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THE *CONUS CEDONULLI* COMPLEX

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With one text-figure and 4 plates

ABSTRACT

The *Conus cedonulli* complex of the Southern Caribbean shows remarkable variation in morphological characters. Based on personal investigations the present author provides information on specimens and their habitats from numerous localities. He concludes that five groups should be distinguished, which he provisionally regards as of specific rank. Of these taxa *Conus sanctaemarthae* is described as a new species.

INTRODUCTION

Since the time of the great shell auctions of the early 1700's there has been confusion about the identity of the rare *Conus cedonulli*, or "cone yielding to nothing (in beauty/value)". We are left with a figure from Seba (1759), a woodcut by Knorr (1757), some beautiful nineteenth-century paintings, and a series of ill-defined names such as *C. cedonulli* Linnaeus, 1767, *C. mappa* Lightfoot, 1786, *C. insularis* Gmelin, 1791, *C. aurantius* Hwass in Bruguière, 1792, and *C. dominicanus* Hwass in Bruguière, 1792.

Clench (1942) recognized *C. dominicanus* as a species. Later, Clench & Bullock (1970), following Kohn (1966), used the older name *C. insularis* for this species. They additionally accepted *C. aurantius* as a separate species but made the observation that "Further study may prove that *insularis* and *aurantius* are conspecific". Coomans (1963) had distinguished *C. dominicanus* from *C. aurantius*, but Van Mol, Tursch & Kempf (1967), studying specimens from the Amsterdam museum and the Dautzenberg collection, were unable to establish definite differential criteria. At first Holeman & Kohn (1970) concurred with the view of Van Mol et al. that *C. aurantius* must not be considered a separate species. However, in their opinion the only valid species should be called *C. mappa* Lightfoot, 1786. They redescribed the species but could "offer no information on the appearance of the animal in life, nor on its habitat and habits". Thereafter Dunn (1971) drew the

attention to the fact that Seba's figure (1759) of "Cedo Nulli" is nearly identical to a *Conus* specimen dredged at St. Vincent. Therefore rather than *C. mappa*, *C. cedonulli* Linnaeus, 1767, should be restored to its rightful position, being the oldest name available for the Caribbean species. In a recent analysis of the species of *Conus* described during the 18th century Kohn (1976) has corrected errors and omissions in his first reports and assimilated corrections made by others. Following Dunn he now considers *C. cedonulli* Linnaeus, 1767, as a valid species with *C. mappa* Lightfoot, 1786, as a junior synonym. He also considers *C. aurantius* Hwass in Brugière, 1792, provisionally valid pending future studies. It should be mentioned that Coomans had always recognized two distinct species and had summarized their differences (1973). Van Mol confirmed his earlier statement that from examination of the material he had at hand no stable differential characters between *C. dominicanus* and *C. aurantius* could be found, but added that he might well have to reconsider his ideas as soon as more information concerning the distribution and habitat of these rare Conidae becomes available (personal communication, 1975).

I believe that much confusion arises from the fact that locality data are not always sufficiently accurate, while differences between the marine faunae of islands located close to each other exist. For instance on Aruba and Venezuela various species such as an *Ancilla glabrata* (Linnaeus, 1758) and *Vasum muricatum* (Born, 1778) are found which do not occur on nearby Curaçao and Bonaire. This is not surprising as Aruba lies on the continental shelf whereas Curaçao and Bonaire are separated from the mainland by deep trenches. The fauna of Aruba, different from that of Curaçao and Bonaire, evidently is not just Venezuelan witness the occurrence of such endemic species as *Conus hieroglyphus* Duclos, 1833, and *Murex macgintyi* M. Smith, 1938. To solve the *cedonulli* problem one should start from a detailed and accurate inventory.

Conidae assigned to the *C. cedonulli* complex in the present paper are white to purplish grey with spiral lines of alternating light and dark streaks or dots, and yellow, brown or black maculations. The animal is red and the operculum is small (about one-seventh of the aperture). *C. regius* Gmelin, 1791, is a closely related species (Vink, 1974) but is not considered to belong to the complex. It differs in not having spiral lines with light and dark streaks at regular intervals, notwithstanding its overall streaked appearance. The animal of *C. regius* is purplish red and the operculum is large (about one-half or one-third of the aperture). Young specimens of *C. regius* with a rather high spire and maplike maculations without streaks show some resemblance with Conidae from Curaçao and Bonaire assigned to the *C. cedonulli*

complex (where the spiral lines of alternating light and dark dots are less pronounced), but can be easily distinguished by the colour of the animal and the large operculum. I have also excluded from my considerations *C. hieroglyphus* Duclos, 1833, which occurs on Aruba and which is quite distinct from Conidae assigned to the *C. cedonulli* complex (notwithstanding there has been confusion in the past). It has a violet animal and relatively large operculum (one-third to one-fourth of the aperture).

The *C. cedonulli* complex seems to be confined to the Southern Caribbean: it can be found throughout the Lesser Antilles and off South America from Colombia to Trinidad (*C. dominicanus* reported by Van Mol et al. (1967) from off Fortaleza, Brazil, has now been redescribed as *C. scopulorum* Van Mol et al., 1971).

