The Hawaiian Species of Conus (Mollusca: Gastropoda) 1

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IN THE COURSE OF a comparative ecological study of gastropod mollusks of the genus Conus in Hawaii (Kohn, 1959), some 2,400 specimens of 25 species were examined. Uncertainty of the correct names to be applied to some of these species prompted the taxonomic study reported here. Many workers have contributed to the systematics of the genus Conus; nevertheless, both nomenclatural and biological questions have persisted concerning the correct names of a number of species that occur in the Hawaiian archipelago, here considered to extend from Kure (Ocean) Island (28.25° N., 178.26° W.) to the island of Hawaii (20.00° N., 155.30° W.).

FAUNAL AFFINITY

As is characteristic of the marine fauna of the Hawaiian Islands, the affinities of Conus are with the Indo-Pacific center of distribution. The Hawaiian Islands mark the northeastern limit of most of the species that occur there. Eastern Pacific species of Conus are entirely absent from the Hawaiian fauna.

Most of the species present in Hawaii range widely throughout the central and western Pacific Ocean, Indian Ocean, and Red Sea. The chief mode of distribution is the pelagic veliger larval stage. Drifting while attached to floating material may be a secondary mechanism. Despite the extensive distribution of most of the species occurring in Hawaii, the geographic position of the archipelago and the prevailing westerly surface currents are factors which could plausibly effect the isolation necessary for geographic speciation.

Of the 33 species of Conus considered in this paper to be valid constituents of the Hawaiian fauna, about 20 occur in shallow water on marine benches and coral reefs and in bays. Of these, only one species, C. abbreviatus Reeve, is considered to be endemic to the Hawaiian archipelago. Less is known of the species more characteristic of deeper water habitats. Some, known at present only from dredgings about the Hawaiian Islands, may in the future prove to occur elsewhere as well, when adequate sampling methods are extended to other parts of the Indo-West Pacific region.

ECOLOGY

Since the ecology of Conus has been discussed in detail elsewhere (Kohn, 1959), ecological data are restricted to notes in this report.

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Mrs. A. M. Harrison, W. C. Ross, and C. S. Weaver. Valuable assistance rendered by Charles E. Cutress in preparation of the color photographs is gratefully acknowledged. Most of the work was carried out at the Osborn Zoological Laboratory, Yale University, during tenure of a fellowship from the National Science Foundation.

BIBLIOGRAPHICAL NOTES

An excellent bibliographical account and collation of the major works in which species of Conus were described is given by Hanna and Strong (1949). Except where otherwise noted, the collations cited therein are followed in the present paper.

Catalogue of the Portland Museum. 1786. This catalogue was published anonymously, but its authorship is usually attributed to George Humphrey (Dall, 1921). The names of new species are attributed to Daniel Solander in the volume, and the same usage is followed in the present paper. A valuable discussion of this catalogue is given by Wilkins (1955), who also presents cogent reasons for attributing the names to Humphrey.

J. G. Bruguière, Encyclopédie Méthodique. Histoire Naturelle des Vers. 1792. Many previously undescribed species of Conus were named and carefully described in this work. However, the authorship to be attributed to these names has been a matter of dispute almost since the volume appeared. In the volume, Bruguière attributes the names and Latin diagnoses of species to C. H. Hwass (p. 598). Bruguière states that he himself wrote the descriptions and the "additional" synonymy (see Clench, 1942: 3). New specific names are published in the volume as, e.g. "Conus catus Hwass.

However, many subsequent writers (Blainville, 1818; Reeve, 1843–1844; Adams and Adams, 1858; Weinkauff, 1874; Smith, 1879; Tryon, 1884; Fischer, 1887; von Martens and Thiele, 1903; Tinker, 1952; and Morris, 1952) have cited the names as they appear in Bruguière (1792). A third group of writers (Dautzenberg, 1937; Clench, 1942; Mermod, 1947; and Dodge, 1953) has cited such names as, e.g., "Conus catus Hwass in Bruguière."

Application of the Règles of the International Commission on Zoological Nomenclature (ICZN), and later provisions and clarifications of the Règles, does not lead to an unequivocal solution to this problem. In the decisions of the ICZN meeting in Paris in 1948, it was recommended (Bull. Zool. Nomencl. 4: 565–566, 1950) that "where in a book or paper written by one author (say author 'A') it is clearly stated that the description of one or more specified taxonomic units there named has been prepared exclusively by some other author (say author 'C'), the name or names in question are to be attributed to author 'C', not to author 'A'. The name of the taxonomic unit so described and named is to be cited by later authors as having been published by 'C in A'."

It is apparent from the remarks of Bruguière (1792: 598; see also Clench, 1942: 3) that the descriptions of the species were not prepared exclusively by Hwass, although the names and brief Latin diagnoses were. It is, however, the present author's opinion that Hwass's contribution is sufficient to justify attributing authorship of the names to him. This view is strengthened by the more recent further clarification of Article 21 (Copenhagen Decisions, 1953: 58–59), which states that "the rule set out on pages 565–566 of vol. 4 of the BULLETIN should be qualified in such a way as to make it clear that it applies only where the book or paper concerned contains a clear indication that not only the name in question was proposed by some author other than that by whom the book or paper was written but also that the indication, defini-
tion, or description on which, under Article 25, the availability of that name depends was written not by the author of the book or paper concerned but by the author to whom the name is there attributed."

For these reasons, the species of Conus referred to as, e.g. "Conus catus Hwass" in Bruguière (1792) are herein cited as, e.g. "Conus catus Hwass in Bruguière."

*Museum Calonnianum.* 1797. The names introduced in this publication were rejected in Opinion 51 of the ICZN (Smithsonian Publ. 2060, 1912: 116), but this decision has not been universally accepted. Of the names listed in the Museum Calonnianum, only three, all of which are synonyms, are pertinent to this paper. For the sake of completeness, they are listed in brackets in the synonymies. Authorship of the Museum Calonnianum is attributed to George Humphrey, following general acceptance. The problem is discussed in detail by Iredale (1937).

*Museum Boltonianum.* 1798. The names in this volume were accepted as nomenclatorially available in Opinion 96 of the ICZN (Smithsonian Misc. Coll., 73(4): 16–18, 1926), and their authorship was attributed to P. F. Röding in Direction 48 of the ICZN (Opinions and Declarations Rendered by the ICZN, 1: 255–264, 1956).

L. W. Dillwyn. *A Descriptive Catalogue of Recent Shells.* 1817. A number of species of Conus described by Chemnitz (1788, 1795) are listed in Dillwyn’s catalogue. Since the specific names in Chemnitz (1788, 1795) have been rejected by Opinion 184 of the ICZN (Opinions and Declarations Rendered by the ICZN, 3: 27–35), these names became nomenclatorially available upon publication by Dillwyn (1817). (See also Bull. Zool. Nomencl., 4: 259–260, 1950.)

L. C. Kiener. *Spéces Général et Iconographie des Coquilles Vivantes.* 1845–1850. The names of species described in this work appear both on the plates and in the text. Hanna and Strong (1949) reproduce the summary of the collation of Sherborn and Woodward (1901: 218) which gives 1846 as the year of publication of the plates. This date, however, is erroneous, being presumably a typographical error. The correct date is 1845 as given in the body of the paper (Sherborn and Woodward, 1901: 217). Therefore, the names in Kiener’s work should date from 1845 rather than from the dates on which they appeared in the text.³

Tomlin (1937) has given the most complete catalogue of the genus Conus. Some 2,700 names are listed, including both extant and fossil species. Earlier catalogues of Recent species are given by Reeve (1843–1849), Kiener (1845–1850), Sowerby (1857–1858), and Tryon (1884).

Earlier published lists of the species of Conus in Hawaii are those of Garrett (1878), Edmondson (1933, 1946), Tinker (1952, 1958), and Greene (1953). Extensive unpublished lists compiled by W. A. Bryan in 1919, and by E. H. Bryan, Jr. in 1956, have been made available to the writer by E. H. Bryan, Jr.

**SYNONYMY**

The synonymies consist of the first known publication of all known different names, authors, and combinations which have been applied to the species, listed chronologically. Subsequent references to the same name are not given, with the exception of errors and emendations, in order to conserve space. It is perhaps unfortunate that some of the references are to distributional lists and museum catalogues, which in many cases lack taxonomic information. These are included primarily because specific names first published in some of the museum catalogues have been recognized as available by the ICZN. Furthermore, in addition to their historical importance, such lists and catalogues are in some cases the source of errors which have been perpetuated in the subsequent literature.

Many specific names of Conus were introduced by authors who did not consistently use the binominal system. These names are

³The author is grateful to Dr. Harald A. Rehder for having pointed out this discrepancy.
thus invalid (see Opinions and Declarations Rendered by the ICZN, 3: 27–35; 5: 265–279) and have not been included in the synonymies. Among the post-Linnean authors responsible for such names are Martini (1773), Chemnitz (1788, 1795), Meuschen (1778, 1787), and Martyn (1784–1792).

In cases of generic changes by subsequent authors, the name of the author of the species has been placed in parentheses throughout, whether or not this was done by the author of the generic change.

Described varieties of listed valid species are not included in synonymies. However, if the listed valid species itself has been described as a variety of another species, that entry is included in the synonymy.

In cases of published erroneous identification of specimens, the notation "(error)" follows the entry.

Genus CONUS Linné

Shell obconical, turbinate; whorls enrolled upon themselves, attenuated anteriorly. Spire usually short, smooth or coronate. Aperture elongate, narrow, effuse at the base, without teeth; outer lip smooth, sharp, with a sutural sinus.

Conus abbreviatus Reeve

Fig. 33 in Plate 2

Conus abbreviatus Reeve, 1843, Conch. Icon., 1: pl. 16, sp. 86.

Conus abbreviatus Sowerby, 1857, Thes. Conchyl., 3: 10 (as "C. abbreviatus Nuttall MS., Reeve C.I." on pl. 4, fig. 84).


Conus miliaris Hwass var. abbreviatus. Tryon, 1884, Man. Conch., 1: 22, pl. 5, fig. 89.

Stephanocorus abbreviatus (Reeve). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 4.

DESCRIPTION: Shell small but sturdy. Body whorl striate, the striae as raised ridges near the base, impressed and widely spaced elsewhere. Aperture fairly narrow, flaring somewhat towards the anterior, or basal end. Base attenuated. Shoulder coronate; spire depressed, coronate, striate. Color bluish gray, with pale flesh-colored transverse bands in the middle of the body whorl and at the shoulder; with rows of rather distantly spaced small brown dots encircling the body whorl. Aperture purplish brown within, with a light median band. Periostracum thin, yellow, translucent. In life, foot pale brown; siphon pale brown, tinged with pink.

