish this slug from a unnamed look-alike *Caloria* common in Kāne`ohe Bay, O`ahu, which has white tipped rhinophores. The reason for the name *indica*, meaning "from India" is not clear; the original specimens seem to have been collected in Indonesia. Many authors place this animal in the genus *Phidiana*. Indo-Pacific. To about 1 1/2 in. Photo: Ulua Beach, Maui, 50 ft.

p. 178. EGG EATING NUDIBRANCH:

~~Known from Japan, Guam and Hawai'i~~. [Indo-Pacific](#). Photo: a) Pūpūkea, O`ahu. 30 ft. b) Lehua Rock, Ni`ihau. 30 ft. ([with Redmargin Spanish Dancer](#) eggs)

p. 184: BLACK-LIPPED PEARL OYSTER 4th line from bottom: (*Conchodytes meleagris*) should be (*Conchodytes meleagrinae*)

p. 185: WINGED PEARL OYSTER, line 2:

These cluster on black coral trees (*Antipathes* [and](#) *Myriopathes* spp.) ...

p. 188:

Thorny Oysters. Family Spondylidae

There are at least ~~four~~[two](#) species in Hawai'i.

SPINY OYSTER replace text

Spondylus gloriosus Dall, Bartsch & Rehder, 1938

Family Spondylidae

· The spines of this and similar Indo-Pacific thorny oysters probably serve to keep gastropod predators, such as murexes, from drilling into the main shell. They also form good points of attachment for tunicates, bryozoans and sponges, which camouflage the animal, sometimes hiding it almost completely. Individual shells may have short thick spines or long slender ones. Most shells are white, but others are yellow, orange, wine colored, or even multicolored. This bivalve occurs from 10-350 ft. and prefers well protected holes and caves. Maximum length about 4 in. Possibly endemic. Photo: Pauline Fiene. Molokini Islet, Maui. 100 ft.

p. 189: True Oysters, last line *Pycnodonta kamehameha* (should be *Pycnodonta*)

p. 197: ORNATE OCTOPUS.

~~Octopus ornatus~~ Gould, 1852 should be [Callistoctopus ornatus](#) (Gould, 1852)

p. 198:

Redo page adding a new species. Use new photos & text.

SHORT-ARM SAND OCTOPUS

Amphioctopus arenicola

Huffard & Hochberg, 2005

Order Octopoda; family Octopodidae

· This animal is typically reddish brown to cream with many small white spots that create a mottled, almost reticulated pattern. It lives in sand from the shallows down to at least 250 ft., typically burying itself almost completely, but sometimes sheltering in hollow objects, such as old coconut shells or pairs of bivalve shells held together with its arms. The animal in the photo opposite was found in an old bottle; when turned out of its refuge it performed this defensive display. Like most octopuses, this species feeds primarily after dark. The scientific name means "sand dweller." Known only from Hawai'i. Photo: Kahe Point, O'ahu. 60 ft.

LONG-ARM SAND OCTOPUS

Octopus sp. 1

Order Octopoda. Family Octopodidae

· These small octopuses occupy holes in silty sand at depths of 40 ft. or more. By day they typically peer from their burrows with just their eyes exposed. Occasionally, they emerge completely and sometimes swim by holding their arms together and undulating, much like a flatfish. They can quickly darken, lighten, or change their skin texture to match the substrate. Little is known about this animal and it is probably undescribed. A similar octopus occurs in Indonesia. Photo: Ho'okena, Hawai'i. 40 ft.

add new species:

BLUE-OCCELLUS OCTOPUS

Octopus sp. 2

Order Octopoda. Family Octopodidae

· This small octopus looks much like a juvenile Day Octopus and has been seen at depths of 8-80 ft. in crevices, under ledges, and even in a pipe on the deck of a sunken ship. It seems to be at least partially active by day. The two bluish ocelli (one clearly visible in this photo) fade when

the animal is relaxed and intensify when it is disturbed. Little else is known about this octopus and it probably represents an undescribed species. Photo: Mākua, O`ahu. 8 ft.

p. 218: ~~UNNAMED~~ JUMPING SAND SHRIMP

Trachypenaeopsis ~~sp.~~c.f. *mobilispinis* (Rathbun, 1915)

Family Penaeidae

· If sufficiently disturbed, this sand-dwelling shrimp swims high into the water column to foil sand-grubbing predators. It can be abundant in some rubbly sand bottoms adjacent to the reef. [Its identity is uncertain. Bleached museum specimens correspond to *T. mobilispinis*, a tropical Atlantic shrimp, but no color *mobilispinis* photos are known for comparison; it seems questionable that the two are the same.](#) To about 2 in. Indo-Pacific. Photo: Mākaha, O`ahu. 20 ft.

