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SOME NEW SPECIES OF AMASTRA.

BY

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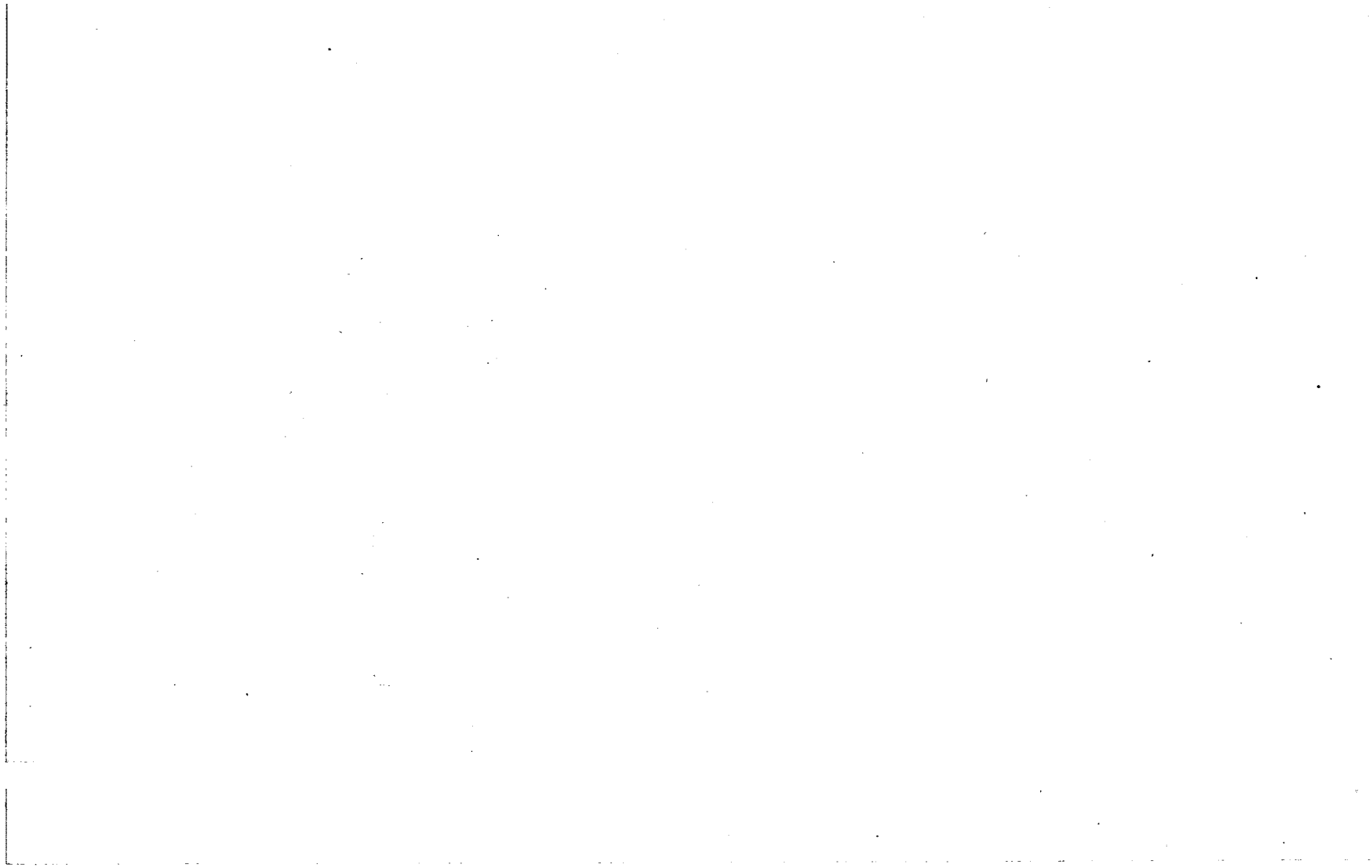

Some New Species of Amastra.

By C. Montague Cooke, Jr.

Nearly all the material treated of in the present paper has come to the Bishop Museum since the visit of Dr. Pilsbry to the Hawaiian Islands in 1913. Six of the species and varieties, found in the following descriptions have been taken alive: two of the species are only known from recently dead specimens: the rest (nineteen species and varieties) are described from specimens found in more or less recent Pleistocene deposits.

All the Holotypes of the following species and varieties are in the collection of the Bishop Museum. The color-terms used in the descriptions of the living species are taken from Ridgway's Color Standards and Nomenclature, 1912. Dr. Pilsbry's classification in the Manual of Conchology, Vol. XXI, has been followed and the proper position of each of the following species can be found by referring to the Systematic List of Amastræ on page 137.

The illustrations were prepared from photographs of the Holotypes. Figures 2 and 3 plate B and 3 and 7 plate C, were photographed by Mr. Dean H. Lake of the Museum Staff, the rest by Mr. R. K. Bonine.

Subgenus Kauaia.

Section Armiella.

A. ricei, n. sp.

Pl. C. Fig. 1.

The shell is imperforate, dextral, elongate, ovate-conic, solid; in fresh dead specimens the color is benzo-brown with a broad, yellowish white band below the sutures and a basal patch of the same color. Spire elongate, with convex outlines and an acute

apex. First embryonic whorl smooth and polished, slightly convex; the second flat with rather strong nearly straight uneven striæ. The post embryonic whorls are regularly and closely sculptured with coarse growth-wrinkles; the last two in addition having very faint close irregular, spiral striæ. The last whorl cylindrical, ascending rather rapidly just back of the peristome. Aperture rather long and narrow, its regularly curved outer margin furnished with a well defined lip-rib. Columella slender, nearly perpendicular, its outer margin impressed into the surface of the shell and furnished near its base with a low, blunt, oblique fold. The latter terminating gradually close to the outer margin of the columella.

Length 24.0, diam. 12.2, apert. 10.9 mm.; 6¾ whls. (Holotype)
" 24.7, " 13.0, " 10.6 " 6¾ "
" 23.9, " 12.2, " 10.0 " 6⅔ "

Kauai: In the Kauaiula branch of Milolii valley (C. A. Rice).

Type and cotype No. 41,993, paratypes No. 16,062, Bishop Museum.

Only five recently dead specimens were taken by Mr. Rice of which no two are exactly similar in the characters of the last whorl. In the type specimen and one other, the last whorl is rounded at the periphery. In a third specimen, there are three narrow parallel furrows on the periphery. In this specimen there is an oblique angle where these lines meet the margin of the aperture, which is flattened above. In the two remaining specimens there is a low oblique keel on the periphery and the last half of the last whorl is slightly shouldered just above the suture. The upper half of the peritome is slightly flattened.

At first glance this species appears to be closely related to *A. anthoni* especially as both species have almost the same color-pattern and the surface sculpture is somewhat similar. In *A. ricei*, however, the form and sculpture of the embryonic whorls is almost like that of *A. knudseni* and *A. kauaiensis*, though the striæ are not as coarse as in either of these two species. It is interesting to note that *A. ricei* is probably a connecting link between the sections *Armiella* and *Amastrella*.

var. r. **armillata,** n. var.

Pl. A. Fig. 8.

The shell is somewhat similar to *A. ricei* with the following differences; the fourth and fifth whorls are slightly swollen, and the surface is more coarsely but not as closely sculptured with growth-wrinkles. The periphery is distinctly carinated on the last whorl; the carina is margined along its upper edge by a deep narrow sinus. The lower half of the last whorl descends rather rapidly, with the carina appearing slightly above the suture. The outer margin of the aperture is distinctly modified by the carina. The upper portion being flattened, the lower evenly arched. The columellar fold is weak, thread-like, very oblique and deeply situated.

Length 22.7, diam. 12.1, apert. 10.0 mm.; 6½ whls. (Holotype)
" 24.6, " 12.0, " 10.0 " 7 "

Kauai: Milolii (A. F. Judd).

Holotype and cotype No. 41,994, Bishop Museum.

