NUMBER 135 FEBRUARY 25, 1923

OCCASIONAL PAPERS OF THE MUSEUM OF ZOOLOGY

UNIVERSITY OF MICHIGAN

ANN ARBOR, MICHIGAN PUBLISHED BY THE UNIVERSITY

THE MOLLUSCA COLLECTED BY THE UNIVERSITY OF MICHIGAN-WALKER EXPEDITION IN SOUTHERN VERA CRUZ, MEXICO, IV

BY H. BURRINGTON BAKER

The introduction and parts I, II, and III of the present paper appeared as number 106 of this series (Feb. 18, 1922). The habitat references (preceded by H) are explained in the introduction. Attention is called to the following errata in the preceding parts:

Page 8, 5 lines from bottom: (?) to precede *U. plicatulus.*

Pages 10, 11, 12: *E. p. crocodilorum,* not *crocodilarum* (corrected by L. S. Frierson, in letter).

Pages 24, 25, 27: *Arotonaias,* not *Artonaias* (correction due to L. S. Frierson).

Page 47, 6 lines from bottom: *Drymæus,* not *Drymacus.*

Pages 48, 49: *E. elegantulus,* not *elegantula.*

Page 56, 5 lines from bottom: *T. hornii,* not *kornii.*

SPHAERIIDÆ

Pisidium atlanticum Sterki. Sixteen specimens from near bank of La Laja, buried in wet humus and leaves at edge of forest pools (H, v, a). The growth-wrinkles on these specimens are considerably coarser than is usual in the species.

PLANORBIDÆ

Planorbis cultratus d'Orbigny. One specimen; on roots of water plants, northern corner of Lake Catemaco (H, vii, d). More or less intermediate between this species and *P. sumichrasti* C. and F., this specimen appears closer to the former. It is somewhat higher than typical *P. cultratus,* and the carination of the outer lips of the aperture is not quite so acute.

Planorbis isabel "Morelet" Sowerby (1879).

P. yzabelensis C. and F. (1879).

Eleven specimens; 10 from pools in burnt-over area (H, v, b); 1 from rocks in shallow water near shore of Laguna de Catemaco (H, vii, d). A peculiar species, with each whorl extensively enveloping the preceding one.

Planorbis retusus Morelet? A single small, broken specimen, but the growth and spiral riblets are well marked; from lowland forest ponds along La Laja (H, v, a), perhaps drifted in from La Laja itself (H, vii, a).

Planorbula orbicula (Morelet). Two rather small specimens; from Laguna de Catemaco (H, vii, d).

Planorbula obstructa (Morelet). Five specimens; from lowland forest pools (H, v, a) and pools in burnt-over region (H, v, b). These correspond very well with Crosse and Fischer's figures.

Planorbula dentiens cannarum (Morelet). Nine specimens; from roots of water-plants, Laguna de Catemaco (H, vii, d).

Although most of the specimens possess the typical, internal callus, none have developed the teeth.

PHYSIDÆ

Physa spiculata Morelet. Seven specimens; from pools in lowland forests (H, v, a) and in the burnt-over region (H, v, b), and from roots of water-plants (Pistia) along the shore of Laguna de Catemaco (H, vii, d).

ANCYLIDÆ

Uncancylus sp.? Several specimens that appear to belong to this genus were found on rocks, etc., near shore of Laguna de Catemaco (H, vii, d). They have been sent to Dr. Bryant Walker for examination.

PUPILLIDÆ

Sterkia bakeri Pilsbry (1921). One specimen, the type, from ground in lowland forests (H, i, a).

Pupisoma dioscoricola insigne Pilsbry. Twenty-three specimens; from leaves of trees in lowland forests (H, i, b) and the savannah brush (H, iii, b). (Identified by Dr. Pilsbry.)

SUCCINEIDÆ

Succinea virgata von Martens. One adult and 4 young specimens; on floating debris in Arroyo Hueyapam, near mouth of La Laja (H, vii, a). The adult measures:

Altitude	Greatest diameter	Height aperture	Diameter aperture
12.3 mm.	59 (7.3 mm.)[1]	67 (8.3 mm.)[1]	47 (5.8 mm.)[1]

From the description and figures, I cannot separate this species from the more southern *S. guatemalensis* Morelet,

[1] As in the previous parts of this paper, the first dimension is given in millimeters, while the remainder are each expressed, as a percentage, in terms of the first; these ratios are followed by the actual measurements in millimeters (in parentheses).

which has the priority. Specimens from Guatemala also are in the A. N. S. P.