LENGTH: To 60 mm., but usually smaller.

TYPE LOCALITY: Oahu.

REMARKS: It is believed that this species is endemic to the Hawaiian archipelago. It is known from Midway Island and all of the main islands, where it is usually rather common on marine benches. Larger specimens are found on sandy substrata of coral reef platforms.

Conus miliaris Hwass and C. coronatus Gmelin, neither of which occurs in Hawaii, are the most closely related species. C. abbreviatus may be distinguished from both by the regular arrangement and small size of the brown dots, by the characteristic bluish-gray ground color, and by the absence of irregular longitudinal white flecks (as in C. miliaris) or brown blotches (as in C. coronatus).

Pleistocene fossils of C. abbreviatus are known from Oahu (Ostergaard, 1928), Maui, and Molokai (Ostergaard, 1939).

Conus acutangulus Lamarck

Fig. 37 in Plate 2


Conus turriculatus Sowerby, 1866, Thes. Conchyl., 3: 328, pl. 27, figs. 643, 644.


DESCRIPTION: Shell small, rather thin. Body whorl elongate, bearing rather distantly and irregularly spaced incised spiral lines marked by small punctures. Aperture narrow, outer lip protracted. Shoulder angular, ridged; spire elevated, turreted, concave, striate, comprising at least one third of the total shell length; apex sharp. Early whorls smooth, succeeding whorls with slender protracting curved axial riblets which fuse to form strong nodules at the shoulder, the nodules becoming less conspicuous on the latest whorls. Color of body whorl white to pale buff, marked with interrupted broad brown spiral bands either side of the center. Rows of brown dots between the striae mark the light area between the brown bands. Spire marked by distantly spaced rather regular broad brown spots. Periostracum grayish white, bearing lamellae on the fine riblets of the spire.

LENGTH: 30 mm.

TYPE LOCALITY: "Mers des grandes Indes."

REMARKS: Specimens of C. acutangulatus have been collected in Hawaii by dredging in comparative shallow water and to a depth of 200 fathoms.

Conus bullatus Linne

Fig. 1

Conus turriculatus

References are given to the shells figured. The dimensions given are shell length × maximum diameter.

Fig. 1. Conus distans Hwass in Bruguière. 75 × 43 mm. Off Rabbit (Manana) Island, off Oahu. USNM coll., No. 484738.

Fig. 2. Conus textilis Linné. 80 × 44 mm. Waikiki, Oahu, C. E. Cutress coll.

Fig. 3. Conus pennaceus Born. 64 × 35 mm. Keaukaha, Hilo, Hawaii. USNM coll., No. 338584.

Fig. 4. Conus quercinus Solander. 80 × 49 mm. Honolulu Harbor Channel, Oahu. USNM coll., No. 338584.

Fig. 5. Conus striatus Linné. 107 × 53 mm. Waikiki, Oahu, C. E. Cutress coll.

Fig. 6. Conus miles Linné. 67 × 39 mm. Waikiki, Oahu, C. E. Cutress coll.

Fig. 7. Conus imperialis Linné. 69 × 36 mm. Lahaina, Maui. USNM coll., No. 484735.

Fig. 8. Conus spiceri Bartsch & Rehder. 113 × 62 mm. Midway Island. USNM coll., No. 523700.

Fig. 9. Conus marmoratus Linné. 96 × 54 mm. Honolulu Harbor entrance, Oahu, 5–8 fathoms. USNM coll., No. 338163.

Fig. 10. Conus leopardus (Röding). 143 × 86 mm. Waimea Bay, Oahu. C. E. Cutress coll.

Fig. 11. Conus vexillum Gmelin. 88 × 54 mm. Kahala, Oahu. USNM coll., No. 338510.

Fig. 12. Conus pulicarius Hwass in Bruguière. 48 × 27 mm. Honolulu, Oahu. USNM coll., No. 338195.

Fig. 13. Conus smirna Bartsch & Rehder. Holotype. 61 × 23 mm. off Lanai, 257–312 fathoms. USNM coll., No. 173226.

Fig. 14. Conus vitulina Hwass in Bruguière. 56 × 31 mm. Keokea, Hawaii. USNM coll., No. 338549.

Fig. 15. Conus lipophorus Hwass in Bruguière. 41 × 19 mm. Honolulu Harbor entrance, Oahu, 5–8 fathoms. USNM coll., No. 338538.

Fig. 16. Conus moreleti Crosse. 46 × 23 mm. Kailua, Oahu, 12–15 feet. USNM coll., No. 484249.

Fig. 17. Conus lividus Hwass in Bruguière. 39 × 23 mm. Honokowai, Maui. USNM coll., No. 338531.

Fig. 18. Conus flavus Lamarck. 42 × 25 mm. Honokowai, Maui. USNM coll., No. 338522.

Fig. 19. Conus nussatella Linné. 53 × 17 mm. Kuhio Bay, Hilo, Hawaii. USNM coll., No. 338577.

Cyclus nubecula (Gmelin). Röding, 1798, Mus. Boltenianum, p. 46.

*Cucullus nubecula* (Gmelin). Reding, 1798, Mus. Boltenianum, p. 46.


*Conus bullatus* Lamarck, Sowerby, 1833, Conch. Illus., p. 2, pt. 29, fig. 23.

Textilia bullatus. Swainson, 1840, Treat. Mal., p. 312.


**DESCRIPTION:** Shell rather thick but not heavy, ovate-oblong, the maximum diameter not at the shoulder but about one third of the distance from shoulder to base. Body whorl glossy, with impressed, rather widely spaced transverse striae basally. Shoulder rounded, smooth; spire obsolescently striate, canalicate. Ground color white or pale pink, clouded with orange brown subtrigonal markings often fused to form three broad, rather poorly defined transverse bands, separated by areas of sparser, irregularly placed similar markings. Spire marked irregularly with orange brown and pink or pinkish white. Interior of aperture pinkish orange. Peristome thin.

**LENGTH:** The most recently collected specimen from Hawaii (see below) measures 62 × 29 mm.

**TYPE LOCALITY:** None.

**REMARKS:** Very few specimens of *Conus bullatus* are known from the Hawaiian Islands. A single shell in excellent condition was dredged off Nanakuli, Oahu, but whether or not it was alive is not known (D. Thaanum, in litt.). In November, 1957, a living specimen (Fig. 1) was collected half-buried in sand at a depth of 100 feet off Diamond Head, Oahu (C. S. Weaver, in litt.). At least two other specimens are believed to have been collected in Hawaii, but it has not been possible to verify the reports. In addition, a number of dead shells have been collected (K. W. Greene, in litt.; L. Brand, verbal communication).

**Conus capitaneus** Linne

*Fig. 2*

**Conus capitaneus** Linne, 1758, Syst. Nat., ed. 10, p. 713.

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**PLATE 2**

References are given to the shells figured. The dimensions given are shell length × maximum diameter.

Fig. 20. *Conus ebraeus* Linne. 39 × 23 mm. Hilo, Hawaii. USNM coll., No. 338209.

Fig. 21. *Conus chalceus* (Röding). 29 × 18 mm. Hilo, Hawaii. USNM coll., No. 338477.

Fig. 22. *Conus varicellatus* Born. 42 × 25 mm. "Sandwich Is." USNM coll., No. 5038. A faded specimen.

Fig. 23. *Conus quercinus* Solander. 33 × 16 mm. Off Kaanapali, Maui, 4–12 fathoms. USNM coll., No. 338187.

Juvenile specimen, showing the characteristic high spire.

Figs. 24–28. *Conus suturatus* Reeve, showing changes in color pattern with increase in size. Fig. 24. 23 × 11 mm. Off Launiupoko Camp, Maui, 4–12 fathoms. USNM coll., No. 338546. Fig. 25. 25 × 13 mm. Off Mt. Lihau, Maui, 4–12 fathoms. USNM coll., No. 338547. Fig. 26. 32 × 17 mm. USNM coll., No. 338546. Fig. 27. 37 × 21 mm. Honolulu Harbor entrance, Oahu, 5–8 fathoms. USNM coll., No. 338541. Fig. 28. 48 × 27 mm. North Island, Pearl and Hermes Reef. Mrs. J. Bromley coll., No. 3363.

Fig. 29. *Conus catus* Hwass in Bruguière. 29 × 18 mm. Honokowai, Maui. USNM coll., No. 338561.

Fig. 30. *Conus ranaus* Hwass in Bruguière. 30 × 17 mm. Honolulu, Oahu. USNM coll., No. 338516.

Fig. 31. *Conus pertusus* Hwass in Bruguière. 30 × 15 mm. Locality unknown. USNM coll., No. 18522.

Fig. 32. *Conus retifer* Menke. Midway Island. USNM coll., No. 524591. A faded specimen.

Fig. 33. *Conus abbreviatus* Reeve. 26 × 17 mm. Honokowai, Maui. USNM coll., No. 338488.

Fig. 34. *Conus circumactis* Iredale. 22 × 11 mm. Off Lanai, 179–253 fathoms. (Holotype of *Conus hamatus* Bartsch and Rehder). USNM coll., No. 173225, Juvenile.

Fig. 35. *Conus circumactis* Iredale. 17 × 9 mm. USNM coll. Juvenile.

Fig. 36. *Conus obscurus* Sowerby. 23 × 9 mm. Off Waikiki, Oahu, 20 feet. USNM coll., No. 487470.

Fig. 37. *Conus acutangulum* Lamarck. 24 × 10 mm. Honolulu Harbor entrance, Oahu, 6–8 fathoms. USNM coll., No. 338564.

Figs. 38–39. *Conus sponsalis* Hwass in Bruguière. Kauai. USNM coll. Fig. 38. 15 × 9 mm. Fig. 39. 18 × 11 mm.
Fig. 1. Conus bullatus Linné, 62 X 29 mm. Collected off Diamond Head, Oahu, 17 fathoms. Shell in collection of C. S. Weaver. Photographs by the author.

Conus classarius Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 705, pl. 335, fig. 7. [Conus venator Humphrey, 1797, Mus. Calon-nianum, p. 11.]

[Conus agasus Humphrey, 1797, Mus. Calon-nianum, p. 11.]

