OSCAR L. CARTWRIGHT
and ROBERT E. WOODRUFF

Ten Rhyparus from the Western Hemisphere (Coleoptera: Scarabaeidae: Aphodiinae)

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ABSTRACT

Cartweight, Oscar L., and Robert E. Woodruff. Ten Rhyparus from the Western Hemisphere (Coleoptera: Scarabaeidae: Aphodiinae). *Smithsonian Contributions to Zoology,* 21:1—20. 1969.—This is the first report of the genus *Rhyparus* (Coleoptera; Scarabaeidae: Aphodiinae) being found in the Western Hemisphere. It is closely related to *Termitodius,* a genus known from Costa Rica, Panama, and Colombia, but easily recognized by characters given. One South American species from Bolivia is transferred from *Termitodius* and nine new species are described and illustrated as follows: *Rhyparus spangleri* from Costa Rica; *opacus* from Mexico; *blantoni* from Panama; *suspiciosus* from Costa Rica; *mexicanus* from Mexico and Costa Rica; *zayasi* from Cuba and Jamaica; *sculpturatus* from Costa Rica; *isidroi* from Costa Rica; and *costaricensis* from Costa Rica and Mexico.

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Ten Rhyparus from the Western Hemisphere (Coleoptera: Scarabaeidae: Aphodiinae)

The first North American species of *Rhyparus* (*zayasi*, new species) was received at the United States National Museum in December 1964 for determination under an erroneous family name after passing through the hands of several different taxonomists. This is not too surprising because the genus had not been reported from the Western Hemisphere, and the species are so radically different from most other aphodiine Scarabaeidae of this area. Surprise on finding the first species has been greatly heightened with the discovery of nine additional species in such a short time since then. All of the American specimens were taken at light so nothing is known of their habits or life histories. In discussing Old World species, however, Arrow (1935) states that, "Probably all of them (*Rhyparus*) are inmates of the nests of ants or termites." Their general appearance would indicate that his observation quite likely was true.

The original descriptions of this genus—then spelled *Ryparus*—and of the first species were read by Westwood in August 1843 before the Entomological Society of London, the same year that Spinola used identical spelling for a genus of Cleridae. R. D. Pope of the British Museum (Natural History), however, has informed us that the actual publication date of the Westwood descriptions was July 1, 1845 (Wheeler, 1912) and that the Spinola paper was reviewed before the French Entomological Society by Audinet-Serville on June 25, 1845. Agassiz emended the name to *Rhyparus* in 1846, as a substitute for *Ryparus desjardinsii* of Dejean (nomen nudum) and *Ryparus desjardinsii* Westwood (1845). Schoenherr's *Rhyparus* (1823) and Dejean's *Ryparus* (1833) are nomina nuda. *Rhyparus* has been used for the aphodiine genus by Schmidt, 1910 and 1922; Arrow, 1935; and other authors since the Agassiz emendation.

World literature lists at least 28 species of *Rhyparus*, most from Borneo, Java, and Sumatra. Others have been reported from scattered localities from Japan to Australia, India and West Africa. Previous known world distribution of the genus is shown on the world map, Figure 1. Fourteen oriental species were discussed and presented in a key by Balthasar (1964). Distributions of each of the species of *Rhyparus* of the Western Hemisphere are shown in Figure 2 (Central American section: Goode Base Map Series, Department of Geography, The University of Chicago; copyright by the University of Chicago). It is interesting that five different species have been collected in Costa Rica.

The American species, though clearly distinct from one another, are similar in general appearance. In all of them the head shows four strong basal tubercles, the pronotum has eight longitudinal ridges with all except the middle pair more or less broken or interrupted across the anterior third. The elytra have eight strong costae separated by flat, punctate intervals, and have deep glandular areas apically. They may be confused only with species of *Termitodius*.

Species of *Termitodius* Wasmann (1894) have a quite different habitus (Figure 4) but are evidently closely allied to *Rhyparus*. Compared with *Rhyparus*, *Termitodius* from Costa Rica, Panama, and Colombia, have a smoother, more shining surface, higher, more

Oscar L. Cartwright, Department of Entomology, Smithsonian Institution, Washington, D.C. 20560. Robert E. Woodruff, Contribution Number 114, Entomology Section, Division of Plant Industry, Florida Department of Agriculture, Gainesville, Florida 32601.

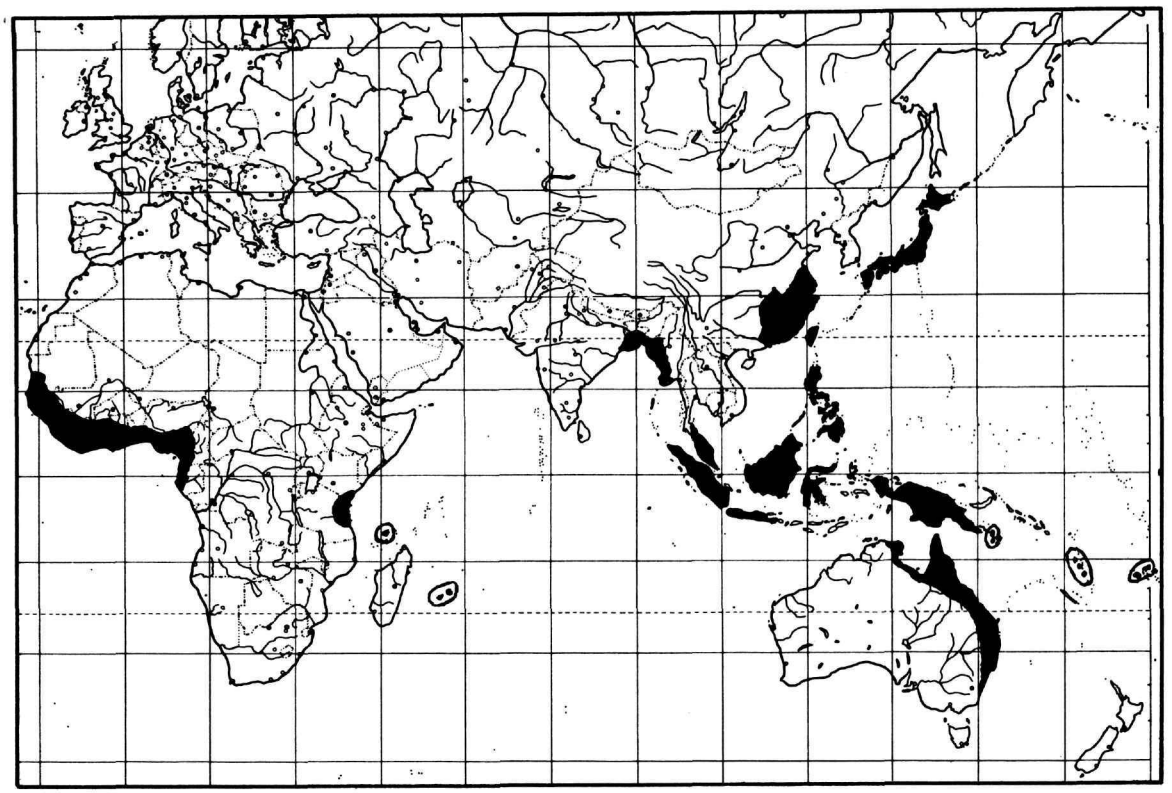


FIGURE 1.—Previous known world distribution of *Rhyparus* as shown by Balthasar (1964, page 604).

prominent pronotal ridges, and elytral costae; are comparatively much shorter in length, pronotum half as long as elytra, elytra two-thirds as wide as long, much wider at anterior fourth; posterior femora longer than abdomen, first segment of posterior tarsus shorter than following four segments combined; and metasternum characteristically almost completely disrupted by nine, large, deep depressions (Figure 3). *Termitodius* are found in termite nests. For comparison the ventral side of *Rhyparus* is shown in Figure 5.

In the descriptions and key to American *Rhyparus*, we frequently refer to pairs of ridges, costae, and intervals. By a pair we mean any given ridge, costa, or interval and its counterpart at equal distance on the opposite side of the midline or elytral suture. Elytral intervals, in comparison with other aphodiine beetles, appear either as costae or flat punctate intervals. In this paper, however, we restrict elytral intervals to mean only the flat, punctate intervals between the costae.