Succinea virgata microspira C. and F. (1878).

S. v. pueblensis C. and F. (1878), not *S. pueblensis* C. and F. (1877, 1878).

Eleven specimens; from the banks of La Laja (H, vii, a), and from wet place with water oozing out over rocks, on the shore of Laguna de Catemaco (H, vii, d). Examples measure:

	Altitude	Greatest diameter	Height aperture	Diameter aperture
H. vii, a....	12.4 mm.	62 (7.7 mm.)	73 (9.0 mm.)	50 (6.2 mm.)
H. vii, d....	11.5 mm.	63 (7.2 mm.)	75 (8.6 mm.)	50 (5.7 mm.)

The Latin description of Crosse and Fischer (1878) gives the name of this variety as var. (beta) *microspira* (p. 659), but the French description gives it as var. (beta) *pueblensis;* under the remarks it is again called var. (beta) *microspira.* The plate does not use the varietal name (xxvii-3). Von Martens (1900) re-describes the form as *microspira* n.

Succinea brevis Dunker? One specimen; from grass on the cleared portion of the Hacienda de Cuatotolapam (H, ii, c). This shell has quite the shape of a young *S. virgata,* but is solider and more opaque than are even the adults of that species. The growth-lines are heavy, so as to give the shell almost a ribbed appearance, while the spiral lines are also quite evident. The color (after stay in alcohol) is creamy and opaque, alternating in stripes with a rather dark amber. The shell has almost 3 whorls, and there is a rather definite callus on the columellar margin of the aperture.

OLEACINIDÆ

Streptostyla irrigua similis Strebel. Five specimens; from the ground in the lowland forests (H, i, a). The following is the synonymy of the entire species, as it appears to me:

A. *Streptostyla irrigua irrigua* (Shuttleworth). Typical form.

Spiraxis (*Streptostyla*) *irrigua* Shuttleworth (1852); *Streptostyla i.* C. and F. (1870) and von Mart. (1891).

Streptostyla cingulata Crosse and Fischer (1868, 1870).

The typical forms are those with a stronger tendency toward impressed lines and costulae near the suture; *cingulata* represents the extreme of this phase.

B. *Streptostyla irrigua shuttleworthi* (Pfeiffer).

Spiraxis shuttleworthi Pfr. (1856).

Streptostyla sallei Crosse and Fischer (1868, 1870); Strebel (1878), etc.

These are the larger shells which resemble, to a certain degree, *Streptostyla lattrei* (Pfr.). From the original description, I certainly agree with Strebel's (1878, page 51) observation, that true *shuttleworthi* of Pfeiffer seems closer to *sallei* and *edwardsiana* C. and F., and is not what is ordinarily known by that name.

C. *Streptostyla irrigua edwardsiana* Crosse and Fischer (1868, 1870), and others.

This form is very close to the preceding, but is somewhat more attenuate.

D. *Streptostyla irrigua similis* Strebel.

Streptostyla shuttleworthi C. and F. (1870), Strebel (1878, p. 18), von Martens (1891), etc.

Streptostyla similis Strebel (1878).

As used here, this includes the smaller thin-shelled forms, usually called typical *shuttleworthi,* and also the shells with less prominent spiral, but more prominent vertical, sculpture, which are Strebel's typical *similis.* Strebel's *shuttleworthi* and his *similis* are not different geographical, or probably not even ecological, races, as he mentions specimens of both, obtained in the same lot (p. 19). As the differential characters are very variable, I do not think that a new name is necessary for the form usually called *shuttleworthi.*

E. *Streptostyla irrigua ventricosa* von Martens (1891).

S. shuttleworthi ventricosa von Martens (1891).

A slightly stouter form of what is here called *similis.*

This whole group of forms, all of them described from around Cordova and Orizaba, may be nothing more than variations or ecological forms of a northern subspecies of *S. lattrei*

(Pfeiffer) from Guatemala. The longer and heavier forms (true *shuttleworthi*) certainly approach quite closely that species. However, in all of the specimens that I have seen, *S. lattrei* has the embryonic whorls smaller in proportion to the size of the shell, so that the apex appears sharper than in *S. irrigua*. Also, in the former, the suture is more deeply impressed, and each whorl appears as if shoved up over the preceding one, so that the embryonic whorls look as if they had broken loose along the sutural attachment and slumped down into the surrounding whorls. In addition, in the specimens before me (A. N. S. P.), the columella is more nearly truncate in *lattrei* than in *irrigua,* although the descriptions of different authors disagree on this point. I have not seen specimens of *Streptostyla quirozi* Strebel (1878), but, from the description and figures, it appears to be more closely related to *S. streptostyla* (Pfr.) or *cylindracea* (Pfr.), which comprise a divergent offshoot from the same *lattrei* stock.