Cucullus capitaneus (Gmelin). Röding, 1798, Mus. Boltenianum, p. 43.


Conus ceciliae Crosse, 1858, Jour. Conchyl., 7: 381, pl. 14, fig. 5.


Lithoconus capitaneus (Linné). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 4, fig. 9.

DESCRIPTION: Shell of moderate thickness; body whorl encircled by finely punctate striae on the basal half, the striae more distinct and separated by low ridges basally; aperture rather narrow, the sides parallel. Shoulder angular, smooth; spire rather low, obtuse, striate; apex pointed. Color of body whorl variable, yellow or olive yellow to orange brown or olive brown, encircled by several dark brown dotted lines and two broad white bands, interrupted by dark brown blotches, at the shoulder and centrally on the body whorl. The white bands may also be crossed by closely spaced longitudinal wavy brown
lines. Young individuals may lack the two white bands. Spire tesselated with alternate brown and white blotches, continuing to form band on body whorl at shoulder. Outer lip thin; aperture violet within. Periostracum rather thin but opaque, encircled by raised transverse ridges.

LENGTH: The only two specimens known from the Hawaiian Islands (Fig. 2) measure 31 × 21 mm. and 19.5 × 11.5 mm.

TYPE LOCALITY: Asia.

REMARKS: This species was not known to occur in the Hawaiian area until the collection of a living specimen (Fig. 2, right) by Mrs. A. M. Harrison at a depth of 15-20 feet off Nanakuli, Oahu, in April, 1958. A second, smaller specimen (Fig. 2, left) was collected by Mr. A. M. Harrison at a depth of 35 feet near Kaena Pt., Oahu, on 31 August 1958.

Conus catus Hwass in Bruguière

Fig. 29 in Plate 2


Cucullus nubilus Röding, 1798, Mus. Boltenianum, p. 46.


Conus discrepans Sowerby, 1833, Conch. Illus., p. 2, pt. 29, fig. 28.


Chelyconus (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 6, fig. 10.

DESCRIPTION: Shell stout, solid, bulbous. Body whorl striate, the striae raised, rounded, usually obsolete near the shoulder, and granular near the base. Aperture rather broad, the sides almost parallel. Shoulder rounded, smooth; spire obtuse, deeply striate. Apex sharp, rose-colored, but often eroded. Color of body whorl and spire brown with irregular white flecks or splotches. Aperture white with brown margin. Periostracum thin, yellow, translucent. In life, foot mottled brown on buff. “Pale cinereous, varied with delicate brown mottlings, which are most conspicuous on the muzzle” (Garrett, 1878).

LENGTH: To 40 mm.

TYPE LOCALITY: Several localities are given with the original description, the first two of which, "Saint-Domingue" and Martinique, are almost certainly in error. The species described as Conus catus is restricted to the Indo-West Pacific region although it resembles Conus ranunculus Hwass in Bruguière, a western Atlantic species.

REMARKS: Conus catus is less variable with respect to shell characteristics in Hawaii than in other parts of the Pacific and Indian oceans. It occurs intertidally on benches and rocky shores and subtidally as well. Pleistocene fossils are known from Oahu (Ostergaard, 1928).

Conus chaldaeus (Röding)

Fig. 21 in Plate 2


Conus ebraeus Linné var. E. Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 619, pl. 321, figs. 1, 7, 8.

Cucullus chaldaeus Röding, 1798, Mus. Boltenianum, p. 42.

Fig. 2. *Conus capitatus* Linne. Left, 19.5 X 11.5 mm. Specimen collected by A. M. Harrison near Kaena Pt., Oahu, 6 fathoms. Right, 31 X 21 mm. Specimen collected by Mrs. A. M. Harrison near Nanakuli, Oahu, 3 fathoms. Photographs by the author.


*Conus hebraeus* Linne var. β. Reeve, 1843, Conchol. Icon., 1: pl. 19, fig. 104a.


*Conus chaldaeus* (Röding). Tinker, 1952, Pacific Sea Shells, p. 44.

*Conus chaldaeus* (Röding). Dietrich and Morris, 1953, Nautilus, 67: 17, pl. 4, fig. 19.


*Stephanocanconus chaldaeus* (Röding). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 10.


DESCRIPTION: Shell rather small but extremely thick and sturdy. Body whorl transversely striate, the striae obsolescently tuberculate near the base, becoming strongly so near the shoulder; aperture narrow. Shoulder coronate; spire moderately elevated, tuberculate, striate; apex often eroded. Color mostly black, with narrow, irregular, usually interrupted white bands at the shoulder and centrally on the body whorl, the black areas also interrupted by intermittent vertical white streaks. Aperture bluish white, the external color pattern visible at the outer lip. Perios- tracum rather thin, yellow, translucent. In life, foot black, with a broad central longitudinal tan stripe on the sole. Siphon and rostrum black, tipped with red.

LENGTH: Usually less than 40 mm. A specimen collected by the author at Waikiki, Oahu, measures 44 mm.
TYPE LOCALITY: None.

REMARKS: This species is closely related to Conus ebraeus and is regarded as a variety of that species by some recent workers (e.g. Dodge, 1953). It differs from C. ebraeus in being generally smaller, having a tuberculate surface, and having the black flammules confluent so as to cover most of the shell. The two species are sympatric over a wide range. Hawaiian specimens are easily distinguishable. In other areas, the two species tend to approach each other more closely morphologically but do not intergrade. Lamarck's (1810) statement that the two species are constantly distinct is correct.

C. chaldaeus occurs most commonly near the outer edge of marine benches. Pleistocene fossils are known from Oahu (Ostergaard, 1928).

Conus circumactis Iredale

Figs. 34 and 35 in Plate 2; Fig. 3

Conus cinctus Swainson, 1822, Zool. Illus., ser. 1, 2: pl. 110. (non cinctus Bosc, 1801.)

Conus pulchellus Swainson, 1822, Zool. Illus., ser. 1, 2: pl. 114. (non pulchellus Röding, 1798.)


DESCRIPTION: Shell rather thin; body whorl slightly concave near the base on the left side, spirally striate with the striae obsolete and impressed toward the shoulder but stronger and with widely spaced low knobs basally. Aperture narrow, widening slightly basally; outer lip thin. Shoulder angular, smooth or

Fig. 3. Conus circumactis Iredale. Specimens dredged by C. A. Allen off southern shore of Oahu, 8–60 fathoms. Left, 21 X 12 mm.; center, 25 X 13 mm.; right, 34 X 18 mm. Photographs by M. Miyamoto.
extremely obsoletely cororate. Spire low; apex nipplelike, especially in young specimens; whorls finely striate, separated by a deeply impressed suture. Color of body whorl pale yellow or yellowish brown, with large white blotches forming a band at the shoulder and another at the middle; body whorl also encircled by narrow brown lines, which are usually interrupted to form dots and dashes; base violet or pink; interior of aperture bluish or pinkish white. Spire white or pinkish white, sparsely maculated with brown. Periostracum rather thick, yellowish brown and opaque in young specimens, yellow and somewhat translucent in older individuals.

LENGTH: 35 mm.

TYPE LOCALITY: Amboina.

REMARKS: All specimens of *C. circumactis* known from the Hawaiian Islands have been collected by dredging. The holotype of *C. hammatus* Bartsch and Rehder, here considered the juvenile of *C. circumactis*, was dredged off Kauai in about 200 fathoms. C. A. Allen collected thirteen specimens from depths of 8–60 fathoms off the southern shore of Oahu.

Of the other species of *Conus* in Hawaii, *C. vitulinus* is most closely related to *C. circumactis*. The latter can be distinguished by its pale ground color, pink or violet base, and yellowish brown periostracum. *C. circumactis* can be distinguished from *C. litoglyphus* by the narrow interrupted transverse brown lines and the pink or violet base in the former.

**Stephanocorus distans** (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 16.

DESCRIPTION: Shell large, elongate, slightly concave in profile. Body whorl smooth or encircled with obsolete impressed lines; aperture narrow, the sides parallel. Shoulder cororate; spire short, corornated with obtuse rounded tubercles. Color of body whorl yellowish brown, obsoletely banded with white or pale bluish white at the center and near the shoulder. Tubercles of the spire white, depressed areas between them dark brown. A purplish brown stain usually present near the base. Interior of aperture light violet with a lighter central band, darker violet at the base. The violet of the interior is deeper in juvenile specimens, which are generally more colorful. Periostracum thick, olive green, with transverse rows of tufted ridges on body whorl. In life, foot brown; siphon light tan, mottled with brown; rostrum dark brown, tipped with yellow; tentacles light brown; penis orange.

LENGTH: 120 mm.


REMARKS: *C. distans* occurs chiefly at the outer areas of reef platforms and in depths of one or more fathoms.

**Conus ebraeus** Linné

Fig. 20 in Plate 2


*C. quadratus* Perry, 1811, Conchology, pl. 24, fig. 5. (non *quadratus* Röding, 1798.)


**Stephanocus bebraeus** (Linné). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 9.

**Description:** Shell solid; body whorl smooth, becoming encircled with obsolete raised ridges toward the base; outer lip of aperture flaring slightly basally. Shoulder coronate, often obsolescently so; spire of moderate height, often somewhat eroded, indistinctly coronate. Color white with usually three rows of large angular rhomboidal black flammules, with another row encircling the shoulder. Aperture with clouded bands corresponding with the exterior markings. Periostracum thin, yellow, translucent. In life, foot black, with a broad longitudinal central buff stripe on the sole. Siphon and rostrum black, tipped with a narrow red margin.

**Length:** This species attains greater length in the Hawaiian Islands than in other parts of its extensive range. Specimens exceeding 50 mm. are often found. A specimen collected by the author at Diamond Head, Oahu, measures 56 mm. in length.

**Type Locality:** India.

**Remarks:** One of the most abundant species of *Conus* in the Hawaiian Islands, *C. ebraeus* is the dominant species on intertidal benches and occurs also on reef platforms. Pleistocene fossils are known from Oahu (Ostergaard, 1928).

### Conus flavidus Lamarck

Fig. 18 in Plate 1


**Conus flavidus** Bruguère. Issel, 1869, Malacologia del Mar Rosso, p. 143.


**Description:** Shell thick and heavy. Body whorl transversely striate, the striae more pronounced and raised toward the base; aperture narrow. Shoulder rather square, smooth; spire low, striate. Color of body whorl usually olivaceous or yellowish brown banded with white and/or bluish white at the shoulder and below the middle. Base stained dark violet. Aperture violet, with a light central band and yellow margin. Periostracum gray, transversely ridged in young specimens, smooth in older individuals. In life, upper surface of foot reddish brown, mottled with brown; remainder of foot and rostrum light yellowish brown mottled with darker brown; tip of siphon yellow, followed proximally by black and yellow bands; remainder of siphon yellow mottled with black. Tentacles white to yellow.