Key to American *Rhyparus*

1. No elytral interval with more than 2 rows of punctures 2
   One or more elytral intervals with 3 rows of punctures 3
2. Elytral intervals shining, punctures large, deep, separated by less than their diameters; Costa Rica . . . . . 1. *spangleri,* new species
   Intervals opaque, punctures small, shallow, more widely separated; Mexico . . . . . 2. *opacus,* new species

3. Second pair of intervals with 3 distinct, complete rows of punctures, or punctures of the 2 outside rows united to form a row of very elongate, transverse punctures 4
Second pair of intervals with 2 rows of more or less circular punctures 6
4. Second pair of intervals with 3 distinct rows of punctures on disc at middle of elytra . . 5
Second pair of intervals with outside rows forming transverse elongate punctures, sometimes all 3 rows uniting; Cuba, Jamaica . . . . . 3. *zayasi,* new species
5. Length 5.3 mm, elytra black, pronotum reddish, 1st and 4th elytral costae very narrowly separated, almost touching, at apex; Costa Rica . . . . . 4. *isidroi,* new species
Length 4.0 mm, uniform reddish brown, 1st and 4th costae widely separated apically by more than width of sutural costae combined; Costa Rica . . . 5. *costaricensis,* new species
6. First pair of elytral costae fine and depressed over middle length, wider and elevated basally and apically; second pair uniformly elevated over disc; noticeably, strongly sinuate over posterior half 7
Costae more or less equal and uniformly elevated except at ends 8
7. Third pair of pronotal ridges completely broken at basal third; Panama . . . . . 6. *blantoni,* new species
Third pair of pronotal ridges complete and unbroken at basal third; Costa Rica . . . . . 7. *suspiciosus,* new species
8. Inner apical angle of 4th pair of elytral costae opposite ends of first pair 9
Inner apical angle of 4th pair of elytral costae opposite ends of the 2nd pair; Costa Rica . . . . . 8. *sculpturatus,* new species
9. First pair of pronotal ridges obliterated over bridge separating the deep fossae at anterior third of pronotum, posteriorly these ridges noticeably arcuate inward; elytra black; pronotum reddish, ridges and costae low, rounded; Mexico . . . . 9. *mexicanus,* new species
First pair of pronotal ridges distinct over bridge separating the fossae, posteriorly these ridges straight, not arcuate; elytra and pronotum uniform dark reddish brown, ridges and costae high and noticeable; Bolivia . . . . . 10. *denieri* (Martinez)

1. *Rhyparus spangleri,* new species

FIGURE 6

HOLOTYPE MALE.—Length 3.1 mm, width 1.1 mm. Narrow, elongate, parallel; moderately shining; reddish brown. Clypeus with double anterior edge, separated by a shallow, alutaceous groove from gena to gena, lower edge with median triangular tooth directed downward and slightly backward, upper edge with 4 low obtuse teeth equally separated, the margin between them arcuately emarginate, the outside 2 separated from the obtusely rounded genae by a shallow notch; disc almost circular, convex, bearing 2 low, elongate tubercles slightly converging anteriorly, disc separated from flat to slightly concave surrounding area by a deep groove; 4 elongate longitudinal tubercle-like frontal ridges, the middle pair separated by their own width, the outside ridges about half again as far away; a deep pit behind gena in front of eye with a furrow back around eye; basal area with a band of moderate punctures separated by their diameters; surface everywhere finely alutaceous.

Pronotum quadrate; 8 low, elongate, longitudinal ridges across the anterior fifth; the middle 6 about equally spaced but outside ridges much farther away and appearing as lateral pronotal margin; all but middle 2 ridges interrupted at anterior third by deep transverse pits, the middle 2 more or less complete but crowded toward each other by the pits on each side, then diverging and continuing almost straight to base of pronotum; the next or 1st interrupted ridge slightly sinuate to base of pronotum; the next ridge strongly arcurate laterally behind pits, interrupted again at basal fourth and ending as an elongate tubercle at base of pronotum; the outside ridge interrupted at anterior third and practically disappearing over posterior third. All pronotal ridges rather subdued compared with other American species, middle 2 not sharply defined; anterior to deep transverse pits, ridges have 2 to 4 moderate punctures between them; there is a single median puncture between first 2 ridges, 2 at posterior fourth and 2 at base; a single puncture on inside at posterior fourth and 1 at base between middle and 2nd ridges; a single deep puncture medially just inside 3rd ridge and 1 at base; a basal puncture appears between 3rd and 4th ridges.

Elytra feebly shining, minutely alutaceous, elongate, margins parallel, length 2.1 mm, width 1.1 mm; each elytron with 4 straight parallel costae between flattened sutural costae and lateral margins; costae gradually

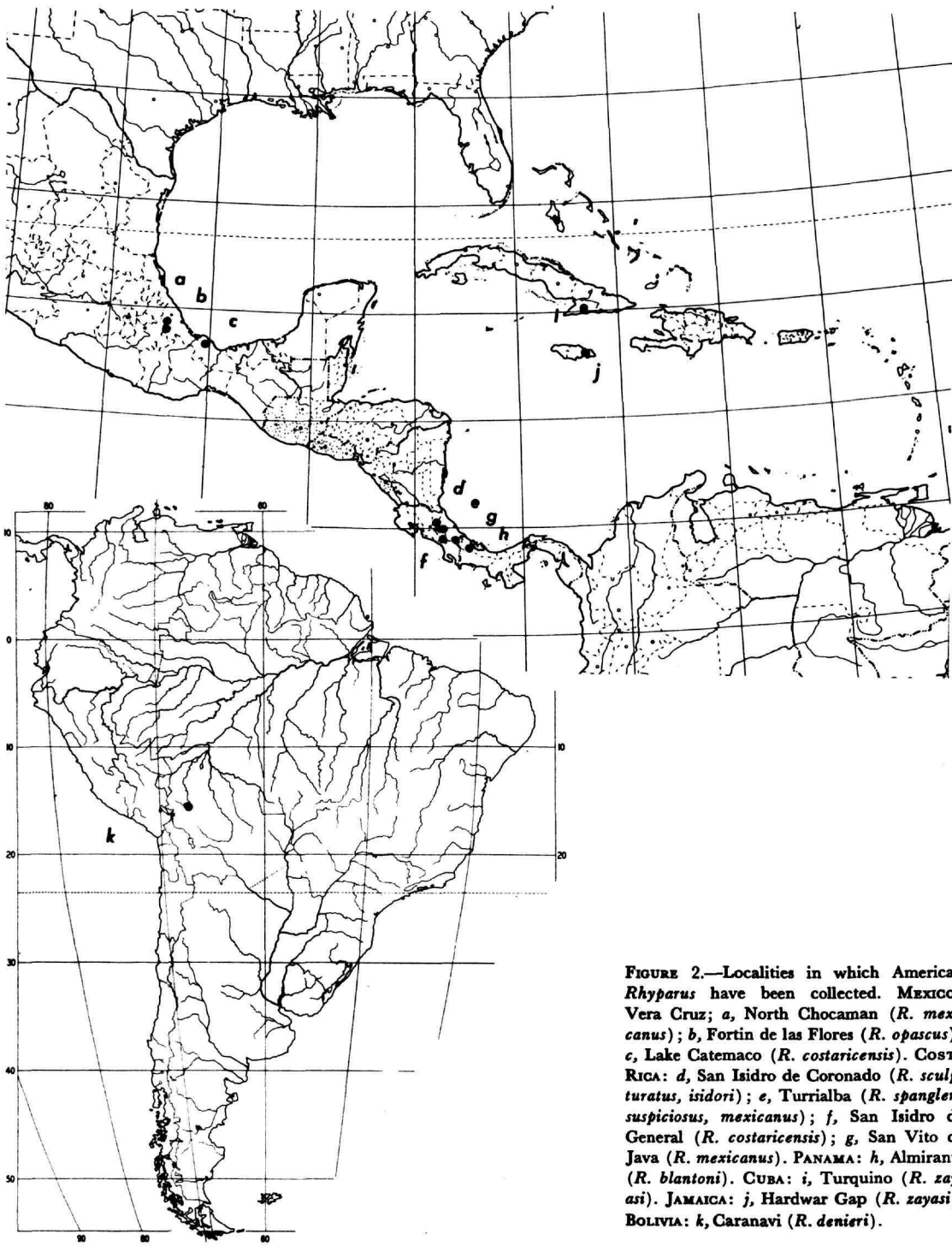


FIGURE 2.—Localities in which American *Rhyparus* have been collected. MEXICO: Vera Cruz; *a*, North Chocaman (*R. mexicanus*); *b*, Fortin de las Flores (*R. opascus*); *c*, Lake Catemaco (*R. costaricensis*). COSTA RICA: *d*, San Isidro de Coronado (*R. sculpturatus, isidori*); *e*, Turrialba (*R. spangleri, suspiciosus, mexicanus*); *f*, San Isidro de General (*R. costaricensis*); *g*, San Vito de Java (*R. mexicanus*). PANAMA: *h*, Almirante (*R. blantoni*). CUBA: *i*, Turquino (*R. zayasi*). JAMAICA: *j*, Hardwar Gap (*R. zayasi*). BOLIVIA: *k*, Caranavi (*R. denieri*).