My specimens belong to the form *similis,* as used here. They all show some signs of spiral sculpture, but two have the vertical, impressed lines especially well-marked near the aperture, so as to approach typical *similis* of Strebel. Two others slightly approach typical *irrigua,* in that the vertical lines are accentuated near the suture. All are rather small and thin-shelled, and have very faint, wavy varices of darker fulvous on the light amber, general color. The whorls appear to have a sutural border, but the lens shows this is simply due to the transparency of the shell. The largest has a trifle over 6 whorls; it measures:

Altitude	Greatest diameter	Height aperture	Diameter aperture
21.5 mm.	42 (9 mm.)	77 (16.5 mm.)	19 (4 mm.)

Salasiella margaritacea (Pfeiffer) (1857). Four specimens (3 adult); from among leaves and humus on ground in low-

land forests (H, i, a). They were associated with *Streptostyla irrigua similis*. Von Martens' (1891) diagnoses this species as *"laevis,"* but his figure shows the plicatulations, and Pfeiffer's description (1859) distinctly calls attention to them. My specimens show quite definite growth-wrinkles, bounded toward the aperture by impressed lines, which extend up to within 2 whorls of the apex. Traces of very obscure, spiral striations are also visible on the body whorls. The apical whorls are practically smooth, even under considerable magnification. The color of the shells is whitish-horn. They are rather small; the largest have 5 whorls and measure:

Altitude	Greatest diameter	Height aperture
8.5 mm.	42 (3.8 mm.)	71 (6.0 mm.)
8.2 mm.	44 (3.6 mm.)	71 (5.8 mm.)

This species has the shortest spire in the genus, and also has the least-shouldered whorls. Nearest it, in general shape, are *S. guatemalensis* and *S. pulchella,* which differ from it by their somewhat higher spires, more marked sutures, and the flatter, vertical sides of their apical whorls.

S. browni Pilsbry from Panama, *S. guatemalensis* Pilsbry from Guatemala, *S. pulchella* (Pfeiffer) from Chiapas, *S. joaquinæ* Strebel from Vera Cruz, and *S. hinkleyi* Pilsbry from San Luis Potosi, form a series of apparently quite closely related species. As a group, they decrease in size quite regularly from south to north (lengths 12, 9.9, 10.5, 8.5, 8.5 mm. in the order named), while the spire increases in comparative prominence both north and south of the area near the southern boundary of Mexico (length of aperture divided by length of shell equals 60, 66, 67, 60, 50 per cent, respectively, in the order named). The proportion between the greatest diameter and the altitude is quite the same (35 to 37 per cent) in all of

these species, with the exception of *S. guatemalensis,* which is slightly broader (40 per cent).

Euglandina decussata (Deshayes), near subspecies *tenella* (Strebel). Ten specimens, nearly adult, and 21 juvenile specimens; from the ground and the leaves of the trees in the lowland forests (H, i, a and b); dead shells from the burnt-over area (H, ii, a); from the leaves of trees in the savannah brush (H, iii, b), and one dead specimen quite far from the nearest trees on the savannah grassland (H, iv); also from near the Laguna de Catemaco. This species is a rapidly moving form, which appears to cover most of the ground habitats, and goes quite high up into the trees. The juvenile specimens are especially common on the leaves of trees.

ACHATINIDÆ

Opeas beckianum (Pfeiffer) (1846). Seventy adults and some juveniles; mainly from the ground in the lowland jungle (H, i, a), but also from the ground in the savannah brush (H, iii, a) and from near Lake Catemaco. These are quite characteristic of the slender Vera Cruz form (cf. Pilsbry, 1906), but have very distinct costulations on the middle whorls and sometimes quite to the aperture. The apex, under magnification, shows minute, spiral lines in both this species and in *O. gracile.* A figure (Figure 6) of the radula is given; the marginals differ from the laterals, mainly in their reduced size.