**Length:** 50 mm.

**Type Locality:** None.

**Remarks:** *C. flavidus* is one of the commonest species of *Conus* on Hawaiian coral reefs. Pleistocene fossils have been collected on Oahu by Ostergaard (1928) and the writer and on Molokai by Ostergaard (1939).

### Conus imperialis Linné

Fig. 7 in Plate 1

**Conus imperialis** Linné, 1758, Syst. Nat., ed. 10, p. 712.


**Cucullus imperialis** (Gmelin). Röding, 1798, Mus. Boltenianum, p. 37.

Cucullus regius Röding, 1798, Mus. Boltenianum, p. 38. (non regius Gmelin, 1791.)


DESCRIPTION: Shell large and sturdy, body whorl elongate, striate basally; outer lip thin. Shoulder coronate; spire low, strongly coronate. Ground color of shell white, with numerous interrupted light and dark brown bands on the spire as well as on the body whorl. Two broad yellowish brown bands encircle the body whorl. The band nearer the shoulder is broader. Both bands contain several narrow revolving dark brown lines interrupted by white. Color of base pale blue, often as narrow interrupted revolving lines. Base of aperture stained with a dark purple marginal band. Periostracum thin, yellow, transluscent, but often obscured by epizoic coralline algae in nature. In life, exposed soft parts red, speckled with black.

LENGTH: 90 mm.

TYPE LOCALITY: None.

REMARKS: C. imperialis occurs on reef platforms and to a depth of at least 30 fathoms. Pleistocene fossils are known from Oahu (Ostergaard, 1928).

Conus leopardus (Röding)

Fig. 10 in Plate 1


Conus littoratus Linne var. D Hwass in Bru guière, 1792, Enc. Meth. Vers, 1: 638, pl. 324, fig. 4.

Conus littoratus Linne var. G Hwass in Bru guière, 1792, Enc. Meth. Vers, 1: 638, pl. 324, fig. 3.

Conus littoratus Linne var. I Hwass in Bru guière, 1792, Enc. Meth. Vers, 1: 638, pl. 323, fig. 5.

Cucullus leopardus Röding, 1798, Mus. Boltenianum, p. 41.


Conus littoratus Linne var. millepunctatus Lamarck. Anton, 1839, Verzeichnis, p. 105.


Conus littoratus Linne var. millepunctatus Lamarck. Tryon, 1884, Man. Conch., 6: 10, pl. 2, fig. 19.


Conus littoratus Linne var. millepunctatus Lamarck. Dautzenberg and Bouge, 1933, Jour. Conchyl., 77: 78.


**Conus millepunctatus** Lamarck var. *aldrovandi*  

**Conus litteratus pardus** (Bolten). Suvatti, 1938, Molluscs of Siam, p. 39.


**DESCRIPTION:** Shell massive, conical. Body whorl with very obscure striae; base truncate; aperture rather narrow, the sides parallel. Shoulder smooth; spire depressed, spirally canalicate and striate. Color of body whorl cream white, with many encircling rows of oblong bluish brown to black spots. One or two rows of small spots often alternate with one or two rows of large ones. The spots are more pronounced in smaller individuals. The body whorl of juvenile specimens is dark cream with-narrow transverse white bands on which the dark spots are superimposed. The latter are more square than in adult specimens. Specimens 15 cm. or more in length may be almost completely unmarked. Color of aperture white or pale orange, sometimes yellow at the base. Periostracum olive brown, very thick, opaque. In life, exposed soft parts yellowish white, mottled with brown.

**LENGTH:** Ordinarily 150–200 mm. This species is the largest representative of the genus in Hawaii. A specimen in the collection of Mr. C. S. Weaver of Honolulu measures 221 × 124 mm.

**TYPE LOCALITY:** None.

**REMARKS:** *Conus leopardus* may be distinguished from *C. litteratus* Linné, its closest relative, by the following characteristics: *C. litteratus*, which does not occur in Hawaii, attains a length of only about 5 inches. It generally reaches its maximum width anterior of the shoulder, rather than at the shoulder, as in *C. leopardus*. The base of *C. litteratus* is pointed rather than truncate, and it typically bears a black smudge at the base of the aperture. The spots are more nearly similar in size and more square, and the shell typically bears two broad yellow bands.

*C. leopardus* is occasionally found on reef platforms but occurs more commonly in depths of one fathom or more in bays and offshore. It is known to occur to a depth of 12 fathoms. Pleistocene fossils of *C. leopardus* are known from Oahu (Ostergaard, 1928).

**Conus litoglyphus** Hwass *in* Bruguieré


**Conus litoglyphus** Hwass *in* Bruguieré, 1792, Enc. Meth. Vers., 1: 692, pl. 338, fig. 8.

**Cuculus cinamomus** Röding, 1798, Mus. Boltenianum, p. 43.

**Cuculus oreleanus** Röding, 1798, Mus. Boltenianum, p. 44.


**Conus carpenteri** Crosse, 1865, Jour. Conchyl., 13: 302, pl. 9, fig. 1.

(? ) **Conus seychellensis** Nevill, 1874, Jour. Asiatic Soc. Bengal, 43(2): 22.


**Conus lithographus**. Platt, 1949, Natl. Geog. Mag., 96: 53, fig. 2.

**Conus inermis** Born. Tinker, 1952, Pacific Sea Shells, p. 40.

**Lithocorus ermineus** (Born). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 4, fig. 10.

**DESCRIPTION:** Shell elongate; body whorl faintly and distantly striate toward the base,
the striae absolutely tuberculate. Aperture very narrow, the sides parallel. Color of body whorl dull yellow, reddish brown, or chestnut, often darker at the base, banded at the center and shoulder with rows of white blotches. Spire with alternate brown and white maculations on each whorl. Interior of aperture white.

LENGTH: 50 mm.

TYPE LOCALITY: "Mers des grandes Indes."

REMARKS: This species has often been referred to as *Conus erminius* Born (Dautzenberg, 1937). Although Born did not provide a figure of *C. erminius* and his brief description has been held by some (Burch, 1955) to be inadequate, the first figure reference given by Born (Valentyn, 1773: pl. 5, fig. 47) is a fairly good representation of the species under discussion. However, as was first pointed out by Brauer (1878), the two specimens on which Born’s original description was based (Naturhistorisches Museum, Vienna, Nos. 4051 and 4052) are not conspecific with *C. litoglyphus* Hwass. Born’s specimens are of the species later described by Lamarck (1810: 281) as *C. narcissus*.

*Conus litoglyphus* occurs rarely on Hawaiian reefs. It has been collected at a depth of 30 fathoms.

*Conus lividus* Hwass *in* Bruguière

Fig. 17 in Plate 1

*Conus rusticus* var. *β* Gmelin, 1791, Syst. Nat., ed. 13, p. 3383. (non *rusticus* Linné, 1758.)

*Conus lividus* Hwass *in* Bruguière, 1792, Enc. Meth. Vers., 1: 630, pl. 321, fig. 5.


(?) *Conus balteatus* Sowerby, 1833, Conch. Illus., p. 3, pt. 37, fig. 58.


*Conus citrinus* Gmelin. Sowerby, 1857, Thes. Conchyl., 3: 4, pl. 4, fig. 70. (error).


*Stephanoconus lividus* (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 13.

DESCRIPTION: Shell solid, with widely spaced transverse slightly elevated striae on the body whorl, the striae obsolete near the shoulder but strongly granulated basally. Aperture narrow, the sides parallel. Shoulder coronate; spire obtuse, coronated with large tubercles, striate, often eroded. Color olivaceous or orange brown, with tubercles of the spire and a transverse band below the shoulder white or bluish white. A central band on the body whorl light yellow, white, or bluish white. Color of aperture violet with a pale central transverse band; margin of outer lip yellow. Periostracum greenish brown, thick, opaque. In life, foot, rostrum and siphon black, finely mottled with more or less red, appearing reddish black.

LENGTH: Usually to 60 mm. A specimen 76 mm. in length, collected near Nanakuli, Oahu, is in the collection of Mr. A. M. Harrison of Honolulu.

TYPE LOCALITY: "Antilles," "Isle-de-France"
Hawaiian Conus — KOHN

& aux Indes orientales.’ The first locality is undoubtedly in error. Île de France was an eighteenth-century French name for Mauritius, which was probably the source of Hwass’s specimens.

REMARKS: C. lividus is one of the two most abundant species of Conus on Hawaiian coral reef platforms, the other being C. flavidus.

Conus marmoreus Linné

Fig. 9 in Plate 1


Conus nocturnus Solander, 1786, Cat. Portland Mus., p. 156, no. 3411.

Conus marmoratus Linné. Herbst, 1788, Hist. Verm., p. 176, pl. 43, fig. 1. (Not seen.)

Conus bandanus Hwass in Bruguère, 1792, Enc. Meth. Vers, 1: 611, pl. 318, fig. 5.

Conus nocturnus Hwass in Bruguère, 1792, Enc. Meth. Vers, 1: 611, pl. 318, fig. 1. [Conus tigrinus Humphrey, 1797, Mus. Calonianum, p. 13.]

[Conus nigritius Humphrey, 1797, Mus. Calonianum, p. 13.]


Cucullus proarchithallassus Röding, 1798, Mus. Boltanianum, p. 38.


Conus maculatus Perry, 1811, Conchology, pl. 24, fig. 4.


Coronaxis bandanus (Lamarck). Swainson, 1840, Treatise on Malacol., p. 311.


Conus deburghiae Sowerby, 1857, Thes. Conchyl., 3: 2, pl. 1, figs. 6, 7.


Conus crosseanus Bernardi, 1861, Jour. Conchyl., 9: 168, pl. 6, figs. 5, 6.

Conus pseudomarmoreus Crosse, 1875, Jour. Conchyl., 23: 223, pl. 9, fig. 4.


Conus marmoreus bandanus Lamarck. Kaischer, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 3, fig. 6.

