



THE PHILIPPINE LAND SHELLS OF THE GENUS AMPHIDROMUS.

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INTRODUCTION.

George Brettingham Sowerby, jr., in his Conchological Illustrations, published between 1832 and 1841, gives the first record of *Amphidromus* in the Philippine Islands. On plate 145 he reproduces a front and back view (fig. 100) of *Bulinus maculiferus*, stating that the specimens are in Lady Harvey's collection. This plate, we are told by Mr. Sherborn¹ was published in 1836. A description of this species was furnished five years later by William John Broderip.² Here Broderip describes not only the typical form of *Bulinus maculiferus* Sowerby, but varieties A-F.

The material reported upon in this paper was collected by Hugh Cuming, who writes: "All the varieties, except variety C, were found in the Province of Misamis, in the islands of Mindanao. Variety C was found at Gindulman in the isle of Bohol. All were taken on trunks of trees."

In 1848 the greater part of Lovell Augustus Reeve's monograph of the genus *Bulinus*³ appeared, and in it we find the following figures and descriptions of Philippine *Amphidromi*.

Plate 6, figures 26a and 26b, *Bulinus maculiferus* Sowerby from the Province of Misamis, collected by Cuming. These two figures represent 26a, *A. maculiferus maculiferus*, and 26b, *A. maculiferus cataganensis*, of the present text.

Plate 37, figure 223, represents and the text describes *Bulinus chloris* Reeve. "Eastern Island," the locality from which this specimen is said to have come, is rather vague, but later references place it in our domain.

¹ Proc. Malac. Soc., vol. 8, 1909, p. 33^f.

² Proc. Zool. Soc. London, vol. 9, 1841, pp. 14-15.

³ Conchologia Iconica, vol. 5.

Ludwig Pfeiffer, in the second volume of his *Monographia Helicorum Viventium*¹ assigns *Bulinus maculiferus* Sowerby to *Bulimus perversus* Linnaeus, as variety E, but a year later² changed his opinion and considered it a valid species. In the above work he gives a full description of this species (p. 134), and *Bulimus chloris* Reeve (p. 137), citing a variety B of the latter, and giving the Philippine Islands with Cuming as authority for the habitat of *A. chloris* Reeve.

In the part on Mollusca, of the Zoology of the Voyage of H. M. S. *Samarang*, 1850, by Arthur Adams and Lovell Reeve, the following statement is found (p. 58): "The animal of *Bulimus chloris* is of a pale brown color, always differing in this respect from that of *B. citrinus*, and of extremely vivacious habits. A bushel of them, collected on the mountains of Mindanao, soon dispersed themselves all over the cabin in which the basket was deposited. The shell was of the same elongated form and deep yellow color throughout, with no indication of bands or markings."

The same year Johan Christian Albers erected the genus *Amphidromus*³ placing in it, among others, the two species *A. maculiferus* Sowerby and *A. chloris* Reeve., heretofore referred to.

Pfeiffer, in 1853,⁴ retains *Bulimus* for the group. He redescribes (p. 319), *B. maculiferus* Reeve and adds a description of var. β , which in the present effort is referred to as *A. maculiferus gracilior* Fulton, and another form γ , which we consider synonymous with *A. maculiferus* as from Mindanao. He also relists *Bulimus chloris* Reeve as in volume 2.

In 1854 Jacques Bernard Hombron and Honore Jacquinot published the Molluscan part of the Voyage au Pole Sud et Dans L'Oceanie of the *Astrolabe* and *Veele*.⁵ On page 29 of this work *Bulimus sulphuratus* is described from Samboanga. It is figured on plate 8, figures 10-12. This has since been placed in the synonymy of *Amphidromus chloris* Reeve.

In 1855, Pfeiffer's Monograph on the genus *Bulimus* was published.⁶ In it, on pages 117-118, *Bulimus maculiferus* is described, and figured on plate 36, figures 1 and 2, and a variety β on plate 40, figure 9, which has since been described as *Amphidromus maculiferus gracilior* by Fulton.

In the same volume (p. 183), *Bulimus chloris* Reeve, is described and figured on plate 49, figures 7 and 8, and *Bulimus sulphuratus*, Hombron and Jacquinot is placed in the synonymy of it.

¹ Page 38, 1848.

² Zeltschr. f. Malak., 1849, pp. 134, 137.

³ Die Heliceen, Berlin, 1850, pp. 138-140.

⁴ Monographia Helicorum Viventium, vol. 3.

⁵ Zool., vol. 5.

⁶ Martini-Chemnitz Conchylien Cabinet, vol. 1, pt. 13, p. 1.

The same year he published his *Versucheiner Anordnung der Heliceen nach naturlichen Gruppen*.¹ In this he recognized *Amphidromus* as a subdivision of *Bulimus* (pp. 146–147), and referred the above-mentioned species to it. Here he also assigned a lot of *Helicostyla* erroneously to this group.

Henry and Arthur Adams in 1858 referred² *Bulimus chloris* Reeve, and *B. maculiferus* Sowerby, to the subgenus *Canistrum* Klein, which they considered synonymous with *Amphidromus* Albers and *Balea* of Blainville.

In the fourth volume of Pfeiffer's *Monographia Heliceorum Viventium* published in 1859, we find on pages 381 and 382 the references to *Bulimus maculiferus* Sowerby and *Bulimus chloris* Reeve, given in his third volume, and in the publications in which these species have been alluded to since that volume was issued, *Bulimus sulphuratus* is listed under *B. chloris*.

In 1867 the volume on Mollusca of Die Preussische Expedition nach Ost.-Asien, by Edward von Martens, appeared. In this³ (p. 351), *Bulimus sulphuratus* of Hombron and Jacquinot is made a subspecies of *Bulimus perversus* Linnaeus, and considered quite distinct from *Bulimus chloris* Reeve.

The sixth volume of Pfeiffer's *Monographia Heliceorum Viventium*, 1868 (pp. 25–26), cites references to the previous volume and gives the notations listed in our remarks since its publication in 1859.

Carl Semper, in his *Reisen im Archipel der Philippinen*⁴ describes the anatomic characters for the genus *Amphidromus*, giving the anatomy of *Amphidromus maculiferus* Sowerby (p. 146), and illustrating it on plate 14, fig. 1; and on pages 141–149 he cites the places in Mindanao and Bohol from which he has seen specimens. He describes three yellow shells with a single or double varix, which had been given to him and were said to have come from Cebu, but does not bestow a name upon them.

He also lists *Amphidromus chloris* Reeve (p. 148), from Zamboanga, and considers *A. sulphuratus* Hombron and Jacquinot synonymous with it.

In 1877 Pfeiffer's eighth volume of his *Monographia Heliceorum Viventium* was published, and here, as in the previous volumes, he gives the additional references which have been occasioned since the publication of volume 6, in 1868.

In the same year Joaquin G. Hidalgo published a small paper entitled *Description d'un Amphidromus et d'un Cyclophorus nou-*

¹ Malak Blat., vol. 2, 1855.

² Genera of Recent Mollusca, vol. 2, p. 143.

³ Zoologischer Theil, vol. 2.

⁴ Zweiter Theil, Wiss. Res., vol. 3, 1873.

veaux provenant les isles Philippines.¹ In this, *Amphidromus quadrasi* is described and figured (pl. 2, fig. 2), from Caramandanes Island.

The following year the same author reached the present genus in his series of papers entitled Recherches conchyliologiques de M. Quadras aux iles Philippines.² He discusses these Philippine forms (pp. 31-34).

He figures (pl. 6, fig. 1) the variety of *Amphidromus maculiferus* which is now named *A. philippinensis*. He assigns the yellow and pale form of what was later described as *A. entobaptus* Dohrn to *Amphidromus perversus* Linnaeus and refers at length to *A. chloris* and corrects the locality name given in the previous volume for *Amphidromus quadrasi* from Caramandanes to Candaramanes Island, a member of the Balabac group.

He also lists *Amphidromus contrarius* Muller from Balabac and Luzon. The second citation is undoubtedly due to a market specimen, as *Amphidromus* does not occur on Luzon, and the first may also be a market shell or else a form of the *A. quadrasi* group. *A. contrarius* Muller belongs to Timor.

In 1889 Dr. Heinrich Dohrn's Beitrag zur Conchylienfauna der Philippinischen Insel Palawan appeared.³ In this the yellow *Amphidromus* from the region of Puerto Princesa is described as *Amphidromus entobaptus*. The next year the first part of Joaquin Gonzalez Hidalgo's Obros Malacologicos⁴ appeared. On pages 17-18 the description of *A. quadrasi* Hidalgo is published.

In 1893 Edgar A. Smith published his report On a Small Collection of Land Shells from Palawan and Balabac, Philippine Islands.⁵

Here four figures (10-13, pl. 18) are given of *Amphidromus quadrasi* and forms a-f, described from a series of a hundred specimens from Balabac. The same year Otto Franz von Möllendorff's Materialien zur Fauna der Philippinen XI Die Insel Leyte appeared.⁶ In this *Amphidromus maculiferus multicolor* is described from Leyte and Camotes.

The following year Edgar Albert Smith published his report On the Land Shells of the Zulu Archipelago.⁷ In this (p. 55) he describes and figures (pl. 4, figs. 9, 9a) a variety of *Amphidromus maculiferus* from Bilitan Island, which is now named *A. philippinensis* Fulton.

¹ Journ. d. Conch. Paris, vol. 35, 1887, pp. 36-37.

² Idem, vol. 36, 1888.

³ Nachr. Deut. Malak. Ges., vol. 20, pp. 53-63.

⁴ Mem. Real Acad. Clen., Madrid, vol. 14.

⁵ Ann. Mag. Nat. Hist. London, ser. 6, vol. 11, 1893, pp. 347-353.

⁶ Bericht, Senck. Natuz. Ges. Frankfurt am Main, 1893.

⁷ Ann. Mag. Nat. Hist., ser. 6, vol. 13, 1894.

The same year Zur Mollusken Fauna der Sulu Inseln, by Otto Franz von Möllendorff, was published.¹ On pages 210 and 211 *Amphidromus roeseleri* is described from Sulu Island, and the variety of *A. maculiferus* mentioned, described, and figured by Smith from Bilitan Island, mentioned in the last reference, is described on page 211.

A year later Edgar Albert Smith's paper On a Collection of Land Shells from Sarawak, British North Borneo, Palawan, and other Neighboring Islands² appeared. In this he lists *Amphidromus quadrasi* Hidalgo (on pp. 98-99) from Candaraman, and *A. entobaptus* Dohrn (on p. 99) from Palawan.

In 1896 the genus *Amphidromus* was subjected to a critical revision by Hugh Fulton in A List of the Species of Amphidromus Albers, with Critical Notes and Descriptions of some Hitherto Undescribed Species and Varieties.³ In this (p. 67) he refers *Amphidromus chloris* Reeve to *A. perversus* Linnaeus or a subspecies, and *A. entobaptus* Dohrn is also considered a subspecies of *A. perversus* Linnaeus. *Amphidromus maculiferus* and varieties *gracilior* Fulton, *strigata* v. Möllendorff, and *obscura* Fulton are described from Mindanao; while variety *inflata* Fulton is referred to Philippine Islands without specific locality. Variety *multicolor* Möllendorff is listed from the island of Leyte (pp. 74 and 75), and *Amphidromus roeseleri* Möllendorff described (p. 75) from Bilitan Island.

Amphidromus quadrasi Hidalgo is reported from Balabac Island (p. 85), and *A. q.*, variety *solida* Fulton, is described (p. 86) and figured (pl. 5, fig. 16).

Amphidromus versicolor Fulton, described (p. 86), embraces part of the complex referred to by Smith⁴ as varieties of *A. quadrasi*. *Amphidromus dubius* Fulton is diagnosed (pp. 86 and 87) and figured (pl. 6, figs. 1, 1a) and comes from Balabac Island, while *Amphidromus everetti* Fulton, also a member of the *A. quadrasi* complex described as a variety of that species by Smith⁵ as coming from Palawan, is given specific rank on page 87.

In the same year R. P. Fr. Casto de Elera published the third volume of his Catalogo Sistemático de toda la Fauna de Filipinas. On pages 617 and 618 he lists *A. chloris* Reeve from Mindanao, Basilan, and Mindoro; *A. maculiferus* Sowerby from Bohol, Camotes, Leyte, Maasin, Bato, and Mindanao, and *Amphidromus* variety *multicolor* Möllendorff from Leyte, Maasin, Bato, and Camotes.

To *Amphidromus contrarius* Muller the rather large range of Luzon, Balabac, and Timor is assigned.

¹ Nachr. Deut. Malak. Ges., vol. 26, pp. 205-215.

² Proc. Zool. Soc. London for 1895.

³ Ann. Mag. Nat. Hist., ser. 6, vol. 17.

⁴ Idem, vol. 11, 1893, p. 351, pl. 18, figs. 11-13.

⁵ Idem, p. 350, pl. 18, fig. 12.

A. entobaptus is reported from Porto Princesa, Paragua (=Palawan); *A. perversus* Linnaeus variety from Busuanga, Mindanao, and Zamboanga, and *A. quadrasi* Hidalgo from Candaramanes.

A. cosmandanus Crosse is erroneously listed (p. 618) as *Amphidromus*. This, we learn later from Pilsbry,¹ is *Helicostyla crossmaniana* Crosse.

Joaquin Gonzales Hidalgo, in his beautiful Atlas Obras Malacológicas¹ reached Amphidromus in 1898. He devoted three plates to the Philippine forms, 99-101. On plate 99, figures 1 and 2 represent a large inflated yellow shell with a whitish band at the summit of its whorls, and a dark varix on the last turn, which is listed under the designation of *A. maculiferus* Sowerby var. This we learn from correspondence with Señor Hidalgo, comes from Dapitan, Mindanao. It is our *Amphidromus hidalgoi*. Figures 3 and 4 represent *A. chloris* Reeve, and 5-8, *A. entobaptus* Dohrn.

Plate 100 has 6 figures showing races of *A. maculiferus* Sowerby. Of these, figures 1, 4, 5, and 6 represent my *Amphidromus maculiferus cotabatoensis*, and figures 2 and 3 appear referable to my *Amphidromus maculiferus cataganensis*.

Plate 101, figures 1-4, are said to represent *A. nigrofilosus* Rochebrune. They are in reality *A. maculiferus gracilior* Fulton. Figures 5 and 6 illustrate *A. quadasi* Hidalgo and 7 and 8 *A. dubius* Fulton.

In his Verzeichniss der auf Philippinen Lebenden Landmollusken,² Dr. Otto von Möllendorff lists on pages 148-150 the following: *A. entobaptus* Dohrn, from Paragua, with subspecies *gracilis* Möllendorff from Linapakan and Busuanga, and subspecies *contracta* Möllendorff from Koron and Kalamianes. These two names are *nomena nuda* and have no status. *Amphidromus chloris* Reeve is listed from Mindanao (Samboanga), *A. maculiferus* Sowerby from western Mindanao. Of this he lists subspecies *strigata* Möllendorff (= "*Amph. mac. var. gracilior et strigata*, Fulton") from eastern Mindanao and Bohol. Subspecies *multicolor* Möllendorff, from Leyte and Camotes; subspecies *obscurus* Fulton from Mindanao and subspecies *inflatus* Fulton.

Amphidromus quadrasi Hidalgo is credited to Balabac and subspecies *solidus* Fulton to Paragua. *A. versicolor* Fulton and *A. dubius* Fulton are both listed from Balabac, and *A. everetti* Fulton from Paragua.

The last to give these shells consideration was Dr. Henry A. Pilsbry, who monographed the genus in 1900.³ In this he recognizes

¹ Mem. de la Real Acad. de Sel. Madrid, 1890-1904.

² Abhand. Naturf. Ges. Gortitz, vol. 22, 1898.

³ Man. Conch., vol. 13, pp. 127-234.

(pp. 130–133) *Amphidromus maculiferus* Sowerby with variety *obscurus* Fulton; subspecies *multicolor* Möllendorff; subspecies *gracilior* Fulton; variety *strigata* Möllendorff; subspecies *inflatus* Fulton, *Amphidromus chloris* Reeve (pp. 143–144) with variety *pallidulus* Pilsbry from Zamboanga and varieties *purissimus* Pilsbry and *rosa* Pilsbry from Basilan Island.

A. roeseleri Möllendorff is listed on pages 144–145—*A. entobaptus* Dohrn on pages 145–147. *A. lindstedti* Pfeiffer is referred to as coming from Balabac according to Fulton (pp. 228–229). As we have said before, the Balabac specimens cited probably refer to some of the forms of *A. quadrasi* Hidalgo. *A. lindstedti* Pfeiffer comes from Malacca.

Amphidromus quadrasi Hidalgo is treated (pp. 229–230) and *solidus*, *versicolor*, *dubius*, and *everetti* of Fulton are recognized.

GEOGRAPHIC DISTRIBUTION.

The genus *Amphidromus* presents some very fascinating zoogeographic problems in the Philippine Islands, and, when fully studied, will undoubtedly throw considerable light on the derivation and dispersal of the Philippine land shells. At present the available information is fragmentary, and more material with specific locality notes is badly needed.

There are several distinct groups which show a northward migration from Borneo into the Philippine Archipelago. One of these is the group of *Amphidromus quadrasi*, which has undoubtedly come from some Bornean stock and is extending its range northward into Palawan. At the present time it is distributed over Balabac and the adjacent islands.

Then there is the group of *Amphidromus entobaptus*, which extends over Palawan and the Calamianes group, apparently splitting up into races in the islands of the latter group, and a generic label "Calamianes," which was applied by the older collectors to material from this group, is absolutely insufficient to enable one to understand the complex or the conditions and causes for the variations presented by a mixture of forms assembled from the various places within the group. This is well shown by the specimens which we have had for examination which have enabled us to recognize a number of races, each practically confined to a separate island. The northernmost extension of the yellow *Amphidromus* is found in Mindoro in the large inflated species now described as *A. mindoroensis*.

No *Amphidromus* has been reported from Luzon (the term "Manila" seen at times on old labels simply means that they were purchased in the Manila markets and not that they occur at or about Manila), nor do any *Amphidromi* occur on any of the smaller

islands, as far as known, intervening between Mindoro and Luzon or Panay.

The group of *A. chloris*, embracing *roeseleri* and *suluensis*, extends over the Sulu Archipelago and Zamboanga, Mindanao, and it appears as if it had been derived from Borneo and had reached Mindanao through the chain of islands which extend from Borneo to Mindanao, through Tawi Tawi, Jolo, etc.

Amphidromus inflatus, *pallidulus*, *meurnsi*, and *calista* are yellow forms which, though the last is at times variously marked with red, combine the yellow coloration of the *chloris* group with the black flations of *maculiferus*.

By far the most satisfactory lot of material which we have had for our study belongs to the group of *Amphidromus maculiferus*, which divides up into a series of geographic races, beautifully accounted for by the separate habitats which they occupy. A full discussion of this group will be found preceding the description of this species and its races.

I wish to acknowledge my deep appreciation of the courtesies extended to me by the authorities of the United States Bureau of Fisheries and the United States National Museum, in assigning the collection of mollusks made by the Fisheries steamer *Albatross* in the Philippines, to me for report. Also to the Philippine Bureau of Sciences for material sent for report, and to Dr. H. A. Pilsbry, of the Philadelphia Academy of Natural Sciences, for the loan of the Philippine *Amphidromi* in the collection of the academy, and to Dr. Frank C. Baker, of the Chicago Academy of Sciences, and Walter F. Webb, of Rochester, New York, for similar reasons. I wish also to express my sincere thanks to Dr. William H. Dall, honorary curator of the Section of Mollusks, United States National Museum, for his counsel and many suggestions.

The photographs used in the illustrations were made by the Division of Photography, United States National Museum, and were retouched by Mrs. E. B. Decker.

GROUP OF AMPHIDROMUS MACULIFERUS.

The group of *Amphidromus maculiferus* extends over the southeastern islands of the archipelago, its chief center being Mindanao. When one looks at a topographic or relief map of the Philippine Islands, particularly Mindanao, one sees that this island is composed of a series of smaller islands which have been fused into the large territory by a comparatively moderate raising of that part of the ocean floor, and the *Amphidromi* reflect this state of affairs beautifully.

Amphidromus maculiferus Sowerby ss. was described from material collected by Hugh Cuming in Misamis Province, Mindanao,

and is undoubtedly a coastal race. The material before us agrees well with Sowerby's figure, which represents an elongate-ovate, spotted form without varices.

On the slopes of Mount Malindang another form occurs, which is decidedly shorter, more chubby, more brightly colored, with a few faint indications of varices. To this race I have given the subspecific name *cataganensis*.

In the Cotabato region, or, in other words, the lower Rio Grande Valley, we find another race which is profusely spotted and provided with very strong, dark, varicial bands. To this race I have applied the name *cotabatensis*.