Leptinaria martensi (Pfeiffer) (1857). One adult and 8 younger specimens that are probably this form; from the ground in the lowland jungles (H, i, a); also 1 young specimen, from near Lake Catemaco, that is either this form or *L. mexicanum* (Pfr.). The columellar fold appears rather variable in these shells, and the vertical costulae are quite well marked.

BULIMULIDÆ

Bulimulus coriaceus (Pfeiffer) (1857). Two quite typical specimens, except for their grayish color, on the ground in a banana plantation at the edge of the jungle, near Lake Catemaco. The larger measures:

Altitude	Greatest diameter	Height aperture	Diameter aperture
19.8 mm.	52 (10.2 mm.)	49 (9.8 mm.)	34 (6.7 mm.)

Bulimulus coriaceus, var. a. Seven adults and numerous younger specimens, from the Hacienda de Cuatotolapam, show the dark chestnut band poorly, or even lack it entirely. A few young shells of this form were obtained on the ground in the lowland forests (H, i, a), but the majority were collected from the cleared land (H, ii, b) along the railroad track, in sugar-cane and corn fields, and even in the middle of a road, where they were observed, coming up out of the ground in considerable numbers, during a rain-storm. This is plainly a deep-burrowing form, that appears to occur in colonies, and which thrives under conditions of cultivation. Most of the specimens were quite typical in shape, but others were considerably more slender. Examples measure:

Altitude	Greatest diameter	Height aperture	Diameter aperture
15.8 mm.	56 (8.8 mm.)	48 (7.6 mm.)	36 (5.7 mm.)
15.8 mm.	51 (8.0 mm.)	47 (7.2 mm.)	30 (4.8 mm.)

The radula of this form is shown in figure 3. The entocone is represented by a distinct lamella on most of the inner teeth. The radular formula may be given as:

$$C\,\frac{1}{3};\ L\,\frac{15}{2}+\frac{6}{3}+\frac{2}{4+}+\frac{1}{1}=24-1-24.$$

There is no marked differentiation of marginals, but the teeth toward the outside of the radula become smaller, tend to turn inward, and lose the entoconal lamella.

Bulimulus coriaceus, var. b. One shell from the grass on the savannah (H, iv) is very large and slender. It is buff in color and lacks the sutural band. If obtained in larger numbers, it would seem to be worthy of at least subspecific recognition. It measures:

Altitude	Greatest diameter	Height aperture	Diameter aperture
21.7 mm.	47 (10.1 mm.)	41 (8.8 mm.)	30 (6.4 mm.)

Drymæus dominicus (Reeve) (1850). Nine adults and 5 smaller specimens; from leaves of trees in the lowland jungles (H, i, b), in savannah forests (H, iii, b) and dead shells from ground in latter (H, iii, a); also one immature specimen from near Lake Catemaco, and numerous juveniles along Arroyo Hueyapam (H, ii, a). These shells are very variable in coloration; one young specimen has all of the 5 bands present, but the upper 2 are broken into dots; another has the uppermost and lowest absent; two shells have bands 2, 3, 4 and 5, with 2 and 3 broken; while the remainder have only 3, 4 and 5, with 3 and sometimes 4 broken. An example measures: Altitude, 19 mm.; greater diameter, 55 (10.5 mm.).

The jaw and radula were obtained from two dried specimens. The radular formula (Figure 2) is 121—1—121. In one radula the rhachidian tooth bears two cusps and is quite symmetrical, but in the other its symmetry is usually disturbed by the presence of a third, smaller cusp. In all cases, the basal portion is long and slender. The remainder of the teeth cannot be sharply divided into laterals and marginals. Most of them have 4 cusps, but some of the inner three may have only 3; teeth of both types occur in a single longitudinal row. In the outer portion of the radula the second cusp from the inside is larger and more spatulate than the others. The base of all of these lateral teeth is trapezoidal, and the posterior edge is almost as broad as the anterior. The cusp-bearing portion

has a very noticeable thickened prolongation of the outer anterior end. The outermost 2 or 3 teeth are somewhat reduced and have a larger number of cusps. On either side of the center the transverse rows extend obliquely forward, but curve so as to be almost transverse at their outer ends.