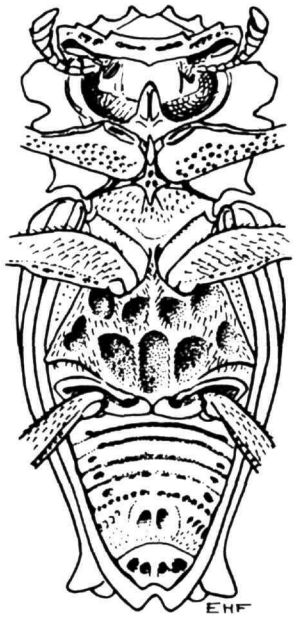


FIGURE 3.—Ventral side of an undescribed *Termitodius* species.

enlarged over posterior fourth; separated by deeply, coarsely punctate intervals, punctures usually separated by less than their diameters and arranged in longitudinal rows, 2 rows on each interval except extreme lateral which has a single row, inner row of punctures gradually much smaller apically and finally merging into a groove or furrow; apically the 4th costa bends upward around the other 3 into an enlarged bulbous end with a triangular margin and joins sutural costa on upper declivity, triangular anterior margin narrowly separated from end of 1st costa, posterior tips of first 3 costae as well as opposite area of 4th covered with yellowish glandular masses which do not quite coalesce, coarse punctures of lateral interval become much larger posteriorly toward suture with 3 or 4 similar punctures above them on the bulbous end of 4th costa. Extremely fine, close, short, decumbent, whitish hairs along each side of costae very inconspicuous or worn away in this species.

Prosternal processes greatly elevated above general surface as in other American species and of similar form, anterior part finely, longitudinally carinate, interrupted medially by an elongate puncture and with a shallow furrow or depression on each side laterally; posterior part forming a 4-pointed star with a coarse puncture in center. Mesosternum shagreened with minute, close, appressed hairs. Metasternum at much higher plane than mesosternum with triangular intercoxal area connected anteriorly with vertical carina to lower plane of mesosternum; 2 large, deep pits and moderately deep lateral furrow narrowly separated behind middle coxae; lateral furrow turning inward undercutting interior area at posterior angle, then continuing inward along posterior edge about two-thirds distance to midline; midline deep and moderately wide, continuing forward from posterior margin three-fifths length of metasternum, surface otherwise relatively smooth with a few scattered fine punctures extending outward each side about two times width of medial furrow to a more or less double, slightly depressed, longitudinal row of moderately coarse, close punctures, a little closer posteriorly, remaining surface outward to lateral furrow with scattered very moderate setigerous punctures generally separated by a distance equal to two or more times their diameters. Abdominal segments 2 to 5 slightly longer at sides, segments 3 to 5 with a marginal triangular pore or large puncture, anterior margins serrate by row of close, deep, very coarse punctures, median surface with scattered fine punctures bearing very fine, moderately long hair; terminal segment four times as long at middle as preceding segment, punctures setigerous, scattered, mixed fine to coarse, a large, coarse, deep, transverse pit near anterior margin laterally. Entire undersurface feebly shining but minutely alutaceous. Pygidium with strong Y-shaped carina separating 3 deep depressed areas, the 2 lateral areas about five times as large as the median basal area, upper ends of Y-shaped carina swollen and enlarged; apical margin roughly punctate.

Anterior femur with anterior marginal groove, posterior margin slightly arcuate inward, surface covered with moderately coarse punctures generally separated by a distance about equal to their diameters; trochanter with elongate central area depressed, surrounded by carina-like edge. Middle femur somewhat constricted along anterior margin at apical fourth and with a row of 5 strong setae; posterior margin sinuated by 2 low wide obtuse teeth, alutaceous surface with scattered fine punctures; tibia straight, a strong apical tooth directed inward at right angles to tibia; tarsi flattened, four-fifths length of tibia. Posterior femur flattened on inside, curving up around body, longer and not as wide as middle femur, alutaceous surface with scattered fine punctures; tibia wider and slightly shorter than middle tibia, with strong terminal tooth directed

inward at right angle, terminal fringe of fimbriae short and close; tarsi as long as tibiae, length of 1st segment equal to remaining 4 segments combined.

Unique holotype, USNM 69918, collected in Turrialba, Costa Rica, at light, 15–19 July 1965 by P. J. Spangler.

REMARKS.—It is a pleasure and a privilege to name this species after Dr. Paul J. Spangler, friend and colleague who has proven himself to be an unusually diligent and successful field collector for the United States National Museum.

2. *Rhyparus opacus*, new species

FIGURE 7

HOLOTYPE FEMALE.—Length 3.7 mm, width 1.2 mm. Narrow, elongate, sides parallel, moderately shining, dark reddish brown, almost black. Clypeus with double anterior edge, lower edge with median triangular tooth directed downward and slightly backward, separated from upper edge by a strong furrow or groove extending from gena to gena; upper edge with 4 more or less triangular teeth equally spaced; the outer 2 separated from the obtusely rounded genae by a shallow, rounded notch, clypeal margin arcuately emarginate between the teeth; central disc convex, separated by a distinct narrow furrow of varying depth from slightly concave surrounding surface, the furrow slightly broken where upper part tends to follow the frontal suture outward, upper middle parts curve and merge into a single line between middle frontal ridges; central disc with a median pair of low, elongate tubercles; surface of clypeus alutaceous and with scattered very fine punctures; 4 low obtuse frontal ridges, the middle 2 separated by about two-thirds the distance to the outer 2, surface everywhere alutaceous with shallow, scattered, very moderate to fine setigerous punctures between tubercles on each side and across basal area, a fine furrow follows curvature of the eye into a large deep pore at base of gena.

Pronotum more or less quadrate; with 8 interrupted longitudinal ridges; the 8 low evenly spaced ends of the ridges slightly higher and more distinct posteriorly; apical fifths of ridges separated by a square of 4 deep, widely spaced, moderate, punctures; 1st or middle pair of ridges obsolete over a flattened bridge between the deep pits on each side, then diverging and continuing uninterrupted to posterior margin of pronotum; the next pair of ridges widely, completely severed by large and deep transverse cavernous pits then continuing to posterior margin paralleling the 1st pair, the deep transverse pits here are narrowly constricted by an angle of the intervening surface between 2nd and 3rd ridges which projects obliquely across the pit toward a similar projection from severed end of the 2nd ridge; from above, the 3rd pair of ridges appears sinuate with sharp depressions at anterior and basal fourth, the basal fourth sinuate and seemingly forming the posterior pronotal angle opposite humerus of elytra; 4th ridge visible on each side from above as 2 lateral rounded projections, from the side appearing as a curving sinuate ridge from anterior to posterior margin; the ridges have a deep coarse puncture on each side at about posterior third, the punctures forming a sinuate transverse line, a similar line of punctures just inside the finely carinate basal margin.