FIELD OBSERVATIONS

During the years 1971-1976 a number of field trips were made to collect specimens of the complex and make observations of their habitats and habits. The various localities visited and on which information will be given are shown in fig. 1¹⁾. Other records which I have not been able to verify exist from Nevis, Antigua, Dominica, and Martinique. Recently, St. Martin was added to the list (Coomans, 1974). The species has also been reported from the Bahamas (possibly because Clench (1942: 7, "*Conus dominicanus*") obtained his specimen from the governor of the Bahamas), Surinam (indication of *C. cedonulli surinamensis* Hwass in Bruguière, 1792, but not mentioned by Van Regteren Altena (1975)), and Cuba (?). A short account of the field

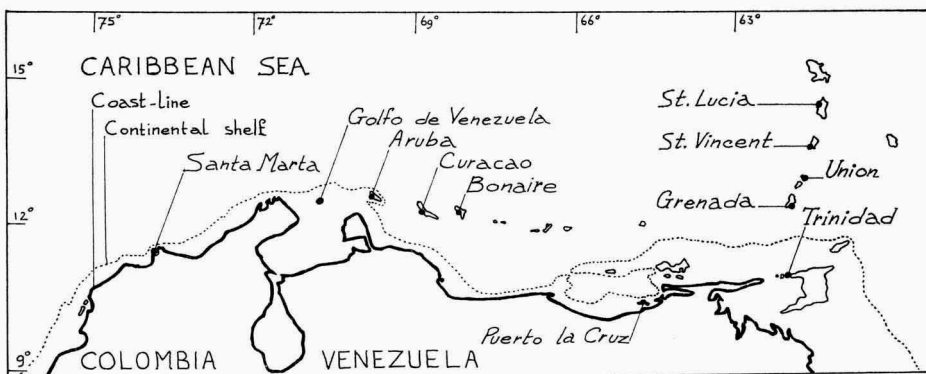


Fig. 1. Localities where members of the *Conus cedonulli* complex were found.

1) Besides specimens from these locations I now have seen specimens from St. Thomas, which extends the range considerably northwards beyond St. Lucia.

trips follows next, while full descriptions of the various shells collected will be given in a later section of this paper.

Curaçao and Bonaire. — The occurrence of *cedonulli*-type Conidae on the Netherlands Antilles is well known (e.g. Van Pel, 1969). I have found both young and fully adult specimens as well as egg capsules at depths of 1 to 10 m. On Curaçao and Bonaire, at about 10 m depth, the oceanfloor suddenly drops to some 60 m or more and *cedonulli*-type cones are never found on the slope. Normally the shells are found partly or completely buried in sand under huge dead coral heads or coral rubble. It is amazing how barren the habitat sometimes looks, without any vegetation and only consisting of sand and slabs of dead coral. The water is extremely clear with a temperature of about 26°C. The shell has a straight high spire and a squarish knobbed shoulder (pl. 1 fig. 2; pl. 4 figs. 1, 2). There are brown, black, yellow and orange colour variations. I have seen at least 120 specimens in various collections.

Aruba. — The Aruba *Conus* has a speckled appearance and is rather fat with a smooth shoulder (pl. 1 figs. 3; pl. 2 figs. 4-6). It is a shallow water species, I have collected adult specimens in 2 to 4 m water. The habitat is similar to that on Curaçao, but there is more vegetation, the water is less clear, and the bottom consists of sand and silt. Specimens are found under slabs of coral but also hidden in gullies. I have seen at least 70 specimens in various collections.

Santa Marta (Colombia). — The German biologist R. von Cosel drew my attention to the fact that *cedonulli*-type Conidae can be found at some of the beaches North of Santa Marta in Colombia. When visiting one of these beaches in 1974, I was struck by the completely different habitat. The bottom consisted of sand and silt with quite some vegetation but no coral formations. Ideal for *Architectonica nobilis*, *Turritella variegata*, etc. (which hardly occur on Curaçao) but not a place to expect Curaçao-type Conidae. The stretch of shallow water was not very large. The water was not very clear and only after a long search we suddenly found a number of live specimens in a rather limited area. The specimens were half buried in sand, often near depressions in the sea floor, at a depth of 2 to 3 m. The largest measured 53 mm (pl. 4 fig. 4). Most strikingly different is the colour of these rather dark purplish grey shells (pl. 1 fig. 5; pl. 4 figs. 4-6). Various specimens, although life collected, show worn areas on the body whorl as if they had been buried in the silt in a similar position for quite some time. During a second visit to the beach near Santa Marta in 1976 we were unable to locate a single specimen.

However, Dr. B. Werding of the Instituto de Investigaciones Marinas provided us with a specimen that he had life collected at 20 m while scuba diving in the same bay. Evidently the species occurs in shallow zones to depths of 20 m.

Cedonulli-type cones from Santa Marta have an internal restriction within the aperture. It is as if the early whorls are more tightly coiled, which produces a rounded ridge on the internal section of the columella (if one puts a pen into the opening at the base it is difficult to move the pen out of the aperture with a corkscrew motion). This is not the case with specimens from Curaçao and Bonaire, while Aruba specimens have a very weak internal ridge. In total I have seen 16 specimens of the Santa Marta *Conus*, of which 5 specimens from the collection R. von Cosel.

Golfo de Venezuela. — From the Golfo de Venezuela I obtained one *cedonulli*-type cone, trawled by fishermen from Punto Fijo, Venezuela. The shell (pl. 3 fig. 1) was collected from a depth of about 30 m, probably near Los Monges Islands. It is a rather large shell with a high tuberculated spire. I have seen one more specimen of the Golfo de Venezuela shell (collection G. Ferrato) which looks almost identical, the high concave spire being characteristic. R. von Cosel had obtained two specimens of this shell from Colombian trawlers fishing in the same area (personal communication, 1973). The aperture is white (purplish white in the dark coloured Santa Marta specimens).