This variety is represented in the collection of the Bishop Museum by two dead specimens. It is not known whether they were from a Pleistocene deposit or simply old surface shells. The main interest attached to these specimens is the extreme development of the peripheral carina, so that the external margin of the aperture is modified to a greater degree than in any of the specimens of the typical form.

Subgenus CYCLAMASTRA.

(*Umbilicata Series.*)

A. juddii, n. sp.

Pl. B. Fig. 5.

The shell is perforate, dextral, conic, thin, nearly smooth, irregularly sculptured by distant blunt growth-wrinkles, in its fossil state of a dirty whitish color. Spire conic, with nearly straight outlines. Embryonic whorls worn, nearly smooth, convex; the following whorls slightly convex, the last large, convex,

tapering gradually to the base. Aperture large, very oblique, subquadrate in outline, with a very convex outer margin, and furnished with a thick broad lip-rib, obtusely angulate at the base of the columella and having a thick parietal callus. Columellar fold basal in situation, rather strong, subtransverse, terminating abruptly back of the columellar margin. Umbilicus small, cleft-like nearly closed by the thickened callus of the outer margin of the columella.

Length 11.5, diam. 6.9, apert. 5.5 mm.; 6 whorls. (Holotype) Kauai: (Judd).

Holotype No. 41,995, Bishop Museum.

This species is represented by the single type specimen in the collection of the Bishop Museum and two or three additional specimens in the Judd collection. It is entirely unlike any other species of *Cyclamastra* from Kauai. Its nearest relative appears to be *A. umbilicata* from Oahu. From this species it is most easily distinguished by its flatter whorls, greater proportional width, and broad aperture.

A. thurstoni, n. sp.

Pl. B. Fig. 2.

The shell is narrowly perforate, accuminately turreted, rather thin; spire with convex outlines, slowly tapering to the rather acute summit. The surface is rather strongly and almost regularly plicated, the plicæ are not sharp and gradually diminish in height towards the apex, stopping abruptly at the 2½ whorl. Whorls seven, the embryonic, convex, at first increasing rapidly then more slowly, almost smooth, very faintly striate. The fourth contracted, less convex than the remaining whorls; the last long, tapering towards the base, indistinctly angulate about the margin of the perforation. Umbilicus contracted slightly at its mouth, compressed, narrow. Aperture somewhat oblique, subrhomboidal, furnished just within the outer lip with a thick blunt callus. Columella narrowly triangular. Columellar fold basal in position, oblique, extending nearly to the margin.

Length 14.4, diam. 6.3, apert. 5.5 mm.

Oahu: Manoa, in excavation for Mr. R. Mist's house (Thurston, Oestergard and Cooke).

Holotype No. 40,631, Bishop Museum.

This extremely rare and interesting species is entirely distinc from any other species of AMASTRA. The Pleistocene deposits in Manoa are rather interesting as the shells do not occur in layers as in most deposits but in rather small pockets, containing from a few cc. to maybe half a liter. These pockets are literally full of shells, mostly in fragments, and belong to a number of genera.

A. thurstoni differs from all the other species of *Cyclamastra* by its proportionately long and slender spire and distinct plicate surface. It is not closely related to any of the known Oahuan species, but appears to be related to *A. fragilis* of Molokai, with which it agrees in having a narrow perforation and attenuated spire. It differs, however, in having more whorls, the spire is proportionately more attenuate and the surface more distinctly plicate.

A. gouveii, n. sp.

Pl. C. Fig. 3.

The shell is narrowly perforate, conic, very thin, translucent, irregularly striate, covered with a uniform dresden-brown epidermis, slightly lighter below the periphery. Spire narrowly conic, with an acute apex. Whorls nearly 7, covex; the embryonic distinctly very finely but regularly striate; the rest irregularly striate, the striæ arcuate, blunt; the last whorl rather short, rotundate, bluntly angulate at the margin of the perforation. Aperture rather broad, slightly oblique, with its outer margin almost regularly curved, hardly angulate at its junction with the columella, and with scarcely any thickening along the outer margin of the peristome. Columella straight, narrow, arched above the narrow compressed perforation, furnished near its base with a minute deeply seated oblique fold.

Length 12.4, diam. 6.2, apert. 5.0 mm. (Holotype)

Oahu: Wailupe, east side a little more than half way up the ridge, on the dead leaves of Ki (*Cordyline terminalis*)

Holotype No. 40,547, paratypes No. 40,548, Bishop Museum and in Gouveia collection.

A. gouveii is very closely related to *A. umbilicata* Pfr., and is undoubtedly derived from the same stock, being probably, a high altitude relative of this lowland species. There are a number of

more or less important characters which separate it from *A. umbilicata*. Its spire is longer and more conic in outline. Its last whorl is more rotund and shorter with a flatter base. Its perforation is decidedly narrower and is without the distinct ridge around its margin. Its aperture is wider with a more convex peristome and is decidedly less angular at its junction with the columella; its columellar fold, similar in position, is not as strong, thinner, slightly more oblique and more deeply seated.

The only other close relative from Oahu is *A. sola* Pils., to which it is very closely related. It differs by its longer and more conic spire, flatter and less excavated base. The embryonic shells of these two species are entirely different. Those of *A. gouveii* are longer, more acute, darker colored, much more distinctly striate, and have a proportionally narrower aperture than those of *A. sola*.

A. elephantina, n. sp.

Pl. B. Fig. 3.

The shell is openly perforate, globosely conic, rather thin for a shell of its size, in its fossil state white with the entire margin of the aperture pinkish. Embryonic whorls slightly convex, almost smooth, somewhat darker than the rest of the whorls. Subsequent whorls convex, the penultimate and last are distinctly distantly though somewhat irregularly striate, between the coarser striæ are numerous (6-10) fainter striæ. The last whorl is very large and tapers towards the base, it is contracted along the margin of the umbilicus forming a blunt rounded keel. The aperture is rather small, slightly contracted, with a thick heavy pinkish callus within its outer lip. Columella very broad, furnished near its base with a low thick slightly oblique fold. The parietal margin is covered with a rather thick pinkish callus.

Length 24.4, diam. 15.3, apert. 12.2 mm.; 6⅓ whorls.

Oahu: Waimano gulch (Thaanum).

Holotype No. 40,719, Bishop Museum. Paratypes in Thaanum collection and that of Acad. Nat. Sci. Phil.

The present species is very closely related to *A. antiqua*, Baldwin. It differs, however, in size, more globose outlines and form of aperture which is not as distinctly angulate at the base as

in Baldwin's species. The diameter of the perforation is less in proportion than in *A. antiqua* or its variety *A. a. kawaihapaiensis*.

Only four specimens of this species were taken by Mr. Thaanum in a very rich pocket of fossiliferous earth. The pocket contained about a bushel of earth and in it were thousands of shells and shell fragments.

A. modicella, n. sp.

Pl. A. Fig. 7.

The shell is openly perforate, dextral, thin, fragile. In its fossil state of a pale brownish-white. The embryonic whorls are minutely, though distinctly, striate, convex. The rest of the whorls are convex, sharply and irregularly striate with growth-wrinkles, becoming coarser on each succeeding whorl. Sutures rather deep. Aperture rather large and broad for a shell of its size, with a very convex outer margin, not distinctly biangular as in most of the species of this subgenus. The columella is narrowly triangular with a straight outer margin. Columella fold very weak, diagonal, and extending nearly to the base of the columella. Umbilicus minute, nearly circular, with a rounded edge.

Length 9.3, diam. 5.4, apert. 4.1 mm.; 5½ whls. (Holotype)
" 11.0, " 5.6, " 4.4 " 6 "

Hawaii: Waikii station, in the land of Waikoloa, about 6,000 feet elevation.

Holotype and cotype No. 41,969, paratypes No. 41,970, Bishop Museum.