In the upper regions of the Rio Grande, about Lake Buluan, we find another race, which lacks the spotting altogether, but has strong, brown varices, which I have called *buluanensis*.

On the southeast coast of Mindanao, along the shores of the Gulf of Davao, another race occurs, which is very elongate-ovate, has alternating pale-brown and hydrophanous axial bands and a general rosy suffusion on the surface. This is von Möllendorff's *strigatus*.

On northeastern Mindanao still another race is found, which is nearest allied to *strigatus*, but is always pale, lacking the rosy suffusion and also the dark varicial bands. This is *gracilior* Fulton.

North of Mindanao, the islands of Bohol, Leyte, and Samar each contain a race of *maculiferus*. That in Bohol is smaller than *strigatus* and *gracilior*, and is provided with alternating bands of pale brown and dingy white. This I shall term *boholensis*. On the island of Leyte we have the race named *multicolor* by von Möllendorff. It is an exceedingly dark-colored race, by far the most marked of all the forms so far mentioned. The race living on the island of Samar is more nearly related to that of Bohol than to that of Leyte. It is of darker color and stouter form than the Bohol race, and may be known as *samarensis* Bartsch.

South of Mindanao we have the race now described as *cosmius* Bartsch, occurring on Basilan Island. This race is the smallest of the entire group. It has the general form and markings of *gracilior* Fulton, but differs from it by its diminutive size and a much lesser number of hydrophanous bands and in being suffused with faint yellow.

An additional race from the island of Cebu is indicated by Semper, who is quoted on page 18.

As derived from the group of *maculiferus* may be considered the mountain species occurring on Mount Malindang and Mount Apo in Mindanao. Both of these forms have the dark filations on the early whorls, which indicate relationship to *maculiferus*, but the rest of the characters are sufficient in my estimation to entitle them to full specific rank, and so I have called them *malindangensis* and

apocensis. These two forms have developed along parallel lines, but are quite distinct.

The little race of *Amphidromus* occurring on the island of Basilan, which I have called *basilanensis*, is related to these last two forms, as is the shell from Lampinigan Island, which is too poor to serve for diagnosis.

There remains but one shell of the group of *maculiferus* which is to be considered in this monograph and that is *Amphidromus floresi*. This form has indications of the black filiations on the early whorls which would ally it to *maculiferus*, but it differs markedly in form from any of these and also in its sculpture, the surface being ornamented with numerous, slender, thread-like riblets. This shell comes from southeastern Mindanao.

DESCRIPTIONS OF SPECIES.

AMPHIDROMUS MACULIFERUS MACULIFERUS Sowerby.

Plate 2, figs. 1-5.

- Bulinus maculiferus* SOWERBY, Conch. Ill., 1838, pl. 145, fig. 100.
Bulinus maculiferus BRODERIP, Proc. Zool. Soc. London, vol. 9, 1841, pp. 14-15.
Bulinus maculiferus REEVE, Conch. Icon., vol. 5, 1848, pl. 6, fig. 26a.
Bulinus perversus LINNAEUS, var. *B.* PFEIFFER, Mon. Hel. Viv., vol. 2, 1848, p. 38.
Bulinus maculiferus PFEIFFER, Zeitschr. f. Malak., 1849, p. 134.
Amphidromus maculiferus ALBERS, Heliceen, 1850, pp. 138-140.
Bulinus maculiferus PFEIFFER, Mon. Hel. Viv., vol. 3, 1853, p. 319.
Bulinus maculiferus, var. PFEIFFER, Mon. Hel. Viv., vol. 3, 1853, p. 319.
Bulinus maculiferus PFEIFFER, Mart. Chem. Conch. Cab., vol. 1, pt. 13, 1855, pp. 117-118, pl. 36, figs. 1-2.
Bulinus (Amphidromus) maculiferus PFEIFFER, Malak. Blät., 1855, vol. 2, p. 147.
Bulinus (Canistrum) maculiferus H. and A. ADAMS, Gen. Rec. Moll., 1858, p. 143.
Bulinus maculiferus PFEIFFER, Mon. Hel. Viv., vol. 4, 1859, p. 381.
Bulinus maculiferus PFEIFFER, Mon. Hel. Viv., vol. 6, 1868, p. 25.
Amphidromus maculiferus SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 146, pl. 14, fig. 18.
Bulinus maculiferus PFEIFFER, Mon. Hel. Viv., vol. 8, 1877, p. 39.
Amphidromus maculiferus HIDALGO, Journ. de Conch., vol. 36, 1888, p. 31.
Amphidromus maculiferus ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.
Amphidromus maculiferus obscura FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 75.
Amphidromus maculiferus VON MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, 1898, p. 149.
Amphidromus maculiferus obscura VON MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, 1898, p. 149.
Amphidromus maculiferus PILSBRY, Man. Conch., vol. 13, 1900, pp. 130-131, pl. 49, figs. 19-21.
Amphidromus maculiferus obscura PILSBRY, Man. Conch., vol. 13, 1900, p. 131.

Shell elongate-ovate, whorls moderately rounded, marked by incremental lines only. The first three whorls have a narrow, black band appearing above the suture, while the rest is white. The remaining turns are yellowish white, profusely spotted with irregularly shaped blotches of chestnut brown, which are bordered by a lighter area and usually preceded by a white area. There are no strongly developed varicial streaks; if shown at all they are indicated as mere faint lines.

The type of *A. maculiferus* was collected by Hugh Cuming in Misamis Province, Mindanao. The material which I have examined comes from the same region. The following table gives additional data as to number of whorls and measurements:

Cat. No. U.S.N.M.	Num- ber of whorls.	Length in mm.	Diam- eter in mm.	Locality.	Collector.
244668	7	70	32.7	Camp Overton, Mindanao.....	E. A. Mearns.
244668	6	59	32.7	.....do.....	Do.
244669	7	66.5	31.6	.....do.....	J. Clemens.
244670	6	60.5	32.8	Camp Pantar, Angus. R. 4 miles from Lake Lanao, Mindanao.	E. A. Mearns.
244671	-----	-----	-----	Tangob, Misamis, Mindanao; a young individual.	
99567	6	62.3	32.2	P. I., without specific locality.....	

AMPHIDROMUS MACULIFERUS CATAGANENSIS, new subspecies.

Plate 3, figs. 1-5.

Bulimus maculiferus REEVE, Conch. Icon., vol. 5, 1848, pl. 6, fig. 26b.

Amphidromus maculiferus HIDALGO, Mem. Real Acad. Sci. Madrid, 1896, pl. 100, figs. 2-3.

Shell ovate, dextral, or sinistral. Whorls well rounded, appressed at the summit and marked by lines of growth only. Sutures strongly constricted. Aperture moderately large; outer lip expanded and reflected; inner lip almost vertical, slightly twisted and reflected over the narrow umbilicus; parietal wall covered with a moderately thick callus. The first two volutions are bordered with a narrow black band at the suture, the rest being white; the next two are yellowish white, while the succeeding may have the same ground color or they may be suffused with a rosy blush and are marked by irregular, wavy, somewhat protractive, brown axial bands and a few irregularly placed, scattered spots of brown which are usually preceded by a lighter area.

The type and two specimens of this species were collected by Lieut. Col. Edgar A. Mearns at Catagan, Mindanao, on the Mount Mal-

indang Expedition, at 1,100 feet altitude. The type, Cat. No. 244672, U.S.N.M., has six whorls and measures—length, 52 mm.; diameter, 31 mm. The following additional specimens have been examined:

Cat. No., U.S.N.M.	Num- ber of whorls.	Length in mm.	Dia-me- ter in mm.	Locality.	Collector.
244672 ¹	6	52	31	Catagan, Mindanao, 1100 feet.....	E. A. Mearns.
244672	6	56	31.2	.....do.....	Do.
244672	6.2	56.6	30	.....do.....	Do.
244673	6.2	55.5	29	Mount Malindang, 3500 to 9200 feet (fragment).	Do.
244274	.....	.....	29	.....do.....	Do.

¹Type.

AMPHIDROMUS MACULIFERUS COTABATENSIS, new subspecies.

Plate 1, fig. 1; plate 4, figs. 1-8.

Amphidromus maculiferus FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, p. 74, 1896.

Amphidromus maculiferus HIDALGO, Mem. Real Acad. Sci., Madrid, pl. 100, figs. 1, 4, 5, 6, 1898.

Shell elongate-ovate with the whorls well rounded, appressed at the summit, with the sutures moderately constricted; lip normal. First two whorls white, excepting a narrow, black band immediately above the suture. The succeeding two are dingy white, and the remainder yellowish white, in places suffused with pale brown. The first one succeeding the dingy white turns bears a number of zigzag, axial bands of brown with a few spots of the same color, while the rest are marked with numerous, more or less elongate dots of brown, which are preceded by a whitish area. In addition to the above, the whorls are also crossed by a number of strong, dark brown varices.

The type (Cat. No. 244676 U.S.N.M.) comes from Cotabato, Mindanao. It has 6.2 whorls and measures—length 57 mm.; diameter 31.5 mm. The following specimens have been examined:

Cat. No. U.S.N.M.	Num- ber whorls.	Length in mm.	Diame- ter in mm.	Locality.	Collector.
244676 ¹	6.2	57	31.5	Cotabato, Mindanao	E. A. Mearns.
244676	6.3	60.5	32.1	.....do.....	Do.
244676	6.5	59.5	31	.....do.....	Do.
244676	6.7	61	31	.....do.....	Do.
244676	.....	.....	.....	Cotabato, Mindanao, one young specimen.	Do.
244677	6.6	60.3	30.3	Cotabato, Mindanao, five ad- ditional young specimens.	Do.
184564	6.5	57.4	30	Cotabato, Mindanao	von Möllendorff.
244678	6.5	61.7	33	.....do.....	E. A. Mearns.
244678 ²	6.7	57.6	30.5	.....do.....	Do.
244679	6.6	54	31	Libungan River and La'bas River, Rio Grande Valley, Mindanao.	Do.
244679	.....	.....	33.6	Libungan River and La'bas River, Rio Grande Valley, Mindanao, young individ- ual, dextral.	Do.
105023	.....	.....	33.5	Loc.?	
215578	7.2	66.5	35.4	Kidapawan, Cotabato.....	Webb.
302840	6.3	58.2	32.8	Kidapawan, Cotabato, Min- danao.	Henderson.

¹ Type.² Dextral.**AMPHIDROMUS MACULIFERUS BULUANENSIS, new subspecies.**

Plate 5, figs. 1-6.

Shell elongate-conic, with the whorls moderately rounded and appressed at the summit and the sutures moderately constricted, the first two whorls bearing the dark filiation in the suture, the succeeding ones pale brown with an occasional retractive streak of light brown or dingy white. These varicial streaks become much intensified on the last two volutions. The spotting is entirely absent. Aperture normal.

The type (Cat. No. 244688, U.S.N.M.) was collected with two other specimens on the trail between Simpitan and Buluan, Mindanao, by Lieut. Col. Edgar A. Mearns. The type has seven whorls and measures—length, 66.2 mm.; diameter, 33.4 mm. Some of the specimens have the whorls a yellowish white instead of light brown. These are dead specimens and have probably been bleached. The following material has been examined:

Cat. No. U.S.N.M.	Num- ber whorls.	Length in mm.	Diam- eter in mm.	Locality.	Collector.
244680	7.2	65.5	32.7	Trail from Simpitan to Buluan, Mindanao.	E. A. Mearns.
244680	7.1	64	32.8	.....do.....	Do.
244680	7	59.8	30.3	.....do.....	Do.
244680	.....	.....	.....	Trail from Simpitan to Buluan, Mindanao, young individual.	Do.
244683	7	65	34	Trail from Simpitan to Buluan, Mindanao.	Do.
244683	7	60.7	32.3	.....do.....	Do.
244683	7	59.7	29.5	.....do.....	Do.
244683	.....	.....	.....	Trail from Simpitan to Buluan, Mindanao, young.	Do.
244686	7	63.5	34	Trail from Simpitan to Buluan, Mindanao.	Do.
244686	6.8	59	32	.....do.....	Do.
244686	7	58	29.4	.....do.....	Do.
244686	.....	.....	.....	Trail from Simpitan to Buluan, Mindanao, two young.	Do.
244688 ¹	7	66.2	33.4	Trail from Simpitan to Buluan, Mindanao.	Do.
244688	7	58.6	30.8	.....do.....	Do.
244688	6.5	56.6	30	.....do.....	Do.
244687	6.5	59.5	33	Lake Buluan, Mindanao.....	Do.
105023a	.....	.....	.....	Young individual without locality..	Do.
244685	6.5	60	33.2	Buluan, Mindanao.....	Do.
244685	7	62.6	31.5	.....do.....	Do.
244685	7	64.9	31.7	.....do.....	Do.
244685	7	65.3	32.5	.....do.....	Do.
244682	7	62.5	33	.....do.....	Do.
244682	6.5	60	30.5	.....do.....	Do.
244682	6	63.5	32.2	.....do.....	Do.
244682	.....	.....	33	Buluan, Mindanao, fragment.....	Do.
244684	7	60.2	31.2	Buluan, Mindanao.....	Do.
244684	.....	.....	.....	Buluan, Mindanao, one young in- dividual.	Do.

¹ Type.**AMPHIDROMUS MACULIFERUS STRIGATUS (von Möllendorff) Fulton.**

Plate 6, figs. 1-5.

- Amphidromus maculiferus* HIDALGO, Journ. de Conch., vol. 36, 1888, p. 31.
Amphidromus maculiferus, var. *strigata* FULTON, Ann. Mag. Nat. Hist.,
 ser. 6, vol. 17, 1896, p. 75.
Amphidromus maculiferus ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.
Amphidromus maculiferus strigatus (von Möllendorff) FULTON, Ann. Mag.
 Nat. Hist., ser. 6, vol. 17, 1896, p. 75.
Amphidromus maculiferus strigatus VON MÖLLENDORFF, Abhand. Naturf.
 Ges. Görlitz, vol. 22, 1898, p. 149.
Amphidromus maculiferus gracilior PILSBRY, Man. Conch., vol. 13, 1900,
 p. 132.
Amphidromus maculiferus gracilior, var. *strigata* PILSBRY, Man. Conch., vol.
 13, 1900, p. 132.

Shell very elongate-ovate. The first two whorls have the narrow dark band in the suture, the rest are white. The succeeding turns are flesh colored, with very retractively slanting dark brown varices and similarly disposed light hydrophanous bands. Some scattered, elongate dots are also present. Aperture normal.

This race is said by von Möllendorff to occur in Eastern Mindanao. Six specimens from the von Möllendorff collection, from Davao, Mindanao, are in the United States National Museum. The following material has been examined:

Cat. No.	Collection.	Number whorls.	Length in mm.	Diameter in mm.	Locality.	Collector.
184565	U.S.N.M.....	6.5	67.5	33.5	Davao, Mindanao..	von Möllendorff.
184565	.....do.....	7	67.5	32.3	.....do.....	Do.
195849	.....do.....	7.1	70.5	32.4	.....do.....	Do.
195849	.....do.....	7	67.3	31.4	.....do.....	Do.
195849	.....do.....	7	69.7	34.5	.....do.....	Do.
195849	.....do.....	6.5	60	32.3	.....do.....	Do.
	Webb.....	7	66	30.2	.....do.....	Quadras.

AMPHIDROMUS MACULIFERUS GRACILIOR Fulton.

Plate 7, figs. 5-6.

Bulimus maculiferus, var. β PFEIFFER, Mon. Hel. Viv., vol. 3, 1853, p. 319.

Bulimus maculiferus, var. β PFEIFFER, Mart. Chem. Conch. Cab., vol. 1, 1855, pl. 40, fig. 9.

Amphidromus maculiferus, var. β SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 149.

Amphidromus maculiferus, var. *gracilior* FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 74.

Amphidromus maculiferus ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.

Amphidromus nigroflorus HIDALGO, Mem. Real Acad. Sci. Madrid, 1898, pl. 100, figs. 1-4.

Amphidromus maculiferus gracilior PILSBRY, Man. Conch., vol. 13, 1900, p. 132.

Shell very elongate-ovate; the first two whorls have a very broad, black band which frequently covers half of the turns, the rest of the early whorls being white. The whorls succeeding are yellowish white with numerous, retractively slanting hydrophanous bands, which are of irregular width and distribution. There are no dark varices. The whorls are rather high between the sutures, strongly appressed at the summit, and well rounded. The aperture is normal. The following material has been examined.

Cat. No.	Collection.	Number whorls.	Length in mm.	Diameter in mm.	Locality.	Collector.
184566	U. S. N. M. Chicago Acad. Sci.....	7.3	72	32.8	Mindanao.....	von Möllendorff.
	Webb.....	7	69.2	33	Mainit, Mindanao..	Quadras.
	.....do.....	6.5	58.7	28.6	.....do.....	Do.
	.....do.....	6.5	64.5	29.5	.....do.....	Do.
	.....do.....	6.8	60	28.5	.....do.....	Do.

AMPHIDROMUS MACULIFERUS BOHOLENSIS, new subspecies.

Plate 1, fig. 2; plate 7, figs. 1-3.

Bulinus maculiferus, var. C. BRODERIP, Proc. Zool. Soc. London, vol. 9, 1841, pp. 14-15.

Amphidromus maculiferus SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 149.

Amphidromus maculiferus ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.

Shell elongate-ovate. Whorls moderately well rounded and appressed at the summit; sutures moderately constricted; aperture normal. The first two turns show a faint, black band in the suture, the rest being white. The succeeding turns are marked by alternate re-tractively slanting bands of pale brown and dingy white, the latter usually a little broader than the brown areas. There are no distinct dark varices.

The type and nine specimens of this species were collected by A. Celestino, at Sevilla, Bohol. The type (Cat. No. 245563, U.S.N.M.) has six and a half whorls and measures—length, 57 mm.; diameter, 27.5 mm. The following specimens have been examined:

Cat. No.	Collection.	Number whorls.	Length in mm.	Diameter in mm.	Locality.	Collector.
245563 ¹	U. S. N. M.....	6.5	57	27.5	Sevilla, Bohol.....	A. Celestino.
245563	.....do.....	6.5	57.5	28	.....do.....	Do.
245563	.....do.....	6.3	56.5	28.4	.....do.....	Do.
245563	.....do.....	6.1	51.3	27	.....do.....	Do.
215577	.....do.....	6.5	58.5	30.2	Belar.....	Webb.
	Phil. Bur. Sci.	6.5	55.5	28	Sevilla.....	A. Celestino.
	.....do.....	6.5	59.5	29.2	.....do.....	Do.
	.....do.....	6.1	55.3	28.6	.....do.....	Do.
	.....do.....	6.3	60.5	30.5	.....do.....	Do.
	.....do.....				Sevilla, Young.....	Do.
	Chicago Acad. Sci.	6.5	55	26.5	Bohol.....	Quadras.
	Webb.....	6.5	62.2	30	.....do.....	Do.
	.....do.....	6.3	55.4	28.5	Belar, Bohol.....	Webb.

¹Type.

AMPHIDROMUS MACULIFERUS MULTICOLOR von Möllendorff.

Plate 8, figs. 1, 2, 4, 5.

Amphidromus maculiferus SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 149.
1893, p. 99.

Amphidromus maculiferus, var. *multicolor* FULTON, Ann. Mag. Nat. Hist.,
ser. 6, vol. 17, 1896, p. 74.

Amphidromus maculiferus ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.

Amphidromus maculiferus multicolor VON MÖLLENDORFF, Abhand. Naturf.
Ges. Görlitz, vol. 22, 1898, p. 149.

Amphidromus maculiferus multicolor PILSBRY, Man. Conch., vol. 13, 1900,
pp. 131-132.

Shell elongate-ovate; the first two whorls with the usual narrow black band at the suture, the rest with alternating, retractive bands of yellowish white and brown, the brown bands on the last whorl following a somewhat zigzag course and being more closely spaced on the last turn than on those preceding. The white bands between the darker appear as if superimposed upon a dark ground. The inside of the lip is of a purplish blue color, while the peristome is white. The shell in its entirety is much darker than any of the other races of *A. maculiferus*. One of the specimens in the Webb collection has a tendency toward spiral lines of brown on the last volution. We have seen the following specimens:

Cat. No.	Collection.	Number whorls.	Length in mm.	Diameter in mm.	Locality.	Collector.
184562	U. S. N. M. Chicago	6.4	56.5	26	Leyte	von Möllendorff.
	Acad. Sci.....	6.2	60	29	Matalon, Leyte..	Quadras.
	.....do.....	6.3	59.5	29.9	Sitio Busay, Mas- sin, Leyte	Do.
	Webb.....	6.5	58.5	28.5	Sitio, Jonas, Bato, Leyte.	Do.

AMPHIDROMUS MACULIFERUS SAMARENSIS, new subspecies.

Plate 7, fig. 4.