Trinidad. — The occurrence of a *cedonulli*-type *Conus* on Trinidad was already reported in 1970 by Percharde (see Clench, 1970, mention of *C. insularis* Gmelin found in association with *C. centurio* Born), who provided the following information when we visited him in 1975. The species can be found near the North-West coast of Trinidad at a depth of about 40 m in flat silt areas where it is partially buried, often in small depressions. Visibility is limited and the water temperature rather low, below 19°C. Juvenile specimens can be found in more shallow waters, often in areas in which grit and muddy silt meet. The shell (pl. 1 fig. 4; pl. 3 figs. 2, 4) is particularly heavy and wide with irregular patches of brown on a milky-white background. It is interesting to note that juvenile specimens are black brown. As they grow the brown colour becomes lighter. I have seen some 10 specimens of this *Conus* (collection P. L. Percharde).

Puerto la Cruz (Venezuela). — In 1971 I found on one of the little islands near Puerto la Cruz a small live *Conus* on sandy bottom in 2 m of water,

which undoubtedly belongs to the *C. cedonulli* complex. It shows dark brown maculations (nearly black on earlier part of body whorl) on a cream background, and spiral lines of alternating white and reddish brown dots. The animal of this juvenile specimen was cream with a large orange red rim around the foot. The whorls are not tuberculated as in the Curaçao *Conus*. During a subsequent visit to the island we found a still good, beachworn specimen on the shore, but only after an intensive search did I find a large live specimen at about 2 m depth. Most peculiarly, it was found with its apex stuck in the silt, and the worn apex showed that it had been in that position for quite some time. It had a thick redbrown periostracum, and only after removing this the yellow brown and greyish white colour pattern became visible. During a third visit to the little island in 1974 we only found a nice crabbed specimen. The habitat on the island is quite different from that on Curaçao. There are some boulders of coral but the bottom is sandy with silt and vegetation and the water rather turbid. Particularly near the bottom the water temperature is very low, about 18°C.

The shell from Puerto la Cruz (pl. 3 figs. 3, 5) very much resembles the Trinidad *Conus*, e.g. there is a very strong internal restriction within the aperture. Only the colour pattern is somewhat different, the Puerto la Cruz specimens having smaller yellow maculations. I am convinced that the Puerto la Cruz *Conus* is also a deepwater species and that only juvenile specimens occur in shallow water. In other collections I have seen one brown beachworn specimen (collection P. Hoeblich) and three nearly black juvenile shells (collection J. Gibson-Smith), all originating from the same islands. The large adult specimen found in shallow water, which most probably was a female because of its low spire, may have got stuck in the silt. (Had it moved to more shallow waters for reproduction?) Probably it only had developed the heavy periostracum because of its peculiar position.

Grenada. — Holeman (1969) recorded a *cedonulli*-type *Conus* (*C. aurantius* Hwass) from Grenada and the Grenadine Islands, and in the summer of 1975 we had the opportunity to search on these islands ourselves. We were most lucky to find a few specimens (of which two alive) near the South-East coast of Grenada and on little islands near this coast. They were found in areas with sand and slabs of broken coral, where they laid buried at a depth of less than 2 m. The Grenada cone (pl. 4 fig. 3) is smaller than the Curaçao *Conus*, with smaller but more numerous knobs on the shoulder of the body whorl. I have seen 10 specimens of this *Conus*, of which 2 specimens from the collection B. M. Willcox.

Union Isle. — Reports on the occurrence of *cedonulli*-type Conidae on Union Isle, one of the Grenadine Islands, made us visit this isolated spot. The excursion was successful: on a sandy reef in the bay we found in shallow water one live specimen of a *cedonulli*-type *Conus* with lightbrown maculations. Habitat as on the Netherlands Antilles. From Union Isle we have also seen specimens with yellow brown maculations, in total 5 specimens (collection Mrs. J. Wall).

St. Vincent. — Some years ago a land reclaiming scheme at Kingstown harbour on St. Vincent brought to the surface interesting deepwater material consisting of unusual shells among which *cedonulli*-type Conidae. The dredging material consisted of black volcanic sand from depths between 30 and 50 m.

The typical St. Vincent *Conus* (pl. 1 fig. 1; pl. 2 figs. 1, 2) resembles Seba's figure with strings of ivory white circles in the dark areas. It is an unusual pattern which looks as being "printed" on the shell. Some of the lines around the ivory-white areas change from thin to thicker which produces a "three dimensional effect". It has been suggested that this is the result of having been buried in the black volcanic sand for lengthy periods, but I have seen specimens which had been dredged alive (collection M. de Silva) and of which the colour pattern is almost the same, the ivory-white areas being somewhat more bluish. The animal was described as "blood red with very fine cream speckles" (?).

Scuba diving in Kingstown harbour in an attempt to find live specimens was not successful (empty shells at some 10 m depth apparently carried back into the sea during land reclaiming process). Some empty shells were of juvenile specimens with the same pattern as adult shells but with higher spire and tuberculated body whorl. The bottom consisted of black volcanic sand "dunes". Unfortunately we lost our way in this "desert" and were unable to search in areas deeper than 17 m.

In total I have seen some 80 specimens of this shell, all recovered from the dredging material.