Elytra subparallel, slightly wider at basal third, length 2.2 mm, width 1.2 mm; flat sutural and 4 straight costae smooth and shining; with flat alutaceous, coarsely punctate, dull intervals between the costae. Base of elytra with finely carinate edge. The costae are unusually straight and parallel, the 1st pair slightly flattened or spread out near posterior end, thus narrowing the interval between them and sutural costae, then curving away from the sutural costa slightly at the end; the 4th costa curves outward apically (dorsal view) then upward, swelling into a large bulbous triangular mass, the inner apex of the triangle opposite and narrowly separated from end of 1st costa, then downward to a junction with the sutural costa; the ends of the 3 enclosed costae and the opposite surface of the 4th costae covered with a light colored mass of glandular material; the dull strongly alutaceous intervals with a row of moderately coarse deep punctures along each side, the rows separated by about twice the diameter of the punctures, punctures separated in their row by 2 to 4 diameters; each interval with 2 rows of punctures except the extreme lateral with a single row. The costae have a row of well-separated very fine appressed hairs along each side.

Underside practically duplicates that of *R. spangleri* except for only a single row of 5 or 6 coarse punctures paralleling deep midline furrow of metasternum, and much different terminal abdominal segment. In *opacus* the terminal segment is widely separated from the preceding segment but appears to be connected to it by a narrow median carina, and the anterior half has a large deep triangular pit narrowly separated from large, deep, lateral pits, with apex of median pit immediately

behind carina to preceding segment, surface elsewhere with deep moderate punctures separated by about their diameters. Middle and posterior tibiae lack the large triangular teeth on apical inner margin, but have a small spur directed posteriorly as in all females of American species.

Holotype, female, only specimen known, USNM 69919. Mexico, State of Veracruz, Fortin de las Flores, Cerveceria Moctezuma, 14 July 1964, at hydroelectric plant in black light trap by Daniel Rabago, R. E. Woodruff collection, deposited in the United States National Museum.

REMARKS.—This species seems so close to *R. spangleri* it may prove to be only sexually different; however, the very dull, alutaceous elytral intervals with much smaller, more widely separated punctures and the slightly curving posterior ends of the very shiny costae give it a quite different appearance. We believe it is a different but closely allied species.

3. *Rhyparus zayasi*, new species

FIGURE 11

HOLOTYPE MALE.—Length 4.6 mm, width 1.6 mm. Elongate, sides almost parallel, feebly shining, black. Clypeus with double edge, the lower with a median triangular tooth directed downward and slightly backward; edges separated by a deep groove from gena to gena; upper edge with 4 wide triangular teeth about equally spaced, lateral 2 separated by a shallow notch from the obtusely rounded genae, margin shallowly emarginate between teeth; disc convex, with 2 slightly elongate tubercles at middle separated by slightly more than their length, disc separated from slightly concave surrounding area by deep, sharply edged broken furrow or groove, anterior portion being slightly more than a half circle, basal part divided, each section edging outward slightly at clypeal suture then continuing curve around disc to middle where it bends posteriorly around and between median pair of frontal ridges, the 2 sections coming close but not uniting; surface of clypeus and genae otherwise with scattered, fine-to-moderate, shallow, setigerous punctures, recumbent setae very short, and nearly as long as diameter of puncture; 4 moderately high frontal ridges or elongate tubercles, middle 2 separated by about two-thirds distance to those outside; a deep furrow follows curvature of eye into a large pore or pit at base of gena; occipital area above frontal ridges with a band of close, moderate, setigerous punctures separated by their diameters or less, a few scattered forward between ridges each side, whitish setae pointing forward and slightly longer than diameters of punctures.

Pronotum somewhat quadrate in shape, wider than long, constricted at apical third, with 8 longitudinal ridges almost equally separated along anterior margin; all are depressed or interrupted at apical third, 1st pair less so than others but they are crowded toward each other and almost obliterated between the deep transverse pits, then diverge and continue to base of pronotum; next or 2nd pair bent downward into pit and completely but narrowly broken, then continuing parallel with middle ridges to base; 3rd pair, though appearing straight from directly above, converge slightly to anterior third where pronotum is narrower than at base, then curve arcuately outward and into basal third and continue almost straight to base of pronotum; 4th or outside pair appear as lateral margins of the pronotum, sharply arched outward over anterior third, less so over middle third and then straight to base of pronotum; between ridges in anterior fourth are 2 transverse rows of coarse punctures, tranverse smoth area between these rows appearing as a low transverse carina, 2nd row of punctures become ends of narrow, deep, grooves leading down into the large pits, punctures on each side of 2nd pair of ridges form a V into pit inside the ridges; deep moderate punctures coalescing along midline are scattered between the deep pits in obsolete area of middle ridges; elsewhere they are separated by a distance up to twice their diameters; large coarse punctures on each side of ridges form a transverse line at about posterior third, a similar line of punctures crosses close to very finely carinate basal margin.

Elytra black, feebly shining, elongate, nearly parallel but widest at anterior third, length 2.9 mm, width 1.6 mm. Basal margin finely carinate. Each elytron with 4 strong costae between flat sutural costa and lateral margin, separated by coarsely punctate intervals. First 2 pairs of costae sinuate, arcuate inward over most of their length then slightly arcuate outward posteriorly, basally 1st pair noticeably elevated; 3rd pair curves upward around the humeral umbone, otherwise appears straight; 4th costa curves upward and outward apically to form a noticeable right-angled tubercle then upward around the other 3 costae into a large bulbous swelling then down slightly to a smaller hump or swelling before joining sutural costa, on inner apical margin