This species is intermediate between *A. ultima* and *A. fragilis*, the latter from the island of Molokai. It differs from the former by its much smaller umbilicus, slightly more convex spire and the aperture is not as distinctly biangular, Besides the surface is rougher and more deeply sculptured with growth-striæ. It agrees with the latter species in the size of umbilicus and form of aperture. It differs, however, in its less attenuate spire, greater proportional breadth and more compact form.

The specimen from which the second set of measurements was taken is much larger than any of the other specimens and differs considerably from them. It is a loosely coiled shell with an indistinct suprasutural angle on the penultimate whorl. In this specimen the columellar fold is very weak. It is represented by a faint line which does not reach the margin of the columella.

A. umbilicata var. **pluscula,** n. var.

Pl. C. Fig. 2.

The shell is umbilicate. The umbilicus being decidedly wider than in *A. umbilicata;* broadly conic, rather thin, in its fossil state of a light brownish-red color and beginning on the back of the last whorl shading to an almost pure white at the margin of the aperture. The aperture is large, oblique, strongly convex along its outer margin and scarcely angulate below. Columella slightly oblique, furnished with a very minute oblique fold deep within. Umbilicus nearly circular furnished with a distinct spiral sulcus opposite the columellar fold.

Length 13.1, diam. 7.2, apert. 6.2 mm.; 6⅔ whls. (Holotype)
" 12.7, " 7.3, " 6.2 " 6½ "
" 11.4, " 6.4, " 5.2 " 6¼ "

Hawaii: Kapulehu, in the district of North Kona, about 18,000 feet elevation (Gouveia).

Holotypes and cotypes No. 41,978, paratypes No. 41,979, Bishop Museum and in the Gouveia collection.

This species is very common in its fossil state along the government road between Waimea and North Kona. A number of the specimens have such a fresh appearence that it does not seem possible that they have been very long dead. Most of the specimens were found in earth under lava blocks. It differs principally from *A. ultima* by its larger size and less convex whorls. This variety differs from typical *A. umbilicata morticina* not only by its larger umbilicus but also by its proportionally wider and larger aperture which is not distinctly angled below, and its much less developed columellar fold.

Subgenus AMASTRA.
Section AMASTRELLA.
(*Rugulosa Series.*)

A. remota, n. sp.

Pl. A. Fig. 3.

The shell is imperforate, dextral, solid, long-ovate, in its fossil state whitish below shading to a pale russet above and without

any indication of a light zone below the sutures. Spire with convex outlines, blunt. Embryonic whorls large, rounded, smooth, the first increasing rapidly, flattened above. The post-embryonic whorls are slightly convex, roughly sculptured with coarse, slightly oblique, irregular growth-wrinkles, and on the last two whorls encircled by numerous faint spiral striæ, the surface appearing under a strong lens to be minutely pitted; the last whorl cylindrical, tapering very gradually towards the base. The aperture is oblique, narrow, its outer margin furnished with a strong thick and blunt lip-rib. The columella is not as short as in *A. anthoni*, narrowly triangular, thick-callus. The columellar fold is low, blunt, diagonal, nearly basal in position and extends nearly to the margin of the columella.

Length 18.0, diam. 9.3, apert. 8.2 mm.; 6 whls. (Holotype)
" 18.9, " 9.3, " 8.0 " 6½ "
" 17.5, " 10.0, " 8.4 " 6 "

Kauai: Pleistocene deposits of the southwestern bluff of Kalalau valley about 100 feet elevation (Knudsen and Cooke).

Holotype and cotypes No. 41,996, paratypes No. 15,657, Bishop Museum.

A. remota is undoubtedly closely related to *A. anthoni*. It differs from Newcomb's species by its much larger and flatter embryonic whorls, more cylindrical and less conic outlines. There is no doubt that both species are derived from the same stock as the granular surfaces of both are almost identical though slightly coarser in the best preserved specimens of *A. remota*. In two specimens of this species, the aperture is very oblique and narrow, the last whorl descending very rapidly just before terminating at the peristome.

A. rugulosa var. **fastigata,** n. var.

Pl. B. Fig. 1.

The shell is minutely perforate or imperforate, dextral, long-conic, nearly solid, in its fossil state of a pale bluish-white. The spire is conic, with nearly straight outlines, pointed at the apex. The embryonic whorls are extended, convex, nearly smooth, polished. The rest of the whorls slightly convex, irregularly finely sculptured with rather close growth-wrinkles; the last sub-

cylindrical, in some cases, the surface showing an indication of indistinct malleation. The aperture is slightly oblique, rather narrow, with a regular convex outer margin, furnished with a thick strong lip-rib. Columella short, almost perpendicular. Columellar fold submedian in position, rather weak, terminating gradually close to the margin of the columella.

Length 12.5, diam. 6.7, apert. 5.8 mm.; 6½ whls. (Holotype)
" 13.6, " 7.2, " 5.7 " 6½ "
" 10.8, " 6.2, " 5.0 " 6¼ "

Kauai: Pleistocene of Koloa (Stokes); Mahalepu and Kipukai (Cooke).

Holotype and cotypes No. 41,997, paratypes No. 35,809, Bishop Museum.

Very abundant in the Pleistocene deposits under the sand dunes of all the above localities, associated with, but not as abundant as *A. similaris*. This form is for the present placed as a variety of *A. rugulosa*, though it may prove ultimately to be worthy of specific rank. The shells of this variety are for the most part slightly longer and considerably narrower than those of *A. rugulosa* or any of its varieties. The narrow extended embryonic whorls are also a distinctive character. This variety is geographically related to *A. r. normalis*, live specimens of which are still abundant on the northern slopes of the mountain range, which cut off the southern beaches from the rest of Kauai.

A. rugulosa var. **annosa,** n. var.

Pl. A. Fig. 9.

The shell is perforate, dextral, elongate-conic, rather thin, in its fossil state of a dull tawny olive color. The embryonic whorls are nearly smooth, the other whorls (due to the slightly worn state of all the specimens) are indistinctly obliquely and irregularly sculptured with growth-wrinkles. The aperture is diagonal, oblique, slightly contracted above, with a very convex outer margin, furnished with a thick lip-rib. Columella narrowly triangular, slightly bent backwards, its outer margin indistinctly thickened and united with the outer margin of the peristome by a thin parietal callus. Columellar folds weak, oblique, terminating

gradually far within the margin. Umbilicus rather small, semi-circular in cross section.

Length 13.1, diam. 7.4, apert. 6.0 mm.; 6⅓ whls. (Holotype)
" 13.4, " 7.8, " 6.3 " 6¾ "
" 11.3, " 6.2, " 5.1 " 6 "
" 11.2, " 7.0, " 5.0 " 6¼ "

Kauai: Pleistocene deposits of Hanamaulu plains south of Wailua river (Dole and Cooke).

Holotype and cotypes No. 41,998, paratypes No. 19,476, Bishop Museum.

This extremely variable form is abundant in road cuttings on the coastal plain south of the Wailua river. There are several distinct forms found associated in the different deposits. The typical form described above might be considered a distinct species if it did not occur with numerous intergrades of other form which closely approach *A. rugulosa normalis*. A constant differentiating character between all these specimens of *annosa* and *normalis* is the very weak, oblique, deeply situated columellar fold of the former. Some of the specimens of *annosa* at first glance seem to belong to the subgenus *Cyclamastra* but the embryonic whorls are less convex than those of any species of this subgenus.

All the specimens of this variety are openly perforate except those of a rather rare narrow form. The third series of measurements given above is taken from one of the narrow imperforate examples; the first and second series of measurements are of typical examples; while the last is from a specimen which in form and position of the aperture closely approaches *normalis*. In the typical form the aperture is slightly diagonal and contracted above.

(*Flavescens Series.*)

A. flavescens var, **emortua,** n. var.

Pl. A. Fig. 6.