St. Lucia. — On St. Lucia, near Pigeon Isle, an artificial sand beach has been made from white sand dredged from 30 to 50 m. Again *cedonulli*-type Conidae were found in the dredging material. The general appearance of the St. Lucia shell (pl. 2 fig. 3) very much resembles the St. Vincent *Conus* (no internal restriction within the aperture) but the colour pattern is different (which could have to do with the white sand instead of the black sand habitat). The shell is nearly completely yellowish white. I have seen some 30 specimens of this shell, all recovered from the dredging material.

TAXONOMIC SCHEME

A summary of my observations on the *Conus cedonulli* complex is presented in table 1. As is apparent, the specimens assigned to the complex show remarkable variations in morphological characters (outline of spire straight to concave, whorls canaliculate to tuberculated, shoulder of body whorl smooth to knobbed, shell smooth to granulated). They occur in different habitats (coral rubble to flat silt areas, shallow zone to depths of 50 m). Nevertheless, various groups of closely related shells can be distinguished (such as Conidae from oceanic islands without internal restriction versus Conidae from continental islands with internal restriction). However, rather than considering a complicated scheme of various species with subspecies (which would reflect a well known relationship between the various groups), I shall provisionally regard five groups as of specific rank (see plate 1 figs. 1-5). Sufficient differential criteria exist to identify unambiguously any specimen of the material examined (without considering locality data) with one of the following species.

Conus cedonulli Linnaeus, 1767 (pl. 1 fig. 1; pl. 2 figs. 1-3)

Linnaeus, in his "Systema Naturae" (12th edition), gave a brief description of *C. ammiralis cedo-nulli* with habitat O. Americae meridionalis. He cited the figure from Seba, 1759: pl. 48 fig. 8. This figure represents a specimen from the collection of Johan Bernard de la Faille of the Hague, Holland, already known as "Cedo Nulli", which however has been lost. Dunn (1971) proposed to restore *C. cedonulli* Linnaeus, 1767, as a species. Kohn (1976) agreed with this proposal and designated Seba's figure as representative of the lectotype. According to Kohn (1976) *C. architalassus* Solander in Lightfoot, 1786, is a junior synonym.

Distribution. — St. Vincent, St. Lucia, probably other Windward islands.

Description. — The typical *C. cedonulli* is yellow-orange with many irregular ivory-white patches below the mid-region and on the shoulder of the body whorl. In addition, spiral lines consisting of white and brown dots in the ivory-white areas, and of strings of ivory-white circles in the dark areas. The ivory-white circles are outlined with orange and interconnected by a thread of orange. In the strings of circles on the upper half of the shell some circles are larger at regular intervals, forming small ivory-white patches comparable to the patches on the mid-region. The circles on the lower half of the shell are placed on pustulations. There also exists a rare reddish brown form. Specimens from St. Lucia (pl. 2 fig. 3) are nearly completely yellowish white with only sporadically yellow-brown to orange-brown maculations. Some of these specimens have a beautiful pinkish-white background

TABLE I
Conidae belonging to the *C. cedonulli* complex

Locality	Habitat	Depth	Morphological aspects	Colour pattern	Colouration of juveniles	Taxon
Curaçao, Bonaire	oceanic island sand, coral rubble	shallow water, to depths of 10 m	slender, shoulder body whorl tuberculated, no internal restriction	black, brown, orange, yellow	similar to adults	<i>aurantius</i>
Aruba	continental island sand, coral rubble, some vegetation	shallow water, to depths of 5 m	shoulder body whorl smooth, very weak internal restriction	black, brown, orange	similar to adults	<i>insularis</i>
Santa Marta (Colombia)	mainland coast sand, silt, vegetation	shallow water, to depths of 20 m	shoulder body whorl smooth, strong internal restriction	purplish grey, with or without brownish maculations	similar to adults	<i>santaemarthae</i>
Golfo de Venezuela	continental shelf area ?	deep water (30 m)	shoulder body whorl smooth, strong internal restriction	brown on a light background	?	<i>mappa?</i>
Trinidad	continental island flat silt areas	deep water (40 m)	shoulder body whorl smooth, strong internal restriction	brown on a milky-white background	black brown, darker than adults	<i>mapa</i>
Puerto la Cruz (Venezuela)	continental island sand, silt	deep water	shoulder body whorl smooth, strong internal restriction	yellow brown on a greyish-white background	black brown, darker than adults	<i>mapa</i>
Grenada	oceanic island sand, coral rubble	shallow water, to depths of 2 m	slender, shoulder body whorl tuberculated, no internal restriction	black, brown	similar to adults	<i>aurantius</i>
Union Isle	oceanic island sand, coral, some vegetation	shallow water, to depths of 2 m	shoulder body whorl tuberculated, no internal restriction	brown, yellow	probably similar to adults	<i>aurantius</i>
St. Vincent	oceanic island black volcanic sand	deep water (30 to 50 m)	shoulder body whorl smooth, no internal restriction	yellow brown or reddish brown	similar to adults	<i>cedonulli</i>
St. Lucia	oceanic island white sand	deep water (30 to 50 m)	shoulder body whorl smooth, no internal restriction	yellowish white or pinkish white	similar to adults	<i>cedonulli</i>

(instead of yellowish-white). Spire moderately elevated and strongly concave in adult specimens, whorls canaliculate (early whorls distinctly tuberculated), shoulder of body whorl smooth, no internal restriction within the aperture. Juvenile specimens show the same colour patterns as adult shells (pl. 2 fig. 2).