DESCRIPTION: Shell large; body whorl obsoletely striate, its maximum diameter slightly anterior of the shoulder; aperture rather narrow, with almost parallel margins. Shoulder strongly coronate; spire depressed, coronate, striate. Large triangular pale flesh-colored markings separated by dark brown and crowded in two areas form broad irregular bands on the body whorl in specimens from the Hawaiian Islands, the anterior band being narrower. Aperture white or pale pink. Periostracum thin, yellow, translucent. In life, foot tan, siphon banded proximally from the tip with red, white, and black bands.

LENGTH: Usually to 100 mm. A specimen from Oahu in the B. P. Bishop Museum measures 139 mm.

TYPE LOCALITY: Asia.

REMARKS: Hawaiian representatives differ from typical C. marmoreus, in which the white markings are larger and less crowded and do not form bands. In some localities, such as New Caledonia (Crosse and Marie, 1874),
Bikini, the Philippines, both forms occur together, with intergrades. To the writer’s knowledge, none of the typical forms of C. marmoratus have ever been collected in the Hawaiian Islands. The form found in Hawaii (and elsewhere) was described as C. bandanus Hwass in Bruguière. Most authorities regard the latter as a variety of C. marmoratus, which is probably valid in areas where both, as well as intergrades, occur. However, it is probably legitimate to consider the Hawaiian populations as belonging to the subspecies Conus marmoratus bandanus Hwass in Bruguière. It occurs uncommonly on Hawaiian reefs and has been collected at a depth of eight fathoms.

**Conus miles** Linné

Fig. 6 in Plate 1


*Cucullus miles* (Gmelin). Röding, 1798, Mus. Boltenianum, p. 43.


*Lithoconus miles* (Linné). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 3.

**DESCRIPTION:** Shell solid, with a moderately elevated spire. Body whorl smooth except for raised granular transverse ridges near the base. Aperture narrow, the sides parallel; outer lip thin. Shoulder obsolescently coronate; spire obsolescently tuberculate or plicate, rather faintly striate, concave in young individuals to straight or convex in larger ones. Color of body whorl yellowish white, with a broad, transverse blackish brown band above the center of the body whorl, and another at the base. The bands may be divided transversely into lighter and darker portions. Above and below the upper band, shell marked by narrow threadlike longitudinal dark brown lines, which are continuous on the spire; the lines becoming more closely spaced in older individuals. The broad brown bands, alternating with white, are visible within the aperture. Periostracum greenish brown, with transverse rows of tufted ridges on the body whorl. In life, exposed soft parts greenish black.

**LENGTH:** 80 mm.

**TYPE LOCALITY:** India.

**REMARKS:** *C. miles* is rare on Hawaiian coral reefs and marine benches but occurs more commonly at depths of one to several fathoms. It has been collected at a depth of 26 fathoms.

**Conus moreleti** Crosse

Fig. 16 in Plate 1

*Conus elongatus* Reeve, 1843, Conch. Icon., 1: pl. 27, fig. 157. (non *elongatus* Borson, 1820.)

*Conus oblitus* Reeve, 1849, Conch. Icon., 1(Emendns.): 1. (non *oblitus* Michelotti, 1847.)


**DESCRIPTION:** Shell elongate, body whorl with raised, obsolescently knobbed striae basally, otherwise smooth; aperture very narrow, the sides parallel; outer lip thin. Shoulder coronate; spire low, convex, coronate, striate. Color of body whorl yellowish brown or olive, darker at the base, with lighter transverse bands at the shoulder and at the middle. Interior of aperture deep violet, outer lip yellow. Periostracum yellowish brown, rather thin, translucent, forming tufts on the tubercles.

**LENGTH:** 50 mm.
REMARKS: C. moreleti may be distinguished from C. lividus, its closest relative, by its elongate shape and small and closely spaced tubercles on the shoulder. It is rare on Hawaiian reefs but occurs more commonly at depths of a few fathoms.

Conus nussatella Linné

Fig. 19 in Plate 1


Conus nussatellites Linné. Schröter, 1782, Mus. Gottwald., p. 23, pl. 13, figs. 96a, 96b, 96c; pl. 43, fig. 52a.

[Conus punctatus major Humphrey, 1797, Mus. Calonnnium, p. 15.]

Caculus nussatella (Gmelin). Röding, 1798, Mus. Boltenianum, p. 50.


DESCRIPTION: Shell cylindrical, rather thin. Body whorl closely striate, the striae minutely granular. Aperture narrow, flaring slightly basally. Shoulder rounded; spire high, convex; apex sharp. Color yellowish white, clouded irregularly with orange brown or light purplish brown longitudinal splotches; with transverse rows of numerous small dark orange brown spots on the body whorl and spire. Periostracum thin, yellow, translucent.

LENGTH: 60 mm.

TYPE LOCALITY: "Nussatello Insulam Asiae."

REMARKS: C. nussatella is a rare species in the Hawaiian Islands. Pleistocene fossils have been collected on Oahu by Ostergaard (1928) and the writer.

Conus obscurus Sowerby

Fig. 36 in Plate 2


Conus obscurus Humphreys MSS. Reeve, 1843, Conch. Icon., 1: pl. 16, fig. 82.


DESCRIPTION: Shell elongate-ovate, very thin. Body whorl smooth except for very fine transverse grooves basally. Aperture rather broad, flaring basally. Shoulder smooth; spire moderately elevated, striate; apex pointed. Shell marked by irregularly shaped and distributed blotches and dots of light brown; the lighter areas separating them are violet. Periostracum very thin, translucent.

LENGTH: 30 mm.

TYPE LOCALITY: Arabia.

REMARKS: C. obscurus occurs rarely in shal-
low water in Hawaii and is apparently more
common at depths of several fathoms.

**Conus pennaceus** Born

Fig. 3 in Plate 1

**Conus pennaceus** Born, 1780, Test. Mus. Caes.
Vind., p. 167, pl. 7, fig. 14.

**Conus aulicus** var. α Gmelin, 1791, Syst. Nat.,
ed. 13, p. 3394.

**Conus aulicus** var. β Gmelin, 1791, Syst. Nat.,
ed. 13, p. 3394.

**Conus aulicus** var. γ Gmelin, 1791, Syst. Nat.,
ed. 13, p. 3394.

**Conus aulicus** var. ε Gmelin, 1791, Syst. Nat.,
ed. 13, p. 3394.

(?) **Conus omaria** Hwass in Bruguieré, 1792,
Enc. Meth. Vers, 1: 743, pl. 344, fig. 3.

**Conus rubiginosus** Hwass in Bruguieré, 1792,
Enc. Meth. Vers, 1: 746, pl. 344, figs. 1, 2.

(?) **Conus praetatus** Hwass in Bruguieré, 1792,
Enc. Meth. Vers, 1: 746, pl. 345, fig. 4.

(?) **Conus episocus** Hwass in Bruguieré, 1792,
Enc. Meth. Vers, 1: 748, pl. 345, figs. 2, 6.

(In part.)

(?) **Conus crocatius** Lamarck, 1810, Ann. Mus.

(?) **Conus colubrinus** Lamarck, 1810, Ann. Mus.

**Conus pennaceus** Bruguieré. Lamarck, 1810,

**Conus omaria** Hwass var. β. Reeve, 1843,
Conch. Icon., 1: pl. 32, sp. 177, figs. 177a, 177b.

**Conus pennaceus** Lamarck. Reeve, 1843,
Conch. Icon., 1: pl. 32, sp. 177.

(?) **Conus eliae** Kiener, 1845, Spéc. Gén. Icon.
Coq. Viv., 2: pl. 64, figs. 1, 1a, p. 341.

(?) **Conus stellatus** Kiener, 1845, Spéc. Gén.

**Conus madagascariensis** Sowerby, 1858, Thes.
Conchyl., 3: 43, pl. 24, fig. 582.

**Conus racemosus** Sowerby, 1873, Proc. Zool.
Soc. Lond., 1873: 721, pl. 59, fig. 11.

**Conus auratus** Hwass. Ostergaard, 1928,

**Darioconus racemosus** (Sowerby). Cotton, 1945,
seulement, dans l’espèce ici décrite, les grandes zones sont plutôt longitudinales que transverses, et le réseau qui les constitue n’est pas aussi nettement limité. La form d’ailleurs est également différente; elle est toujours plus raccourcie et plus ventrue. ” The present writer has found that these distinctions generally hold, but it would be difficult to classify a small percentage of specimens collected in Hawaii using these criteria. If the two species eventually prove to be synonymous, the name *C. pennaceus* has priority over *C. omaria*.

*C. pennaceus* is one of the most common species on Hawaiian coral reef platforms. Fossils are known from Pleistocene deposits on Molokai (Ostergaard, 1939, as *C. omaria*). *C. elisae* Kiener, here listed questionably as a synonym, is possibly a valid species. For an account of it, see page 396.

**Conus pertusus** *Hwass in Bruguère*  
Fig. 31 in Plate 2

**Conus nobilis** Linné. Schröter, 1783, Einl. Conchyl., 1: 36, pl. 1, fig. 4. (error).

**Conus pertusus** *Hwass in Bruguère, 1792*, Enc. Meth. Vers, 1: 686, pl. 336, fig. 2.


**Conus festivus** Dillwyn, 1817, Descr. Cat. Rec. Shells, 1: 413.

(?)*Conus inquinatus* Reeve, 1849, Conch. Icon. Suppl., pl. 5, sp. 251.


**Lithococonus pertusus** (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 4.

**DESCRIPTION:** Shell conical; body whorl encircled by distantly spaced punctate striae; aperture rather narrow, sides parallel. Shoulder smooth; spire low, convex, rather obtuse. Color rose, flaked with yellow or white, banded with two interrupted transverse rows of white or light pink blotches below the shoulder and centrally on the body whorl.

**LENGTH:** 40 mm.

**TYPE LOCALITY:** ”Grandes Indes.”

**REMARKS:** *Conus pertusus* is uncommon in Hawaii. It is known to occur subtidally to a depth of 25 fathoms.

**Conus pulicarius** *Hwass in Bruguère*  
Fig. 12 in Plate 1

**Conus pulicarius** *Hwass in Bruguère, 1792*, Enc. Meth. Vers, 1: 622, pl. 320, fig. 2.

**Conus fustigatus** *Hwass in Bruguère, 1792*, Enc. Meth. Vers, 1: 623, pl. 320, fig. 1.

**Cucullus punctulatus** Röding, 1798, Mus. Boltenianum, p. 40.


**Conus fustigatus** Lamarck. Reeve, 1849, Conch. Icon. Temp. Index (Critical Analysis), unpaginated.


**DESCRIPTION:** Shell thick and solid; body whorl with impressed transverse striae basally; aperture rather narrow, sides parallel. Shoulder coronate; spire moderately elevated, striate, coronate. Color white with dark brown to black spots, the spots often crowded into two transverse bands, one on each side of the center. Spire white, marked sparingly with
brown dots. Periostracum yellow, very thin and translucent in young individuals, thicker and brown in larger specimens. In life, foot and rostrum pale tan mottled with yellowish to reddish brown; tip of siphon reddish orange, followed proximally by pale buff and black bands.