The shell is imperforate, conic, solid. In its fossil state of a very light vinaceous color, the surface nearly smooth, indistinctly and irregularly sculptured with growth-striæ. The spire is elongate-conic, with slightly convex outlines. The embryonic whorls

are very smooth, larger than those of *A. flavescens* and the first is slightly flattened on top. The rest of the whorls are uniformly slightly convex. The aperture is rather narrow, with a regularly curved outer margin which is scarcely thickened within. The columella is narrow, slightly twisted. The columellar fold is strong, oblique, and terminates abruptly close to the margin of the columella. There is a faint indication of an angle on the periphery of the last whorl.

Length 19.2, diam. 10.3, apert. 8.8 mm.; 6½ whls. (Holotype)
" 18.7, " 9.7, " 8.3 " 6½ "
" 18.0, " 9.2, " 7.6 " 6¾ "

Hawaii: Huehue in the district of North Kona, on the northwestern slopes of Hualalai about 1,700 feet elevation (A. Gouveia).

Holotype and cotypes No. 41,971, paratypes No. 41,972, Bishop Museum.

By its size and form this variety is easily separable from *A. flavescens* Newcomb. It is placed as a variety of Newcomb's species on account of its close relationship to *A. f. saxicola*. Paratypes of *saxicola* in the Bishop Museum collection are smaller, narrower and with less convex whorls.

A rather distinct race of *emortua* is found in the same deposit. In this race the whorls are slightly more convex, the surface glossy, and more strongly sculptured. The aperture is smaller and in most of the specimens there is an additional columellar fold above the usual one. The last series of measurements given above is of a specimen of this race. These two races are so intimately connected by intergrading specimens, that it seems unnecessary to separate them.

(*Melanosis Series.*)

A. whitei, n. sp.

Pl. C. Fig. 4.

The shell is imperforate, dextral, elongate-conic, nearly solid, very slightly translucent, light brownish-vinaceous, covered more or less by a cuticle of a dresden-brown color. Spire conic with slightly convex outlines and an acute apex. The embryonic whorls slightly lighter in color than the rest, very slightly convex,

almost smooth, indistinctly and irregularly striate; the later whorls convex, lusterless, sculptured with indistinct irregular growth-lines. The last is slightly angular at the periphery, the angle being continued on the penultimate whorl just above the suture. The aperture is somewhat narrow, the outer lip is regularly curved, slightly thickened within and margined with black. The columella is narrow, flattened and closely appressed to the shell. The columellar fold is rather large, oblique, terminating abruptly at the margin of the columella.

Length 12.6, diam. 6.8, apert. 5.5 mm.; 6 whls. (Holotype)
" 12.1, " 6.8, " 5.5 " 6 "

Hawaii: Kahauloa, elevation 3,250 feet; Keauhou elevation 2,000–2,400 feet (L. A. Thurston and T. C. White).

Holotypes No. 41,964, paratypes No. 39,642, Bishop Museum.

At first sight this AMASTRA appears to be a form of *A. conica*. It differs, however, from *A. conica* and its varieties (*gyrans* and *kohalensis*) in its thicker shell, closed perforation, besides the embryonic whorls are slightly more convex and the apex less pointed. Some of the specimens are more distinctly keeled at the periphery than the holotype. It is, however, in the immature specimens that the differences are more apparent. The shells are broader in proportion to their length and there is a strong distinct keel at the periphery. *A. whitei* has a much stronger, less oblique columellar fold than either *A. c. gyrans* and *A. c. kohalensis*.

An immature specimen with five whorls measures; length 9.3 diam. 5.0 mm. There is a minute perforation below, but the upper part of the columellar is appressed to the shell for more than half its length. *A. whitei* may ultimately prove to be related to *A. melanosis*, which Newcomb claimed to have been collected near the localities mentioned above.

A. coniea var. **gentilis,** n. var.

Pl. A. Fig. 1.

The shell is imperforate or nearly so, elongate-conic, rather solid. In its fossil state the lower whorls are white, gradually becoming darker as they ascend. The spire is narrowly conic, with very slightly convex outlines, the whorls are nearly flat and separated by a very shallow suture. The aperture is rather narrow.

Columella very slender, furnished with a low oblique fold.

Length 13.4, diam. 6.9, apert. 6.0 mm.; 6 whls. (Holotype)
" 14.3, " 6.9, " 6.4 " 6 "
" 13.3, " 6.2, " 5.7 " 6 "

Hawaii: Waikii station, land of Waikoloa about 6,000 feet elevation.

Holotypes and cotypes No. 41,967, paratypes No. 41,968, Bishop Museum.

This variety differs from *conica* by its less convex whorls and absence of a perforation; from var. *gyrans* it differs by its thicker shell and less convex whorls, especially those of the embryonic stage. It is easily separated from var. *kohalensis* by the less convex outlines of its spire, shallower sutures, longer and proportionally narrower aperture, more solid shell and absence of a perforation. The supersutural keel of the penultimate whorl is not as strongly developed in *gentilis* as in *A. conica* and its two varieties. In an immature specimen of five and one half whorls, this keel is represented as a rather faint raised line.

A. spicula, n. sp.

Pl. A. Fig. 2.

The shell is imperforate or minutely perforate, ovate-conic, solid. In its fossil state of a glossy whitish color. The spire is conic with slightly convex outlines, contracted above. The embryonic whorls are almost flat, uniformly minutely striate; the third and fourth whorls are slightly more convex, more coarsely and less regularly striate with growth-wrinkles, the penultimate whorl is very irregularly striate with faint revolving striæ above gradually becoming malleate below. The last whorl is maleate with a distinct angle just above the periphery, the angle being continued just above the sutures of the fourth and fifth whorls. The aperture is rather large with a strongly curved outer margin. The columella is very narrow and slender, the upper portion of its outer margin being appressed to the shell. The columellar fold is rather weak, oblique, terminating rather abruptly near the margin of the columella.

Length 17.5, diam. 10.4, apert. 8.3 mm.; 6½ whls. (Holotype)
" 16.8, " 9.2, " 7.9 " 6½ "
" 18.9, " 10.1, " 8.5 " 7 "

Hawaii: Waikii station in the land of Waikaloa abou 6,000 feet elevation (Judd).

Holotype and cotypes No. 41,965, paratypes No. 41,966 Bishop Museum.

This species does not seem to be closely related to any of th other species from Hawaii. Its pointed apex and the striation o the embryonic whorls place it in the *melanosis series*. *A. senilis* i undoubtedly the closest relative of this species known at present The former is larger, wider and has a rather wide and oper umbilicus.

The specimens of *A. spicula* which have been examined vary considerably in form from each other. They all agree, however in having a closed or nearly closed perforation, and the degree o malleation is fairly constant. The sharp and pointed apex is by far the easiest character by which we can recognize this species. The first specimens were found by Mr. Judd, and it is probably not very abundant as only nine examples have been examined.

Immature specimens of about five whorls are either perforate or imperforate. In perforate specimens the columella is straight and narrow and furnished with a low oblique fold. In imperforate specimens the columella is slightly twisted and is furnished with a low oblique fold. Immature specimens are distinctly angled or carinate at the periphery.

A. viriosa, n. sp.

Pl. C. Fig. 6.

The shell is openly perforate, ovately conical, thick; the color of the cuticle is brussels brown, the under-color of the last whorl is pale olive-buff, the rest of the whorls being of a vinaceous-fawn. The upper part of the spire is almost straightly conic; the penultimate and last whorls are rather strongly convex, slightly shouldered above. The embryonic whorls are nearly flat, almost smooth, much darker than the rest of the whorls; in young specimens, under a strong lens, they are very minutely and almost regularly striate. Later whorls are coarsely irregularly striate and in some specimens the last whorl is more or less irregularly malleate. The aperture is rather small for a shell of its size, somewhat contracted above and without a distinct thickening along the outer lip. The

columella is slightly oblique, bent backwards below and flattened above the perforation. The columellar fold is rather weak, oblique, submedian in position and does not quite reach the margin of the columella.