p. 219: BANDED CORAL SHRIMP, replace text

Most snorkelers and divers in the tropics are familiar with these striking red and white shrimps. Clinging upside down to the undersides of ledges and coral heads, almost always in pairs, they can usually be spotted by their conspicuous white antennae, which signal their presence to nearby eels or fish. If approached, the shrimps will sometimes groom these animals, presumably removing and eating parasites. This behavior, however, is infrequently seen in Hawai`i, perhaps because the shrimps are most active at night. Females frequently carry a light greenish blue egg mass under their abdomens, held in place by their swimmerets. In a captive situation, Banded Coral Shrimps have been observed grooming each other, guarding each other during molting, performing a courtship "dance," and mating. (Unmated individuals placed together, however, will often fight to the death.) These shrimps shed their claws if stressed and are often seen with only one claw. The claws grow back in the next molt, although several molts may be necessary to regain full size. The species name means "bristly" or "spiny" because the upper surfaces of the body and legs are covered with small hooked spines, forward-pointing at the front of the body, backward-pointing at the rear. They occur in all warm seas, from tide pools to depths of 100 ft. or more, attaining about 2 in. body length. Photo: Lāna`i Lookout, O`ahu. 25 ft.

p. 222: CLEAR CLEANER SHRIMP, last 2 lines:

Photos: [a\)](#) Aquarium (cleaning a Convict Tang). [b\)](#) A similar [but](#) unnamed species of *Urocaridella* with more spots, [which](#) also occurs in the Islands. [Mākua, O`ahu. 30 ft.](#)

p. 224: IMPERIAL SHRIMP, line 2 of text:

nudibranchs, *Hexabranchnus* ~~*sanguineus* (p. 172)~~ [spp. \(p. 172-3\)](#)

p. 224. SISTER SHRIMP, last line:

Indo-Pacific [and Eastern Pacific](#).

p. 225: BARRED WIRE CORAL SHRIMP

Pontonides ~~sp.~~1 *ankeri* Marin, 2007

replace text:

· These small shrimps live commensally on the wire coral *Cirrhopathes anguina*, possibly subsisting on their host's mucus or on planktonic organisms caught in its tentacles. Their pattern of yellowish green bars separated by transparent areas blends remarkably well with the coral's polyps. Occurring in pairs (females twice the size of males), they probably spend their entire adult lives on a single coral colony, sometimes sharing it with a few juveniles. Recently described and

named, *P. ankeri* is widespread in the Indo-Pacific. The name honors zoologist and shrimp specialist Arthur Anker. To about 1/2 in. total length. Photo: Dennis McCrea. "Black Hole," Kona, Hawai'i. 75 ft.

p. 229: HARLEQUIN SHRIMP

Line 2: (In the Western Pacific and Indian Oceans the spots are brown with bluish edges, ~~likely~~possibly signifying a different species.)

p. 230: ORANGE-BANDED SNAPPING SHRIMP

Alpheus ~~c.f. *paracrinitus* Miers, 1881~~sp. *macrocheles* group

p. 239: 2nd paragraph, end:

However, the related reef lobsters (family Enoplometopidae) are common. ~~Even more abundant,~~
as are the spiny lobsters (family Palinuridae) and slipper lobsters (family Scyllaridae). Hawai'i has at least ~~46~~ 17 lobster species of which 12 are illustrated here. Also discussed are two species of lobster-like burrowing shrimps of the infraorder Thalassinidea.

p. 242: end of 2nd and entire 3rd paragraph.

...Juveniles a few inches long are especially colorful ~~and can easily be kept in aquariums.~~

~~Of the three species of spiny lobsters in Hawai'i, only two are of commercial value. All three are discussed below. Also included is the uncommon Mole Lobster, a member of the family Synaxidae that scientists place between the spiny and slipper lobsters.~~

Out of four Hawaiian spiny lobster species, three are illustrated here. Omitted is the rare Blue-Spot Spiny Lobster (*Panulirus femoristriga*), recently discovered in the Islands.

p. 243: LONG-HANDED SPINY LOBSTER

Spiny lobsters lack an enlarged pincer-bearing first pair of legs. At first glance, however, males of this species seems an exception: ~~its~~ their first two legs are elongated and flattened, and each ends in a curved "false claw."

p. 244:

FURRY LOBSTERS. FAMILY SYNAXIDAE

MOLE LOBSTER

Palinurellus wieneckii (De Man, 1881)

Family Synaxidae

The Copper Lobster (*P. grundlachi*) ~~is a closely related Caribbean species, of the Caribbean, and the strange deepwater Musical Furry Lobster (*Palibythus magnificus*) are the only close relatives.~~

Little is known about these animals. To about 4 in. Indo-Pacific. Photo: Kea'au Beach Park, O'ahu. 50 ft. (night)

p. 246: RIDGEBACK SLIPPER LOBSTER

Replace entire text:

· This heavily armored crustacean is the largest Hawaiian slipper lobster. Carapace and tail are patchy gray to orange-brown (brighter in freshly molted individuals) and covered with low tubercles; a series of humps runs down the center of the back. The flattened antennal plates bear

no notches or spines and tend to pink or purple at the edges. It feeds on large bivalve molluscs such as Ventricose Ark Shells, Cliff Oysters, and Black-Lipped Pearl Oysters, patiently wedging them open with its strong appendages. To about 20 in. Indo-Pacific. Photo: Kona coast, Hawai'i. 45 ft. This species is protected by law. See Appendix B (p. 346)

p. 247: Replace entire HAWAIIAN LOCUST LOBSTER text with

~~HAWAIIAN~~-~~FIJI~~ LOCUST LOBSTER

Scyllarus sp. *Biarctus vitiensis* (Dana, 1852)

Replace entire text:

· Small lobsters such as this are sometimes called "locust lobsters." This species was first described from Fijian specimens, thus the name, but it occurs throughout much of the Western and Central Pacific. In Hawai'i look for it at night along rocky shores, especially near crevices and caves, and sometimes in living coral. It is usually solitary, but large aggregations have been observed. At least five other locust lobsters occur in Hawai'i, most from deep water. To about 1 1/2 in. Photo: "Hale'iwa Trench," O'ahu. 20 ft.

p. 264: Caption at bottom. ~~Cypraea~~*Mauritia maculifera*

p. 270: SEA URCHIN CRAB

· The females of this parasitic crab live in the rectums of sea urchins, in Hawai'i almost exclusively in the common Banded Urchin, *Echinothrix calamaris* (p. 317). Except in very shallow water, ~~almost every~~most Banded Urchins ~~hosts~~ one or more of these animals. The tiny dark males and immature females live among the spines and are usually difficult to see; the larger females ~~are imprisoned~~ usually remain inside the rectum (located on the urchin's upper side). ...

p. 271: Delete HOLCOM'S ELBOW CRAB text and 2 photos

Add new species:

KING KONG ELBOW CRAB

Daldorfia rathbunae De Man, 1902

Family Parthenopidae

· This perfectly camouflaged, slow-moving crab exactly resembles the rubble in which it lives. Its lumpy, knobby carapace and pincer-bearing limbs may be overgrown with pinkish coralline algae, sponges, and other growths. To about 4 in. across. Photo: John Earle. Mākuā, O'ahu. 40 ft. (A similar crab, *D. dimorpha*, attains only about 1 1/2 in.)

Add new species:

GIANT ELBOW CRAB

Rhinolambrus sp.

Family Parthenopidae

· Rarely-seen, this crab lives on silty sand or mud bottoms, far from reefs. It can partially bury itself, leaving only its pointed head and green eyes protruding. When disturbed it spreads its arms menacingly, and if too closely approached doesn't hesitate to defend itself. Little else is known about the animal. It might be *Rhinolambrus contrarius*. Outstretched, this individual was about 12 in. from claw to claw. Photo: Ma'alaea Bay, Maui. 40 ft.

p. 274: RED SWIMMING CRAB

Charybdis Gonioinfradens paucidentata.

Line 1 of text: Hawaiian Swimming Crab (~~abeve~~below).

p. 275: LONG EYED SWIMMING CRAB

Replace photo

· The eyestalks of this crab are amazingly long and can either be held erect or folded back into grooves along the front of the carapace. Wary and hard to approach, these somewhat furry animals ~~are brown~~, live in burrows on soft, muddy bottoms, and can tolerate brackish conditions. They can be common, but ~~D~~ivers and snorkelers seldom encounter the ~~em~~is animal because of ~~its~~their habitat. The species name means "watchful." To about 5 in. carapace width. Indo-Pacific.

Photo: ~~John E. Randall, Maumere, Flores, Indonesia~~Dennis McCrae. Hōnokohau Harbor, Hawai'i. 12 ft .

p. 289:

~~KAHE POINT CRAB~~

~~*Pseudochrytochirus kahe* McCain and Coles, 1979~~

CORAL CHAMBER CRAB

Utinomiella dimorpha (Henderson, 1906)

~~The species was discovered at Kahe Point, O`ahu, during an environmental survey for the Hawaiian Electric Company, hence the species name.~~ Females attain about 1/5 in. carapace length. ~~Probably~~ Indo-Pacific ~~in distribution~~. Photo: Kahe Point, O`ahu. 25 ft. (Similar crabs include *Fungicola* sp. which inhabits chambers in Oval Mushroom Coral (p. 61), and the xanthid *Jonesius triungiculata*, which inhabits chambers in Lobe Coral (p. 56).

p. 292 : Bottom line. ~~Fif~~Nineteen are illustrated here.