Discussion. — As pointed out by Dunn (1971), specimens from St. Vincent belong to this species, and specimens from St. Lucia must also be placed within this group (the pattern of spiral lines in the sparse yellow-brown areas is similar to that of the St. Vincent *Conus*). It is a deepwater species occurring in a sandy habitat near oceanic islands (i.e. islands which geologically do not form part of the mainland). The shoulder of the body whorl is smooth and there is no internal restriction within the aperture. Juvenile specimens are similar to adult specimens.

Conus aurantius Hwass in Bruguière, 1792 (pl. 1 fig. 2; pl. 4 figs. 1-3)

Hwass (1792) described *Conus aurantius* in Bruguière's "Encyclopédie Méthodique" (vol. 1, page 606, pl. 317 fig. 7), giving erroneously the Philippines as a locality for the species. This was corrected subsequently by Clench & Bullock (1970) to Curaçao, Netherlands Antilles. Some cones of Hwass' collection are at present in the Musée d'Histoire Naturelle, Geneva (Kohn, 1968); No. 1106/42 there has been designated as the lectotype of *C. aurantius* by Kohn (1968).

Distribution. — Curaçao, Bonaire, Grenada, Union Isle.

Description. — The typical *C. aurantius* is slender, up to 70 mm, with a high spire (even in adult specimens). Whorls strongly tuberculated, shoulder squarish with 14 to 17 knobs, periostracum transparent, operculum small and elliptical. Colour purplish white with brown or black maculations (sometimes light brown outlined with dark brown) and spiral lines of alternating white and reddish brown streaks. Spiral lines sculptured (granulation) particularly near the base where only occasionally a white dot in the dark areas is produced. Some specimens are nearly completely brown or black with white patches on shoulder and mid-region. Specimens from Curaçao are golden brown or black, from Bonaire golden brown, chocolate brown, bright orange or black. Specimens from Union Isle are similar with light brown or yellow brown maculations. Specimens from Grenada (pl. 4 fig. 3) are slender but smaller with the sides of the body whorl not flat but slightly convex. The aperture broadens anteriorly producing a rounded base. Shoulder of body whorl weakly tuberculated with smaller but more numerous (at least 17) knobs than is the case in the Curaçao and Bonaire *Conus*. The colour of the Grenada specimens is bluish white or pinkish white with black, brown or reddish brown maculations and sculptured spiral lines of reddish brown

and white dots (not always visible on dark areas). Animal red (flesh coloured).

Discussion. — Specimens from Curaçao and Bonaire belong to the same species as the lectotype in Geneva. Notwithstanding some morphological differences specimens described from Grenada also belong to this species (ecological form or subspecies). It is a shallow water species found on oceanic islands in a habitat of sand and coral. The shoulder of the body whorl is tuberculated and it has no internal restriction within the aperture. The colour pattern is variable (black, brown, orange), even when considering shells from the same location. Juvenile specimens are similar to adult specimens.

Conus insularis Gmelin, 1791 (pl. 1 fig. 3; pl. 2 figs. 4-6)

Gmelin (1791), in his "Systema naturae per regna tria naturae..." (ed. 13), vol. 1, p. 3389, gave a brief description without locality indication. Holman & Kohn (1970) cited the figure from Martini (1773: pl. 62 fig. 683) as representative of the lectotype.

Distribution. — Aruba.

Description. — At first glance the shells look similar to those of Curaçao and Bonaire, with the same colour variations. The alternating streaks on the spiral lines are, however, more pronounced in colour (speckled appearance) and much less in sculpture (shell not granulated but near the base weak spiral threads). The whitish background is not evenly coloured but shows bluish and pinkish hues. Shell rather fat, up to 50 mm, spire concave, only early whorls tuberculated, later whorls canaliculate, shoulder roundish and smooth (faint indication of knobs in young specimens), periostracum transparent, operculum small and elliptical.

Discussion. — Specimens from Aruba belong to the same species as the specimen pictured by Martini, the concave spire, the smooth body whorl and the speckled appearance being typical for this rather fat shell. These features are sufficient to distinguish the species unambiguously from *C. aurantius*, which like *C. insularis* is a shallow water species. In both species the juvenile specimens are similar to the adult shells with black, brown, and yellow colours. It should be mentioned that Aruba is a continental island (i.e. an island which geologically forms part of the mainland, but was isolated by a rise in sealevel or subsidence of the land between) unlike the oceanic islands Curaçao, Bonaire, Grenada, and Union Isle.

Conus mappa Lightfoot, 1786 (pl. 1 fig. 4; pl. 3 figs. 1-5)

Lightfoot (1786) in "A Catalogue of the Portland Museum etc.", p. 116, referred to a figure by Knorr (1757: pl. 8 fig. 4) as being representative of

the species. This figure was designated as representative of the lectotype by Kohn (1964). *C. solidus* Gmelin, 1791, is a junior synonym. Kohn (1966) designated the figure cited by Gmelin in Chemnitz (1788: pl. 141 fig. 1310) as representative of the lectotype of *C. solidus*. The figured specimen from the collection of the Danish Count A. G. Moltke is present in the Universitetets Zoologiske Museum, Copenhagen. A photograph of this specimen was published by Kohn (1976: pl. 1 figs. 1, 2).

Distribution. — Trinidad, islands near Puerto la Cruz (Venezuela), possibly also Golfo de Venezuela.