Shell very similar in outline to *boholensis*, but stouter, with the brown bands much darker. The narrow black band on the first two whorls is very faint. The lines of growth are also a little stronger in this than in *boholensis*. The type (Cat. No. 215579, U.S.N.M.) was collected by Quadras on the island of Samar. It has 6.5 whorls and measures—length, 56.4 mm.; diameter, 29 mm.—and was presented to the Museum by Mr. Webb.

AMPHIDROMUS MACULIFERUS, subspecies?

Semper, in his *Reisen im Archipel der Philippinen* (vol. 3, p. 149), 1873, writes:

Finally, I have in my possession three examples of a form which were presented to me in Cebu, of which the specific locality in which they were found was unknown. The shell is much more inflated than in the named varieties of *maculiferus*, of a beautiful yellow color, with a simple or double brown varix. The apex is edged with black, and in two of the examples a few brown spots are present under the suture. The dimensions of the two extreme forms are:

Long. 57, diam. maj. 35, min. 28; apert. alt. 29, lat. 15 mm.

Long. 64, diam. maj. 31, min. 26; apert. alt. 30, lat. 14 mm.

This probably is nearest related to *Amphidromus palaceus* var. *sulfureus*, but I dare not take the responsibility for deciding whether that should be placed here or not. I am equally reluctant to describe it as a new species, since I do not consider that I have sufficient material.

I have not seen specimens from the island of Cebu, and therefore simply call attention to the fact that these three specimens which Semper had seen may have come from that island; and if so, it is quite likely that they represent something different from any of the forms that are mentioned in this paper.

AMPHIDROMUS MACULIFERUS, subspecies?

From Lampinigan Island I have a shell which is badly worn, Cat. No. 244692, U.S.N.M., collected by Lieut. Col. Edgar A. Mearns, which differs from any of the described forms. There are traces of brown markings on the badly worn white surface which indicate that it probably belongs near *A. basilanensis*.

AMPHIDROMUS MACULIFERUS COSMIUS, new subspecies.

Plate 9, fig. 4.

Shell elongate-ovate, very thin, yellowish white, with the whorls moderately rounded and the summit of the whorls appressed. The first two whorls show the narrow, faint dark band immediately above the suture. The succeeding turns are marked by irregularly disposed, hydrophanous axial bands of variable width, which are most pronounced on the third and fourth turns. The last whorl is marked by weak axial threads, the remainder being marked by mere incremental lines. Aperture oval; outer lip somewhat expanded and reflected, thin and white at the edge; inner lip short, somewhat twisted, broadened at the base, and reflected partly over the narrow umbilicus; parietal wall covered by a thin callus, which is of pale rust color.

The type (Cat. No. 245562, U.S.N.M.) was collected by Lieut. Col. Edgar A. Mearns on Basilan Island. It has 6.2 whorls and measures—length, 52 mm.; diameter, 25.5 mm.

This shell somewhat resembles *Amphidromus maculiferus gracilior* Fulton, but the hydrophanous markings are considerably less strong in the present form, and it is much smaller and has a faint yellowish suffusion.

AMPHIDROMUS MALINDANGENSIS, new species.

Plate 9, figs. 1, 2.

Shell of medium size, elongate-ovate, dextral or sinistral, yellow with bands of brown. The suture of the first two whorls is bordered by a narrow black zone. The brown markings consist of rather irregularly placed longitudinal bands which extend only over the anterior two-thirds of the whorls between the sutures on the first two and a half whorls. These bands are of quite regular widths and about half as wide as the spaces that separate them. On the last turn the brown bands are irregular in width and assume a decidedly zigzag form, but not a regular definite pattern. They extend over the base to the umbilical area. The whorls are evenly rounded, separated by a moderately constricted suture, and are marked by exceedingly fine lines of growth. Aperture moderately large; outer lip thickened and reflected; inner lip somewhat curved, strong, and slightly twisted, reflected over the narrow umbilicus; parietal wall covered with a moderately thick callus; inside of shell, lip and callus white.

Two specimens of this species are before us, Cat. No. 244689, U.S.N.M. They were collected by Lieut. Col. Edgar A. Mearns at Mount Malindang, Mindanao, at an altitude of between 3,500 and 9,200 feet. Both have six whorls, the sinistral specimen, the type, measures—length, 48.5 mm.; greater diameter, 25 mm. The dextral—length, 46.8 mm.; greater diameter, 27.5 mm.

AMPHIDROMUS APOENSIS, new species.

Plate 9, figs. 5, 6.

Shell elongate-ovate, with the whorls moderately rounded and appressed at the summit, marked by fine lines of growth only. The first two volutions show the narrow black band in the suture, the remainder of these whorls being yellowish-white. The next turn is plain white. Beginning with the third, a series of closely spaced, somewhat retractively slanting zigzag markings of alternating brown and yellowish-white bands, the latter a little wider than the brown elements, make their appearance. These brown bands become a little more closely spaced on the last volution, particularly so on the base. Aperture moderately large; outer lip thin, showing the external markings within, thickened at the edge, which is reflected

and slightly expanded; inner lip almost vertical, expanding at the base into a callus which fuses with the thin callus that covers the parietal wall; partly reflected over the narrow umbilicus.

The type, Cat. No. 244690, U.S.N.M., was collected by Lieut. Col. Edgar A. Mearns on Mount Apo, Mindanao. It has 6.5 whorls and measures—length, 59 mm.; diameter, 28.3 mm.

AMPHIDROMUS BASILANENSIS, new species.

Plate 9, fig. 3.

Shell of medium size; elongate-ovate. The first three whorls dingy white with a satiny luster, the remaining of the same ground color, marked at irregular intervals by more or less interrupted axial zigzag lines of light brown which have no definite form of disposition. The brown markings become more abundant on the last whorl. The whorls are moderately well rounded, appressed at the summit, and crossed by fine, very retractive axial lines of growth and exceedingly fine spiral striations. Sutures moderately constricted. Aperture moderately large, oval; outer lip thickened and reflected; inner lip thickened, somewhat sinuous and reflected over the umbilical chink; parietal wall covered with a moderately thick callus. The inside of the aperture shows the same coloration as the exterior, the brown markings extending through the shell. The outer edge of the peristome is white, while its inner border is of the same brown as the longitudinal bands.

Two specimens of this species were collected by Mr. McGregor, of the Philippine Bureau of Sciences, on Basilan Island. One of these, the type, is in the United States National Museum, Cat. No. 244691; the other is in the Philippine Bureau of Sciences. The type has six post-nuclear whorls and measures—length, 45.8 mm.; greater diameter, 24.2 mm.

AMPHIDROMUS FLORESI, new species.

Plate 8, fig. 3.

Shell ovate, sinistral. Early whorls well rounded, with a narrow band of gray immediately above the suture, the rest white. The succeeding turns are evenly rounded, appressed at the summit, and very feebly constricted at the sutures. All but the last one and a half turns are marked by faint lines of growth and exceedingly fine, spiral striations. On the last turn and a half, the axial sculpture becomes much strengthened, forming regular threadlike riblets. The shell is of bluish white ground color, marked with irregularly distributed, somewhat wavy, narrow, brown axial bands. These may be continuous from the summit to the umbilical region or interrupted. In-

side of the aperture and peristome bluish white; outer lip reflected, and slightly expanded; inner lip broadened at its insertion, which fuses with the thin callus that covers the parietal wall, and reflected over the narrow umbilicus.

The type, Cat. No. 215580, U.S.N.M., was collected for Mr. Walter F. Webb by Mr. I. Flores in southeastern Mindanao. I have named it in honor of Mr. Flores at Mr. Webb's request.

GROUP OF *AMPHIDROMUS INFLATUS*.

The group of *Amphidromus inflatus* at present embraces six species: *A. inflatus* Fulton, *A. mearnsi* Bartsch, *A. pallidulus* Pilsbry, *A. hidalgoi* Bartsch, *A. bilatanensis* Bartsch, and *A. calista* Pilsbry. The type-locality of the first is not known. *A. pallidulus* comes from Zamboanga, *Amphidromus mearnsi* and *calista* from Basilan, *A. hidalgoi* from Dapitan, Mindanao, and *A. bilatanensis* from Bilatan Island. All of these forms have the narrow black band in the suture on the early turns. All but *calista* Pilsbry are yellow; this may be white, yellow, or streaked with red or rose pink. It is evidently the black, suprasutural band of the early whorls, which caused Fulton and subsequent writers to ally the described forms with *maculiferus*, but when one views the various races of *maculiferus* one sees readily that it would require considerable stretching of the imagination to believe these shells mere races of that species.

AMPHIDROMUS INFLATUS Fulton.

Plate 1, fig. 3; plate 10, figs. 6, 7.

- Amphidromus maculiferus*, var. HIDALGO, Journ. de Conch., vol. 36, 1888, p. 31, pl. 6, fig. 1.
Amphidromus maculiferus SMITH, Ann. Mag. Nat. Hist., ser. 6, vol. 13, 1894, p. 55, in part.
Amphidromus maculiferus inflatus FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 75.
Amphidromus maculiferus inflatus VON MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, 1898, p. 149.
Amphidromus maculiferus inflatus PILSBRY, Man. Conch., vol. 13, 1900, p. 133.

Shell ovate; pale yellow; outer edge of the reflected lip sometimes pale orange; the first three whorls have the narrow black band immediately above the suture. All the whorls are well rounded, appressed at the summit, marked by very strong, retractively slanting lines of growth and very fine, weakly impressed, spiral striations. Sutures feebly constricted. Aperture large, yellow within; the slightly expanded and reflected outer, as well as the inner lip is white; inner lip somewhat twisted, expanded at the base, and re-

flected over the narrow umbilicus which is sometimes closed by the reflected callus; parietal wall covered with a thin callus.

Two specimens of this species (Cat. No. 99568 U.S.N.M.) bear the label "Philippine Islands," without specific locality. They have six whorls each, and measure—length, 58.6 mm.; diameter, 31.4 mm.: and length, 55.5 mm.; diameter, 30.2 mm., respectively.

Fulton cites¹ Baranda, Philippine Islands, as the type-locality.

AMPHIDROMUS MEARNSI, new species.

Plate 10, figs. 1, 2.

Shell ovate, canary yellow, excepting the narrow dark band immediately above the suture on the first three whorls and a narrow band of white, which is separated from the summit by a band equaling the white band in width, which agrees with the general coloration of the surface. The whorls are well rounded, appressed at the summit, and marked by well-expressed lines of growth, which almost suggest rib striations and exceedingly fine spiral striations. Sutures moderately constricted. Aperture quite large, oval; outer lip expanded and reflected; inner lip expanded at its insertion and reflected over the narrow umbilicus; parietal wall covered by a moderately thick callus; inside of the aperture and peristome white.

The type (Cat. No. 245565, U.S.N.M.) was collected by Lieut. Col. Edgar A. Mearns, at Atingating, northwest coast of Basilan Island. It has six whorls and measures—length, 47 mm.; diameter, 25.5 mm. Cat. No. 245566, U.S.N.M., contains an adult specimen and a young individual, also from Basilan. The adult has 6.5 whorls and measures—length, 55 mm.; diameter, 28.7 mm.

AMPHIDROMUS PALLIDULUS Pilsbry.

Plate 10, figs. 3, 8.

Amphidromus chloris ELERA, Cat. Sist. Faun. Filip., 1896, p. 617,

Amphidromus chloris, var. *pallidulus* PILSBRY, Man. Conch., vol. 13, 1900, pp. 143, 144, pl. 50, figs. 33, 34.

Shell stout, sinistral, straw colored, with a narrow white zone a little anterior to the suture. The nuclear whorls are marked with a narrow dark zone at the suture. The succeeding turns are well rounded, marked by numerous retractive lines of growth and very fine spiral striations. Aperture large; outer lip provided with a strong white peristome. Columella moderately long, expanded at the base, the outer edge extending over the base and fusing with the parietal callus.

This description is based upon Doctor Pilsbry's cotypes, which were collected by the Steere Expedition at Zamboanga, Mindanao. They both have six whorls and measure—length, 45 mm.; diameter,

¹ Am. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 75.

28 mm.; and length, 46.4 mm.; diameter, 25.5 mm., respectively. They form Cat. No. 106459 of the collection of the Philadelphia Academy of Natural Sciences.

AMPHIDROMUS BILATANENSIS, new species.

Plate 10, figs. 4, 5.

Amphidromus maculiferus, var. SMITH, Ann. Mag. Nat. Hist., ser. 6, vol. 13, 1894, p. 55, pl. 4, figs. 9, 9a.

Amphidromus maculiferus VON MÖLLENDORFF, Nachr. Deut. Malak. Ges., vol. 26, 1894, p. 211.

I have not seen specimens of this species, but base my conclusions of its distinctiveness upon Mr. Smith's figures and remarks and the geographical isolation from any of the other forms of the group. I quote Mr. Smith's remarks:

The specimens from Bilatan present but the faintest trace of oblique strigation, like some of the Philippine examples. They more resemble the variety figured by Hidalgo, being either pale lemon-yellow or pinkish white. They are rather smaller than normal specimens, having an average length of about 50 to 55 millimeters. All as yet examined are sinistral.

Hab., Bilatan Island.

AMPHIDROMUS HIDALGOI, new species.

Plate 11, figs. 4, 6.

Amphidromus maculiferus SOWERBY, var. HIDALGO, Mem. Real Acad. Sci. Madrid, 1898, pl. 99, figs. 1, 2.

Shell large, inflated, the early whorls with the usual narrow black band immediately above the suture. The succeeding ones inflated, appressed at the summit, lemon-yellow with a narrow whitish band at the summit, and irregularly distributed markings of dark rust brown. A varicial streak of the same color marks the last turn. Aperture broad, flaring, strongly reflected; dark within, white at the edge.

I have based my description upon Señor Hidalgo's figures,¹ which measure—length, 60 mm.; diameter, 35.5 mm. Señor Hidalgo informs me that the specimen came from Dapitan, Mindanao.

AMPHIDROMUS CALISTA Pilsbry.

Plate 11, figs. 1-3.

Amphidromus chloris, col. var. *purissimus* PILSBRY, Man. Conch., vol. 13, 1900, p. 144, pl. 50, fig. 32.

Amphidromus chloris, col. var. *calista* PILSBRY, Man. Conch., vol. 13, 1900, p. 144, pl. 50, fig. 36.

Amphidromus chloris, col. var. *rosa* PILSBRY, Man. Conch., vol. 13, 1900, p. 144, pl. 50, fig. 38.

¹ Mem. Real Acad. Sci. Madrid, 1898, pl. 99, figs. 1, 2.

The coloration of this species varies from pure white to pale yellow with reddish brown streaks on the spire, or it may be rose-pink throughout. The three specimens above cited are in the collection of the Philadelphia Academy of Natural Sciences. They have a very dark fillet in the suture of the early whorls, which places them in the *Amphidromus inflatus* group, of which they form the smallest known member. Only two of the three shells are adult and these yield the following measurements, respectively: Number of whorls, 6, and 5.6. Length, 42.4 mm., 39 mm.; diameter, 23 mm., 21.5 mm.

GROUP OF *AMPHIDROMUS CHLORIS*.

The group of *Amphidromus chloris* will probably be found to extend from Mindanao southward over the Sulu Archipelago. From the material examined it is possible to recognize three species—namely, *A. chloris*, *A. roeseleri*, and *A. suluensis*; the first coming from Zamboanga, Mindanao, the second from Jolo, while the material of the third one examined was listed as coming from the islands of the Sulu Sea. It is quite possible that when a complete exploration of the Sulu Archipelago will be completed that more island races of this group will be discovered.

AMPHIDROMUS CHLORIS Reeve.

Plate 1, fig. 4; plate 12, figs. 1-6, 8.

- Bulimus chloris* REEVE, Conch. Icon., 1848, pl. 37, p. 223.
Bulimus chloris PFEIFFER, Zeitschr. f. Malak., 1849, p. 137.
Bulimus chloris PFEIFFER, var. Zeitschr. f. Malak., 1849, p. 137.
Bulimus chloris REEVE, Zool. Voy. Samarang, 1850, p. 58, pl. 14, fig. 10.
Amphidromus chloris ALBERS, Heliceen, 1850, pp. 138-140.
Bulimus sulphuratus HOMBRON and JACQUINOT, Voy. Ast. and Zelee, Zool., vol. 5, 1854, p. 29.
Bulimus chloris PFEIFFER, Conch. Cab. Mart. Chem., vol. 1, pt. 13, 1855, p. 183, pl. 49, figs. 7, 8.
Bulimus (Amphidromus) chloris PFEIFFER, Malak. Blat., vol. 2, 1855, p. 147.
Bulimus (Canistrum) chloris, A. and H. ADAMS, Gen. Rec. Shells, 1858, p. 143.
Bulimus chloris PFEIFFER, Mon. Hel. Viv., vol. 4, 1859, p. 382.
Bulimus sulphuratus PFEIFFER, Mon. Hel. Viv., vol. 4, 1859, p. 382.
Bulimus chloris VON MARTENS, Preus. Exp. Ost. Asien, Zool., vol. 2, 1867, p. 351.
Bulimus sulphuratus PFEIFFER, Mon. Hel. Viv., vol. 6, 1868, p. 26.
Bulimus chloris PFEIFFER, Mon. Hel. Viv., vol. 6, 1868, p. 26.
Amphidromus chloris SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 148.
Amphidromus sulphuratus SEMPER, Reis. Arch. Phil., vol. 3, 1873, p. 148.
Amphidromus chloris PFEIFFER, Mon. Hel. Viv., vol. 8, 1877, p. 42.
Amphidromus chloris HIDALGO, Journ. de Conch., vol. 36, 1888, p. 32.
Amphidromus perversus chloris FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 67.
Amphidromus chloris ELERA, Cat. Sist. Faun. Filip., vol. 3, 1896, p. 617.

Amphidromus chloris HIDALGO, Mem. Real Acad. Sci., Madrid, 1898, pl. 99, figs. 3-4.

Amphidromus chloris PILSBRY, Man. Conch., vol. 13, 1900, pp. 142-144.

Shell very elongate-ovate, pale canary yellow with a narrow white band at the summit. Peristome and aperture white. Whorls well rounded, somewhat constricted at the suture, marked by fine lines of growth only. Aperture elongate, oval; outer lip reflected and thickened; inner lip expanded at the base, partly reflected over the umbilicus where it joins the moderately thick callus of the parietal wall.

A specimen belonging to the Chicago Academy of Sciences, collected by Quadras at Zamboanga, Mindanao, has 6.5 whorls and measures—length, 44.7 mm.; diameter, 22.5 mm. This specimen might have served for Reeve's figure cited above, so perfectly does it agree with it in every feature.

Adams and Reeve state, locality cited, that the animal of *Bulimus chloris* is of pale brown color * * * and of extremely vivacious habits. A bushel of them, collected on the mountains of Mindanao, soon dispersed themselves all over the cabin in which the basket was deposited. The shell was of elongate form and deep yellow color throughout, with no indications of bands or markings. The figure, however, shows the pale sutural band of white.

Thanks to the kindness of Mr. Walter F. Webb, I have had the opportunity of examining 393 specimens of this species collected at Talantalan, Zamboanga, Mindanao. These give the following measurements:

	No. of whorls.	Altitude, mm.	Diameter, mm.
Average.....	6.198+	39.851	22.266+
Greatest.....	7	48.2	25
Least.....	5.5	34	18.8

The extremes represented by the seven specimens, Cat. No. 215641, U.S.N.M., which are figured, yield measurements as follows:

No. of whorls.	Length, mm.	Diameter, mm.	Remarks.
6.25	40	22.3	Norm.—i. e., typical average specimen.
7	45.1	23.2	Greatest number of whorls.
5.5	36.8	20.8	Least number of whorls.
6.75	48.2	24.3	Greatest length.
5.75	34	20.2	Least length.
6.5	45.5	25	Greatest diameter.
6.23	38.7	18.8	Least diameter.

Doctor Pilsbry, in the *Manual of Conchology* (p. 144), makes the following statement:

Basilan.—The Steere Expedition also collected examples of *chloris* on Basilian Island (figs. 32, 35, 36-38), where Semper did not find it. They are identical in form with Zamboanga shells, but vary in color as follows: (a) Color of the typical yellow tint, but rapidly fading to white on the spire (pl. 50, fig. 35). (b) Pale citron or greenish-yellow, the spire white (fig. 37). (c) Similar to color-var. *pallidulus*, but with a slightly darker sutural border and no white band. (d) Pure white throughout, color-var. *purissimus* (fig. 32). (e) Pale yellow or rufous, with oblique reddish-brown streaks on the spire or throughout, the suture narrowly marked with the same, color-var. *calista* (fig. 36). (f) Brilliant rose-pink, with white subsutural band and darker sutural line to the apex, color-var. *rosa* (fig. 38).