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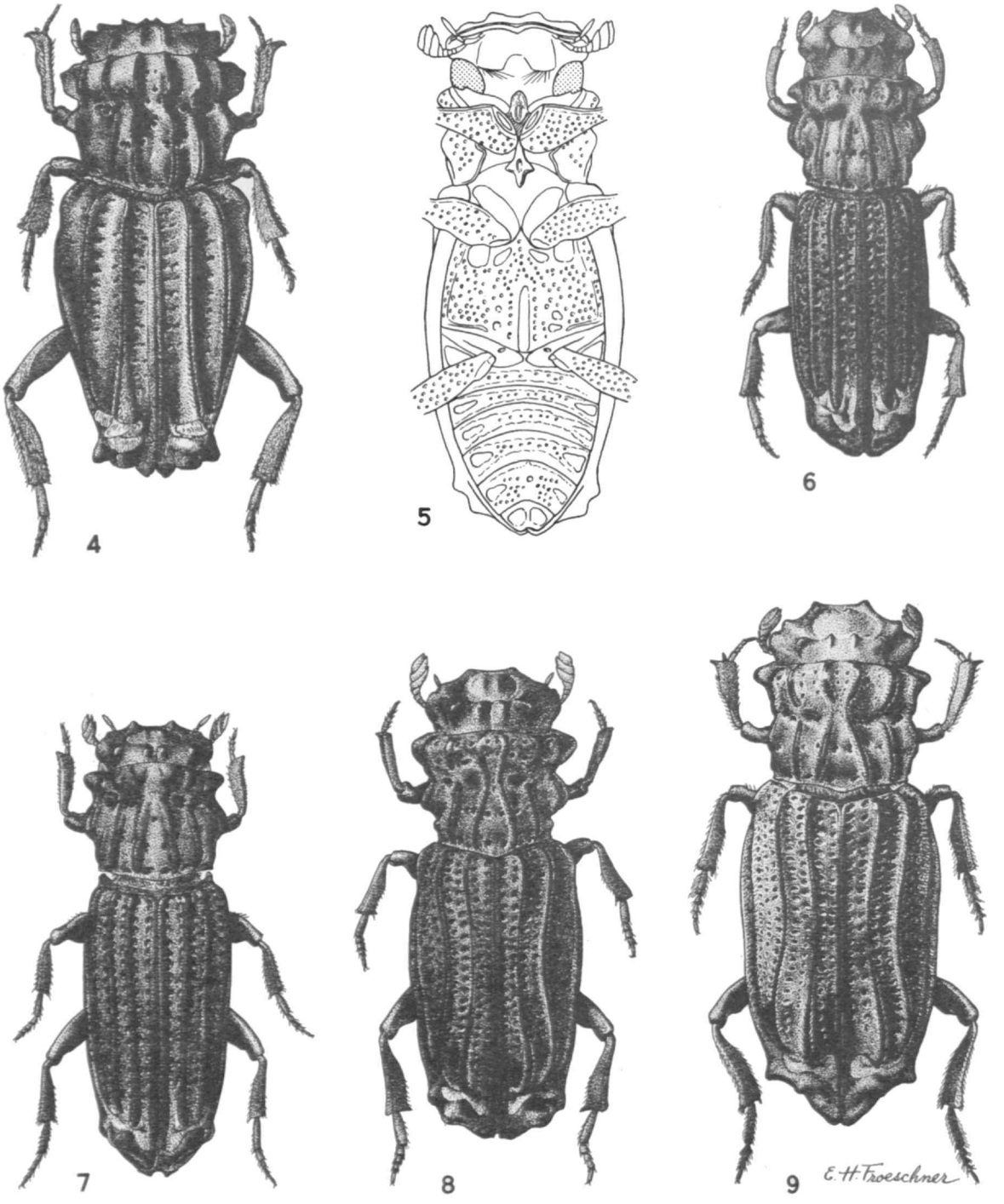
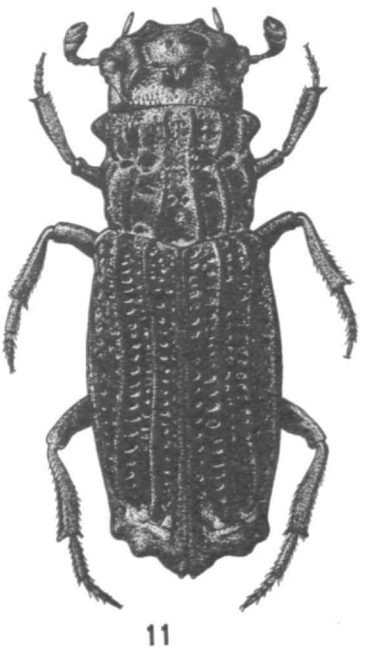
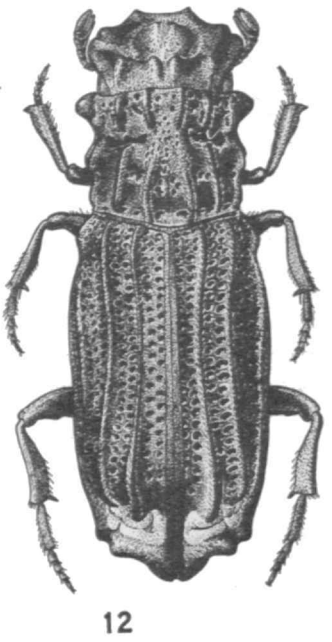
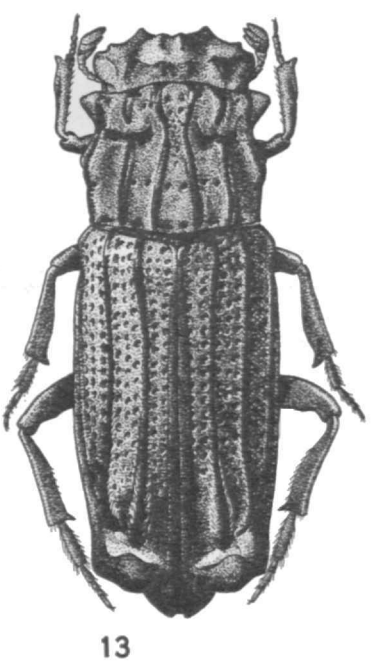


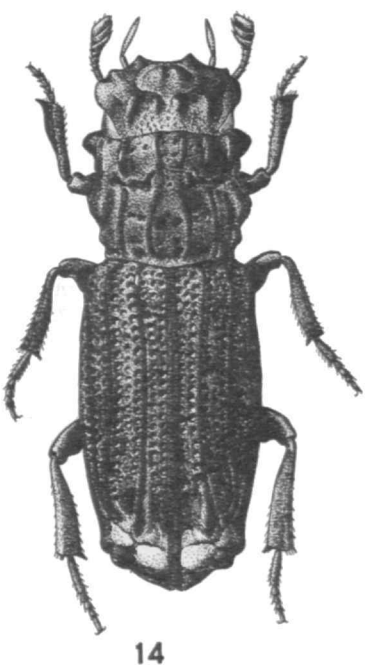
FIGURE 4–9.—4, *Termitodius* species (undescribed); 5, Ventral side of *Rhyparus* species (composite drawing); 6, *Rhyparus spangleri*, new species; 7, *Rhyparus opacus*, new species; 8, *Rhyparus blantoni*, new species; 9, *Rhyparus suspiciosus*, new species.

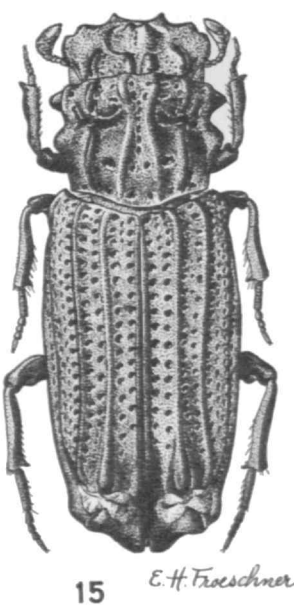












FIGURES 10–15.—10, *Rhyparus mexicanus*, new species; 11, *Rhyparus zayasi*, new species; 12, *Rhyparus sculpturatus*, new species; 13, *Rhyparus isidroi*, new species; 14, *Rhyparus costaricensis*, new species; 15, *Rhyparus denieri* (Martinez).

of 4th costa a slight angle opposite end of 2nd punctate interval separates 2 patches of yellowish glandular material which are narrowly separated from similar patches below swollen ends of 1st, 2nd, and 3rd costae, this terminal pit coated with glandular material deep and cavernous. Sutural costae depressed, flattened, and gradually narrowed near base to half their width otherwise. First flat interval with 2 longitudinal rows of very coarse punctures, discally separated in all directions by less than their diameters, at base 2 or 3 punctures form a very short 3rd row, near apex inner row becomes smaller and disappears, outside row becomes farther apart and suddenly also disappears, leaving a narrow shiny area between the adjacent costae; 2nd interval starts basally with 3 rows of coarse punctures but near basal 3rd middle row gradually merges with outside row to continue as 1 row of double width, which apically ends in a shiny area as did the 1st; 3rd interval carries 3 distinct rows of punctures with middle row first then other 2 becoming smaller and ending in a shiny smooth area; 4th interval carries 2 rows of punctures, outside row becoming smaller and obsolete basally, and inner row smaller and obsolete apically into a shiny smooth area. All costae and ridges have near their summits on each side, a row of close, short, very fine whitish appressed hairs directed obliquely backward.

On underside prosternal process conspicuously higher than its basal plane, anterior part with a shallow elongate puncture with carinate edges, a short carina to tip, and sides depressed with carinate edge; posterior part forms a 4-pointed star with a coarse puncture at middle, posterior point excavated laterally. Mesosternum shagreened, covered with extremely fine, short, appressed hair. Metasternum extending triangularly forward between middle coaxe and joining a vertical carina-like piece to the mesosternum at a lower level, close behind middle coxae a large deep pit which extends inward to tip of the intercoxal triangle, narrowly separated from a 2nd larger pit which in turn is separated narrowly from the wide lateral furrow; lateral furrow extends to posterior angle then inward three-fourths of the distance to midline, undercutting posterior lateral corner inside the furrow; midline furrow wide and deep with steep parallel sides, almost open at posterior end, extending forward two-thirds of total length, stopping with rounded end in line with posterior edges of deep anterior pits; flattened discal area with scattered very moderate punctures along edge of and anterior to midline furrow, scattered large coarse punctures (separated by less than 1 to 2 diameters) outward to lateral furrow, some finer punctures at extreme edge, all punctures setigerous, the setae fine, appressed, and about equal in length to diameters of coarse punctures. Abdominal segments widely, deeply separated at middle, much less so at sides, each segment with a large triangular depression or pit extending inward from lateral margin, this pit one-fourth total width of 5th segment, gradually less on preceding segments, surface over middle with scattered very moderate setigerous punctures bearing fine appressed hairs almost as long as segments at middle; terminal segment about four times as long as preceding at middle with a large lateral pit on anterior half, elsewhere alutaceous and with scattered large shallow punctures separated generally by less than their diameter. Pygidium triangular with large depressed area in outside corners and a smaller median depressed area at middle of base, apical third feebly shining and finely, closely, setigerously punctate.