Description. — Shell heavy and wide with a rather short concave spire (*C. regius* type), whorls canaliculate (very early whorls tuberculated), shoulder of body whorl smooth. The aperture is narrow and white and there is a strong internal restriction within the aperture. The colour is milky-white with two spiral bands of yellow brown broken into many irregular patches (Trinidad form, pl. 3 fig. 4) or greyish white with yellow brown maculations (Puerto la Cruz form, pl. 3 fig. 5). In addition numerous spiral lines of short dark brown and white streaks placed on fine and weak spiral ridges near the base. In the Trinidad form the alternating streaks in the yellow brown areas are replaced by a string of white areas outlined with dark brown and connected by a thread of dark brown. Juvenile specimens black brown and only having tiny white dots in the darker areas (pl. 3 fig. 2, 3). As they grow the brown colour becomes lighter. Animal orange red, operculum small and elliptical. The shell from the Golfo de Venezuela (pl. 3 fig. 1) is slender with a high, concave and pronouncedly tuberculated spire and smooth squarish shoulder. Colour creamy white with yellow brown maculations and sculptured spiral lines of alternating white and reddish brown streaks. It has a strong internal restriction within the aperture.

Discussion. — Specimens from Trinidad belong to the same species as the lectotype of *C. solidus* Gmelin, 1791, in Copenhagen. However, Knorr's figure of *C. mappa* Lightfoot, 1786, also shows a shell with the smooth body whorl and the typical colour pattern of irregular patches characteristic of these Conidae, and therefore the name *C. mappa* is preferred. Specimens from Trinidad and Puerto la Cruz undoubtedly belong to the same species. Shells from this group are found in deep waters in sand and silt near continental islands. There is a strong internal restriction within the aperture. Adult shells are remarkably heavy, hence the name *C. solidus*. Characteristically juvenile specimens are much darker than the adult shells. The specimen from the Golfo de Venezuela is only tentatively placed within this group. It comes from deep waters near continental islands and it has a strong internal restriction within the aperture. Both near Trinidad and in the

Golfo de Venezuela the species share the same habitat with *C. centurio* Born, 1778. However, the shell from the Golfo de Venezuela is less heavy and has a more slender appearance. A final decision can only be made when more specimens of this rare shell (including juvenile specimens!) become available.

Conus sanctaemarthae spec. nov. (pl. 1 fig. 5; pl. 4 figs. 4-6)

Holotype (plate 4 fig. 4): Colombia, Santa Marta, about 10 km to the North. Height: 53.0 mm, width: 29.2 mm. The holotype has been deposited in the Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands. *

Paratypes: nine specimens, all from the same location (collection D. L. N. Vink), and about 10 specimens, collected by R. von Cosel in the same area (collection R. von Cosel).

Distribution. — Santa Marta, Colombia.

Description. — The background is purplish grey with various somewhat darker bands and numerous spiral lines of alternating cream and dark brown streaks. The spiral lines, weakly sculptured near the base, appear to be placed closer together than is the case in Conidae from Curaçao. On a number of specimens there are in addition yellow brown to reddish brown maculations. Spire moderately concave, whorls canaliculate except for early whorls which are tuberculated. Shoulder of body whorl smooth, animal bright red, and operculum small. The periostracum is light brown and thicker than that of specimens from Curaçao. There is a strong internal restriction within the aperture.

Discussion. — Specimens from Santa Marta do not belong to any of the afore-named species. I have chosen the name *sanctaemarthae* after the locality where we collected the specimens. As far as I know it is the only *cedonulli*-type *Conus* occurring on the mainland of South America (the continental shelf area is very narrow near Santa Marta). Although also occurring in shallow water these dark coloured cones can be easily distinguished from *C. aurantius* and *C. insularis*. They have a strong internal restriction within the aperture and do not show a range of colour variations. The habitat is different from that of *C. aurantius* and *C. insularis*. Young specimens (pl. 4 fig. 6, smallest specimen height: 27.1 mm, width: 14.4 mm) are similar to the adult shells, which distinguishes this *Conus* from *C. mappa*.

I realize that my representation of the *Conus cedonulli* complex is provisional and not yet complete. Shells from islands North of St. Lucia were not studied. Neither have I tried to identify Hwass' infraspecific taxa of *Conus cedonulli* Linnaeus, 1767. Hopefully other workers will contribute to the picture so that ultimately a generally accepted identification becomes possible of these rare and beautiful Conidae.