LENGTH: Usually to 60 mm. A specimen collected by W. H. Christensen at Ala Moana Reef, Oahu, measures 74 × 42 mm. A specimen collected by C. S. Weaver measures 73 × 44 mm.

TYPE LOCALITY: Pacific Ocean.

REMARKS: Conus pulicarius occurs in patches of sand on reef platforms and in bays. It has been collected at depths exceeding 40 fathoms.

Conus quercinus Solander

Fig. 4 in Plate 1; Fig. 23 in Plate 2

Conus quercinus Solander in Cat. Portland Mus., 1786, p. 67, no. 1501.
Conus quercinus Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 681, pl. 332, figs. 5, 6.
Conus ponderosus Sowerby, 1858, Thes. Conchyl., 3: 54.
Lithoconus quercinus (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 9.

DESCRIPTION: Shell large and solid, variable in obesity. Body whorl obsoletely striate, the striae becoming more pronounced basally; aperture rather wide, sides parallel. Shoulder smooth, rounded. Spire depressed, concave, striate; apex raised. Color of body whorl yellow, encircled with numerous closely spaced transverse threadlike brown lines; spire usually paler yellow; interior of aperture white. Periostracum thick, brown, opaque. In life, foot and siphon brownish gray, heavily speckled with black.

LENGTH: Usually to 100 mm. A specimen from Oahu in the B. P. Bishop Museum measures 134 mm.

TYPE LOCALITY: None.

REMARKS: Conus quercinus is found in large sandy areas in bays and to depths of more than 40 fathoms.

Conus rattus Hwass in Bruguière

Fig. 30 in Plate 2

Conus rattus Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 700, pl. 338, fig. 7.
Conus taiteensis Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 713, pl. 336, fig. 9.
Conus taitensis Hwass. Reeve, 1843, Conch. Icon., 1: pl. 15, sp. 78.
Conus rattus Lamarck. Reeve, 1843, Conch. Icon., 1: sp. 78.
Conus taitensis Hwass var. rattus Lamarck. Catlow and Reeve, 1845, Conchol. Nomenc., p. 322.
Conus viridis Sowerby, 1837, Thes. Conchyl., 3: 20, pl. 5, fig. 102.


Conus rattus Solander. Schaufuss, 1869, Molluscorum Syst. Cat. Paetel, p. 45.

Conus tabiensi Bruguière. Schaufuss, 1869, Molluscorum Syst. Cat. Paetel, p. 45.


Conus tabiensis Hwass (emend.). Dautzenberg and Bouge, 1933, Jour. Conchyl., 77: 89.


Lithoconus rattus (Hwass). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 1.

**DESCRIPTION:** Shell of moderate thickness; body whorl obsoletely striate near the shoulder, but distinctly so near the base, the striae closely spaced; aperture rather narrow, sides nearly parallel. Shoulder angular, smooth; spire rather low, obtuse, striate. Color of body whorl yellowish or violet brown, with large bluish white spots and maculations forming an interrupted central band and another at the shoulder. Shell below central band densely flecked with white, above band sparsely flecked with white. Spire with alternate brown and white blotches, continuing to form band on body whorl at shoulder. Aperture violet within. Periostracum thin, yellow, translucent, smooth or with raised ridges near growing edge. In life, foot, rostrum and siphon dark olive green, mottled with black.

**LENGTH:** Usually to 40 mm. A specimen collected by T. H. Richert on windward Oahu, and presently in the collection of the Children's Museum of Honolulu, measures 60 mm.

**TYPE LOCALITY:** "Mers d'Amerique," undoubtedly in error.

**REMARKS:** C. rattus occurs not uncommonly both on intertidal benches and on subtidal reef platforms. Pleistocene fossils are known from Oahu (Ostergaard, 1928) and Maui (Ostergaard, 1939).

**Conus retifer Menke**

Fig. 32 in Plate 2


Conus solidus Sowerby, 1834, Conch. Illus., p. 3, pt. 56, fig. 76. (non solidus Gmelin, 1791.)


Cylinder retifer (Menke). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 7, fig. 10.

**DESCRIPTION:** Shell very thick and solid, pear-shaped. Body whorl striate; aperture with almost parallel sides. Shoulder rounded, smooth. Spire elevated, acuminated, striate. Color reticulated orange brown with large and small white triangular markings, arranged as scales, and longitudinal chocolate and orange markings mostly interrupted to form two transverse bands. Color pattern of body whorl continued on spire; apex pink. Interior of aperture white or pale pink. Periostracum very thin, pale yellow, very translucent. In life, foot mottled brown. Tip of siphon vermilion, followed proximally by white and black bands.

**LENGTH:** 50 mm.

**TYPE LOCALITY:** None.

**REMARKS:** C. retifer is uncommon in Hawaii.

**Conus Spiceri Bartsch and Rehder**

Fig. 8 in Plate 1


**DESCRIPTION:** Shell large and thick; body whorl marked by fine incremental lines and closely spaced spiral threads, becoming heavy.

LENGTH: 110 mm.

TYPE LOCALITY: Midway Island.

REMARKS: This species, which is rather rare, is distinguished from C. quercinus in that it lacks the brown spiral lines, has a flatter spire, and is only singly striate on the summit. It is distinguished from C. distans by lacking the brown bands and tuberculate shoulder. Its closest relative is C. virgo Linné, which does not occur in Hawaii. C. virgo is easily distinguished from C. spiceri by the pronounced violet color of the base in the former.

To the author’s knowledge, no specimens of C. spiceri have been collected outside the Hawaiian Islands.

**Conus sponsalis** Hwass *in Bruguèire*

Figs. 38 and 39 in Plate 2

Conus sponsalis Hwass *in Bruguèire*, 1792, Enc. Meth. Vers, 1: 635, pl. 322, fig. 1. 

(?) Conus ceylanensis Hwass *in Bruguèire*, 1792, Enc. Meth. Vers, 1: 636, pl. 322, fig. 10.


Conus ceylanensis Hwass var. sponsalis. Tryon, 1884, Man. Conch., 6: 23, pl. 6, fig. 99.

**Conus ceylonensis** Hwass var. nanus Broderip. Tryon, 1884, Man. Conch., 6: 24, pl. 6, fig. 100.


**Conus ceylanensis** Hwass var. pusillus. Mant, 1922, Nautilus, 35: 84.


Stephanococonus sponsalis (Hwass). Kächer, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 2, fig. 5.

DESCRIPTION: Shell small but thick and solid, extremely variable with respect to several characteristics. Body whorl usually obsoletely striate, the striae somewhat more pronounced basally; aperture narrow, the sides parallel. Shoulder coronated with small tubercles which may be obsolete in large specimens. Spire usually moderately elevated, inner whorls coronated, but often eroded; 0–3 striae per whorl. Ground color of basal two thirds of body whorl typically pale blue; remaining area near the shoulder white; base tipped with brownish purple. In many specimens, no other coloration is present. Some individuals, chiefly younger specimens, marked with reddish or orange brown on body whorl; these markings generally of two arrangements, one or both of which may be present on the same shell: (1) encircling narrow bands of rather distantly separated dots or dashes separated by white dashes (Fig. 39); (2) interrupted longitudinal blotches of color (Fig. 38). Tubercles white, areas between them sometimes orange brown. Interior of aperture dark violet to brown, with white bands near the shoulder and centrally; outer lip white. Periostracum thin, translucent, sometimes becoming thicker and opaque at the growing edge, or in larger specimens. In life, foot pale pink, mottled with white, darker pink at extremities. Siphon and rostrum pale pink or white, tipped with darker pink; tentacles white.

LENGTH: To 30 mm. Most specimens smaller.

TYPE LOCALITY: “Île Saint-George.”
REMARKS: Specimens from Hawaiian populations agree with the original figure and Broderip’s (1833) description of *Conus nanus*, which has not generally been considered a distinct species. A number of workers (Pease, 1868; Tryon, 1884; Ostergaard, 1935; Tomlin, 1937; Tinker, 1952) have considered *C. nanus* to be not specifically distinct from *C. ceylanensis*.

*C. ceylanensis* does not seem to be a well-known species. Specimens from many Indo-West Pacific localities in the U.S. National Museum and Museum of Comparative Zoology collections are indistinguishable from representatives of the Hawaiian populations under consideration.

Examination of specimens from many Indo-West Pacific island groups in the U.S. National Museum, Museum of Comparative Zoology, and Academy of Natural Sciences of Philadelphia, and personal observations of the writer in the Marshall Islands led to the conclusions that the widespread *C. sponsalis* is also extremely variable and that there is sufficient morphological overlap with the Hawaiian forms for the latter to be considered conspecific with *C. sponsalis*. However, since most Hawaiian specimens are morphologically distinguishable from most specimens from other parts of the central and western Pacific, the Hawaiian populations may validly be accorded subspecific rank and termed *C. sponsalis nanus* Sowerby.

Tryon (1884: 24), who was also uncertain of the distinction between *C. sponsalis* and *C. ceylanensis*, considered *C. nanus* a variety of the latter in his arrangement but considered the possibility that both were varieties of *C. sponsalis*. Ostergaard (1935) also listed “*Conus ceylanensis sponsalis,*” under which he stated, “I believe that this shell intergrades with *C. ceylanensis* Hwass and should therefore be termed a variety of that species, as Tryon places it.”

Although the identity of *C. ceylanensis* remains problematical, the present writer is inclined to agree that it is probably conspecific with *C. sponsalis*. In this case, the name *sponsalis* has page priority, and there seems no reason why it should not take precedence over *ceylanensis*. It is hoped that collections in Ceylon and other Indian Ocean areas, to be made by the writer in the near future, will contribute towards a more definitive solution to this question.

*C. sponsalis* is one of the most abundant species of *Conus* on intertidal benches in Hawaii. Pleistocene fossils are known from Oahu (Ostergaard, 1928) and Molokai (Ostergaard, 1939).