Length 20.6, diam. 11.7, apert. 8.4 mm.; 7 whls. (Holotype)
" 20.0, " 12.3, " 9.0 " 7 "
" 20.5, " 12.0, " 9.4 " 7 "
" 18.0, " 11.8, " 9.2 " 6⅔ "

Hawaii: Kahauloa and Kealakekua elevation 4,360 feet and near boundary between Keokea and Kiilae elevation 3,700 feet (L. A. Thurston and T. C. White); Keei elevation 2,950 (A. F. Judd).

Holotype No. 41,963, cotypes and paratypes No. 39,661, Bishop Museum.

This interesting species was first collected by Mr. Judd in February, 1915. His material consisting of a single live immature specimen and a few adult dead and bleached specimens. During August of the same year, Messrs. Thurston and White, collected a fine series of this species at the type locality and a few additional specimens at the second locality mentioned above.

A. viriosa is unlike any species so far reported from Hawaii. Its nearest relative is probably the extinct *A. senilis* from Waimea. The latter is a larger species, much more roughly sculptured and has a larger perforation, besides being much broader in proportion to its length.

An immature specimen with four whorls is broadly conic, with a distinct peripheral angle. It measures length 9.1, diam. 8.4 mm. The embryonic whorls are very finely and regularly striate and there is an indication of three slightly raised spiral striæ. The post embryonic whorls are smoother and glossier than the embryonic. The umbilicus is very distinct about half a mm. in diameter and obliquely angled along its margin. The columellar fold is oblique, broad and low and extends nearly to the margin.

A. fragosa, n. sp.

Pl. A. Fig. 4.

The shell is narrowly umbilicate, dextral, conic, very thin, in its fossil state of a pale dirty white. Spire acutely conical, contracted above, with slightly concave outlines and a very acute apex.

The embryonic whorls are elongate, nearly flat, very faintly and minutely striate. The following whorls are indistinctly flattened above, convex below and indistinctly shouldered above the sutures, rather irregularly sculptured with oblique coarse growth-wrinkles. The last whorl is rounded, tapering towards the base aud slightly contracted around the umbilicus. Aperture somewhat oblique, contracted slightly above, with its outer margin thin and regularly strongly arched. Columellar narrowly triangular, its inner margin slightly oblique, the outer margin thin and slightly arched above the umbilicus. Columellar fold not strong, nearly transverse, terminating very gradually at the outer margin of the columella. Umbilicus subcircular, its margin rounded and slightly contracted, enlarged within.

Length 13.7, diam. 8.0, apert. 5.6 mm.; 7 whls. (Holotype)
" 11.8, " 7.2, " 5.2 " 6½ "

Hawaii: Pleistocene at Kapulehu, about three miles north of Huehue and nearly the same elevation (A. Gouveia).

Holotype No. 41,976, paratypes No. 41,977, Bishop Museum.

This species is closely related to the following *A. pagodula*. Immature specimens of both species are similar though the adults have an entirely different appearance. In an immature specimen of *A. fragosa* there is a distinct peripheral keel not quite as strongly developed as in specimens of *A. pagodula* of about the same age. The immature specimens of both species are quite separable as the spire of *A. fragosa* is longer, sharper and slightly concave-conic. In some of the adult specimens of this species there is a slight tendency to form an indistinct angle at the periphery. When this character is present, the margin of the aperture is not modified as the angle disappears before reaching the aperture.

Embryonic specimens of both species exhibit about the same characters. Those of *A. pagodula* are slightly broader in proportion to their length the whorls increasing more rapidly and not as compact or closely coiled as in *A. fragosa*.

A. pagodula, n. sp.

Pl. B. Fig. 4.

The shell is narrowly umbilicate, dextral, conic, thin, in its fossil state of an ochraceous-orange on the upper whorls, the last

lighter colored shading to a broad white patch behind the peristome. Spire conic, with an acute apex and almost straight outlines. Embryonic whorls somewhat extended, flatly convex, the first smooth and polished, the second minutely closely striate. The following whorls are nearly flat, obliquely sculptured with rather coarse irregular growth-wrinkles. The last whorl is short, strongly carinate (the carina appearing above the suture of the last two whorls), with a flattened base, somewhat contracted about the umbilicus. The carina is slightly granulose, flattened below and its lower margin being bordered by a shallow sulcus. The aperture is small, very oblique, distinctly contracted above, nearly quadrate, in outline, the outer margin modified by the carina forming an obtuse angle; above the carina the margin is somewhat flattened, below regularly slightly arcuate, forming an angle with the base of the columella and furnished with a thin delicate lip-rib. The columella is narrowly triangular, its inner margin slightly oblique, the outer margin thin, semierect. Columellar fold large, nearly basal in position, subtransverse, ending abruptly at the outer margin of the columella. The umbilicus is nearly circular, with a rather acute, slightly contracted margin, wider within.

Length 10.9, diam. 7.4, apert. 4.6 mm.; 6 whls. (Holotype)
" 8.7, diam. 7.3, apert. 4.6 " 5½ "

Hawaii: Pleistocene at Huehue about 1,800 feet elevation (A. Gouveia, L. A. Thurston); Puwaawaa (A. Gouveia).

Holotype and cotypes No. 41,974, paratypes No. 41,975, Bishop Museum.

This remarkable species is provisionally placed in *Amastrella* though it and *A. fragosa* might appropriately form the nucleus of a new section or subgenus. Except for the presence of an umbilicus *A. pagodula* appears to be a diminuative *A. kauaiensis*. In some of the specimens there is a slight concavity to the spire. Immature specimens have a much stronger peripheral keel than adults. Some of the specimens appear to have died only recently as the color is antique brown with a broad whitish basal patch about the umbilicus. The embryonic shells are biconic, angled at the periphery and openly perforate. The columellar fold is minute, thread-like, oblique and submedian in position. The specimen from which the second series of measurements was taken, though considerably shorter and having half a whorl less than the type, is an adult shell with a well-defined lip-rib slightly more developed than that of the type. [238]

Section METAMASTRA.
(*Reticulata Series.*)

A. sericea var. anaglypta, n. var.

Pl. C. Fig. 9.

The shell is imperforate, dextral, globosely-conic, solid, roughly sculptured with close narrow growth-wrinkles, above the periphery the striæ are interrupted at close intervals by numerous fine revolving furrows, color bay, with a broad lighter colored indistinct band just below the sutures of the last and penultimate whorls and beginning at the periphery shading into an isabella color near the columella. Spire with convex outlines; the whorls convex, separated by rather deep sutures. The embryonic whorls very finely and closely striate and without spiral furrows. The last whorl rotund, convex, tapering gradually towards the base, smoother and without spiral furrows below the periphery. Aperture narrow, with a strongly convex outer margin furnished with a thin lip-rib, and with a very deep narrow sinus below the columellar fold. Columellar short, twisted, terminating abruptly. Columellar fold rather strong, oblique, situated at the base of the columella and terminating abruptly at the outer margin of the columella.

Length 14.5, diam. 9.2, apert. 7.3 mm.; 6¼ whls. (Holotype)
" 17.0, " 9.5, " 8.1 " 6½ "

Oahu: Punaluu on the trail to Kaliuwaa just below the summit of the ridge (Spalding, Thaanum, Cook).

Holotype No. 41,985, cotype No. 41,986, paratypes No. 19211, Bishop Museum.

This form is provisionally located as a variety of *A. sericea*. There can be no doubt that it is quite closely related to Pfeiffer's species. Its chief difference is that there are more whorls in the variety. An immature specimen with just six whorls measures nearly 14 mm. in length. This variety, with *A. sericea*, is closely related to *A. badia* and *A. undata*. The character of the surface sculpture of the post embryonic whorls is nearly the same in all four forms. The embryonic whorls of *anaglypta* are more finely striate than those of *A. undata* or *A. badia*. *Anaglypta* is easily separated from these two species by its smaller size, more convex whorls and entire absence of an undulating color-pattern.

A. montivaga, n. sp.

Pl. C. Fig. 5.