From a very careful examination of these shells I am led to believe that a mix-up has occurred in handling collections and that two of the specimens referred to, namely, those represented by figures 35 and 37, are true *chloris* which I am inclined to believe came from Zamboanga, Mindanao. This is all the more probable since Professor Steere's expedition also collected in this place. The other three are sufficiently distinct to merit separation. They belong to the *inflata* group. I have listed them under the name *Amphidromus calista* Pilsbry.

AMPHIDROMUS SULUENSIS, new species.

Plate 1, fig. 5; plate 11, figs. 5, 7-9; plate 12, figs. 7 and 9.

Shell elongate-ovate, dextral or sinistral, sulphur yellow, with occasional, bluish gray varicial streaks. Aperture and peristome white. Whorls rather inflated, appressed at the summit, marked by very fine lines of growth and rather conspicuous varices; sutures moderately constricted. Aperture small, broadly oval; outer lip reflected and thickened; inner lip somewhat twisted and reflected over the umbilicus, which is covered in almost all the specimens, broadly expanded at its insertion, where it joins the thick parietal callus.

The type (Cat. No. 99564, U.S.N.M.) and five specimens bear the label "Islands of the Sulu Sea." The type has 6.5 whorls and measures—length, 45.5 mm.; diameter, 23.8 mm. The following specimens were examined:

Cat. No. U.S.N.M.	Number whorls.	Length in mm.	Diam- eter in mm.	Locality.	Remarks.
99564 ¹	6.5	45.5	23.8	Islands of Sulu Sea....	(Sinistral).
99564	6.5	39	22	.....do.....	Do.
99564	6.5	44.5	23.8	.....do.....	Do.
99564	6.4	41.8	22.3	.....do.....	Do.
99564	6.1	37.4	22	.....do.....	Do.
99564	.....	.....	.....	.....do.....	(Sinistral) young individual.
99565	6.5	39.5	23.4	.....do.....	(Dextral).
99565	6.5	42.4	23.5	.....do.....	Do.
99565	6.5	44.3	29.6	.....do.....	Do.

This species is at once distinguished from all the other Philippine *Amphidromi* by its sulphur yellow color and by the fact that it is variced.

AMPHIDROMUS ROESELERI Möllendorff.

Plate 13, figs. 1-3.

Amphidromus roeseleri VON MÖLLENDORFF, Nachr. Deut. Malak. Ges., vol. 26, 1894, pp. 210-211.

Amphidromus roeseleri FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 75.

Amphidromus roeseleri PILSBRY, Man. Conch., vol. 13, 1900, p. 144.

Shell elongate-ovate, white with a satiny luster. Whorls well rounded, appressed at the summit, marked by numerous, very retractive lines of growth and exceedingly fine, spiral striations. Sutures moderately impressed. Aperture auricular; outer lip expanded, reflected and thickened at the edge; inner lip twisted and expanded at its insertion where it joins the rather thick parietal callus and is reflected over the narrow umbilicus. Inside of aperture and peristome white.

There are three specimens of this species Cat. No. 215576, U.S. N.M., which were collected on Jolo Island, Philippines, by Lieut. Col. Edgar A. Mearns. All of them have six whorls. They measure—length, 46 mm.; diameter, 25 mm.; length, 47 mm.; diameter, 25.2 mm.; and length, 48 mm.; diameter, 28 mm., respectively. Von Möllendorff's type comes from Sulu (=Jolo) Island.

AMPHIDROMUS, species ?

The United States National Museum contains a specimen, Cat. No. 215638, collected by Lieut. Col. Edgar A. Mearns, on Loran Island, opposite the southern end of Ubian Island. This specimen is a dead, badly worn individual, which without question belongs to the group of *chloris*, but it is too poor to serve as the type of a distinct species.

GROUP OF AMPHIDROMUS ENTOBAPTUS.

The yellow *Amphidromi* of the Western Philippine Islands belong to a distinct group, of which we may take the oldest described species, *Amphidromus entobaptus* Dohrn, as the typical figure. This group is distributed over Palawan, the *Cuyos* group, the *Calamianes* to Mindoro, splitting up into races on the various islands. I have recognized *A. entobaptus*, *A. e. viridoflavus*, *A. e. tinapancensis*, *A. e. culionensis*, *A. e. coronensis*, *A. e. busuangensis*, and *A. mindoroensis*. *Amphidromus entobaptus* s. s. comes from Palawan, and *A. viridoflavus* from Malubutglubut Island, while the location of the rest will easily be noted from the name, which is based upon the island of the type-locality.

AMPHIDROMUS ENTOBAPTUS ENTOBAPTUS Dohrn.

Plate 13, figs. 4-9.

- Amphidromus perversus* HIDALGO, Journ. de Conch., vol. 35, 1888, p. 32.
Amphidromus entobaptus DOHRN, Nach. Malak. Gesel., vol. 22, 1889, p. 62.
Amphidromus entobaptus SMITH, Proc. Zool. Soc. London, 1895, pp. 98-99.
Amphidromus perversus entobapta FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 67.
Amphidromus contrarius ELERA, Cat. Sist. Faun. Filip., 1896, p. 617.
Amphidromus entobaptus ELERA, Cat. Sist. Faun. Filip., 1896, p. 618.
Amphidromus entobaptus HIDALGO, Mem. Real Acad. Sci. Madrid, 1898, pl. 99, figs. 5-8.
Amphidromus entobaptus VON MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, 1898, p. 148.
Amphidromus entobaptus PILSBRY, Man. Conch., vol. 13, 1900, pp. 145-6, pl. 51, figs. 42-6.

Shell sinistral, stout, elongate-ovate to ovate, varying in color from almost white to pinkish buff on the outside; inside, light orange buff or buffish yellow. The early whorls are usually soiled white, with a narrow ashy band immediately above the suture. All the whorls are decidedly appressed at the summit, strongly rounded, and marked by decidedly retractive lines of growth. Aperture large; outer lip reflected to form a thickened peristome, the edge of the lip being almost white; columella somewhat sigmoid, reflected over the base in the shape of a callus; parietal wall covered with a thick callus connecting with the columella; columella and the parietal callus of the same color as the edge of the outer lip.

Eighty-five specimens of this species were collected by the U. S. Fisheries steamer *Albatross* Philippine expedition, Cat. No. 254917, U.S.N.M., at Ulugan Bay, Palawan, which is a short distance to the north and across the island from the type-locality, Puerto Princesa. Twenty-five of these taken at random give the following measurements and data:

Number of whorls.	Length in mm.	Diameter in mm.
6	52	28.7
6	51.5	29
6	55.2	32.4
6	51.3	30
6	49.2	29
6	48.5	29
6	52	30
6.2	54.2	30.1
6.1	51.2	29.2
6	49.6	27.3
5.8	49.6	28.3
5.8	48	29.2
6	50.2	29
6.2	48.2	28
6	49.3	27
6	49.1	28
6.2	51.3	27.3
6	48.6	28.2
6	46.2	26.2
6.5	50.3	27.4
6	51.6	29
6.5	55	29.2
6	47.7	28
6	48	25.6
6.5	48.3	27
¹ 6.5	¹ 55.2	¹ 38.3
² 5.8	² 46.2	² 25.6
³ 6.07	³ 50.25	³ 28.95

¹ Largest.² Smallest.³ Average.

Two additional specimens, Cat. No. 254918, U.S.N.M., were collected at Poncal, Palawan, by the U. S. Bureau of Fisheries steamer *Albatross*.

AMPHIDROMUS ENTOBAPTUS VIRIDOFILAVUS, new subspecies.

Plate 14, figs. 1-3.

This race of *A. entobaptus* is of medium size. It is distinguished from the shells so far seen from other islands by the green coloration of the early whorls. In some specimens this reaches a depth of lettuce green. On the last turn the coloration usually corresponds with that of *Amphidromus entobaptus entobaptus*.

I have seen 17 specimens of the race, Cat. No. 215600, U.S.N.M., collected at the observatory on Malubutglubut Island. Only six of these are mature, and these yield the following data:

Number of whorls.	Length in mm.	Diameter in mm.
6	45.2	25.7
6.1	45	23.4
6	44	23.8
¹ 6	46.5	25.8
6.1	46	25.6
5.8	41.7	23.2

¹ Type.

AMPHIDROMUS ENTOBAPTUS LINAPACENSIS, new subspecies.

Plate 16, figs. 1-3.

Amphidromus entobaptus gracilis VON MÖLLENDORFF, Abhand, Nat. Gesel. Görlitz, vol. 22, 1898, p. 148, *nomen nudum*.

Shell elongate-ovate, varying in color from oil green through Naples yellow, through canary yellow to almost white. The greenish tints are usually confined to the early portion of the shell, the later turns being yellow. The inside is always of a deeper shade than the exterior. The peristome is white. The whorls are closely appressed at the summit, marked by decidedly protractively slanting lines of growth and exceedingly fine spiral striations.

We have seen 142 specimens of this race, Cat. No. 215599, U.S.N.M., from Malcochin Harbor, 450 feet altitude, on Linapacan Island, 25 of which taken at random give the following measurements:

Number of whorls.	Length in mm.	Diameter in mm.
6	42.6	23.3
5.5	42.4	23.1
6.2	47.5	25.8
5.7	41.2	23.4
6	47	23.6
6.1	43.2	22.6
6	43.6	24.5
6	43.4	24
6.1	46	25.1
5.5	39.2	22.5
6.2	45	25
6	45.1	25.6
6.1	42	23.3
6.2	45.6	25.6
5.7	45.7	24.1
5.6	41.6	23
6.3	49.9	25.2
5.7	41	23.5
6	41.3	22.5
5.8	41.3	21.3
5.6	39.2	22
6.3	47.2	24.4
6	44.6	22.8
¹ 6.3	49.2	25.1
5.5	40.4	24.2
² 6.3	49.9	25.8
³ 5.5	39.2	21.3
⁴ 5.93	43.8	23.82

¹ Type. ² Largest. ³ Smallest. ⁴ Average.

This race seems nearest to typical *A. entobaptus*, but is uniformly more slender, and a greenish tint is much more apparent.

AMPHIDROMUS ENTOBAPTUS CULIONENSIS, new subspecies.

Plate 1, fig. 6; plate 14, figs. 4-9; plate 15, figs. 1-3.

Shell much smaller than typical *Amphidromus entobaptus entobaptus*, and much less inflated than *Amphidromus entobaptus busu-angensis*. In general shape it resembles *Amphidromus entobaptus gracilis*, but is of a more uniform paler coloration than that race.

We have seen 21 specimens which were collected by Dr. D. C. Worcester on the Menage Scientific Expedition on Culion Island. These yield the following data:

Number of whorls.	Length in mm.	Diameter in mm.
6.1	44.7	24.8
6.2	44.6	24.4
5.7	42.6	23.4
6.1	46	25.7
¹ 5.8	45.8	¹ 25.6
5.7	41.2	23.7
5.5	40	24
6	44.9	25.5
6	38.9	22.6
6.1	47.8	27.1
5.7	48	25.7
5.6	40.5	24.1
5.6	45.6	26.8
5.8	46.3	26.1
5.7	40.6	24.7
5.5	38.6	23.2
6	43.5	24.8
5.6	41.6	24
6	48.2	27
6.1	46.1	24.7
5.2	36.4	23.7
² 5.8	² 43.42	² 24.83
³ 6.2	³ 48.2	³ 27.1
⁴ 5.2	⁴ 36.4	⁴ 22.6

¹ Type. ² Average. ³ Greatest. ⁴ Least.

The type is Cat. No. 215642, U.S.N.M.

AMPHIDROMUS ENTOBAPTUS CORONENSIS, new subspecies.

Plate 15, figs. 6-8.

Amphidromus entobaptus contractus VON MÖLLENDORFF, Abhand. Nat. Gesel. Görlitz, vol. 22, 1898, p. 148, *nomen nudum*.

The shells from Coron Island of the Calamianes Group have the shape of *Amphidromus chloris* Reeve; that is, they are very much more slender than typical *Amphidromus entobaptus*. Of course the typical deep coloration at once proclaims them members of the *Amphidromus entobaptus* complex.

The three specimens in the collection of the U.S.N.M. Cat. No. 195848a come from the von Möllendorff collection. They present the following data:

Cat. No. U.S.N.M.	Number of whorls.	Length in mm.	Diameter in mm.	Locality.
195848a.....	5.8	43	24	Coron.
195848a.....	6.4 ¹	47.5	22.2	Do.
195848a.....	5.8	41.3	23	Do.

¹ Type.

AMPHIDROMUS ENTOBAPTUS BUSUANGENSIS, new subspecies.

Plate 16, figs. 4-9.

Amphidromus perversus LINNAEUS, var., ELERA, Cat. Sist. Faun. Filip., 1896, p. 618.

Amphidromus entobaptus PILSBRY, Man. Conch., vol. 13, p. 146, 1900, pl. 51, figs. 42-44.

Shell elongate-ovate to ovate; cream colored to Naples yellow, usually darker within. Whorls well rounded, appressed at the summit, marked by fine, retractive lines of growth and exceedingly fine spiral striations. The aperture is broadly oval; outer lip thick, expanded and reflected; inner lip expanded at the base where it fuses with the rather thick callus of the parietal wall; peristome white. The following specimens have been examined:

Cat. No.	Collection.	Num- of whorls.	Length in mm.	Diam- eter in mm.	Locality.	Collector.
184559	U.S.N.M.....	6	43.3	23.1	Busuanga.....	Von Möllendorff.
302841	do.....	5.5	40	23.2	do.....	Henderson.
302841	do.....	6	43.3	24.4	do.....	Do.
	do.....	5.6	43	23	Malbato Busuanga..	Quadras.
	do.....	6	45.5	25	do.....	Do.
	do.....	5.4	41.5	24	do.....	Do.
	do.....	6	47.8	24	do.....	Do.
215643	do.....	5.4	40.3	25.5	do.....	Do.
215643 ¹	do.....	5.7	46.5	27.3	do.....	Do.
	Webb.....	5.4	40.6	24.2	do.....	Do.
	do.....	5.8	41.6	24.5	do.....	Do.
	do.....	5.8	44	25	do.....	Do.
	do.....	5.7	38.8	23	do.....	Do.
	do.....	5.9	40.2	22	do.....	Do.
	Chicago Acad. Sci. do.....	5.8	41.5	25	do.....	Do.
	do.....	5.8	45	25.3	do.....	Do.
Largest.....		6	47.8	27.3	.....
Smallest.....		5.4	38.8	22	.....
Average.....		5.73	42.6	24.2	.....

¹ Type.

AMPHIDROMUS MINDOROENSIS, new species.

Plate 15, figs. 4, 5.

Shell inflated, ovate. The first whorl and a half white, the rest canary yellow excepting a very narrow band at the summit and the peristome, which are white. The whorls are inflated, well rounded, appressed at the summit, and marked by very retractive lines of growth and exceedingly fine spiral striations. Aperture rather large, oval; outer lip thick, somewhat expanded and reflected; inner lip twisted, expanded at the base; parietal wall covered with a thin callus. The inside of the aperture is colored like the exterior.

The type (Cat. No. 245564, U.S.N.M.) was collected by Mr. Weber, of the Philippine Bureau of Sciences, in Mindoro. It has six whorls and measures—length, 53.2 mm.; diameter, 29.2 mm.

GROUP OF AMPHIDROMUS QUADRASI.

I am quite perplexed by the following species and feel at a loss as to the treatment that should be accorded to it. My own collecting in the Philippines has taught me that specific locality data are absolutely necessary. Many forms, having a somewhat extended distribution, break up into distinct and easily recognizable races on the various islands. Not only is this true, but they may even become differentiated into several forms in one island; for example, *Cochlostyla ovoidea* on Masbate. In Cataingan Bay we find an extremely large, light-colored form on the hillsides of the west shore, while across the bay on Dumurug Point, in the somewhat swampy lowlands, we find a much smaller race which is always darker colored, while at the town of Masbate we find a third equally distinct race.

The perfectly uniform development at each place of these three lots of mollusks would incline one to consider them as three distinct species. It is only when one has made collections over the entire range of *Cochlostyla ovoidea* and has obtained good series of specimens from each locality that one sees that these races can be arranged in such a way as to show complete gradation from one extreme to another.

The old collections made in the Philippines consisted chiefly of purchased material collected by natives, frequently in widely separate localities, dumped together without any data regarding its source. This material has furnished little aid to the student of geographic distribution. It is a stumbling block and the workers who have amused themselves by describing *unicolor*, *unicincta*, *bicincta*, *tricincta*, and *quadricincta* of certain species would have saved time and trouble for their successors if they had chosen a different field for amusement, because these forms occur in varying numbers in a single brood of one parent.

Looking over the material of *Amphidromus quadrasi* Hidalgo before me, and all the printed matter relating to it, I am strongly inclined to believe that a large amount of the material which has found its way into collections consists of shells purchased from natives at Balabac. It is equally probable that these may have come from many of the smaller islands surrounding Balabac Island and that when careful collecting has been done in these places we may find constant races of *Amphidromus quadrasi* on them just as in the case of *Cochlostyla ovoidea* in other parts of the islands.

My belief in this is strengthened by the fact that the 86 specimens collected by the *Albatross* expedition at Caxisigan Island; also the 107 from Bekin, as well as the 41 from Candaraman Island, are of perfectly uniform shape and coloration. This is also true of the 50 specimens labeled Southern Palawan without specific locality.

AMPHIDROMUS QUADRASI QUADRASI Hidalgo.

Plate 1, fig. 11; plate 17, figs. 1-11.

Amphidromus quadrasi HIDALGO, Journ. de Conch., vol. 35, 1887, p. 36, pl. 2, fig. 2.

Amphidromus quadrasi HIDALGO, Journ. de Conch., vol. 36, 1888, pp. 33-34.

Amphidromus quadrasi HIDALGO, Mem. Real Acad. Sci. Madrid, vol. 14, 1889, pp. 17-18.

Amphidromus quadrasi, var. *a.b.d.* SMITH, Ann Mag. Nat. Hist., ser. 6, vol. 11, 1893, p. 351, pl. 18, fig. 10.

Amphidromus quadrasi FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 85.

Amphidromus quadrasi ELERA, Cat. Sist. Faun. Filip, 1896, p. 618.

Amphidromus quadrasi VON MÖLLENDORFF, Abhand. Naturf. Ges. Gortitz, vol. 22, 1898, p. 149.

Amphidromus quadrasi HIDALGO, Mem. Real Acad. Sci. Madrid, 1898, pl. 100, figs. 5-6.

Shell sinistral, regular, elongate-conic. Early whorls white, nuclear whorls two, well rounded, marked with numerous very fine, evenly scattered granules, post-nuclear whorls appressed at the summit, smooth, excepting very fine, decidedly retractive lines of growth and numerous exceedingly fine spiral striations. Sutures only slightly constricted. Periphery of the last whorl angulated in young shells, and very feebly angulated in the adult; base well rounded, marked like the spire. Aperture moderately large, oblique; outer lip reflected; inner lip moderately reflected. Parietal wall glazed with a thin callus. The coloration of typical *quadrasi* is as follows: Early whorls white, without dark spot at tip of the nucleus; the rest yellow marked with numerous fine, decidedly retractive green lines which tend to become fused toward the latter part of the shell and give this a green aspect. These green lines do not quite extend to the summit. The summit is marked by a very slender yellowish-white line. This is followed by a moderately broad red band which,

in turn, is followed by a narrow yellow zone anteriorly; a red area surrounds the umbilical area and this is followed at its posterior edge by a moderately broad yellow zone. The inside of the aperture and lip are white.

Cat. No. 66188, Philadelphia Academy of Natural Sciences, figured in Tryon's Manual of Conchology (vol. 13, pl. 71, fig. 78), is typical *quadrasii*, it is my figure 3, on plate 12. This comes from Balabac Island. It has a little more than six whorls and measures—length, 34 mm.; diameter, 17.8 mm. Another specimen in Mr. Webb's collection, which I have likewise figured (pl. 12, fig. 1), is also typical *quadrasii* and comes from the same island. It has $6\frac{1}{2}$ whorls and measures—length, 36 mm.; diameter, 18.2 mm.

The United States National Museum has several lots of this form, all obtained by the United States Bureau of Fisheries' Expedition to the Philippine Islands, which I shall list in detail below. All of these are remarkably uniform in coloration, the green streaks being reduced to a minimum, the yellow predominating in every instance. They all have white tips.

Eighty-six specimens, Cat. No. 215603, U.S.N.M., were obtained at Caxisigan Island, near Balabac Island. Twenty-five of these, taken at random, give the following measurements:

Number of whorls.	Length in mm.	Diameter in mm.
6.5	38	20.2
6	37.3	20.2
6.5	30.3	15.2
7	36.5	18.3
6.5	34.5	16
6.5	32.3	16
6.3	31.6	16.2
6.7	34	16.7
6	30.6	15.7
6	33.5	15.5
6.5	35	16.5
6.5	34.5	17.2
6.5	37.5	17.5
7	41.2	19.8
6	28.2	15.3
6	35.8	17.7
7	42.3	22
7	41.5	21
7	36.2	17.2
6.5	34.6	18.5
6.5	37.7	19
6.5	39.6	20
6	22.5	14.5
6	29	15
6	28.6	15
¹ 6.4	34.5	17.4
² 7	42.3	22
³ 6	22.5	15

¹ Average.² Greatest.³ Least.