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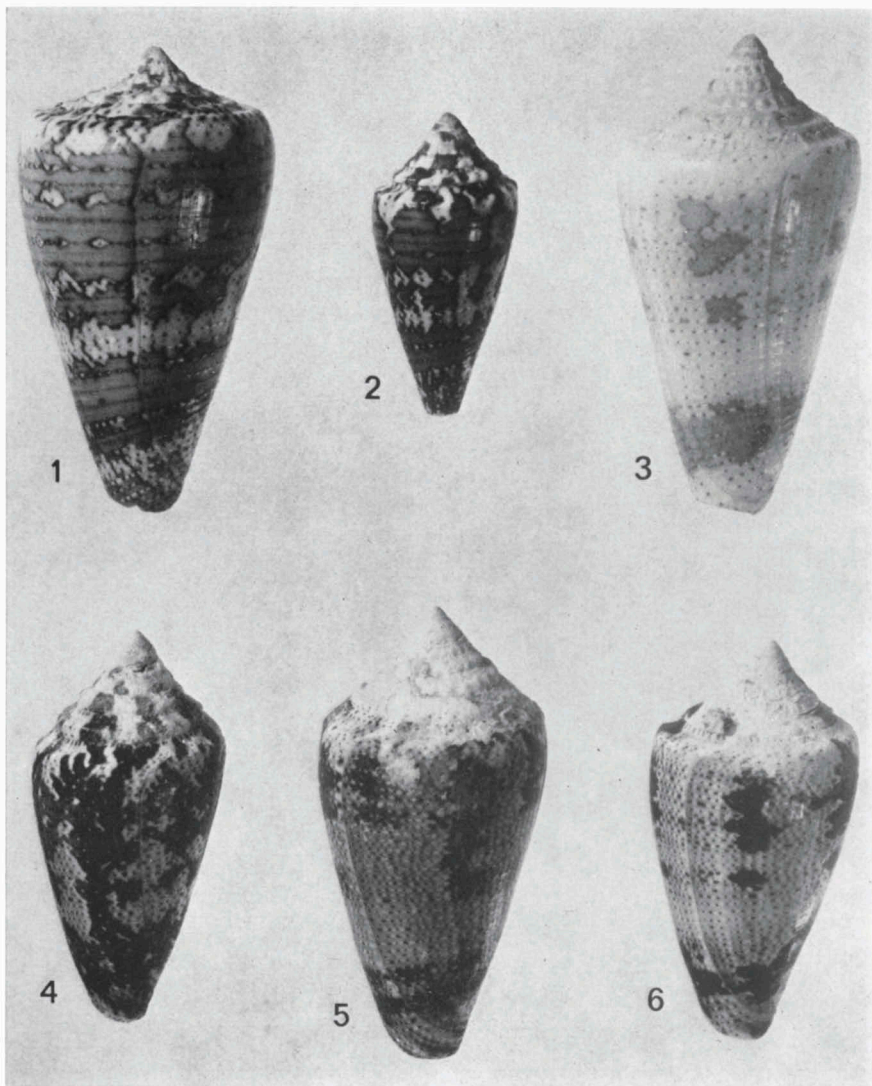
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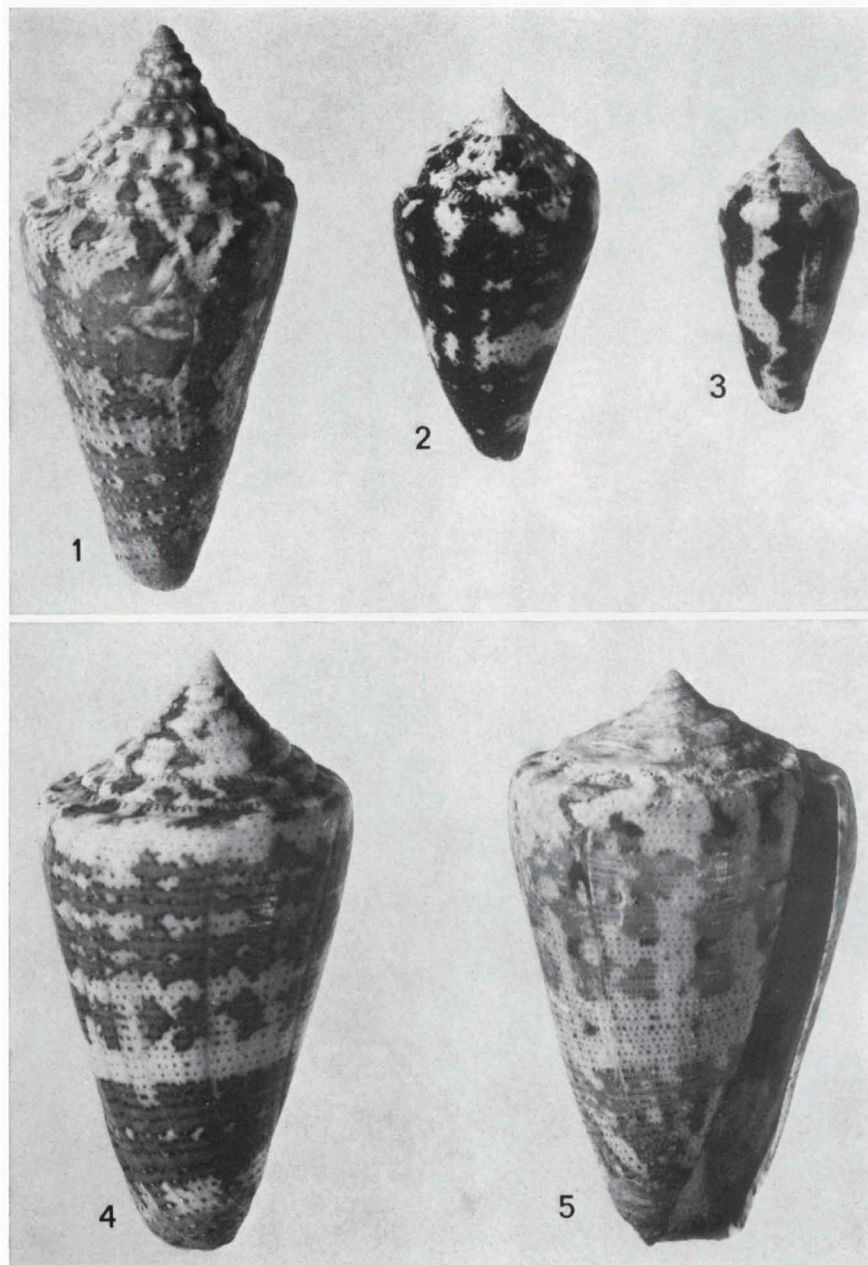
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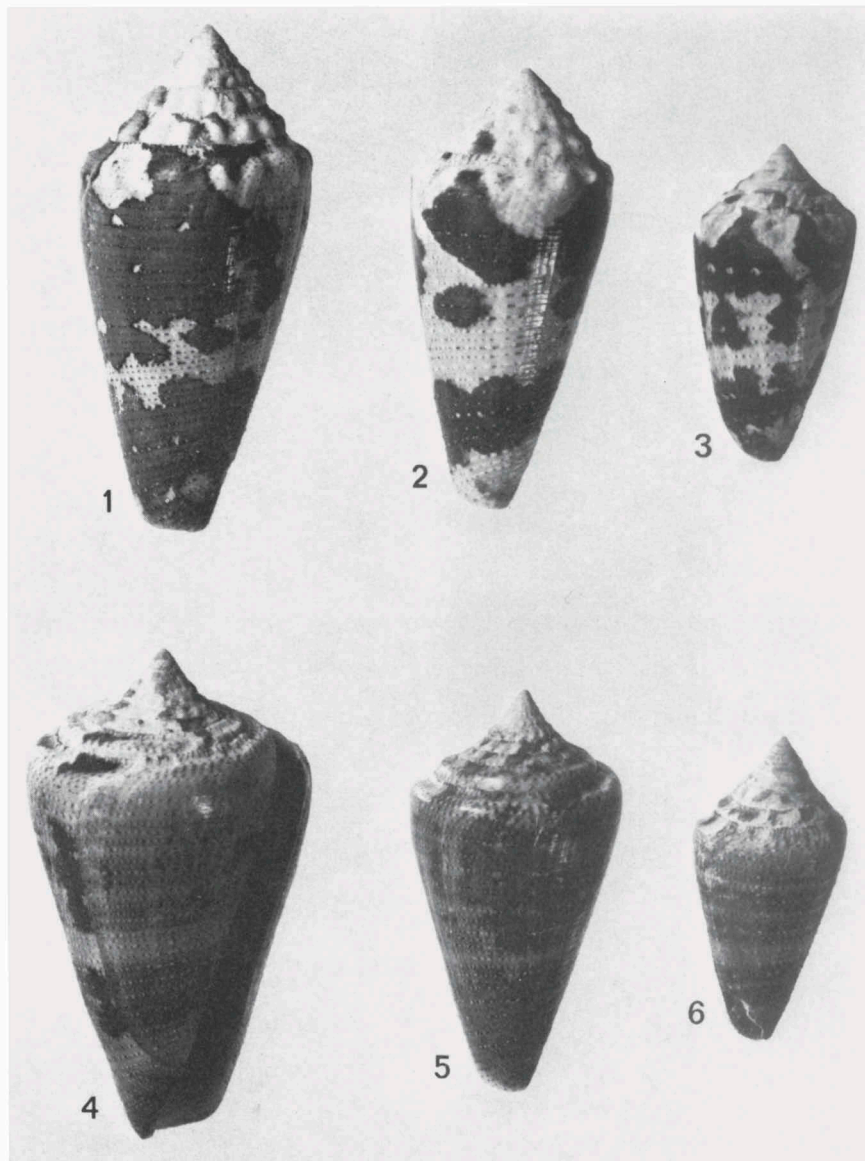
Figs. 1-5 (from left to right, above-below), the *Conus cedonulli* complex. 1, *C. cedonulli* Linnaeus, 1767; St. Vincent; 48.3 mm. 2, *C. aurantius* Hwass in Bruguière, 1792; Curaçao; 45.2 mm. 3, *C. insularis* Gmelin, 1791; Aruba; 47.9 mm. 4, *C. mappa* Lightfoot, 1786; Trinidad; 56.2 mm. 5, *C. sanctaemarthae* spec. nov., paratype; Santa Marta (Colombia); 48.6 mm. Photos: Chr. Hoorn.