The shell is perforate or imperforate, dextral, thin, nearly smooth, faintly striate with growth-wrinkles, just below the sutures there is a shallow sulcus which is transversely interrupted by numerous strong striæ which are slightly bent backwards, color chesnut with a yellowish zone around the columella. Embryonic whorls convex, faintly and irregularly striate with growth-wrinkles. The following whorls slightly convex, with a distinct shoulder just above the sutures. The last whorl indistinctly angulate just above the periphery. Aperture slightly diagonal, its outer margin slightly flattened above, curved below, edged with black and furnished with a very thin lip-rib, and forming with the base of the columella a broad sinus. Columella short, narrow, its outer margin straight above, angled just outside the columellar fold. Columellar fold basal in position, not strong, thin, terminating somewhat gradually close to the outer margin of the columella. Umbilicus (when present) minute, cleft-like.

Length 12.4, diam. 7.3, apert. 5.7 mm.; 5¾ whls. (Holotype)
" 13.2, " 7.3, " 6.0 " 6 "

Oahu: Top of Maunakope, the peak as the head of the western Kalihi ridge (A. Gouveia).

Holotype and cotype No. 41,988, paratypes, No. 41,098, Bishop Museum, also in Gouveia collection.

A. montivaga is undoubtedly a dirivative of *A. textilis.* It differs from the latter species by its smaller size, thinner shell, more convex whorls (which are shouldered below), deeper sutures, etc. A specimen of *A. textilis* from the same locality measures length 16.0, diam. 8.2, apert. has 6¼ shorls. The penultimate whorl of *A. montivaga* is slightly shouldered just above its suture but the rest of the whorls do not show this character. In some of the specimens of *A. montivaga* the yellowish zone occupies the whorl of the shell below the periphery.

A. paulula, n. sp.

Pl. B. Fig. 6.

The shell is perforate, dextral, ovate, in its fossil state very light brown, rather thin. Outlines of the spire convex, with an

obtuse summit. Embryonic whorls increasing very rapidly, convex, smooth, under a lens showing no sculpture. The rest of the whorls are convex, separated by a very shallow suture, sculptured almost regularly by fine thin growth-wrinkles. The last whorl large, rotund. Aperture oblique, broad, its outer margin very convex and furnished with a delicate lip-rib. Columella narrowly triangular, slightly oblique, with a concave inner margin, its outer margin erect and straight. The columellar fold strong, nearly transverse, terminating rather abruptly close to the outer margin and near the base of the columella. Umbilicus distinctly open, cleft-like.

Length 9.2, diam. 5.4, apert. 4.3 mm.; 5⅔ whls. (Holotype)
" 9.8, " 5.4, " 4.4 " 5¾ "
" 8.9, " 5.2, " 4.4 " 5½ "

Oahu: Pleistocene of Malaikahana (type locality) (Spalding, Cooke); Kaipapau (Cooke).

Holotype and cotypes No. 41,982, paratypes No. 41,005, Bishop Museum.

This is the smallest known species of AMASTRA from Oahu. Its nearest relative seems to be *A. gulickiana* also from Oahu but found further south. *A. paulula* is easily separated from this species by its much narrower form. It is most easily distinguished from the rest of the Oahuan Amastræ by its small size and proportionately large and almost smooth embryonic whorls. Embryonic shells are of a light horn color with the initial whorl slightly whiter, the largest specimens have about two and one half whorls. They are slightly obliquely angled at the periphery. Above the angle the whorls are very minutely and irregularly striate with growth-wrinkles. The striæ are short extending from the angle to near the middle of the whorl.

A. praeopima, n. sp.

Pl. C. Fig. 8.

The shell is perforate, dextral, globose, very thin and transparent, of a uniform dull brussels-brown color, without a deciduous cuticle. Spire short, obliquely triangular, with slightly convex outlines. The embryonic whorls convex, the first smooth, increasing rapidly, the rest increasing more slowly, minutely transversely

sculptured with rather fine sharp striæ and encircled by about six narrow parallel furrows. The following whorls distinctly marked with almost regular close transverse growth-wrinkles. The last whorl large, swollen, rotund. Aperture very large, more than half the length of the shell, slightly oblique, with a very convex outer margin which is slightly thickened near the base of the columella. Columella straight, narrow, its outer margin free and arched over the perforation. Columellar fold basal in position rather strong, slightly oblique, terminating very abruptly close to the margin of the columella. Perforation narrow, cleft-like.

Length 10.7, diam. 7.8, apert. 6.1 mm.; 5 whls. (Holotype)
" 12.7, " 8.6, " 6.7 " 5½ "

Oahu: Waiahole at the crest of the Koolau range where the trail crosses the ridge (Cooke).

Holotype No. 41,983, cotype No. 41,984, paratypes No. 23,590 and 23,612, Bishop Museum.

The latter measurements given above are of an old dead shell. In this specimen the columella is bent obliquely backwards, the outer margin of the aperture is furnished with a thick strong lip-rib and there is a thick parietal callus. The characters of the embryonic whorls given above were taken from an immature shell with four whorls. In this specimen there is an oblique angle at the periphery. The columella is straight and the columellar fold is more centrally placed than in adult shells. *A. praeopima* is easily distinguished from all the other Oahuan species of AMASTRA. Its closest relative is undoubtedly *A. gulickiana*. The latter has, however, a thicker and less globose shell, much less distinctly and sharply striate and the columella is shorter.

A. forbesi, n. sp.

Pl. B. Fig. 8.

The shell is imperforate, *sinistral*, elongate-conic, thin, in its fossil state pure white. Outlines of the spire regularly, slightly convex, summit rather sharp. Embryonic whorls slightly convex, indistinctly minutely striate. The rest of the whorls slightly convex, finely striate with growth-wrinkles. The last whorl elongate, subcylindrical, rather coarsely striate, descending rapidly near the aperture, forming a rather oblique suture. The aperture is rather

small, narrow, deeply curved below the columellar fold, its outer margin regularly curved and furnished with a strong thick lip-rib. Columella short and broad. Columellar fold not especially strong, rather oblique and terminating gradually just within the margin of the columella.

Length 14.3, diam. 6.9, apert. 6.1 mm.; 6 whls. (Holotype)
" 13.5, " 6.4, " 5.6 " 6 "

Oahu: Pleistocene of Makua in the Waianae mountains (C. N. Forbes).

Holotype and cotype No. 41,980, Bishop Museum.

The material on which this species is based consists of two whole adult specimens and the lower portion of two additional specimens. All the specimens were taken by Mr. Forbes in a single pocket in sand deposits along the railroad track north of Makua. On a later visit by Mr. Forbes and the author, no additional specimens were found though all the exposed surfaces of the sand pockets along the track were carefully gone over. These pockets consist of beach sand covered by talus. Specimens of *Endodonta*, *Lyropupa*, *Succinea*, *Leptachatina* and *Helicina* are very abundant in these pockets, especially of the two last genera.

A. forbesi is easily distinguished from *A. thaanumi* and *montaguei* by its more extended embryonic whorls, narrower outlines, etc. It is separated from *A. elongata* Newc. by its blunter apex and greater length with less number of whorls. From the characters of the shells in Newcomb's description and the fact that he distributed Mauian shells under the name of *A. acuta* (= *elongata*) we are safe in doubting that Newcomb's species ever came from Oahu.

Section AMASTRA, s. s.

(*Magna Series.*)

A. hitchcocki, n. sp.

Pl. C. Fig. 7.

The shell is imperforate, conic-ovate, large, in its fossil state white. The spire is conic in outline above with slightly convex outlines below. The embryonic whorls conic, very finely striate, outlines of the five earlier whorls nearly straight, the two lower convex. The last whorl is rounded tapering towards the base, with very coarse irregular growth-striæ, especially near the aper-

ture, and indistinctly malleate. Aperture not large. Columella nearly straight, furnished with a rather strong slightly oblique fold.