One hundred and seven specimens, Cat. No. 215606, U.S.N.M. come from Bekin; 25 of these, taken at random, give the following measurements:

Number of whorls.	Length in mm.	Diameter in mm.
6.5	37.8	17.3
6.5	38	18.5
6	27.8	15.2
6.5	32.3	16
6	28	17.5
6	28.2	15.5
5.8	30.7	16.5
6	30.2	15.2
6	28.3	17
6	30.5	15.3
6	31.3	17
6	30	15.5
6.3	35.5	18.2
5.5	25.4	14.5
5.5	28	15
6	30	15.6
6	31	16.6
6	32.5	17
6.5	34	17
6	31.5	16.2
6	30	15.5
6	26.6	15
5.5	27.5	15
6	26.6	14.2
6	29.3	16.7
¹ 6	31.11	16.2
² 6.5	38	18.5
³ 5.5	26.6	14.2

¹ Average.² Greatest.³ Least.

Forty-one specimens, Cat. No. 215605, U.S.N.M., were obtained from Candaraman Island, off Balabac Island; 10 of these, taken at random, measure:

Number of whorls.	Length in mm.	Diameter in mm.
7	40.7	19.2
7	37.2	18
6.5	36.7	18.4
7	43.5	19
6.5	35.6	18.4
6.5	35	18.2
6.5	35	17.5
6	32.7	18
6.5	35	17.5
7	39	18.5
¹ 6.65	37.04	18.27
² 7	43.5	19.2
³ 6	32.7	17.5

¹ Average.² Greatest.³ Least.

Another lot of 50 specimens, Cat. No. 215604, is labeled "Southern Palawan region," without specific locality.

A specimen in Mr. Webb's collection from Balabac is figured on plate 12, figure 11. This has the whorls considerably more convex than any we have seen.

Plate 12, figures 4, 5, are specimens from Caxisigan Island and figures from Candaraman Island.

Another specimen in the Philadelphia Academy of Natural Sciences is entered as Cat. No. 95172 and comes from the Quadras collection from Balabac.

AMPHIDROMUS QUADRASI VERSICOLOR Fulton.

Plate 1, fig. 7; plate 18, figs. 1-10.

Amphidromus quadrasi, var. *c.* SMITH, Ann. Mag. Nat. Hist., ser. 6, vol. 11, 1893, p. 351, pl. 18, fig. 11.

Amphidromus versicolor FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 86.

Amphidromus quadrasi versicolor VON MÖLLENDORFF, Abhand. Naturf. Ges. Görlitz, vol. 22, 1898, p. 150.

Amphidromus quadrasi versicolor PILSBRY, Man. Conch., vol. 13, 1900, pp. 230-231, pl. 71, figs. 84, 87, and 90-91.

The present form agrees in general shape and size fairly well with typical *quadrasi*. All of the specimens, however, have the extreme tip black, and none show the strong red girdle immediately below the summit, although this is faintly indicated in one of the specimens in the Philadelphia Academy of Natural Sciences. The main coloration is pale yellow, the last whorl being frequently streaked with axial lines of green, which, in some instances, become so concentrated as to form broad green spiral bands. Some specimens have several narrow spiral bands. The aperture varies from white to rose-purple. This is also true of the outer lip and the umbilical area. Of the specimens which we would refer to this form we have seen the following:

Cat. No.	Collection.	Number of whorls.	Length in mm.	Diameter in mm.	Locality.
302844	U. S. N. M.....	7.1	41.4	20.5	Balabac Island.
215639	.....do.....	7.2	44.7	21	Balabac, Balabac Island.
215639	.....do.....	7.1	43.3	22.2	Do.
95173	Phila. Acad. Nat. Sci.	7	40.3	19	Cabo, Melbile, Balabac.
98852	.....do.....	.....	.....	.....	Do.
79483	.....do.....	7	39	19.3	Balabac Island.
79483	.....do.....	6.5	34.7	19.7	Do.
79483	.....do.....	6	34	17.7	Do.
95172	.....do.....	6	31.5	15.5	Do.
.....	Webb.....	6.5	36.6	18.1	Do.
.....	.....do.....	6	35	19.2	Do.

AMPHIDROMUS QUADRASI SOLIDUS *Fulton.*

Plate 1, figs. 8, 9, 12, 13, 14; plate 19, figs. 1, 3, 7; and plate 20, figs. 3, 5.

Amphidromus quadrasi, var. *c.* SMITH, Ann. Mag. Nat. Hist., ser. 6, vol. 11, 1893, p. 351, pl. 18, fig. 13.

Amphidromus quadrasi, var. *solida* FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 86, pl. 5, fig. 16.

Amphidromus quadrasi solidus VON MÖLLENDORFF, Abhand. Naturf. Ges. Gorlitz, vol. 22, 1898, p. 149.

Amphidromus quadrasi solidus PILSBRY, Man. Conch., vol. 13, 1900, p. 230, pl. 66, figs. 47, 48, and pl. 71, figs. 72-76.

In the present form the conspicuous bands of the base are practically absent. If present at all, they are a mere suggestion. The coloration of the early whorls is blotched and streaked with brown, like that of *dubius*. The extreme apex also is black. The red subsutural band may or may not be present. The last whorl may be streaked with green as in typical *quadrasi*, or may be orange-yellow or white or even suffused with "Spinel red." Of this form, we have seen the following material:

Cat. No.	Collection.	Number of whorls.	Length in mm.	Diameter in mm.	Locality.
215608	U.S.N.M.	7	42.3	19.5	Balabac (U.S.B.F.) <i>Albatross</i> .
215608	do.	6.5	38.8	18.4	Do.
215608	do.	6.5	40.5	20	Do.
215608	2 immature.				Do.
302844	do.	6.9	38.6	20.9	Balabac Id.
215607	do.	6.5	40.5	19	Port Ciego, Balabac.
215607	do.	6	34.8	17.8	Do.
215607	do.	6	35.8	18.5	Do.
215607	do.	6.2	32.3	16	Do.
215607	8 immature.				Do.
215640	U.S.N.M.	7.3	43.0	20.4	Balabac, Balabac Id.
215640	do.	7.2	47.5	23.0	Do.
215640	do.	7.5	46.0	21.6	Do.
215640	do.	7.2	44.3	21.2	Do.
215640	do.	6.9	41.2	20.5	Do.
215640	U.S.N.M., young.				Do.
98853	Phila. Acad. Nat. Sci.	6	32.7	17	Balabac (Steere Exp.).
98851	do.	6.5	38.6	19	Do.
98851	do.	6	33.5	19.1	Do.
.....	Philippine Bur. Sci.	6.7	39.2	20.1	Do.
.....	Webb.	7	39.2	20.2	Do.

AMPHIDROMUS QUADRASI DUBIUS *Fulton.*

Plate 1, fig. 10; plate 19, figs. 2, 4, 5, 6, 8, 9; plate 20, fig. 2.

Amphidromus quadrasi, var. *f* SMITH, Ann. Mag. Nat. Hist., ser. 6, vol. 11, 1893, p. 351, pl. 18, fig. 12.

Amphidromus dubius FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 86, pl. 6, figs. 1, 1a.

Amphidromus cverctti FULTON, Ann. Mag. Nat. Hist., ser. 6, vol. 17, 1896, p. 87.

Amphidromus dubius HIDALGO, Mem. Acad. Real Sci., Madrid, 1898, pl. 101, figs. 7-8.

Amphidromus quadrasi dubius VON MÖLLENDORFF, Abhand. Naturf. Ges. Gorlitz, vol. 22, 1898, p. 150.

Amphidromus quadrasi everetti VON MÖLLENDORFF, Abhand. Naturf. Ges. Gorlitz, vol. 22, 1898, p. 150.

Amphidromus quadrasi dubius and *everetti* PILSBRY, Man. Conch., vol. 13, 1900, p. 231, pl. 71, figs. 79-83, and pl. 70, figs. 65-68.

In the present form the early extreme apex is dark. In every specimen before us the succeeding turn or turn and a half is white. Following this, we have axial, retractive, broad bands of brown separated by narrow bands of light yellow or white. At times these bands become forked and variously diversified, in some instances ending in a number of fine streaks on the upper half of the whorl. There may be or may not be a red subsutural band present as in typical *quadrasi*. On the last whorl the axial banding in all our specimens becomes very much enfeebled and in some has disappeared entirely. The base may be plain yellow or banded with spiral bands of brown and yellow. The umbilical area is usually red, bordered with a yellow band posteriorly, though in several of the specimens the red is entirely wanting, the yellow covering the entire area. The aperture may be pale purple, the yellow spiral bands appearing white within, or it may be white with the number of bands appearing paler on the inside. The lip may be white or purple. This form is distinguished from the next chiefly by the conspicuous coloring of the base, the spiral bands being practically absent in *solida*. I have seen the following specimens:

Cat. No.	Collection.	Number of whorls.	Length in mm.	Diameter in mm.	Locality.
215609	U.S.N.M.....	6.3	36.5	20.3	Balabac Id.
215610	U.S.N.M., 6 immature.	.....	.....	.....	Pt. Ciego, Balabac.
79485	Phila. Acad. Nat. Sci.	6.5	40.5	21.5	Palawan (Fulton).
79485	.....do.....	6	30.5	16.3	Do.
79480	.....do.....	6	33.7	18	Balabac Id.
79480	.....do.....	6.5	35.2	17	Do.
79480	.....do.....	6	30.2	16.5	Do.
.....	Webb.....	7	39.5	20.6	Do.
.....	.....do.....	(?)	(?)	19.2	Do.
.....	Chicago Acad. Sci...	6	33.4	16.5	Do.
.....	Webb.....	6	35.6	18	Do.

AMPHIDROMUS QUADRASI PALAWANENSIS, new subspecies.

Plate 1, fig. 15; plate 20, figs. 1, 4, 6-9.

Shell more elongate than typical *quadrasi*. Apex black, the succeeding turn white, and all but the last turn or turn and a half are marked with axial bands of brown which usually break up into finer branches on the posterior half of the whorls. The last portion of the

shells lacks this brown banding and is unicolor, excepting the spiral bands of yellow on the base. The entire surface of the shell is suffused with a brownish wash which gives the whole a dusky aspect. Aperture pale purple within, lip dark brown. In all but one specimen the middle of the base is encircled by a moderately broad yellow band. The columellar area also shows indications of a second yellow band surrounding it, though the portion immediately adjoining the columella is purplish brown. All of the shells have a subsutural red band which is toned down strongly by the brownish suffusion.

The specimens examined yield the following data:

Cat. No.	Collection.	Number of whorls.	Length in mm.	Diameter in mm.	Locality.
99570	U.S.N.M.....	7.3	44	21.8	Palawan Passage.
99570	.....do.....	6.5	38	19.5	Do.
99570	.....do.....	7	37.6	18.5	Do.
302843	.....do.....	6.4	32.7	17.5	Do.
302843	.....do.....	6.3	32.6	17.7	Do.
.....	Webb.....	7	43.5	20.4	Palawan.
.....	.....do.....	7	38.3	19	Do.

EXPLANATION OF PLATES.

PLATE 1.

- FIG. 1. *Amphidromus maculiferus cotabatensis* Bartsch.
 2. *Amphidromus maculiferus boholensis* Bartsch.
 3. *Amphidromus inflatus* Fulton.
 4. *Amphidromus chloris* Reeve.
 5. *Amphidromus sulucensis* Bartsch.
 6. *Amphidromus entobaptus calionensis* Bartsch.
 7. *Amphidromus quadrasi versicolor* Fulton.
 8. *Amphidromus quadrasi solidus* Fulton.
 9. *Amphidromus quadrasi solidus* Fulton.
 10. *Amphidromus quadrasi dubius* Fulton.
 11. *Amphidromus quadrasi quadrasi* Hidalgo.
 12. *Amphidromus quadrasi solidus* Fulton.
 13. *Amphidromus quadrasi solidus* Fulton.
 14. *Amphidromus quadrasi solidus* Fulton.
 15. *Amphidromus quadrasi palawanensis* Bartsch.

PLATE 2.

- FIG. 1. *Amphidromus maculiferus maculiferus* Sowerby, Camp Overton, Mindanao, Cat. No. 244668, U.S.N.M.
 2. *Amphidromus maculiferus maculiferus* Sowerby, Camp Pantar, Mindanao, Cat. No. 24467, U.S.N.M.
 3. *Amphidromus maculiferus maculiferus* Sowerby, Camp Overton, Mindanao, Cat. No. 244668, U.S.N.M.
 4. *Amphidromus maculiferus maculiferus* Sowerby, Philippine Islands, Cat. No. 99567, U.S.N.M.
 5. *Amphidromus maculiferus maculiferus* Sowerby, Camp Overton, Mindanao, Cat. No. 244669, U.S.N.M.

PLATE 3.

- FIG. 1. *Amphidromus maculiferus cataganensis* Bartsch, Mt. Malindang, Mindanao, Cat. No. 244672, U.S.N.M.
 2. *Amphidromus maculiferus cataganensis* Bartsch, Mt. Malindang, Mindanao, Cat. No. 244672, U.S.N.M.
 3. *Amphidromus maculiferus cataganensis* Bartsch, Mindanao, Cat. No. 244274, U.S.N.M.
 4. *Amphidromus maculiferus cataganensis* Bartsch, Mt. Malindang, Mindanao, Cat. No. 244673, U.S.N.M.
 5. *Amphidromus maculiferus cataganensis* Bartsch, Mt. Malindang, Mindanao, Cat. No. 244673, type.

PLATE 4.

- FIG. 1. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244676, U.S.N.M.
 2. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244676, U.S.N.M.
 3. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244678, U.S.N.M.
 4. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244677, U.S.N.M.
 5. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244677, U.S.N.M.
 6. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 184564, U.S.N.M.
 7. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244676, U.S.N.M.
 8. *Amphidromus maculiferus cotabatensis* Bartsch, Cotabato, Mindanao, Cat. No. 244676, U.S.N.M., type.

PLATE 5.

- FIG. 1. *Amphidromus maculiferus buluanensis* Bartsch, near Lake Buluan, Mindanao, Cat. No. 244687, U.S.N.M.
 2. *Amphidromus maculiferus buluanensis* Bartsch, Buluan to Simpitan, Mindanao, Cat. No. 244688, U.S.N.M.
 3. *Amphidromus maculiferus buluanensis* Bartsch, Buluan to Simpitan, Mindanao, Cat. No. 244686, U.S.N.M.
 4. *Amphidromus maculiferus buluanensis* Bartsch, Buluan to Simpitan, Mindanao, Cat. No. 244688, U.S.N.M., type.
 5. *Amphidromus maculiferus buluanensis* Bartsch, Buluan to Simpitan, Mindanao, Cat. No. 244688, U.S.N.M.
 6. *Amphidromus maculiferus buluanensis* Bartsch, Buluan to Simpitan, Mindanao, Cat. No. 244686, U.S.N.M.

PLATE 6.

- FIG. 1. *Amphidromus maculiferus strigatus* Möllendorff, Davao, Mindanao, Cat. No. 195849, U.S.N.M.
 2. *Amphidromus maculiferus strigatus* Möllendorff, Davao, Mindanao, Cat. No. 195849, U.S.N.M.

- FIG. 3. *Amphidromus maculiferus strigatus* Möllendorff, Davao, Mindanao, Cat. No. 184565, U.S.N.M.
 4. *Amphidromus maculiferus strigatus* Möllendorff, Davao, Mindanao, Cat. No. 184565, U.S.N.M.
 5. *Amphidromus maculiferus strigatus* Möllendorff, Mindanao, Cat. No. 185849, U.S.N.M.

PLATE 7.

- FIG. 1. *Amphidromus maculiferus boholensis* Bartsch, Sevilla, Bohol, Cat. No. 245563, U.S.N.M.
 2. *Amphidromus maculiferus boholensis* Bartsch, Sevilla, Bohol, Cat. No. 245563, U.S.N.M.
 3. *Amphidromus maculiferus boholensis* Bartsch, Sevilla, Bohol, Cat. No. 245563, U.S.N.M., type.
 4. *Amphidromus maculiferus samarensis* Bartsch, Samar, Cat. No. 215579, U.S.N.M., type.
 5. *Amphidromus maculiferus gracilior* Fulton, Mainit, Mindanao, Chicago Acad. Sci.
 6. *Amphidromus maculiferus gracilior* Fulton (no specific locality), Mindanao, Cat. No. 184566, U.S.N.M.

PLATE 8.

- FIG. 1. *Amphidromus maculiferus multicolor* Möllendorff, Matalon, Leyte, Chicago Academy Sciences.
 2. *Amphidromus maculiferus multicolor* Möllendorff, Maasin Leyte, Chicago Academy Sciences.
 3. *Amphidromus floresi* Bartsch, Mindanao, Cat. No. 215580, U.S.N.M., type.
 4. *Amphidromus maculiferus multicolor* Möllendorff, Leyte, Cat. No. 184562, U.S.N.M.
 5. *Amphidromus maculiferus multicolor* Möllendorff, Bato, Leyte, Webb Coll.

PLATE 9.

- FIG. 1. *Amphidromus malindangensis* Bartsch, Mount Malindang, Mindanao, Cat. No. 244689, U.S.N.M.
 2. *Amphidromus malindangensis* Bartsch, Mount Malindang, Mindanao, Cat. No. 244689, U.S.N.M., type.
 3. *Amphidromus basilanensis* Basilan Island, Cat. No. 244691, U.S.N.M., type.
 4. *Amphidromus maculiferus cosmius* Bartsch, Basilan Island, Cat. No. 245562, U.S.N.M., type.
 5. *Amphidromus apoensis* Bartsch, Mount Apo, Mindanao, Cat. No. 244690, U.S.N.M., type.
 6. *Amphidromus apoensis* Bartsch, Mount Apo, Mindanao, Cat. No. 244690, U.S.N.M.

PLATE 10.

- FIG. 1. *Amphidromus mearnsi* Bartsch, Basilan, Cat. No. 245566, U.S.N.M.
 2. *Amphidromus mearnsi* Bartsch, Basilan, Cat. No. 245565, U.S.N.M. type.
 3. *Amphidromus pallidulus* Pilsbry, Zamboanga, Mindanao, Cat. No. 106459, Phila. Acad. Nat. Sci., cotype.
 4. *Amphidromus bilatanensis* Bartsch, Bilatan Island, British Museum, type.

- FIG. 5. *Amphidromus bilatanensis* Bartsch, Bilatan Island, British Museum, type.
6. *Amphidromus inflatus* Fulton, Philippine Islands, Cat. No. 99568, U.S.N.M.
7. *Amphidromus inflatus* Fulton, Philippine Islands, Cat. No. 99568, U.S.N.M.
8. *Amphidromus pallidulus* Pilsbry, Zamboanga, Mindanao, Cat. No. 106459, Phila. Acad. Nat. Sci., cotype.

PLATE 11.

- FIG. 1. *Amphidromus calista* Pilsbry, Basilan, Cat. No. 106458, Phila. Acad. Nat. Sci., cotype.
2. *Amphidromus calista* Pilsbry, Basilan, Cat. No. 106458, Phila. Acad. Nat. Sci., cotype.
3. *Amphidromus calista* Pilsbry, Basilan, Cat. No. 106458, Phila. Acad. Nat. Sci., cotype.
4. *Amphidromus hidalgoi* Bartsch, Dapitan, Mindanao, type. Hidalgo collection.
5. *Amphidromus suluensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99564, U.S.N.M.
6. *Amphidromus hidalgoi* Bartsch, Dapitan, Mindanao, type. Hidalgo collection.
7. *Amphidromus suluensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99564, U.S.N.M.
8. *Amphidromus suluensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99565, type.
9. *Amphidromus suluensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99565.

PLATE 12.

- FIG. 1. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
2. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
3. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
4. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
5. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
6. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
7. *Amphidromus suluensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99565, U.S.N.M.
8. *Amphidromus chloris* Reeve, Talantalan, Zamboanga, Mindanao, Cat. No. 215641, U.S.N.M.
9. *Amphidromus sulucensis* Bartsch, Islands of the Sulu Sea, Cat. No. 99564, U.S.N.M.

PLATE 13.

- FIG. 1. *Amphidromus roescleri* Möllendorff, Jolo Island, Cat. No. 215576, U.S.N.M.
2. *Amphidromus roescleri* Möllendorff, Jolo Island, Cat. No. 215576, U.S.N.M.
3. *Amphidromus roescleri* Möllendorff, Jolo Island, Cat. No. 215576, U.S.N.M.
4. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.