Drymæus albostriatus (Strebel) (1882). Twenty-seven larger specimens and numerous immature ones; from the leaves of trees and brush (H, i, b; H, ii, a; H, iii, b), and also (dead shells) from the ground (H, i, a; H, iii, a). These shells are very similar in form to the preceding species and occur with it. The coloration is always distinct. Only two specimens show, around the third whorl, 3 broad, spiral bands, broken by lines parallel to the growth-lines. Some of the shells are quite without brown markings, and even without distinct, milky-white varices, but the majority have quite distinct, and rather numerous, chestnut-brown varices. In addition, my specimens are smaller and somewhat heavier than those of *D. dominicus;* and the spiral striations are not as distinct, above the greatest ventricosity of each whorl, as in that species. The columellar reflection also appears more extensive, and the umbilicus is simply a narrow slit. An example measures: altitude, 14.5 mm.; greater diameter, 52 (7.5 mm.).

The jaws and radulae were examined in two specimens. The radular formula (Figure 1) is 135—1—135. The rhachidian tooth is broader and more recurved than in the preceding species; the distal end bears 3 cusps, the middle one of which is larger than the others. The tooth is usually twisted to one side, so as not to be exactly symmetrical. Most of the lateral teeth bear 5 cusps, but some in the inner three rows have only 4, while some of the outer have 6; the variation in the inner teeth may occur in a single longitudinal row,

but the outer rows are usually more constant throughout their lengths. The body of each of these teeth is attenuate anteriad, so that the base is narrow. The cusps of each tooth are more nearly equal in size than in *D. dominicus*. Each half of the transverse rows is quite straight and extends obliquely anteriad from the center.

For comparison, the radulae from two specimens of *Drymœus multilineatus*[1] were examined. The rhachidian tooth is stout and short; the symmetrical tip is markedly recurved and bears three cusps. Most of the lateral teeth bear 4 cusps, but a reduction to 3 very commonly occurs in some of the inner three longitudinal rows. The enlargement of the second cusp from the inside, on each tooth, is even more noticeable than in *D. dominicus*. The body is attenuate anteriad somewhat as in *D. albostriatus*. The transverse rows are V-shaped; each half extends obliquely anteriad from the center for a short distance and then curves slightly outward. The radular formula is 144—1—144.

Oxystyla princeps (Sowerby). Twenty-two adult or nearly adult and 1 juvenile specimens; mainly from trees in the thick jungles (H, i, b), but also from the partially cleared places along Arroyo Hueyapam (H, ii, a) and the savannah brush (H, iii, b). Dead shells also picked up from the ground in the jungle (H, i, a) and the burnt-over places (H, ii, b). This species appears to be purely arboreal, and I have found it aestivating in cavities in the trees.

These specimens are very variable in color and pattern, but no relations between these characters and the habitat could be made out. The variation may be analyzed as follows:

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[1] A. N. S. P. No. 88,779; Sugar Loaf Key, Fla.; J. B. Clark, May 23, 1921.

A. Apex coloration: from dark chestnut to practically colorless.

B. Varices. These dark bands, which appear to correspond to former resting periods in peristomal growth, are not very prominent in my shells, but as many as 3 occur on some of the specimens. A break in the color-pattern quite commonly occurs at the varices. For instance, in one shell the coloration of the major portion of the spire approaches *trifasciata* Pilsbry, although with less prominent color-pattern, but this changes abruptly, on the last whorl, to a pattern resembling *crossei* von Martens.

C. General coloration. Almost white to light brown; usually this background color becomes darker on the later growth.

D. Flammulations. These may be almost black and quite sharply marked, or each may be surrounded by a diffusely colored border, as if the colors had "run." In some shells the coloration is so diffuse that the flammulations are quite indistinct. One shell is so diffusely colored that the axial bands can only be seen near the varices, while the last whorl shows four indistinct broad spiral zones of light brown.

E. Angle-spots. These may not be identifiable; they may appear simply as three projections of each flammulation on the side toward the aperture; they may tend to become darker than the remainder of the color-pattern, so as to give the appearance of three broken spiral bands (*trifracta* Pilsbry); or they may join up completely (*ferussaci* von Martens). When the flammulations are very indistinct or practically absent, but three well-defined spiral bands are present, the coloration is like *tricincta* von Martens. None of my specimens belong to this last category, but one shell is even more diver-

gent, as it has only the two lower spiral bands on an almost white background. Young shells (2 to 3 whorls) usually have flammulations above the angle and a spiral band below, but two of mine lack the flammulations and I believe correspond to the *tricincta*-like form.