Anterior femora with wide, deep groove anteriorly, trochanters large, with depressed median area with carinate edge, surface everywhere with coarse, close setigerous punctures which are gradually slightly smaller outward to knee, posterior margin deeply sinuate inward; foretibiae with carina down middle of underside, explanate along outside apical half, 2 apical teeth, foretarsi less than half the length of tibiae, ratio 9 to 21. Middle femora with 2 low, wide teeth or angles along posterior edge, femur convex, marginal line along each edge, anterior edge slightly constricted at apical fifth, surface everywhere with coarse setigerous punctures, the golden hairs, fine, appressed, as long as three or four times diameter of punctures; tibia with longitudinal marginal line along inside edge, a small apical tooth directed at right angle, apical fringe of fimbriae, short, even, and extremely close; tarsi flattened, subequal to tibiae in length; posterior femora with complete posterior marginal line, convex, arcuate upward, hugging body, surface punctures as on middle femora but moderate in size; posterior tibiae slightly arcuate but otherwise as middle tibiae; tibiae and femora flat and smooth on inner side; posterior tarsi also flattened, slightly shorter than tibiae, 1st segment longer than next 4 together, claws very fine, almost hairlike.

ALLOTYPE FEMALE.—Length 4.8 mm, width 1.7 mm. The only noticeable external difference between the sexes is in the strong terminal tooth set at right angles

on the middle and hind tibiae of the male, lacking in the female; and a small third terminal tooth on the inner side of the anterior tibiae in the female which apparently is lacking in the male.

Holotype male, USNM 69923, Cuba, Oriente, Sierra Maestra, Turquino, June 1964, F. de Zayas, collected at light. Allotype female, Cuba, Oriente, Cardero, Turquino, July 1964, F. de Zayas. Paratypes: 13 males, 13 females collected with allotype; 1 female collected with holotype; Jamaica, 12 males, 10 females taken at black light, Hardwar Gap, 9, 12, 18, and 23 July 1966, Howden and Becker, 3 males, 4 females, same locality, 10, 16, 19, 21, and 22 July 1966, A. T. Howden; 4 males, 2 females, Portland Parrish, Green Hills, Institute of Jamaica Cabin, 23 November 1968, black light trap, 4000 feet, R. E. Woodruff; and 1 female, Chester Vales, July 1936, by W. G. Lynn. Paratypes in the Cuban National Collection, the Canadian National Collection, the United States National Museum, and the private collections of H. F. Howden and R. E. Woodruff.

REMARKS.—The rather long series of *R. zayasi* shows surprisingly little variation. Length varies from 4.3 mm to 4.8 mm or slightly more depending on the position of the head. The rows of elytral punctures of the second interval usually show the two outside rows uniting transversely to give a single row of elongate punctures. Occasionally all three rows unite with single punctures from one costa to the next. Rarely the punctures of all three rows are at least partly separate and distinct.

We are delighted to name this fine species after Fernando de Zayas, the eminent Cuban entomologist who collected such a fine series on his home island. The earliest collected specimen of *Rhyparus* from the Western Hemisphere, known to us, is the specimen of this species collected by W. G. Lynn in Jamaica in 1936.

4. *Rhyparus isidroi*, new species

FIGURE 13

HOLOTYPE MALE.—Length 5.3 mm, width 1.9 mm. Elongate, parallel, very dark brown, elytra black. Clypeus with double anterior edge, lower edge with wide, median, angular tooth downward; separated from upper edge by a wide, shallow furrow from gena to gena; upper edge with 4 obtuse angles or teeth more widely spaced anteriorly than laterally, margin nearly straight between median pair, laterally the margin sinuate and moderately deeply emarginate; genae broadly rounded; disc of clypeus convex, almost circularly separated from surrounding weakly concave area by deep furrows, 2 widely spaced, low elongate, slightly arcuate tubercles at middle as widely separated as the median pair of frontal tubercles or ridges; front with 4 moderately high ridges, the middle pair distinctly shorter than outside pair and separated by half the distance to the outside pair; all furrows and general surface apparently as in *R. sculpturatus* but mostly covered by encrusted foreign material, which adhered so tightly it was impossible to remove it.

Pronotum quadrate, with 8 low, rounded, longitudinal ridges, the 1st pair constricted between the deep transverse fossae at anterior third, the 2nd pair widely interrupted by the fossae, the first 2 pairs nearly straight to posterior margin, punctures vaguely indicated, and surface obscured by encrusted foreign material (see description of allotype).

Elytra feebly shining, elongate, length 3.7 mm, width 1.9 mm; each elytron with 4 weakly elevated costae between the wide flat sutural costa and lateral margin, the 1st pair weakly arcuate inward over anterior three-fourths, becoming much wider over posterior fourth, the outside edges curving toward the 2nd pair which are parallel with the 1st and also enlarged apically; 3rd pair straight except for an anterior curve up over the humeri; 4th pair slightly arcuate posteriorly to a very obtuse angle then upward to swollen triangular mass, then curving back to the sutural costae, the inner angles of the 4th pair almost touching the ends of the 1st pair; first 3 pairs tipped with glandular material, the 4th covered by the same material from end of 3rd pair to the sutural costae. First pair of intervals with short 3rd row of punctures basally, an outside row of very coarse, round punctures separated by one-third or less than their diameters, the inner row about half as coarse separated by a depressed area which becomes a distinct groove over posterior half; 2nd and 3rd intervals with 3 rows of very coarse, close, round punctures; 4th with a single row; surface smooth and shining apically between the costae. All ridges with fine, short, appressed hairs each side of their summits. The apex of the elytra very coarsely, deeply punctate below the large terminal masses of the 4th pair of costa. Underside and legs duplicate *R. sculpturatus* except that the midline furrow of the metasternum extends slightly farther forward and posteriorly is not so evidently open; and the terminal abdominal segment is three times as long at middle as the preceding segment.

ALLOTYPE FEMALE.—Length 5.4 mm, width 2.0 mm. Duplicates the male in general but the surface of the head and pronotum is clean and visible. Except for the shining ridges and tubercles the entire surface of the head and pronotum is finely alutaceous and opaque; the squares of 4 punctures between the anterior pronotal ridges usually so distinct in other species are barely discernible, the punctures are obscured over the bridge between the transverse fossae but unite in short deep furrow where the ridges begin to diverge, a deep puncture is found close on each side of the 1st ridges at basal third and the usual marginal punctures are evident across the basal margin. The terminal abdominal segment is shorter, twice the length of the preceding and the middle and posterior tibiae lack the spurlike spines or teeth found in the male.

Holotype male, USNM 69925, Costa Rica, Province of San Jose, San Isidro de Coronado, Finca J. Smids, 13–IV–67, E. B. Fagan, black light trap, R. E. Woodruff collection. Allotype female same data except collection date, 3–VI–67.

REMARKS.—*Rhyparus isidroi,* one of the larger species, resembles *mexicanus* in size and color but differs in having three distinct rows of punctures on the second interval. It differs from all others in the first row of punctures of the first interval being smaller and forming a furrow along the sutural costa.

5. *Rhyparus costaricensis,* new species

FIGURE 14

HOLOTYPE MALE.—Length 4 mm, width 1.4 mm. Elongate, parallel, feebly shining, dark reddish brown, almost black. Clypeus with double anterior edge, lower with a broad, low angle downward, separated from upper by a coarse deep furrow from gena to gena, upper edge with 4 equally spaced angular teeth, posterior 2 separated from obtusely rounded genae by distinct notches at frontal suture, clypeal margin moderately deeply arcuately emarginate between teeth; disc of clypeus convex, circular, with 2 central elongate tubercles and some fine scattered punctures, disc separated from slightly concave surrounding area by a fine deep furrow narrowly broken at frontal suture, upper part tending to follow suture outward and inwardly curving around and between middle frontal tubercles; 4 frontal tubercles high, three times as long as wide, middle pair nearer together by about one-third less than distance to outer tubercles; basally and slightly between outside tubercles with moderate punctures separated by about their own diameters, laterally a deep furrow follows the curvature of the eye down into a large deep pore at base of gena; head everywhere finely alutaceous.