- FIG. 5. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.
 6. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.
 7. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.
 8. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.
 9. *Amphidromus entobaptus* Dohrn, Puerto Princesa, Palawan, Cat. No. 254917, U.S.N.M.

PLATE 14.

- FIG. 1. *Amphidromus entobaptus viridoflavus* Bartsch, Malubutglubut Island, Cat. No. 215600, U.S.N.M.
 2. *Amphidromus entobaptus viridoflavus* Bartsch, Malubutglubut Island, Cat. No. 215600, U.S.N.M.
 3. *Amphidromus entobaptus viridoflavus* Bartsch, Malubutglubut Island, Cat. No. 215600, U.S.N.M., type.
 4. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 5. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 6. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 7. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 8. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M., type.
 9. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.

PLATE 15.

- FIG. 1. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 2. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 3. *Amphidromus entobaptus culionensis* Bartsch, Culion Island, Cat. No. 215642, U.S.N.M.
 4. *Amphidromus mindoroensis* Bartsch, Mindoro, Cat. No. 245564, U.S.N.M., type.
 5. *Amphidromus mindoroensis* Bartsch, Mindoro, Cat. No. 245564, U.S.N.M., type.
 6. *Amphidromus entobaptus coronensis* Bartsch, Coron Island, Cat. No. 195848a, U.S.N.M.
 7. *Amphidromus entobaptus coronensis* Bartsch, Coron Island, Cat. No. 195848a, U.S.N.M., type.
 8. *Amphidromus entobaptus coronensis* Bartsch, Coron Island, Cat. No. 195848a, U.S.N.M.

PLATE 16.

- FIG. 1. *Amphidromus entobaptus linapacensis* Bartsch, Linapacan Island, Cat. No. 215599, U.S.N.M.
 2. *Amphidromus entobaptus linapacensis* Bartsch, Linapacan Island, Cat. No. 215599, U.S.N.M., type.

- FIG. 3. *Amphidromus entobaptus linapacensis* Bartsch, Linapacan Island, Cat. No. 215599, U.S.N.M.
4. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Cat. No. 215643, U.S.N.M.
 5. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Webb Collection.
 6. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Webb Collection.
 7. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Cat. No. 215643, U.S.N.M., type.
 8. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Webb Collection.
 9. *Amphidromus entobaptus busuangensis* Bartsch, Malbato, Busuanga, Webb Collection.

PLATE 17.

- FIG. 1. *Amphidromus quadrasi quadrasi* Hidalgo, Balabac Island, Webb Collection.
2. *Amphidromus quadrasi quadrasi* Hidalgo, Candaraman Island, Cat. No. 215605, U.S.N.M.
 3. *Amphidromus quadrasi quadrasi* Hidalgo, Balabac Island, Cat. No. 66188, Phila. Acad. Nat. Sci.
 4. *Amphidromus quadrasi quadrasi* Hidalgo, Caxisigan Island, Cat. No. 215603, U.S.N.M.
 5. *Amphidromus quadrasi quadrasi* Hidalgo, Caxisigan Island, Cat. No. 215603, U.S.N.M.
 6. *Amphidromus quadrasi quadrasi* Hidalgo, Candaraman Island, Cat. No. 215605, U.S.N.M.
 7. *Amphidromus quadrasi quadrasi* Hidalgo, Candaraman Island, Cat. No. 215605, U.S.N.M.
 8. *Amphidromus quadrasi quadrasi* Hidalgo, Candaraman Island, Cat. No. 215605, U.S.N.M.
 9. *Amphidromus quadrasi quadrasi* Hidalgo, Caxisigan Island, Cat. No. 215603, U.S.N.M.
 10. *Amphidromus quadrasi quadrasi* Hidalgo, Candaraman Island, Cat. No. 215605, U.S.N.M.
 11. *Amphidromus quadrasi quadrasi* Hidalgo, Balabac Island, Webb Collection.

PLATE 18.

- FIG. 1. *Amphidromus quadrasi versicolor* Fulton, Balabac, Cat. No. 79483, Phila. Acad. Nat. Sci.
2. *Amphidromus quadrasi versicolor* Fulton, Balabac, Cat. No. 98852, Phila. Acad. Nat. Sci.
 3. *Amphidromus quadrasi versicolor* Fulton, Webb Collection.
 4. *Amphidromus quadrasi versicolor* Fulton, Balabac, Cat. No. 95152, Phila. Acad. Nat. Sci.
 5. *Amphidromus quadrasi versicolor* Fulton, Webb Collection.
 6. *Amphidromus quadrasi versicolor* Fulton, Cat. No. 79483, Phila. Acad. Nat. Sci.
 7. *Amphidromus quadrasi versicolor* Fulton, Cat. No. 98852, Phila. Acad. Nat. Sci.

- FIG. 8. *Amphidromus quadrasi versicolor* Fulton, Cat. No. 79483, Phila. Acad. Nat. Sci.
 9. *Amphidromus quadrasi versicolor* Fulton, Cat. No. 95172, Phila. Acad. Nat. Sci.
 10. *Amphidromus quadrasi versicolor* Fulton, Cat. No. 95173, Phila. Acad. Nat. Sci.

PLATE 19.

- FIG. 1. *Amphidromus quadrasi solidus* Fulton, Balabac, Cat. No. 98851, Phila. Acad. Nat. Sci.
 2. *Amphidromus quadrasi dubius* Fulton, Balabac, Cat. No. 79480, Phila. Acad. Nat. Sci.
 3. *Amphidromus quadrasi solidus* Fulton, Balabac, Cat. No. 98851, Phila. Acad. Nat. Sci.
 4. *Amphidromus quadrasi dubius* Fulton, Balabac, Cat. No. 79480, Phila. Acad. Nat. Sci.
 5. *Amphidromus quadrasi dubius* Fulton, Balabac, Cat. No. 79480, Phila. Acad. Nat. Sci.
 6. *Amphidromus quadrasi dubius* Fulton, Balabac, Webb Collection.
 7. *Amphidromus quadrasi solidus* Fulton, Balabac, Cat. No. 79483, Phila. Acad. Nat. Sci.
 8. *Amphidromus quadrasi dubius* Fulton, Balabac, Chicago Acad. Sci.
 9. *Amphidromus quadrasi dubius* Fulton, Palawan, Cat. No. 79485, Phila. Acad. Nat. Sci.

PLATE 20.

- FIG. 1. *Amphidromus quadrasi palawanensis* Bartsch, Palawan, Cat. No. 302843, U.S.N.M.
 2. *Amphidromus quadrasi dubius* Fulton, Palawan, Cat. No. 79485, Phila. Acad. Nat. Sci.
 3. *Amphidromus quadrasi solidus* Fulton, Balabac, Cat. No. 98853, Phila. Acad. Nat. Sci.
 4. *Amphidromus quadrasi palawanensis* Fulton, Palawan Passage, Cat. No. 99570, U.S.N.M.
 5. *Amphidromus quadrasi solidus* Fulton, Balabac Island, Cat. No. 302844a, U.S.N.M.
 6. *Amphidromus quadrasi palawanensis* Fulton, Palawan, Webb Collection.
 7. *Amphidromus quadrasi palawanensis* Fulton, Palawan Passage, Cat. No. 99570, U.S.N.M.
 8. *Amphidromus quadrasi palawanensis* Fulton, Palawan Passage, Cat. No. 99570, U.S.N.M.
 9. *Amphidromus quadrasi palawanensis* Fulton, Palawan, Webb Collection.

PLATE 21.

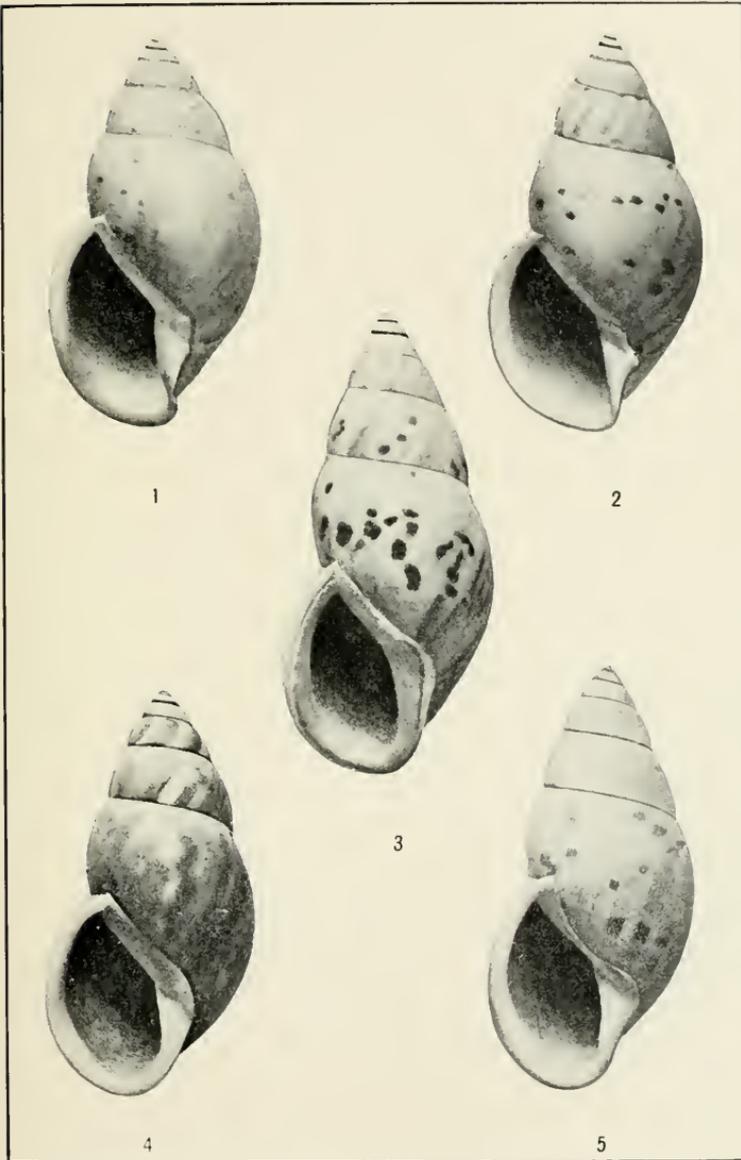
Relief map showing the distribution of the *Amphidromus maculiferus* group, numbers 1 to 16, and *Amphidromus hidalgoi*, number 21.

- | | | | |
|--------------------------|------------------------|------------------------|-----------------------------|
| 1. <i>maculiferus</i> . | 5. <i>strigatus</i> . | 9. <i>samarensis</i> . | 13. <i>malindangensis</i> . |
| 2. <i>cataganensis</i> . | 6. <i>gracillior</i> . | 10. (?) | 14. <i>apoensis</i> . |
| 3. <i>cotabatensis</i> . | 7. <i>boholensis</i> . | 11. (?) | 15. <i>basilangensis</i> . |
| 4. <i>buluanensis</i> . | 8. <i>multicolor</i> . | 12. <i>cosmius</i> . | 16. <i>floresi</i> . |

PLATE 22.

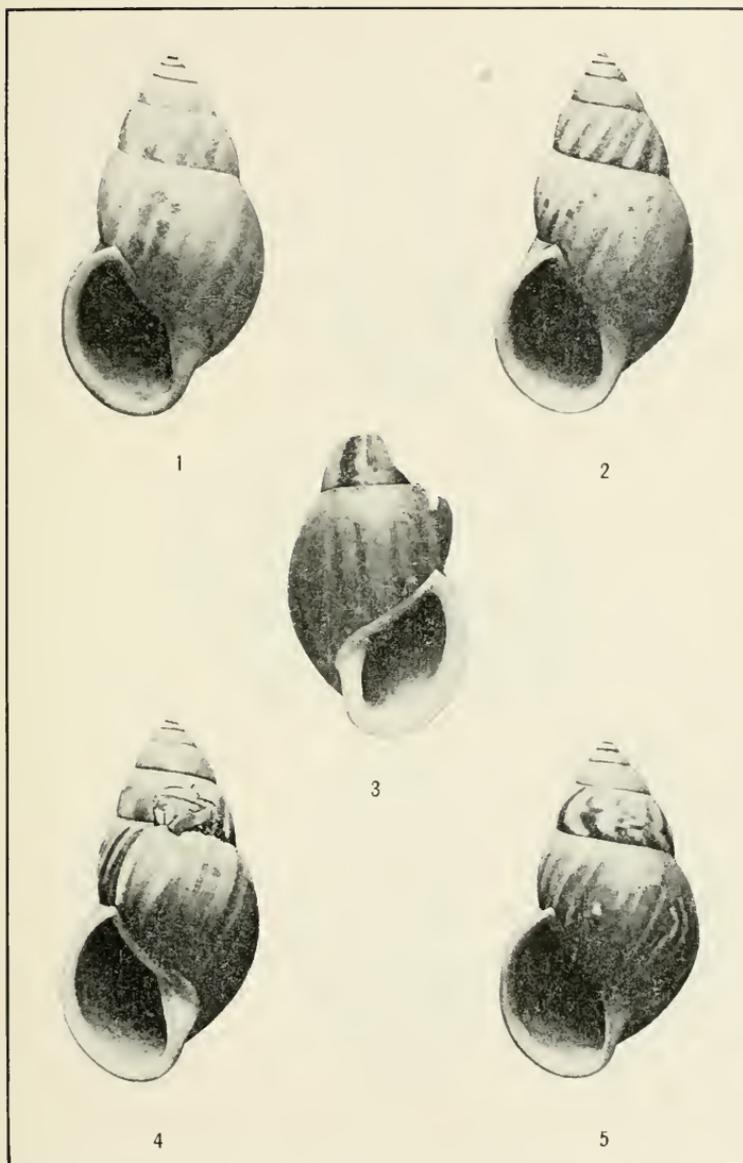
Relief map showing the distribution of the group of *Amphidromus inflatus*, numbers 17-22; the group of *Amphidromus chloris*, numbers 23-25; the group of *Amphidromus entobaptus*, numbers 27-33; and the group of *Amphidromus quadrasi*, numbers 34-38:

17. <i>inflatus</i> .	23. <i>chloris</i> .	29. <i>linapacensis</i> .	35. <i>versicolor</i> .
18. <i>mearnsi</i> .	24. <i>roeseleri</i> .	30. <i>culionensis</i> .	36. <i>solidus</i> .
19. <i>pallidulus</i> .	25. <i>suluensis</i> .	31. <i>coronensis</i> .	37. <i>dubius</i> .
20. <i>bilatanensis</i> .	26. <i>species</i> (?)	32. <i>busuangensis</i> .	38. <i>palawancensis</i> .
21. <i>hidalgoi</i> .	27. <i>entobaptus</i> .	33. <i>mindorocensis</i> .	
22. <i>calista</i> .	28. <i>viridoflavus</i> .	34. <i>quadrasi</i> .	



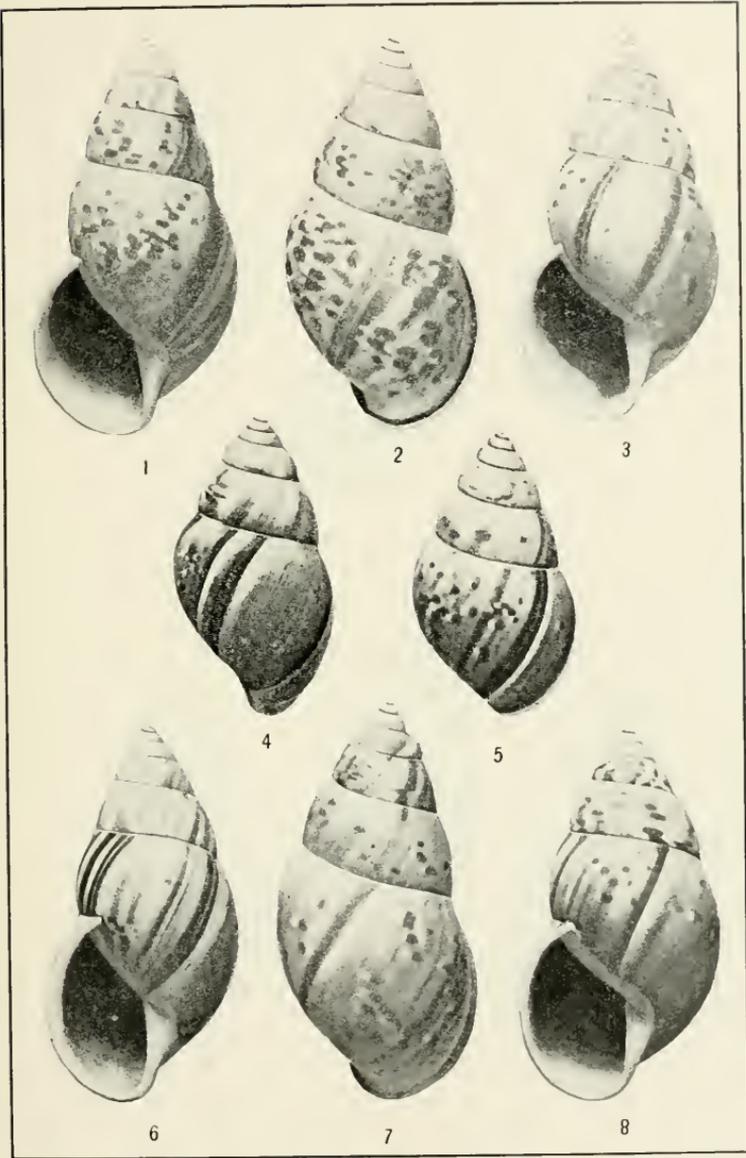
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 40.



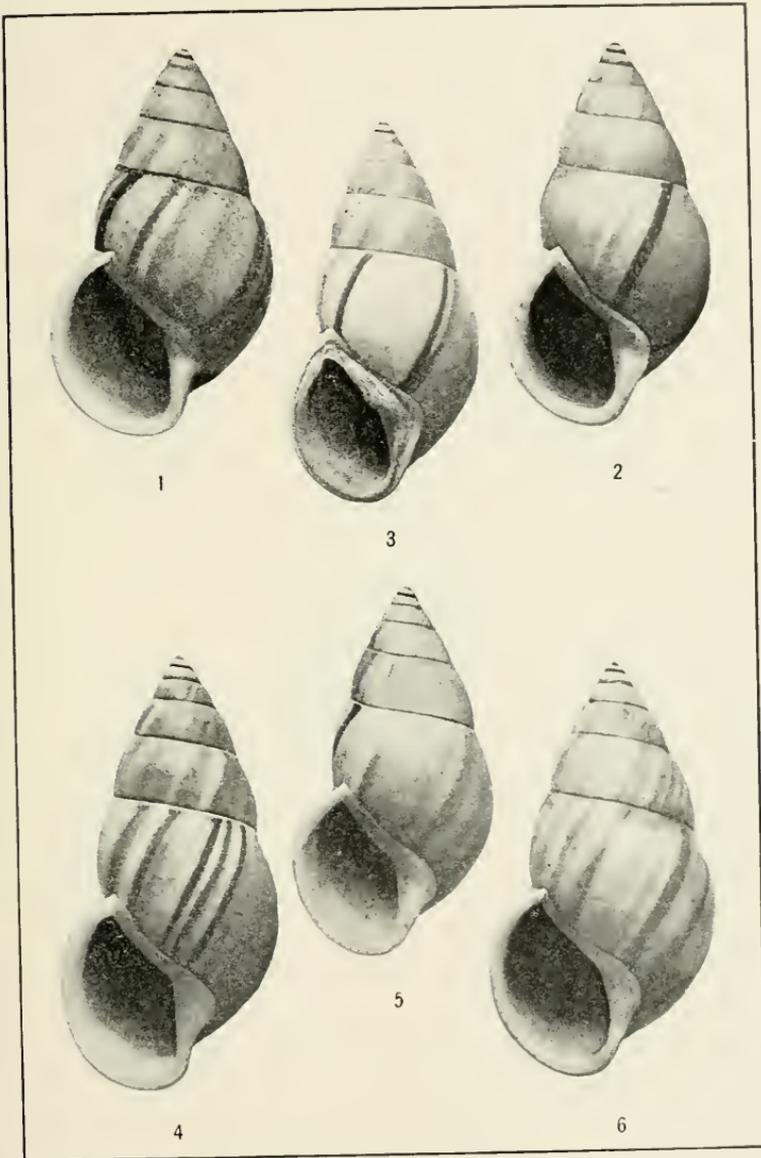
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 41.