Length 39.0, diam. 21.3, apert. 16.5 mm.; 7¾ whls. (Holotype)

Molokai: Mauna Loa on the southern slope between the top and Pohakuloa (Hitchcock); Hinanaula (G. P. Cooke); in various localities near the north shore from the shifting sands on the northern slopes of Mauna Loa to near Puukapele (Cooke); also collected on the north shore of Molokai (Bryan).

Holotype No. 41,962, paratypes No. 40,356, Bishop Museum.

The original specimen of this species was collected by Mr. D. H. Hitchcock, in May, 1913 and consisted of the aperture and a portion of the last whorl. On four trips to Molokai, the writer tried to relocate the original fossil bed but was unsuccessful. In December, 1914, Mr. G. P. Cooke, found a number of examples at Hinanaulua on the northern coast of Molokai. Unfortunately, the only whole specimen was not quite mature. During March, 1915, the writer spent about three weeks on Molokai, collecting for the most part from the fossil beds of the northern coast from the northwest point of the island to near Puukapele. A number of broken and immature specimens were taken and in addition to these two fine adults. One of these serves as a type of the species and came from the second valley west of Puukapele.

A. hitchcocki is closely related to *A. violacea* but differs in its much greater size, rounded aperture and coarser striæ. Some of the specimens of *A. v. wailauensis* are nearly as large as a *hitchcocki* but the two are easily separable as the outlines of the latter are more conic, the aperture is wider and more rounded, the surface more roughly striate and the columellar fold is stronger and less oblique. The specimens of this species, from the shifting sands and near the northeast base of Mauna Loa, are much smaller than those from the deposits east of Moomomi. An adult specimen from Kulainawawae measures length 32.3, diam. 18.0, apert 14.4 mm.

(*Pullata Subseries.*)

A. uniplicata var. **vetuscula,** n. var.

Pl. A. Fig. 5.

The shell is minutely perforate or imperforate, dextral, conic-cylindrical, solid, in its fossil state white. Spire convexly conic,

contracted above, with a rather sharp point. Embryonic whorls costate, carinated above the suture. The intermediate whorls striate, the last half of the penultimate and the last whorl distinctly malleate, with long narrow obliquely descending facets. The last whorl is rather long, subcylindrical, tapering very gradually to the base. Aperture subpyriform the outer margin slightly flattened, lip-rib strong. Columella narrow, nearly straight, appressed to the shell for nearly its whole length. Columellar fold strong, oblique, tapering gradually and nearly reaching the margin of the columella. The umbilicus when present is minute, cleft-like.

Length 18.2, diam. 9.0, apert. 8.0 mm.; 6¾ whls. (Holotype)
" 20.9, " 9.6, " 7.8 " 7½ "
" 18.5, " 8.6, " 7.5 " 6 "

Molokai: Pleistocene of the shifting sands north of Mauna Loa and directly south of Laina where the pipe line crosses the shifting sands (type locality), Kalainawawae, Moomomi, Hinanaulua and Puukapele (Cook).

Holotype and cotypes No. 41,992, paratypes No. 40,102, Bishop Museum.

A very few imperfect specimens were found by Pilsbry and Cooke in 1913 at Moomomi where this variety is extremely rare. Further west, especially in the shifting sands, it occurs more abundantly but is not a common species in any locality. It has been found sparingly in all the known fossil deposits from Puukapele west to the shifting sands. This variety is readily separated from the typical form by its less tumid last whorl, more cylindrical form and malleate surface. The columellar fold is weaker and does not terminate abruptly. *A. u. vetuscula* may on later examination prove to be of specific rank. It differs from all the specimens of *A. uniplicata* in the collection of the Bishop Museum but none of these are as narrow as the figure of Hartman's specimen.

(*Assimilis Series.*)

A. mirabilis, n. sp.

Pl. B. Fig. 9.

The shell is imperforate, *sinistral*, ovately-conic, the outlines of the spire nearly straight above, convex below. In its dead

state the last two whorls are white, becoming darker above, the apical whorls being of a dark reddish-brown. In two specimens there are traces of a thin dark greenish-brown epidermis. Embryonic whorls flattened, the first nearly smooth, the next distinctly costate, the costæ ending in a carina which is situated well above the deep suture. The rest of the whorls are quite regularly sculptured with fine growth-striæ The last whorl large, rounded. Aperture very oblique, large, nearly one-half the length of the shell, its outer margin quite convex and furnished with a distinct lip-rib. Columella short and broad, with its outer margin closely appressed to the shell. Columellar fold strong, nearly median in position, subtransverse and terminating abruptly close to the margin of the columella.

Length 14.5, diam. 8.7, apert. 7.1 mm., 6 whls. (Holotype)
" 15.8, " 9.0, " 7.3 " 6¼ "
" 15.7, " 9.2, " 7.2 " 6¼ "

East Maui: Just below Kaupo gap along the trail, about 5,000 feet elevation (Meinecke) (communicated by D. Thaanum), (Cooke).

Holotype No. 41,990, cotypes No. 41,991, paratypes No. 38,533, Bishop Museum, also in Mr. Thaanum's collection.

This species is undoubtedly a reversed form somewhat distantly related to species of the series of *A. assimilis*. It agrees closely to the species of this series in the form and surface sculpture of the embryonic whorls. It probably has no close relationship with the numerous Mauian species belonging to the section *Heteramastra*. In immature specimens there is a distinct oblique angle at the periphery. In a single specimen there are indistinct spirally descending facets on the last whorl. *A. mirabilis* is undoubtedly related to *A. farcimen*. It differs considerably in size, compactness and greater proportional diameter. The spire of *A. mirabilis* is contracted and in outline shows a much more acute angle than that of *A. farcimen*. Unfortunately the latter species is entirely unknown to modern collectors. The finding of *A. mirabilis* indicates that Dr. Pilsbry was right in placing *A. farcimen* in the Mauian fauna.

Section HETERAMASTRA.

A. flemingi, n. sp.

Pl. B. Fig. 7.

The shell is indistinctly rimate, sinistral, oblong-turrite, in its fossil state whitish. The spire is elongate, faintly contracted above, with slightly convex outlines. The embryonic whorls are regularly and finely striate, the rest rather smooth with few distinct growth-wrinkles, slightly obliquely angled above the oblique sutures from the penultimate to the neanic whorls. The last whorl elongate, subcylindrical, tapering gradually to the base and showing no trace of a supraperipheral angle. The aperture is narrow, distinctly biangular, with its outer margin regularly curved and furnished with a strong lip-rib. The columella is straight with its outer margin closely appressed to the shell, except at its base. The columellar fold is rather strong, subbasal in position, subtransverse, terminating gradually near the margin of the columella.

Length 13.7, diam. 6.0, apert. 5.2 mm.; 6¾ whls. (Holotype)

East Maui: Pleistocene of Kanaio, about 2,000 feet elevation, two miles east of Ulupalakua (D. Fleming).

Holotype No. 41,989, paratypes No. 40,063, Bishop Museum.

Only three specimens of this interesting species were taken by Mr. Fleming. The type is perfect but the other two specimens are quite badly broken. *A. flemingi* occupies a position between *A. læva* and *A. hutchinsonii* and appears to be more closely related to the former than the latter. It not only larger than *A. læva* but is proportionally narrower and its surface is not so roughly striate, besides the aperture is distinctly biangular. *A. flemingi* differs from *A. hutchinsonii* by its more convex outlines, flatter more compact and closer coiled whorls, narrower and biangular aperture, etc. It does not seem to be in any way related to *A. subsoror auwahiensis*, the latter belonging to the *soror subseries*.