Pronotum quadrate with 8 interrupted longitudinal carinalike ridges from apex to base, 2 deep, transverse, cavernous pits completely severing the 2nd ridges and constricting 1st and 3rd pairs; 1st pair of ridges obliterated on narrowed bridge separating pits then continuing and diverging to basal pronotal margin; 2nd pair of ridges widely severed by pits at anterior third then continuing to base; surface between anterior parts of 2nd and 3rd ridges extends obliquely into an angular point out over the deep pits toward basal sections of 2nd ridges thus constricting pits in hourglass fashion; 3rd pair of ridges greatly depressed and almost severed by pits which continue on narrowly to 4th ridges which also are almost severed; basal sections of 3rd and 4th ridges sinuate-arcuate when viewed from top or side; moderate widely spaced punctures form squares in anterior fourth between ridges, those posteriorly on each side of forward part of 2nd ridge become lines converging downward into the deep pit; midline punctures, behind the forward square of punctures, smaller and scattered on bridge, those exactly on midline running together at midpoint, at basal fourth a large deep puncture appears each side close to ridges, with another pair of large deep punctures at basal margin close to ridges; between 1st and 2nd ridges, at basal fourth, 3 deep punctures unite in a line obliquely forward, at basal pronotal margin usual 2 large deep punctures unite into a single large transverse puncture; between 2nd and 3rd ridges a single puncture is found close to 3rd ridge at basal fourth and the basal marginal punctures appear as one; basal margin very finely carinate.

Elytra subparallel, slightly wider at basal third, length 2.4 mm, width 1.4 mm. Basal edge very finely carinate; each elytron with the usual flat sutural margin or costa and 4 sharply convex costae with coarsely punctate intervals; 1st costa slightly elevated basally, straight over disc then diverging from suture and gradually swelling to an enlarged posterior end; 2nd costa even and straight to posterior fourth then gradually curving outward but not enlarging terminally; 3rd costa even and straight except at base where it curves sharply upward over humeral umbone; 4th costae even and slightly sinuate to a prominent posterior angle from which it curves upward to a somewhat angular

swelling then down to a junction with the sutural costa, swelling angled slightly along inner margin toward enlarged end of 1st costa but remaining widely separated, space between bulbous end of 4th costa and ends of other 3 filled with yellowish masses of glandular material; longitudinal rows of coarse deep punctures fill intervals, punctures and rows separated by less than diameters of punctures, outward from suture intervals have 2, 3, 3, 2, and 1 rows of punctures, 1st interval with 3 or 4 punctures of a median 3rd row at base, posteriorly punctures disappear over declivity leaving a smooth shining surface between the costae. Ridges and costae have on each side of summit, a row of close, short, very fine, appressed hairs directed obliquely upward and backward. Underside and legs as in other species but with the innermost 2 deep pits behind mesocoxa comparatively small, extending slightly into intercoxal space, triangular as in *zayasi* and separated narrowly from other larger pit; terminal segment of abdomen angulate forward at middle.

Anterior femora with strong wide anterior groove, posterior margin widely deeply emarginate or sinuate, surface with evenly distributed moderate, setigerous punctures separated by about their diameter; trochanter with narrow rim and concave disc; tibiae with 2 sharp terminal teeth, underside with strong carina lengthwise between marginal grooves; tarsi short, one-half length of tibiae. Middle femora punctate as in preceding, posterior edge excavated to leave dorsal and ventral margins, the dorsal margin widely sinuate to form 2 wide blunt teeth; tibiae with strong terminal tooth set inward at right angles, terminal fringe of spicules numerous, short, close; 1st tarsal segment slightly longer than next 3 combined. Hind femora similar to middle but more slender and moderately arcuate upward around body; tibiae as on middle legs, 1st tarsal segment relatively longer, about equal to following 4 segments combined; claws fine, hairlike.

ALLOTYPE FEMALE.—Length 4.1 mm, width 1.5 mm. Apparently identical with male except that middle and posterior tibiae do not have the large triangular tooth projecting inward from end of tibiae, only a small spine projects backward in female; anterior tibiae bear a small spine on inner terminal margin in addition to median and lateral teeth. The pygidium is radically different in bearing a sharp median toothlike spine at apex directed downward at right angles to body, the tooth about one-fourth length of visible part of pygidium.

Holotype, allotype, 2 male and 1 female paratypes, Costa Rica, Province of San Jose, San Isidro del General, collected in a black light trap, 30 July 1964, by R. E. Woodruff. One male paratype, Mexico, State of Veracruz, Lake Catemaco, Coyame, black light trap, 1–8 July 1963, R. E. Woodruff. One male, 1 female paratype, Mexico, Nayarit, 6 miles north Compostela, 14 August 1963, black light, A. R. Hardy.

Holotype, USNM 69926, allotype and paratype in United States National Museum, paratypes in R. E. Woodruff collection.

6. *Rhyparus blantoni*, new species

FIGURE 8

HOLOTYPE MALE.—Length 4.5 mm, width 1.7 mm. Elongate, parallel, feebly shining, black. Clypeus with double anterior edge, lower edge with a wide, median, angular tooth pointing downward and slightly backward; separated from upper edge by a wide, shallow, indistinct furrow extending from gena to gena with a few coarse punctures at middle and 1 or 2 laterally, most of the flat surface finely scabriculate, upper edge with 4 obtuse angles or teeth about equally spaced, the median pair separated by a shallow median emargination, each of these separated from the lateral tooth by a deeper emargination; the 2 lateral angles separated from the adjoining genae by a noticeable notch; almost circular disc convex with 2 shiny, carina-like, elongate tubercles slightly converging anteriorly, the circular disc set apart from the remainder of the slightly concave surface by a deep groove except narrowly in the frontal area. Front with 4 high shiny-topped tubercles or ridges, the middle 2 closer together, separated by a distance equal to their own width, and from the outer tubercles by twice that distance. From the base of the outer tubercle a deep groove extending to a large deep pit in base of gena in front of the eye, and a narrower short groove at anterior base of outer tubercle. Surface alutaceous everywhere except for the shining carina-like tips of the tubercles; basally and between the frontal tubercles, the punctures close, very moderate, separated by a distance equal to the width of their diameter or less.

Pronotum wider in front than at base, with 8 high, elongate, longitudinal ridges with shining, carina-like tops about equally spaced across anterior fourth, a square of 4 large deep punctures between adjoining ridges; the ridges rise steeply from anterior pronotal margin and curve over and down posteriorly to deep

transverse irregular pits; behind these pits the ridges continue on to base of pronotum, the median pair depressed and closer together, separating the deep transverse pits, then diverging toward base; the ridges of the 2nd pair are widely interrupted by the pits then continue straight to the base; ridges of the 3rd pair broken into 3 parts, the basal part almost a rounded tubercle; those of the outside pair, which from above appear as the pronotal edge, are deeply interrupted at anterior third and from middle curve in concave outline to base. At basal third a pair of large coarse punctures between adjoining ridges forms a transverse row across the pronotum and a similar row appears along the base. All ridges have a row of scattered white hairs near their summits.

Elytra generally dull, alutaceous, elongate, length 2.8 mm, width 1.7 mm; each elytron with 4 sinuate costae between flat sutural costa and lateral margin, separated by coarsely punctate intervals. First pair of costae narrow and high at base and apex, gradually much narrower and less elevated over middle, 2nd pair uniform in width and height over full length; first 2 pairs strongly sinuate, the long middle sections and ends curving inward toward suture; 3rd pair of costae uniform in height, curving sharply up over humeral umbones and continuing with slight inward arcuation with decreasing elevation at posterior ends in terminal pits; 4th pair of nearly uniform height, slightly sinuate to prominent posterior angles then continuing upward around the deep posterior elytral pits and enlarging into large triangular bulbous termini which angle inward over the pits and almost touch the ends of the 1st pair of costae, then down to junction with the sutural costae; lateral margin bordered with a low carina which almost disappears in middle section; intervals between costae with rows of large, coarse, deep punctures usually separated by their diameter or less; outward from the suture successive intervals show the number of rows of punctures to be 2, 2, 3, 2, 1; apically the surface between the costae becomes very noticeably smooth and shiny. Along each side near their summits, both pronotal and elytral costae have rows of short, white, very fine, closely appressed hairs directly obliquely backward. The deep terminal pits, constricted by the 1st and 4th costae, are apparently coated with a surface of yellowish-brown glandular substance. The deep pronotal pits seem to be similarly coated.