**Conus striatus** Linné

Fig. 5 in Plate 1


*Cucullus striatus* (Gmelin). Röding, 1798, Mus. Boltenianum, p. 50.


*Conus floridus* Sowerby, 1858, Thes. Conchyl., 3: 47, frontispiece, fig. 558.


DESCRIPTION: Shell large, rather thin, elongate-ovate, the maximum diameter not at the shoulder but about one fifth of the distance from shoulder to base. Body whorl with fine, closely spaced transverse striae; aperture broad, flaring gradually toward the base. Shoulder angular, smooth. Spire striate,
conalicate, usually concave, often extremely so and depressed below the shoulder, a pecu-
liarity not typically found in specimens from other areas. Ground color pinkish white, irregularly clouded with blotches of brown or purplish brown composed of closely spaced transverse lines. Spire tesselated with brown and white. Interior of aperture white. Periostracum thin, yellow, translucent. In life, foot, siphon and rostrum tan mottled with brown.

LENGTH: Usually to 110 mm. A specimen measuring 120 \( \times \) 53 mm. is in the collection of C. S. Weaver.

TYPE LOCALITY: "Hitoe."

REMARKS: Specimens from the Hawaiian Islands are characterized by having the spire depressed often to such an extent that the apex does not extend beyond the shoulder of the body whorl. In juvenile specimens, the spire is elevated and the sides of the aperture almost parallel.

\( \text{C. striatus} \) occurs uncommonly on Hawaiian reefs. It is typically found associated with a sand substratum. Pleistocene fossils of \( \text{C. striatus} \) have been collected by the author on Oahu.

\text{Conus suturatus} Reeve

Figs. 24–28 in Plate 2

\text{Conus suturatus} Reeve, 1844, Conch, Icon., 1: pl. 45, sp. 250; suppl. pl. 3, fig. 250b.
\text{Conus turbinatus} Sowerby, 1858, Thes. Conchyl., 3: 25, pl. 10, fig. 227.
\text{Lithoconus hawaiiensis} Bartsch and Rehder. Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 6.

DESCRIPTION: Shell solid; body whorl ob-
soletely striate toward the shoulder, the striae more pronounced, impressed but with an adjacent ridge, widely spaced toward the base. In young specimens, the striae are more pro-
nounced over the entire body whorl. Aperture narrow, sides parallel. Shoulder angular,
dredged in 4–50 fathoms off the major islands. *C. ambiguus* Reeve (1844, Conch. Icon., 1: pl. 44, sp. 244) appears to be extremely similar and possibly identical. Some specimens collected in Hawaii have been labeled *C. ambiguus*. A definitive statement concerning *C. ambiguus* will not be made here, pending study of type material.

**Conus tessulatus** Born

*Fig. 22 in Plate 2*


*Conus tessellatus* Lamarck. Reichenbach, 1842, Land.-, Süssw.- u. See-Conch., p. 51, pl. 17, figs. 376, 377.


*Lithoconus tessellatus* (Born). Kaicher, 1956, Indo-Pacific Sea Shells, Sect. 5, pl. 5, fig. 11.

**DESCRIPTION:** Shell fairly thick and stout. Body whorl smooth near the shoulder, bearing rather widely spaced impressed striae basally; base grooved; aperture narrow, the sides parallel; outer lip thin. Shoulder smooth, angular; spire concave, deeply striate, characterized by a ridge on each whorl at the junction of the preceding whorl; apex pointed. Ground color white, body whorl encircled by rows of quadrangular pinkish orange spots, usually crowded to form two transverse bands. Base characteristically stained with violet. Spire tesselated with pink and white. Interior of aperture white, violet at the base. In life, “yellowish white, foot mottled with brownish buff, anteriorly spotted with black; creeping disk buff yellow with darker veins; siphon creamy yellow tinged with brown, edged with yellow, with a transverse black spot at the anterior end” (Garrett, 1878).

**LENGTH:** 35–40 mm.

**TYPE LOCALITY:** Africa.

**REMARKS:** This species is extremely rare in shallow water in the Hawaiian Islands although it is widely distributed throughout the Indo-West Pacific region and reaches the west coast of Mexico (Hanna and Strong, 1949). Only one specimen collected alive in the Hawaiian Islands is known with certainty to the writer. It was collected by S. Sato in Haleiwa Bay, Oahu, depth 25 feet, and is in the Children’s Museum of Honolulu, on loan from Mrs. Jean Bromley.

*C. tessulatus* was recorded from Hawaii by Garrett (1878). Dautzenberg (1937: 244) states that it was also recorded from Hawaii by P. Fischer, but no further reference is given. Three specimens in the U. S. National Museum, collected by the U. S. Exploring Expedition, are labeled “Sandwich Is.” (and are shown in Plate 2, Fig. 22), but this locality datum is not to be considered reliable (J. P. E. Morrison, verbal communication).

**Conus textile** Linné

*Fig. 2 in Plate 1*

Conus undulatus Solander in Cat. Portland Mus., 1786, p. 180, no. 3866.

Conus archiepisopus Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 747, pl. 345, fig. 5; pl. 346, figs. 1, 7.

Cacullus auriger Röding, 1798, Mus. Boltenianum, p. 49.

Cacullus gloria-maris Röding, 1798, Mus. Boltenianum, p. 49. (non Conus gloria-maris Chemnitz, 1777.)

Cacullus textile (Gmelin). Röding, 1798, Mus. Boltenianum, p. 50.


Conus gloria-maris Perry, 1811, Conchology, pl. 25, no. 5. (non gloria-maris Chemnitz, 1777.)

Conus vete-aureum Perry, 1811, Conchology, pl. 25, no. 5.


Conus textilis. Gray, 1842, Fig. Moll. Anim., pl. 10, fig. 1.

Conus victoriae Reeve, 1843, Conch. Icon., 1: pl. 37, figs. 202a, 202b.

Conus vesticulum Reeve, 1843, Conch. Icon., 1: pl. 38, figs. 208a, 208b.


Conus tigrinus Sowerby, 1858, Thes. Conchyl., 3: 41, pl. 23, fig. 563.

Conus scriptus Sowerby, 1848, Conch. Icon., 1: suppl. pl. 1, fig. 270.

Conus scriptus Sowerby, 1858, Thes. Conchyl., 3: 41, pl. 23, fig. 563.

(?) Conus condensus Sowerby, 1866, Thes. Conchyl., 3: 326, pl. 26, fig. 622.


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DESCRIPTION: Shell large, ventricose, rather thin, subcylindrical-ovate. Maximum diameter of about one half shell length is reached about one fifth of the distance from shoulder to base. Body whorl transversely striate, the striae fine and closely spaced; aperture broad, flaring basally. Shoulder smooth; spire elevated, concave, acuminate, striate. Ground color white, with undulating longitudinal brown lines, interrupted by white triangles arranged as scales, and broad orange brown maculations disposed to form two or three interrupted transverse bands on the body whorl; the maculations streaked longitudinally with waved darker brown lines. Spire similarly marked. Interior of aperture white. Periostracum thin, yellow, translucent. In life, foot mottled brown on white. Tip of siphon reddish orange, followed proximally by bands of white and black; remainder of siphon white with closely spaced narrow brown bands.

LENGTH: To 100 mm.

TYPE LOCALITY: Banda Islands.

REMARKS: C. textilis is rare in Hawaiian waters. It is found occasionally on reef platforms and to depths of at least 12 fathoms.

Conus vexillum Gmelin

Fig. 11 in Plate 1


(?) Conus sumatrensis Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 655, pl. 327, fig. 8.

Cacullus canonicus Röding, 1798, Mus. Boltenianum, p. 43. (non Conus canonicus Hwass in Bruguière, 1792.)

Conus vexillum Linne. De Fremery, 1802, Mus. Meyer., p. 82. (Not seen.)


(?) Conus leopardus Dillwyn, 1817, Descr. Cat. Rec. Shells, 1: 364. (non leopardus Röding, 1798.)
**Hawaiian Conus — Kohn**

*Conus sulphuratus* Kiener, 1845, Spéc. Gén. Icon. Coq. Viv., 2: pl. 66, fig. 3; pl. 78, fig. 4; p. 130.


**DESCRIPTION:** Shell large, rather thin. Body whorl obsolescely striate; aperture rather broad, sides parallel. Shoulder broad, angular, smooth. Spire moderately elevated, obtuse, somewhat canaliculate, striate. Color of body whorl white, broadly banded with yellowish brown, stained with darker brown at the base, with irregular chocolate longitudinal waved lines which often branch and are partially interrupted to form a white band at the middle and another at the shoulder. Spire white with yellow apex and broad radiating chocolate bands, some of which are continuous on the body whorl. Interior of aperture white. Periostracum dark green, thick, opaque; ridged. In life, foot and siphon greenish black.

**LENGTH:** To 135 mm.

**TYPE LOCALITY:** None.

**REMARKS:** Although this species was first reported from Hawaii as *C. vexillum* (Garrett, 1878), it has generally been known in Hawaii as *C. sumatrensis*. Examination of specimens in the U. S. National Museum and in collections made by the author in Micronesia as well as Hawaii revealed morphological overlap and intergrades between typical specimens of both species. Further confusion is found in the literature. Kiener (1847: 81) stated under *C. sumatrensis*, "Coquille qui par sa forme se rapproche de la précédente [C. vexillum]; elle est reconnaissable surtout par ses lignes longitudinales ramifiées." Tryon (1884: 39) stated, on the other hand, under *C. vexillum*, "Spire often variegated with white and chestnut broad flames, the latter often overlaying also the lighter chestnut of the body whorl."

Most authorities have considered the two as distinct species. The figures given in Reeve (1843: pls. 1 and 3) show extreme variants, while the specimens figured by Sowerby (1857: pl. 7) are hardly distinguishable.

*C. vexillum* is a relatively uncommon species on Hawaiian reefs. It is known to occur to a depth of 25 fathoms. Pleistocene fossils are known from Molokai (Ostergaard, 1939, as *C. sumatrensis*).

**Conus vitulinus** Hwass in Bruguière

Fig. 14 in Plate 1

*Conus vitulinus* Hwass in Bruguière, 1792, Enc. Meth. Vers, 1: 648, pl. 326, fig. 3.


*Conus vulpinus* Schubert and Wagner, 1829, Syst. Conch. Cab., 12: 56, pl. 222, fig. 3073. (non *vulpinus* Hwass in Bruguière, 1792.)