E. Shell-shape. One shell has a distinct scalariform tendency. This is the one mentioned above, with only two spiral bands of color, and the upper of these, which is usually hidden on all but the last whorl, is visible on all of the whorls, and is 3 mm. above the suture on the penultimate one. This shell (last series of measurements) is more elongate than most specimens of *O. longa* (Pfeiffer).

Three of the larger specimens measure:

Altitude	Greatest diameter	Height aperture	Diameter aperture
62.0 mm.	56 (35 mm.)	54 (33.5 mm.)	34 (21 mm.)
55.5 mm.	59 (33 mm.)	55 (30.5 mm.)	36 (20 mm.)
50.5 mm.	51 (26 mm.)	50 (25.5 mm.)	32 (16 mm.)

In two of the radulae examined from adult specimens of this species the peculiar aculeate tendency of some of the inner teeth is apparent (compare Pilsbry, 1902). In the youngest teeth of both specimens the central tooth is of this type. In one, the second lateral on the left side, and the inner three on the right are of this type; while in the other the inner three on the left side and the inner two on the right show this modification. On the other hand, all of the older teeth, towards the anterior edge of the radula, very closely approximate the normal, rounded form (compare Pilsbry, 1902, for Liguus). In the very large radulae of *O. princeps* this can be seen to be due to wear (Figure 4), and the broken edges of the teeth are quite apparent in the middle portion of the radula. The outer teeth tend to lose the point more rapidly than do the inner, and the rhachidian tooth is the last to be worn down to the

normal form, although sometimes evident breaks give exceptions to this.

Pilsbry (1895), in his classic on the Helicidæ, has pointed out that modification of the radula tends to take place from the center out. However, in some groups of snails the radula tends to be concave, as is also the odontophore. This is especially noticeable in the Helicinidæ and Neritidæ, where there are two radular cartilages with a slit between. In these it would seem that the greatest stress would tend to come at two points some distance out from the center on either side.

Coincident with this stress-tendency, the greatest adaptive modification in some groups seems to be, not at the very center of the radula, but at some distance out on either side. Thus, in the Zonitidæ the inner marginals appear to show the greatest modification along certain lines, while in the Helicinidæ the lateral complexes are certainly the most highly specialized teeth. In those radula of this type which show progressive modification within the transverse row, as, for example, in Euconulus and Guppya (Habroconus), the adaptive (?) specialization seems to become less toward the inside as well as toward the outside (compare Part III of present paper).

In *Oxystyla princeps* the radula is concave at the center and wear appears to be greatest some distance out from the center on each side. On account of the high degree of modification of all of the teeth, it is difficult to establish the position of greatest adaptive (?) modification, but it perhaps may be assumed to be near the position of greatest stress. For this reason, I am inclined to regard these lanceolate teeth as vestigial or atavistic rather than as nascent modifications.

The variability in the numbers of these peculiar teeth and their occurrence in some individuals in most of the genera of

Orthalicinæ appear to substantiate this idea. Vestigial or reversional characters are, as a general rule, more variable than new ones. In addition, the sporadic occurrence of these teeth in several genera appears to be most easily explainable by the hypothesis that they may represent an approximation to the ancestral laterals of this subfamily. In younger radulae (from specimens of three whorls) some of the outer teeth are more pointed than is usual in the older specimens, but the aculeate, lateral teeth do not appear to be much more common.

VAGINULIDÆ

Vaginula moreleti Crosse and Fischer (1872). Occurs practically everywhere, but noted in greatest abundance in the grass along the edges of cleared (H, ii, c) and partially cleared (H, ii, a) fields and in the sugar-cane plantings. It is apparently almost noctural in habits, as it was usually collected on wet mornings; but it was also found moving about on rainy days. In addition to these artificial habitats, it was collected from the lowland jungles, mainly on the ground (H, i, a), but also up on the vegetation (H, i, b); from the grass on the open savannahs (H, iv); and from the ground (H, iii, a) and low vegetation (H, iii, b) in the savannah brush.

PLATE I

The magnification of each of the figures is indicated by the hair-line under it; this represents an actual length of 50 microns (.05 mm.).

Figure 1. *Drymæus albostriatus.* The central and the tips of the first laterals. The 1st, 3rd, 28th, 100th and 135th (outermost) teeth on the right side. The V-line shows the arrangement of a transverse row.