Figs. 1-3, *Comus cedonulli* Linnaeus, 1767. 1, St. Vincent; 48.4 mm. 2, St. Vincent; juvenile, 31.8 mm. 3, St. Lucia; 50.0 mm. Figs. 4-6, *Comus insularis* Gmelin, 1791; Aruba. 4, darkbrown form; 42.0 mm. 5, lightbrown form; 48.4 mm. 6, black form; 42.7 mm. Photos: Chr. Hoorn.



Figs. 1-5. *Conus mappa* Lightfoot, 1786. 1, Golfo de Venezuela; 56.9 mm. 2, Trinidad; juvenile, 37.9 mm. 3, Puerto la Cruz (Venezuela); juvenile, 27.4 mm. 4, Trinidad; 66.5 mm. 5, Puerto la Cruz (Venezuela); 66.0 mm. Photos: Chr. Hoorn.



Figs. 1-3, *Comus aurantius* Hwass in Bruguière, 1792. 1, Curaçao; 51.7 mm. 2, Bonaire; 45.2 mm. 3, Grenada; 32.5 mm. Figs. 4-6, *Comus sanctaemarthae* spec. nov.; Santa Marta (Colombia). 4, holotype; 53.0 mm. 5, paratype; 41.4 mm. 6, paratype; juvenile, 32.0 mm.
Photos: Chr. Hoorn.