*Conus vulpinus* Wagner var. A. Küster, 1837–1840, Syst. Conch. Cab., ed. 2, 4: 29, pl. 3, fig. 7. (non *vulpinus* Hwass in Bruguière, 1792.)


**DESCRIPTION:** Shell thick and solid. Body whorl obscurely striate near the shoulder, the striae becoming more pronounced and granular basally. Aperture narrow, the sides parallel. Shoulder angular, smooth; spire depressed, slightly canaliculate, striate. Color of body whorl usually deep reddish or purplish brown, darker at the base, with white bands mottled with ground color at the shoulder and below the center; the bands contain one to several rows of brown dots. In large specimens, the reddish brown areas often interrupted by longitudinal white blotches. Spire arcately tesselated with brown and white. Perios-
tracum gray, thick, opaque, closely striate transversely. In life, visible portions of foot and siphon bright lemon yellow.

**LENGTH:** 70 mm.

**TYPE LOCALITY:** Indian Ocean.

**REMARKS:** Small specimens of this species closely resemble *C. litoglyphus*. *C. vitulinus* may be distinguished by having striae above the central band, rows of brown dots on the white bands, and absence of a pointed apex.

*C. vitulinus* is a relatively uncommon species on Hawaiian reefs. It is known to occur to a depth of 30 fathoms. Pleistocene fossils are known from Molokai (Ostergaard, 1939).

A single specimen labeled *Conus planorbis* Born in the collection of the B. P. Bishop Museum (No. 68990) was dredged in Honolulu Harbor. The Museum of Comparative Zoology contains another specimen (No. 146332) collected at Midway Island by J. Chalean, apparently alive when collected. These specimens are extremely similar to, and may be synonymous with, *C. vitulinus*, as has been suggested by some workers (p. 395).

**POSSIBLE ADDITIONAL VALID SPECIES IN HAWAII**

**Conus elisae** Kiener

Fig. 4


**DESCRIPTION:** Shell subcylindrical; maximum diameter slightly more than one half the length. Body whorl obesely striate, the striae slightly more pronounced and as raised ridges toward the base. Aperture rather broad, flaring slightly basally. Shoulder smooth, rounded. Spire moderately elevated, obtuse, straight or slightly convex, obesely striate. Color dark reddish brown, as many closely spaced and intersecting longitudinal lines separated by small white spots; occasionally with larger white subtrigonal blotches as in
Kiener’s *C. elisae* and typical *C. pennaceus* have been found, despite an increasing number of specimens collected during the past year. Moreover, the microhabitat of the Hawaiian specimens referred to seems to differ from that of typical *C. pennaceus*. The former are typically found buried as deep as six inches under sand (A. H. Cornelison, verbal communication) while the latter are typically found on or partly buried in sand under rocks (Kohn, 1959). It seems reasonable at the present time to consider *C. elisae* as a possibly valid species. The problem requires further investigation.

**UNIQUE RECORD FROM HAWAII**

*C. smirna* Bartsch and Rehder

Fig. 13 in Plate 1

This species is known only from a single specimen, the type, described by Bartsch and Rehder (1943). It was dredged near Lanai ("Ranai") in 257–312 fathoms by the U.S. Fisheries steamer "Albatross."

**SPECIES KNOWN IN HAWAII ONLY FROM COLLECTION OF DEAD SPECIMENS**

To the author’s knowledge, there are no records of living specimens of the following species from the Hawaiian archipelago.

*C. aulicus* Linne

*C. auratus* is probably a synonym of *C. aulicus*.

Ostergaard (1928) listed *C. auratus* as occurring in the fossil state on Oahu. The present writer is quite convinced that the species referred to was *C. pennaceus*, since Ostergaard (1928) also mentions the normal habitat of living specimens. However, at least one fossil specimen of *C. aulicus* is known from Oahu. It was collected about five feet above high tide mark near Nanakuli by E. C. Jones in March, 1954. It is at present in the collection of the Children’s Museum of Honolulu (No. 2747).

Specimens now considered to be narrow-shelled variants of *C. pennaceus* because of the abundance of intergrades were listed as *C. auratus* by Edmondson (1933). Edmondson (1946) cited both *C. auratus* and *C. omaria*. The same figure of a rather typical shell of *C. pennaceus* was labelled *C. auratus* by Edmondson (1933) and "*Conus omaria (?)" in the 1946 edition.

Specimens of *C. aulicus* were collected by the Tanager Expedition at Kure (Ocean) Island and Pearl and Hermes Reef and are in the collection of the B. P. Bishop Museum (Nos. 66438, 66439, 66205). A shell from Midway Island which is quite fresh in appearance but was empty when collected is in the collection of C. A. Allen.

*C. aureus* Hwass in Bruguière

A number of well-preserved shells of this species have been collected on beaches along the windward coast of Oahu.

*C. auricomus* Hwass in Bruguière

This species has been known erroneously as *C. clavus* Linné (see Dodge, 1953). Several specimens have been collected from dredged material at Honolulu, Oahu, and at Midway Island. *C. magnificus* Reeve, recorded by Garrett (1878) from the Hawaiian Islands, is probably synonymous. A label, "*Conus magnificus* Reeve. Hawaiian Ids.,” is present in the Garrett collection in the B. P. Bishop Museum, but no shell is present.

*C. cylindraceus* Broderip and Sowerby

Several shells have been collected from dredged material at Midway Island. No specimens are known from the main Hawaiian Islands (Thaanum, in litt.).

*C. fabula* Sowerby

(=*Conus scabriusculus* Dillwyn?)

The only known specimen, probably a subfossil, was collected at Makua, Oahu, by W. C. Ross.
Conus tenuistriatus Sowerby

Some authors have considered this species synonymous with (Tryon, 1884) or a variety of (Couturier, 1907; Dautzenberg, 1933) *Conus glans* Hwass *in* Bruguière. Several dead specimens have been dredged and a few have been collected on beaches in the Hawaiian Islands.

Conus tulipa Linné

Ostergaard (1928) reported collection of several fossil specimens, one of which is figured, of *Conus tulipa*. The identification of a fossil specimen, presumably collected by Ostergaard, in the Hawaii Marine Laboratory reference collection, has been verified by the writer as *C. tulipa*. Ostergaard (1928) referred to a "live immature specimen" of *C. tulipa* collected in Hawaii by C. H. Edmondson. It is possible that the specimen referred to was a *C. obscurus*, as several older specimens of that species were labeled *C. tulipa*. However, a single juvenile specimen of *C. tulipa* (No. 20), collected at Waikiki Reef, Oahu, is in the Hawaii Marine Laboratory reference collection. It is not known whether or not this specimen was alive when collected, but it is in fresh condition. A number of shell fragments of *C. tulipa* have also been collected on Hawaiian beaches.

UNVERIFIED AND INACCURATE RECORDS FROM THE HAWAIIAN ISLANDS

Conus arenatus Hwass *in* Bruguière

A single beach specimen, labeled "Hawaii. coll. W. H. Pease," is in the U. S. National Museum (No. 5038). No other specimens are known from the Hawaiian Islands, and the record may be in error as to locality.

Conus aristophanes Sowerby

This species, considered by Tomlin (1937) and others as synonymous with *C. coronatus* Gmelin, was described by Sowerby (1858) from the Philippine and Hawaiian islands. The latter locality is almost certainly in error.

Conus atramentosus Reeve

This is the type species of the genus *Lovellona* of Iredale (1917). Thiele (1931) considers *Lovellona* a section of the genus *Mitromorpha* A. Adams (1865) and places it in the subfamily Cytharinæ of the family Conidae. Other authorities place *Mitromorpha* in the family Pleurotomiæ (Simroth, 1896–1907).

Conus cancellatus Hwass *in* Bruguière

The type locality of this species is given in Bruguière (1792: 713) as "l'île d'Owhyhée dans l'océan pacifique." This is presumably an error, since no specimens from the Hawaiian Islands are known to the writer, although there is some resemblance to *C. acutangulus*. *C. cancellatus* is found in Japan.

Conus emaciatus Reeve

This species, considered by Tomlin (1937) and others as a juvenile of *C. virgo* Linné, was reported from the Hawaiian Islands by Sowerby (1858: pl. 12, sp. 191). This reference may be in error, since no specimens from Hawaii are known to the writer or D. Thaanum (in litt.).

Conus fusiformis Pease

Pease (1860) described this species from the Hawaiian Islands. It belongs to the genus *Mitromorpha*. (See under *C. atramentosus*.)

Conus miliaris Hwass *in* Bruguière

A specimen in the U. S. National Museum (No. 338481) now labeled "*Conus miliaris* Hwass" was collected by D. Thaanum at Keaukaha, near Hilo, Hawaii. Three live specimens were found in a sand pocket in the reef and apparently none have been collected since (Thaanum, in litt.). The specimens were first labeled by W. H. Dall as a variety of *C. abbreviatus*. The single discovery of three individuals in a small area suggests a small, isolated, aberrant population with possible fixation of atypical morphological character-
istics by genetic drift. The circumstances of
collection thus lend support to Dall’s con-
clusion that the specimens represent a variant
of *C. abbreviatus*. However, the specimens
agree quite completely on morphological
grounds with typical *C. miliaris*, which is
otherwise not known to occur in the Ha-
waiian Islands. It is possible that the speci-
mens under consideration may have hatched
elsewhere and have been carried ashore on
Hawaii by currents during the pelagic larval
stage. In either event, the population has
apparently not become established in Hawaii.

The Museum National d’Histoire Natu-
relle, Paris, contains two additional specimens
labeled “Kauai (Sandwich) Rémy 1857.”

**Conus parvus** Pease

Pease (1868) having discovered that *C.
fusiformis* was preoccupied, renamed that spe-
cies *C. parvus*. See under *C. fusiformis*.

**Conus virgo** Linné

Although Garrett (1878) reported this
species from the Hawaiian Islands, there is
no specimen in the Garrett collection in the
B. P. Bishop Museum, and no other records
are known to the writer. Demond (1957)
also lists this species from Hawaii.

**SUMMARY**

The gastropod genus *Conus* is represented
by 33 species in the Hawaiian archipelago.
This number comprises only species of which
more than one individual has been collected
alive in the area between Kure (Ocean) Island
and the island of Hawaii. Synonymies, de-
scriptions, type localities, and notes are given
for each of these species.

One possibly additional valid species, a
unique record of one species, seven species
known in Hawaii only from the collection of
dead specimens, and unverified and inaccu-
rate records of nine species from the Hawaiian
Islands, are cited.

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