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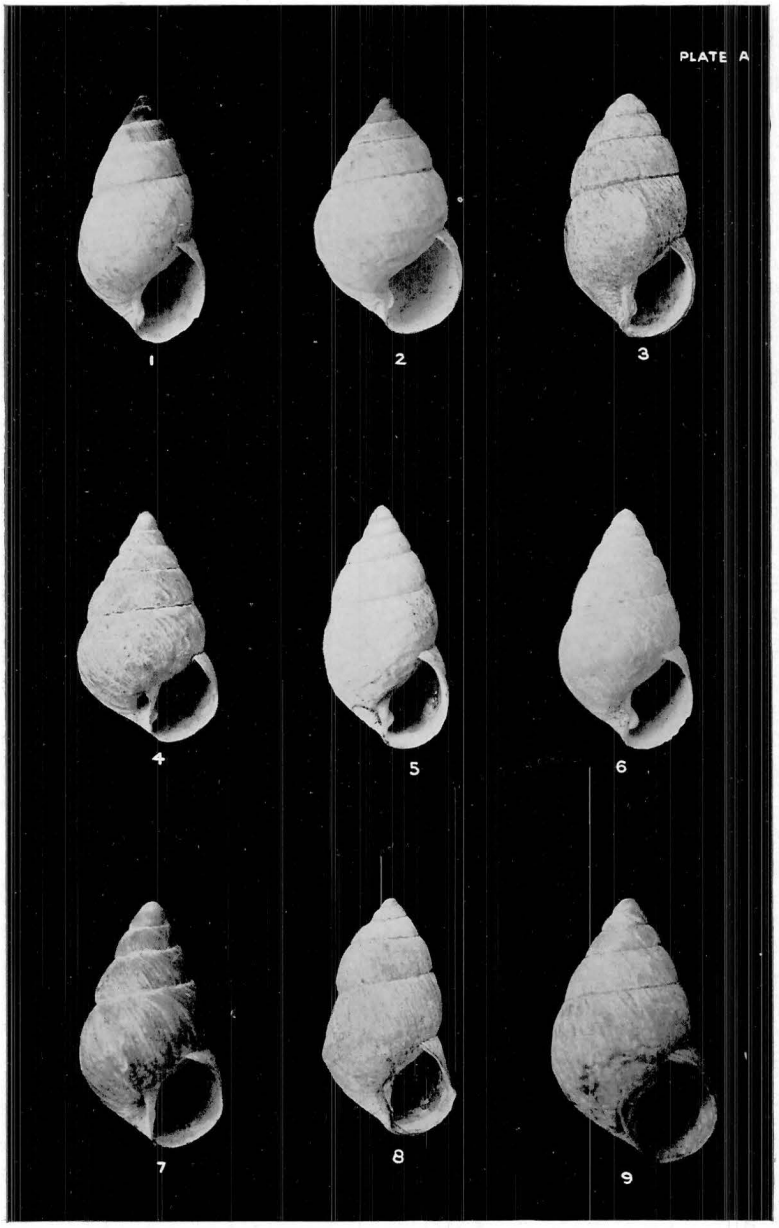
EXPLANATION OF PLATES.

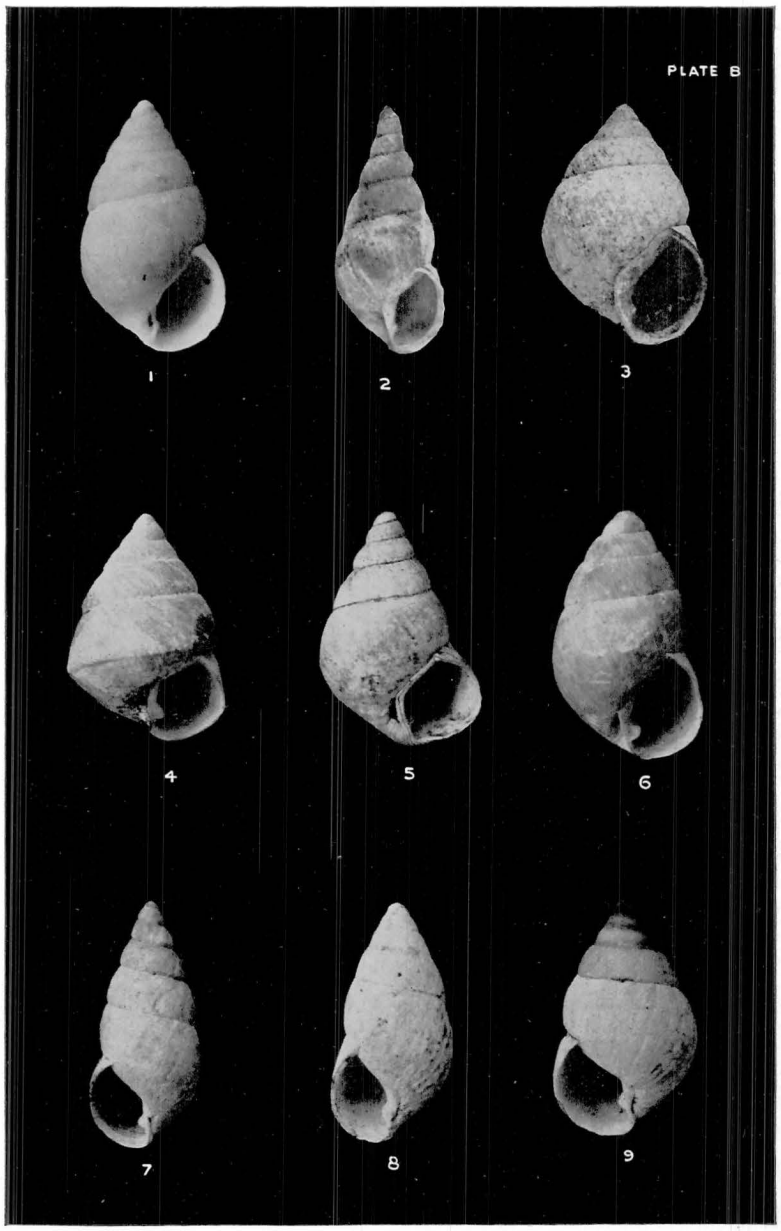
PLATE V. (A)

PLATE VI. (B)

PLATE VII. (C)

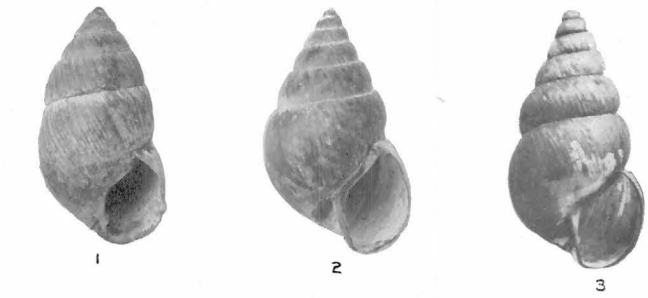


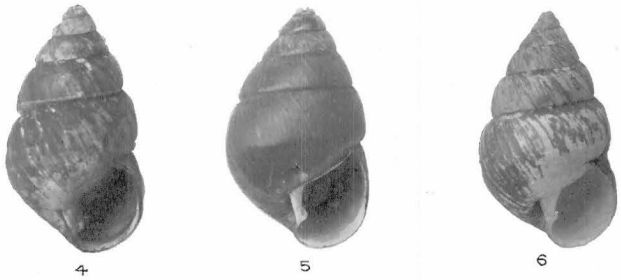
NEW SPECIES OF AMASTRA.

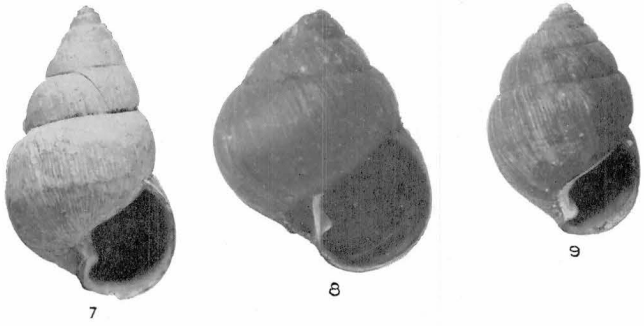


NEW SPECIES OF AMASTRA.

PLATE C







NEW SPECIES OF AMASTRA.