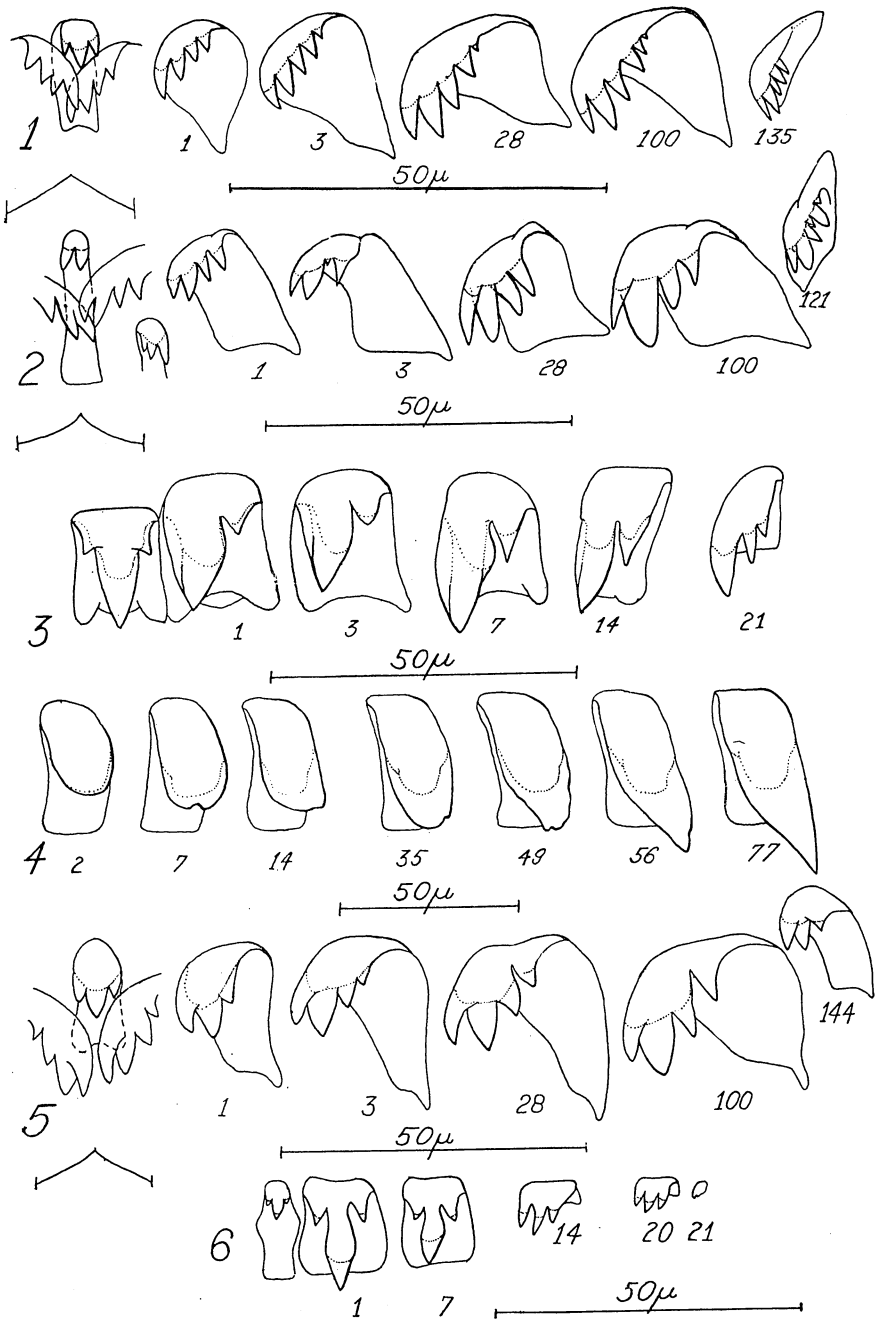
Figure 2. *Drymæus dominicus.* Same arrangement as Figure 1. The tip of a tricuspid central (from another radula) is shown between the central and the first lateral.

Figure 3. *Bulimulus coriaceus.* Central and 1st, 3rd, 7th, 14th and 21st teeth on right side.

Figure 4. *Oxystyla princeps.* Aculeate type of laterals from a single longitudinal row, to show the effects of wear. The 2nd left lateral of the 2nd, 7th, 14th, 35th, 49th, 56th and 77th transverse rows, counting from the anterior end of the radula.

Figure 5. *Drymæus multilineatus.* Same arrangement as Figure 1.

Figure 6. *Opeas beckianum.* The central, the 1st, 7th, 14th, 20th and 21st (outermost) teeth of the right side.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