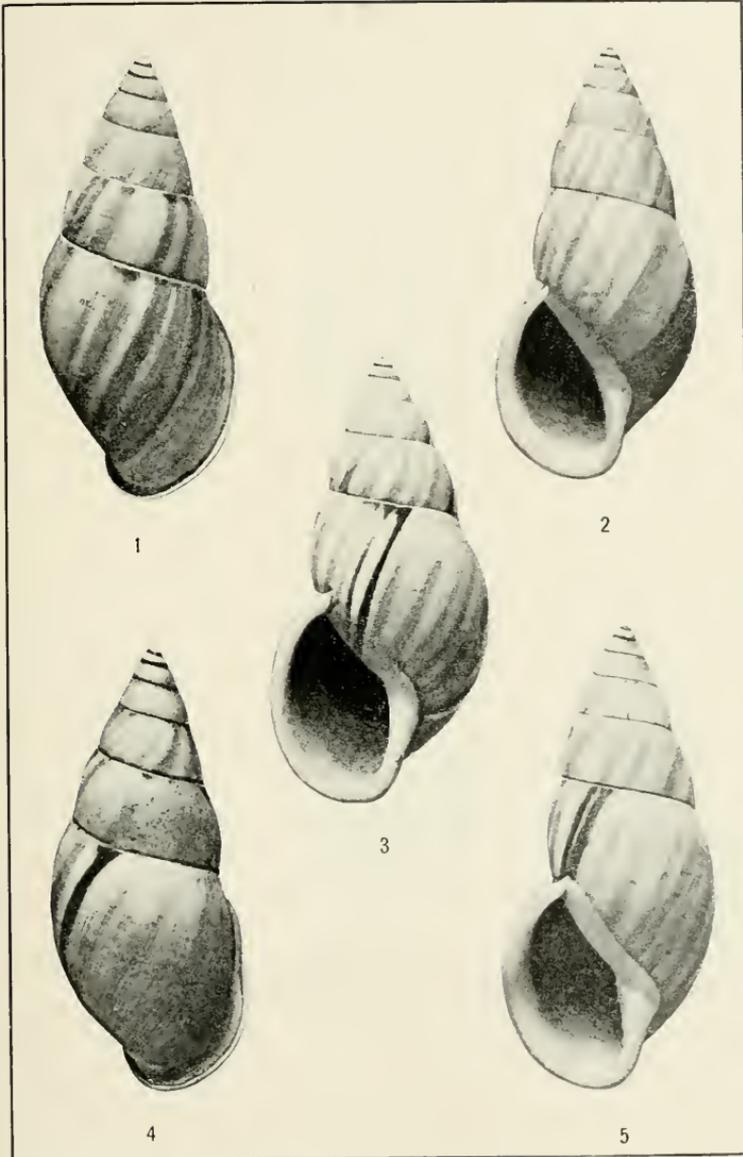
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 41.



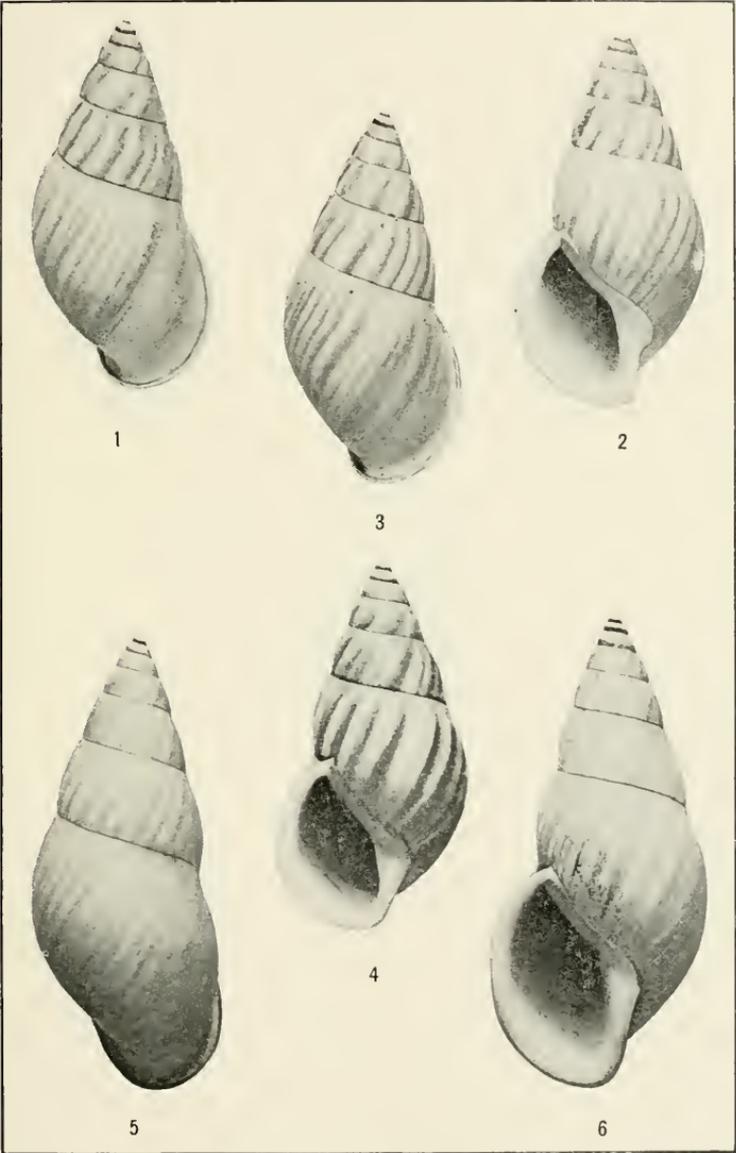
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 41



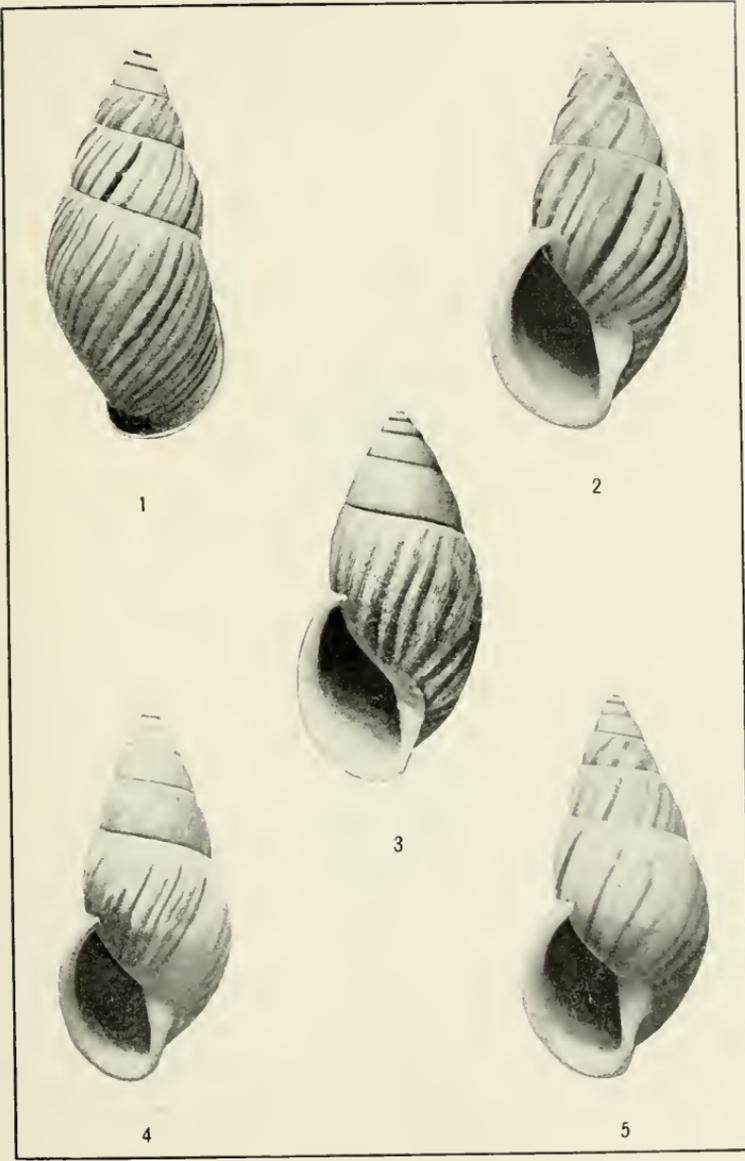
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGES 41 AND 42



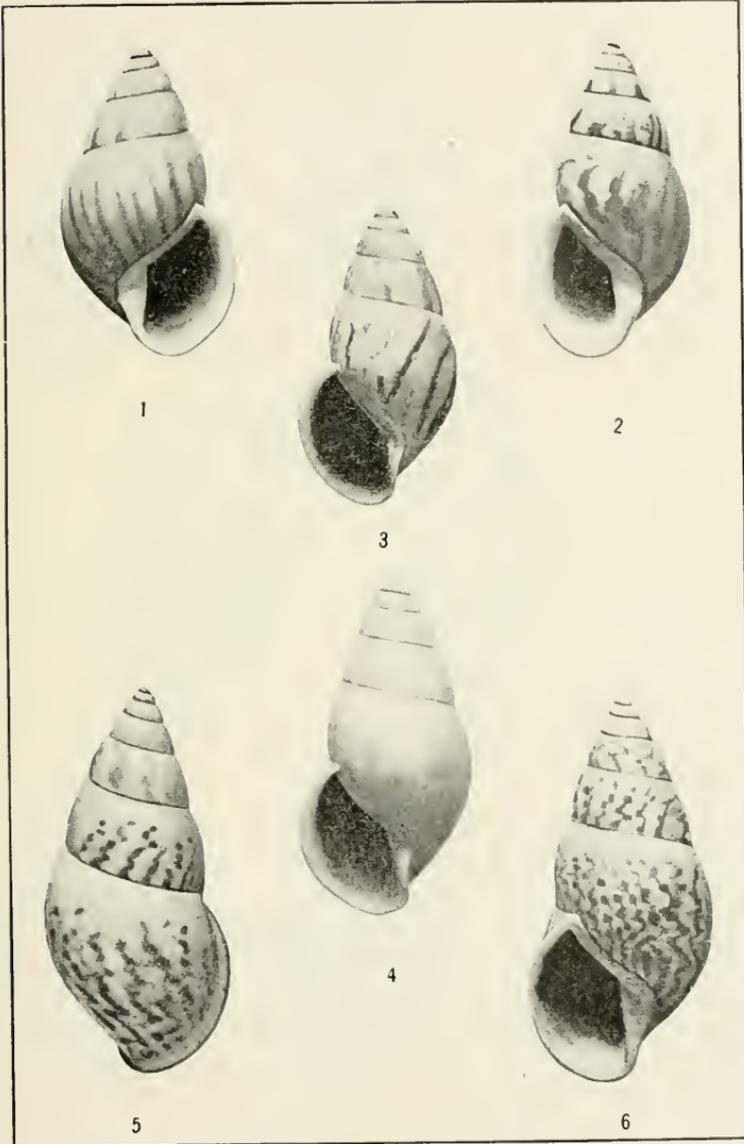
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 42.



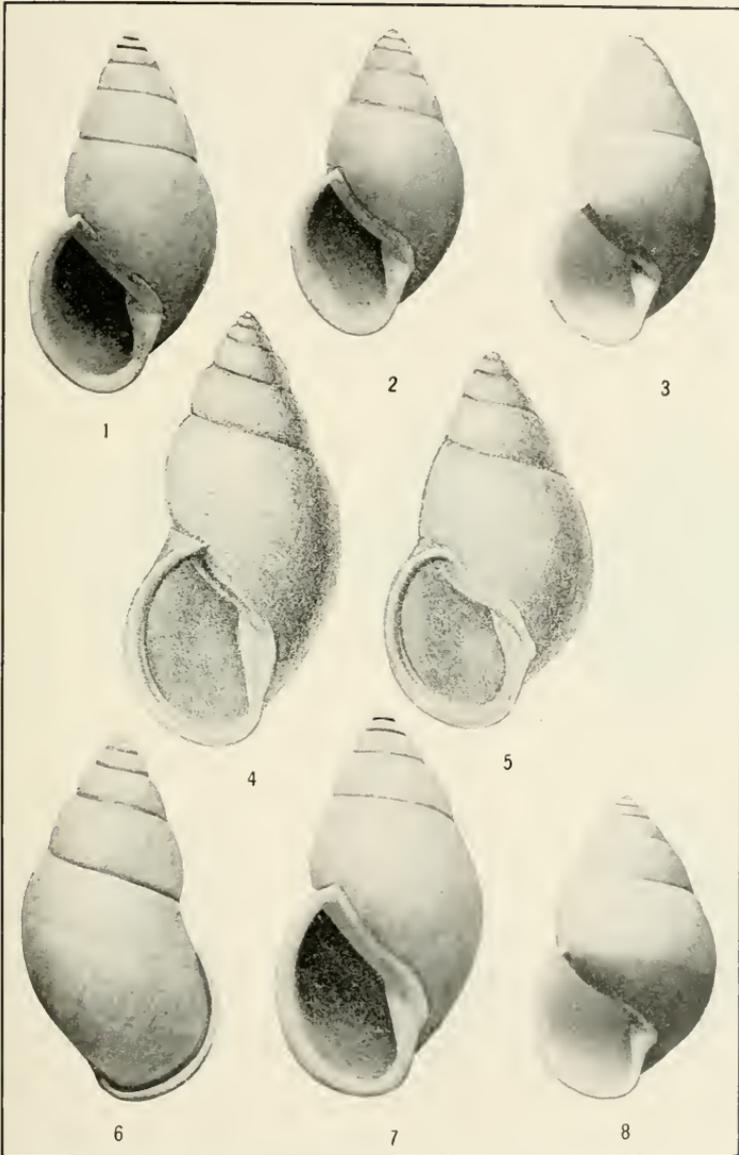
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 42.



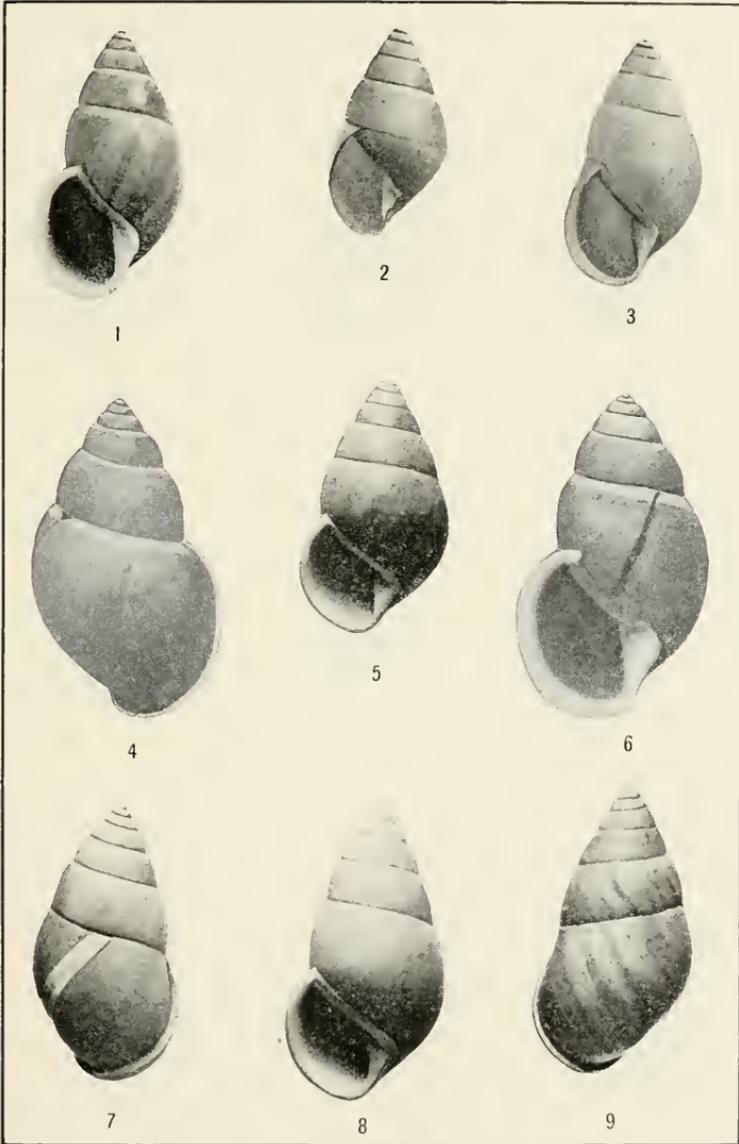
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 42.



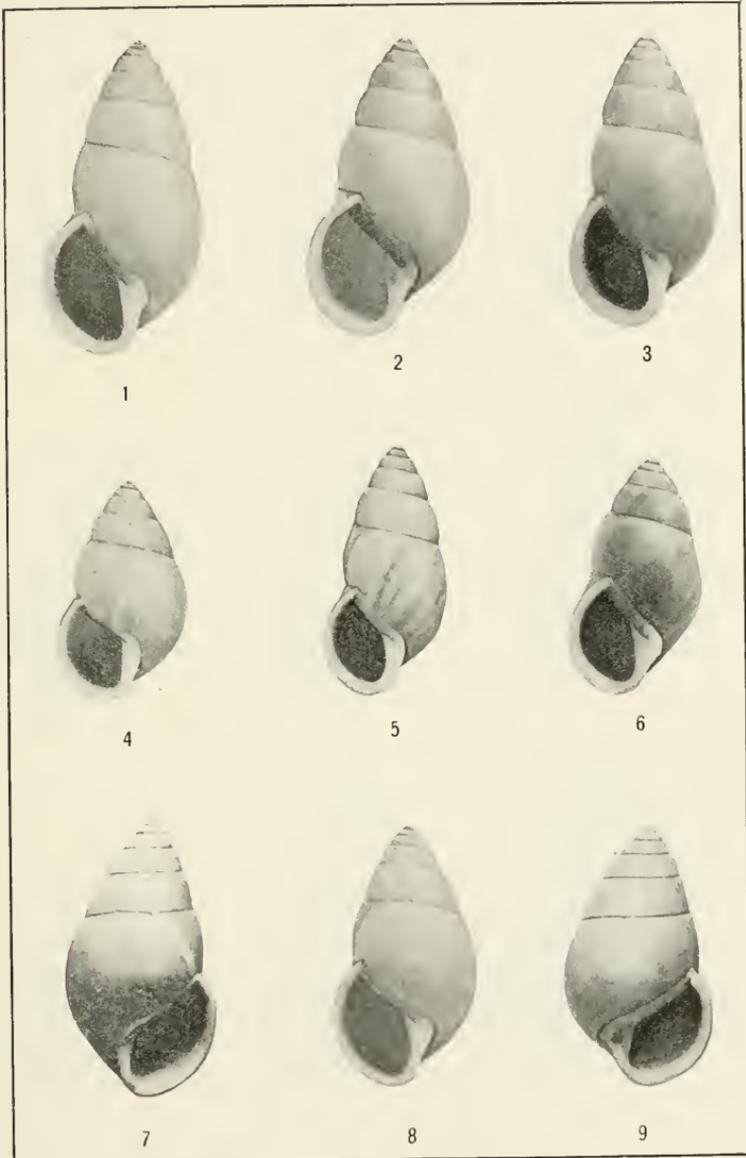
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGES 42 AND 43



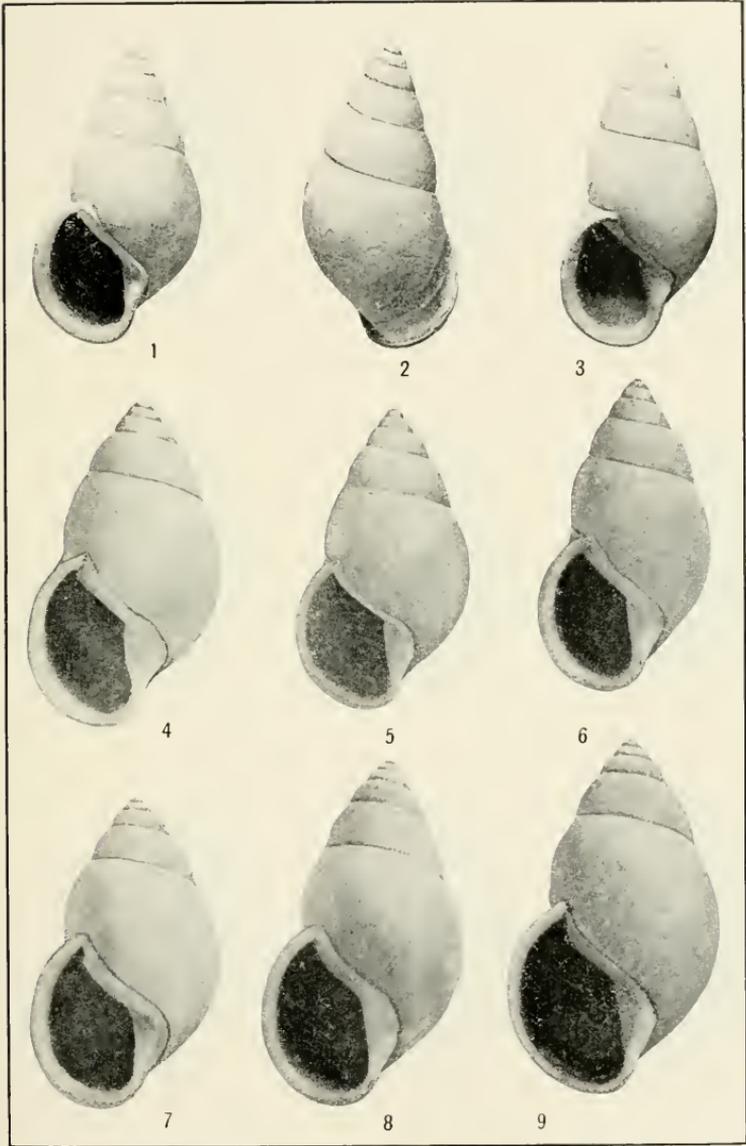
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 43.



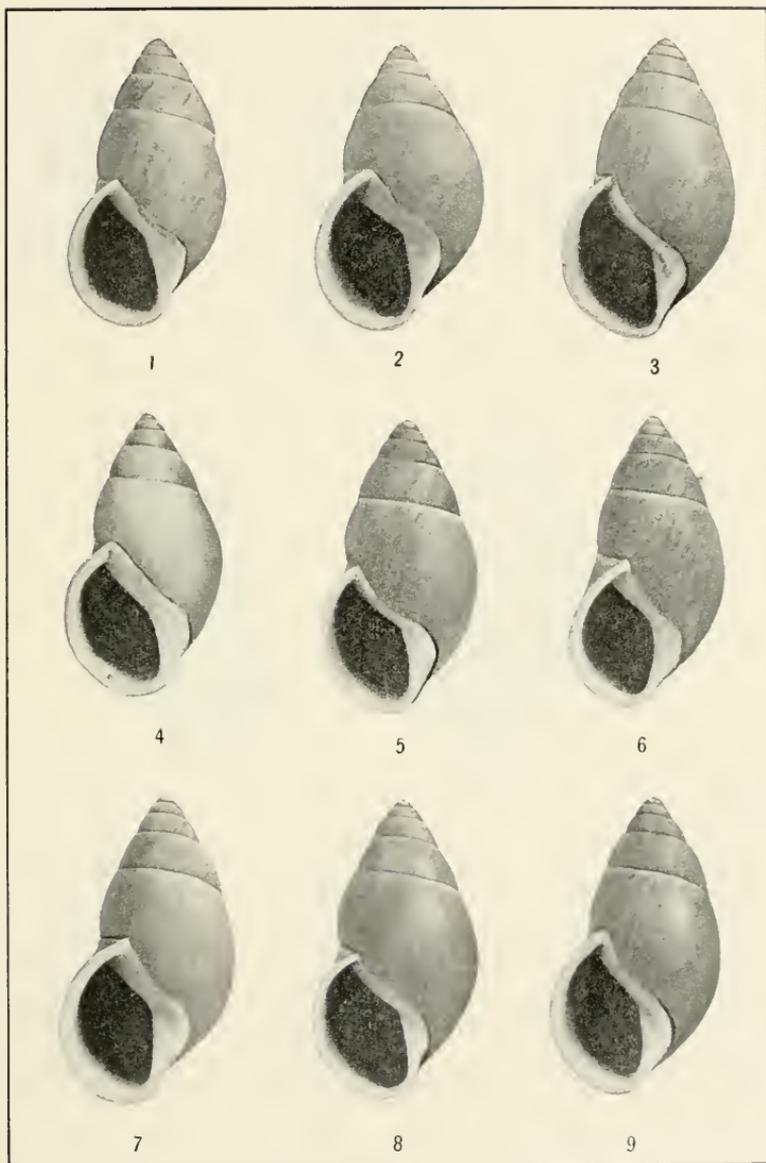
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 43.



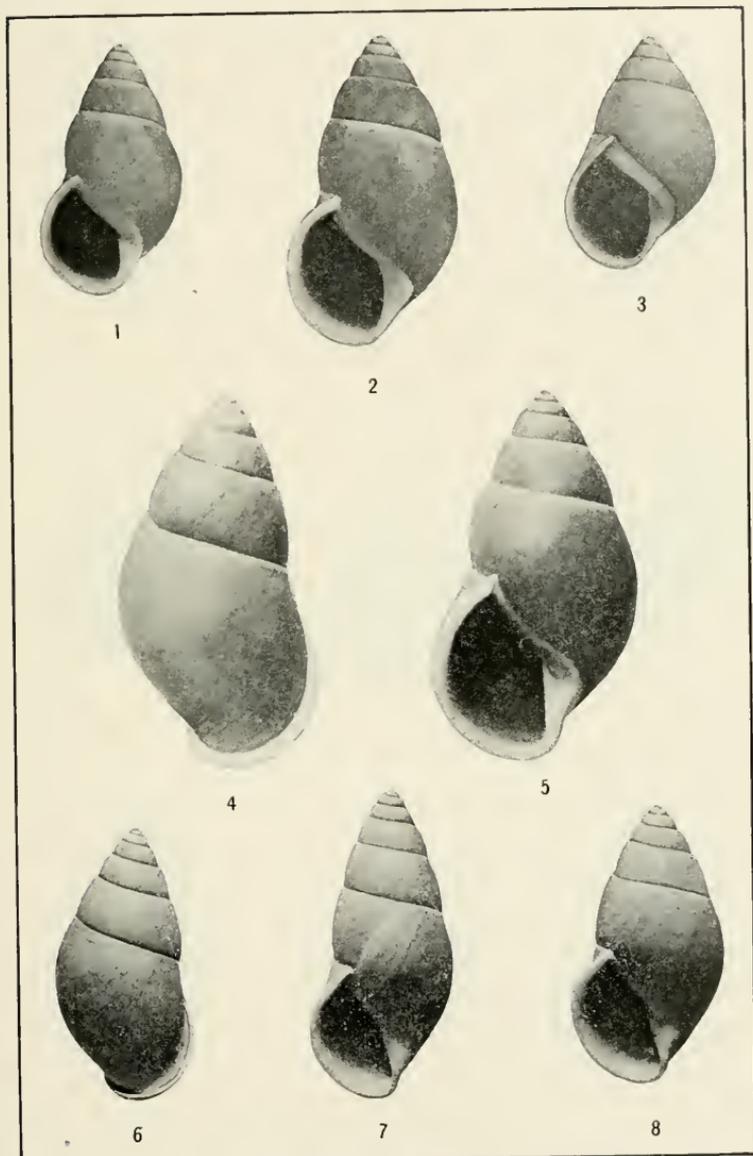
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGES 43 AND 44.



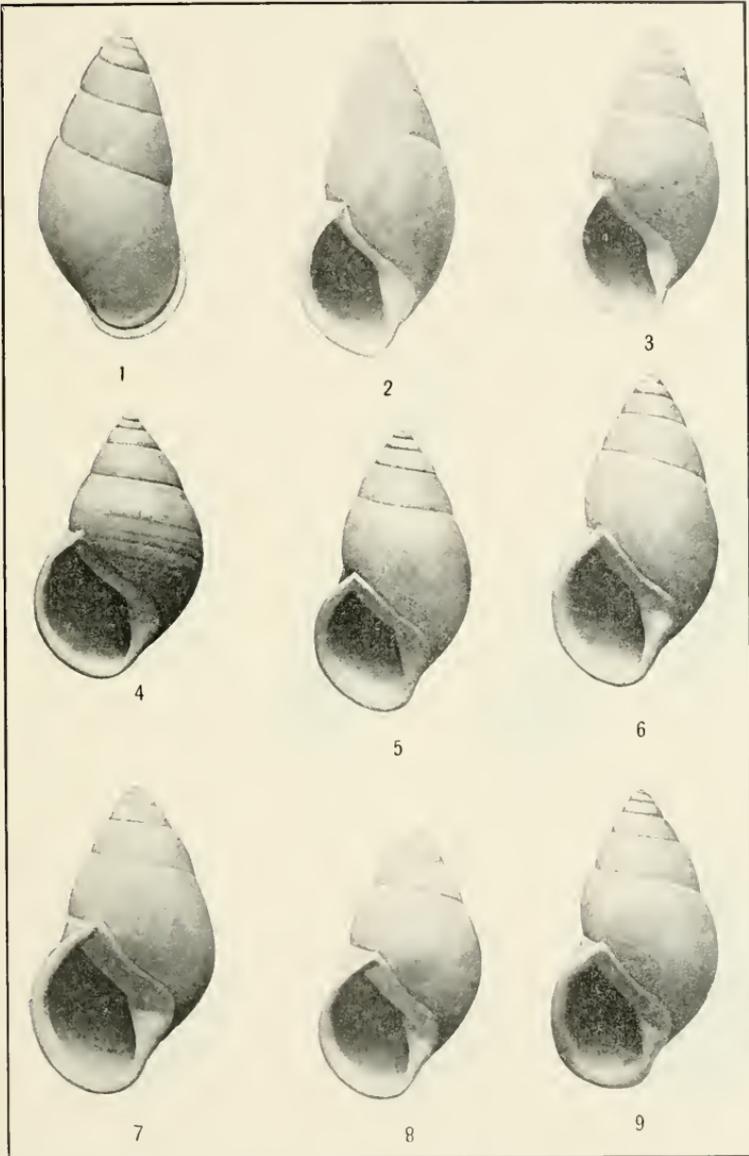
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 44.



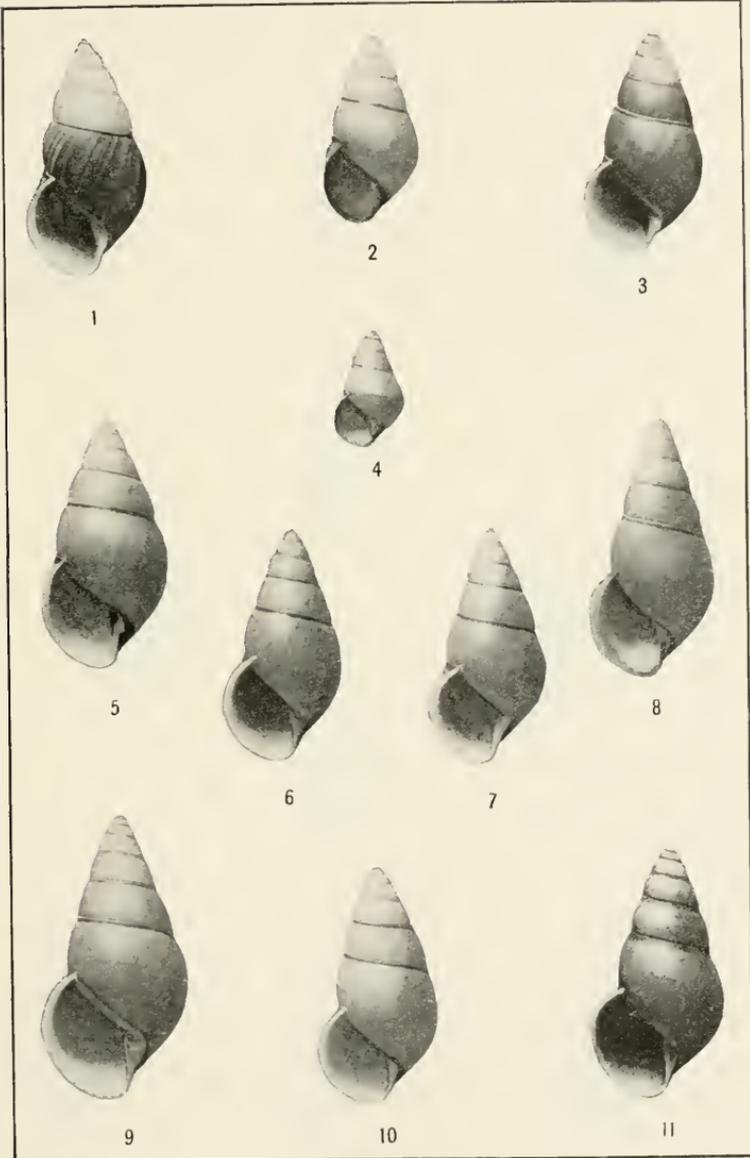
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 44.



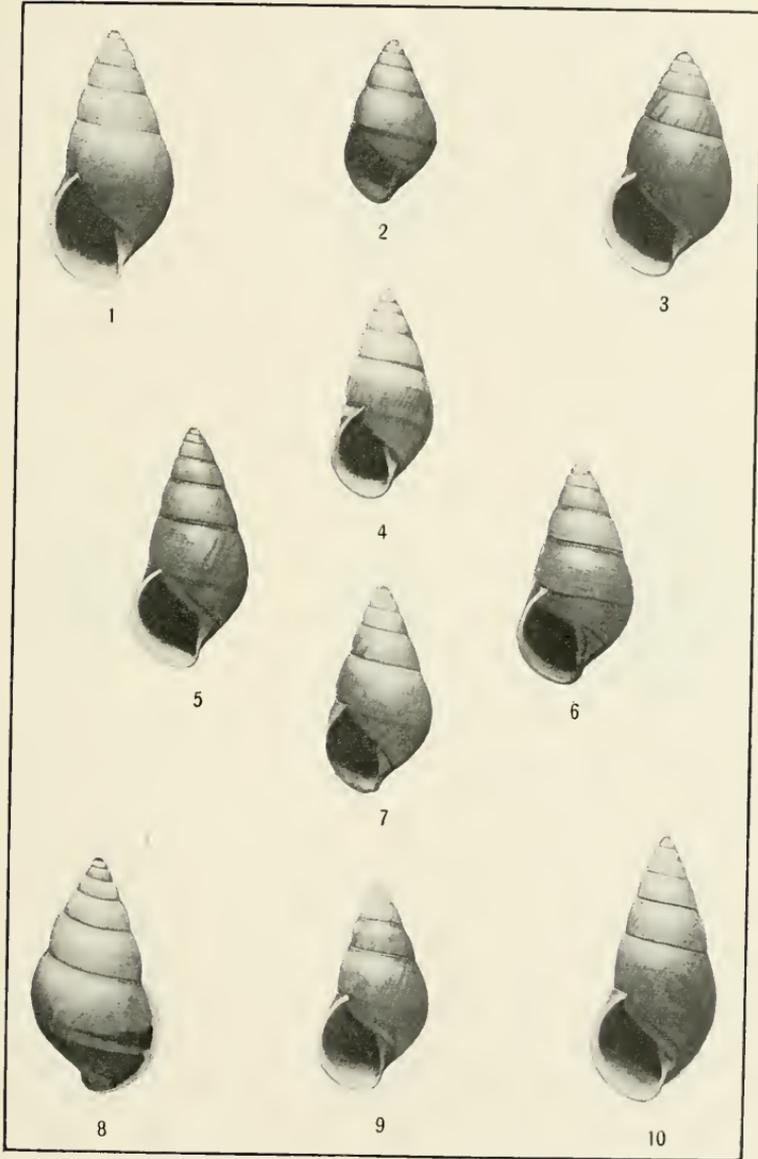
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGES 44 AND 45



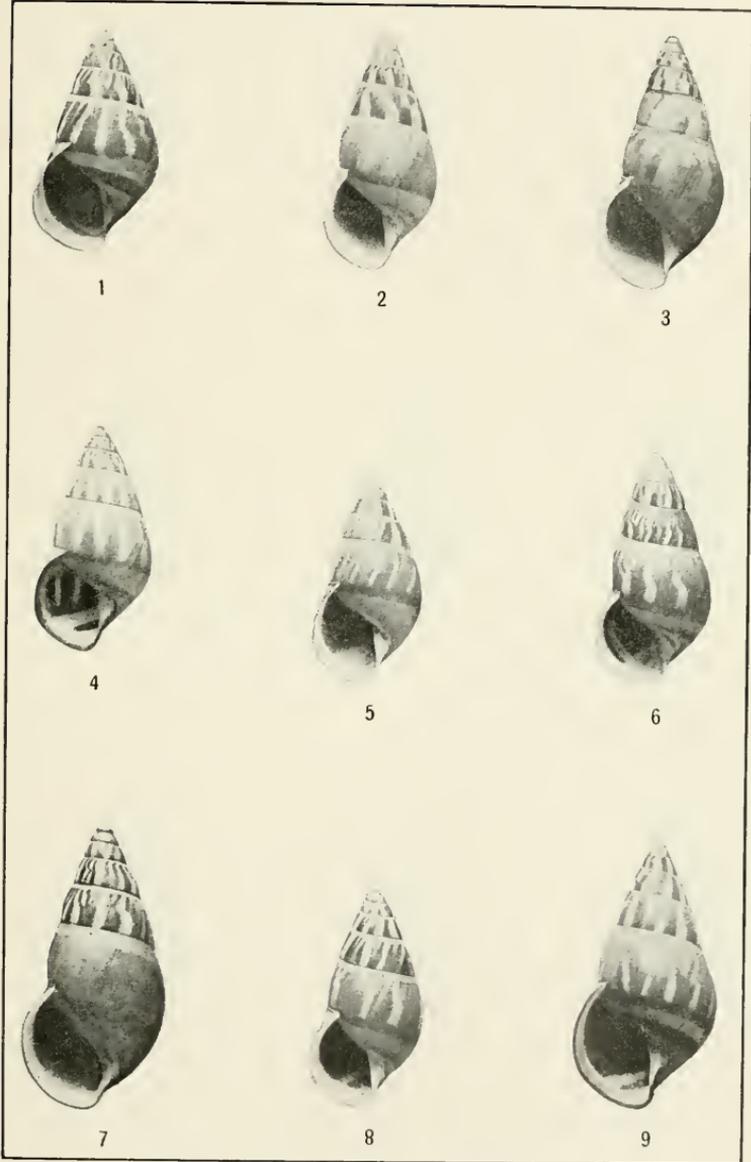
PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 45.



PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGES 45 AND 46



PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 46.



1



2



3



4



5



6



7



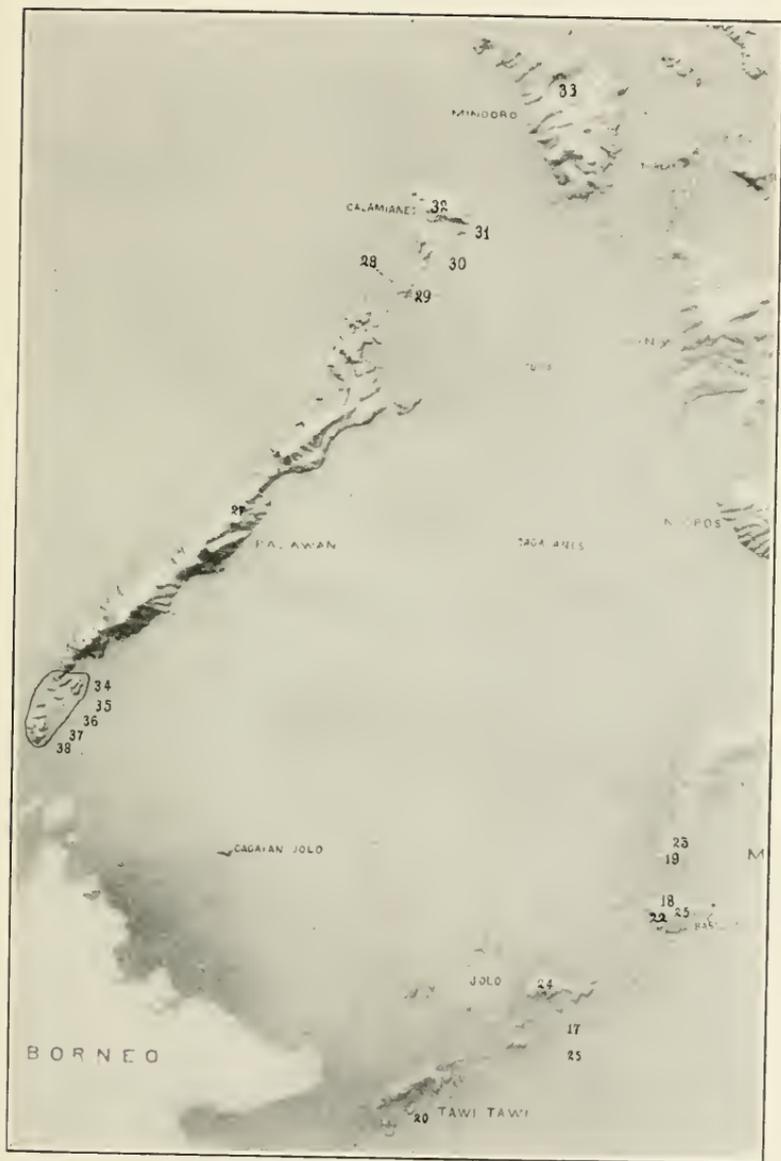
8



9

PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 46.



PHILIPPINE AMPHIDROMUS.

FOR EXPLANATION OF PLATE SEE PAGE 47.