Prosternal processes greatly elevated above general surface much as in Figure 5, anterior process with a basal, elongate puncture behind median longitudinal carina with lateral furrows each side, posterior projection a 4-pointed star with large central pit or puncture. Mesosternum shagreened with extremely fine, very close, short, appressed hairs; depressed posteriorly at middle before the carina between middle coxae. Metasternum at much higher plane than mesosternum with large triangular intercoxal area connected at tip with nearly vertical carina to lower mesosternal surface. Two large deep pits and wide lateral furrow narrowly separated from each other behind each middle coxa; posterior two-thirds of midline a wide (as wide as posterior femur), deep alutaceous depression or furrow rounded at anterior end and almost open posteriorly; the wide lateral furrow deeper anteriorly, posteriorly turning inward along posterior margin and slightly undercutting the angle of the surface within; surface between midline and lateral-posterior furrow much roughened by deep punctures of various sizes, alutaceous everywhere and with numerous but scattered short, fine, appressed hairs. Metasternum drawn angularly backward at middle to meet 1st abdominal segment similarly angulate forward to narrowly separated posterior coxae.

Abdominal segments separated by very deep V-shaped furrows leaving the general flattened surface of each segment very short, less than width of the furrow, the segments widening laterally to enclose a large triangular pore or puncture; terminal segment three times as long as preceding segment, outer fourth somewhat concave leaving an elevated middle half of total width, this somewhat quadrate flattened area with 2 large depressions separated by a longitudinal carina; surface alutaceous everywhere and with usual short, fine, appressed hairs. Pygidium triangular with large triangular depression each side of a median, shorter, similar depression down from the wide furrow above the pygidium.

Anterior femora with perimarginal groove, surface with close, coarse to fine setigerous punctures outward to knee; tibiae explanate along outer anterior margin, a single terminal tooth; tarsi less than half length of tibiae; claws minute. Middle femur swollen, the convex alutaceous surface with close, setigerous, moderate-to-fine punctures, anteriorly with a row of stiff setae, posterior margin with 2 low obtuse triangular teeth equally separated from each other and ends of femur; tibia slightly arcuate outward with strong terminal tooth on inside; 1st tarsal segment equal in

length to next 3 combined. Posterior femora and tibiae similar to middle but longer more slender, and less swollen at base, teeth on posterior margin almost imperceptible, strongly arcuate to conform to shape of body; tibiae similar to those of middle leg but with terminal tooth smaller; terminal fimbriae short, uniform, extremely close, and numerous.

Holotype, only specimen known, USNM 69920, Panama, Almirante, 15 December 1952, in trap light by F. S. Blanton.

REMARKS.—We are pleased to name this species after its collector, Dr. F. S. Blanton, who has been interested in the insect fauna of Central American for many years and has greatly increased our knowledge of the area.

Rhyparus blantoni and the very similar *R. suspiciosus* are distinguished by the shape of the pronotum (see Figures 8 and 9), the unusual appearance of the elytra because of the fine depressed first pair of costae, and the posteriorly sinuate second pair of costae. The completely broken third pair of costae of *blantoni* is a character shared only with the quite different *opacus* and *spangleri*.

7. *Rhyparus suspiciosus*, new species

FIGURE 9

HOLOTYPE FEMALE.—Length 4.5 mm, width 1.9 mm. Elongate, widest at anterior third of elytra, blackish brown, legs dark red brown, pronotum opaque, elytra weakly shining. Clypeus with double anterior edge, the lower with a wide, median, angular tooth directed downward and somewhat masked by a mustache of close, fine, noticeable hairs, separated from the upper edge by a deep, wide, punctuate furrow from gena to gena, upper edge with the usual 4 obtuse, about equally spaced angles, those adjoining the genae more rounded than usual, margin between the angles nearly straight anteriorly, moderately deeply emarginate laterally; almost circular disc of clypeus convex, with 2 short, median shiny tubercles, disc separated from surrounding slightly concave areas by deep furrows or grooves. Front with 4 high, shiny-topped tubercles or ridges, the middle 2 separated by half the distance to the outer pair; a deepening groove from base of outer tubercle to a pit behind the gena, occipital area with a band of close moderate, setigerous punctures, the length of the light colored setae about twice the diameter of the puncture, appressed, and directed forward; surface of head otherwise opaque and finely alutaceous.

Pronotum with 8 longitudinal ridges more or less interrupted by deep transverse fossae at anterior third. In front of the fossae the ridges are high and thin, separated by square of deep punctures. The 1st pair of ridges are constricted by the fossae then diverge to base of pronotum; 2nd pair, completely interrupted by the fossae, continue almost straight to base; 3rd pair sinuate, greatly depressed by fossae but continue unbroken to pronotal margin. Ridges of 1st pair slightly pinched by deep, coarse punctures each side at basal third, a similar puncture at basal third and found close on inside of 3rd pair of ridges, 2 large, deep, coarse punctures between adjoining ridges form a basal row in front of the sharp, thin basal edge of pronotum. The outside pair of ridges are also interrupted at basal third by deep fossae, the fossae not visible from directly above, but the anterior parts of the ridges appear from above as prominent, sharply rounded, anterior angles of the pronotum (see Figure 9). Where visible, surface of pronotum smooth, dull, minutely alutaceous.

Elytra, length 3 mm, width 1.9 mm at anterior third, each elytron with 4 costae between flat sutural costa and lateral margin. First pair of costae higher at base and apex, finer and lower over middle, slightly arcuate inward; 2nd pair uniform in height, strongly sinuate over posterior half and curving toward suture; 3rd pair curves up over prominent humeral umbone but is weakly elevated, especially at posterior end; 4th pair strong, sinuate outward posteriorly to prominent angle, then up to a moderate somewhat triangular swelling and down to the sutural costa, the inner angle of the triangular swelling narrowly separated from end of 1st costa. First 3 pairs of costae tipped with light-colored glandular masses with similar material along opposite areas of 4th pair. First 2 pairs of intervals with 2 rows of coarse, close, deep punctures, 3rd with 3 rows, 4th with 2, 5th with 1. Apically the punctures give way to shiny smooth areas, the inner row first to disappear. Apical areas below 4th costae coarsely, deeply, closely punctuate. All ridges and costae with the usual rows of fine, close, short, appressed, whitish hairs directed obliquely backward near their summits.

Prosternal processes elevated above general surface. Anterior process with narrow, elongate, sharp-edge puncture basally and fine carina anteriorly to rounded tip, laterally a flattened area each side of carina back and downward at sides. Posterior process a 4-pointed

star with central puncture, the posterior point with explanate lower edges, the middle lateral points short and thin. Mesosternum shagreened, posteriorly depressed at middle. Metasternum at much higher plane than mesosternum and connected to it by a vertical carina. Two large deep pits, the inner less than half as wide as outer, and wide, lateral furrow narrowly separated behind middle coxa; midline furrow deep, as wide as lateral furrow, extending forward to a point even with posterior margins of the lateral pits; the deep, wide, lateral furrow bending inward along posterior margin in front of the posterior coxa, slightly undercutting the higher enclosed area; surface, including triangular tip between middle coxae, with close, very shallow, moderate, setigerous punctures, the fine, appressed, posteriorly directed hairs about twice as long as diameter of their punctures. Abdominal segments separated by equally wide deep sutures laterally with large deep, triangular depressions, terminal segment about four times as long as flat surface of preceding segment, flattened surfaces everywhere with fine, setigerous punctures, the light colored hairs appressed as usual. Pygidium with Y-shaped carina enclosing a deep median depression with large lateral depressions on each side.

Anterior femora with perimarginal groove, surface with shallow coarse-to-moderate setigerous punctures; foretibiae explanate over anterior half of outer margin; 2 terminal teeth. Middle femora constricted at outer fifth near knee, posterior margin with 2 blunt large, rounded teeth, surface with close, fine, setigerous punctures separated by up to twice their diameters. Posterior femora longer, about two-thirds as wide as middle femora, arcuate to conform to shape of body, surface vestiture same as middle femora. Middle and hind tibiae with setigerous punctures much closer, more on under surface, smooth on upper; middle and hind tarsi hairy on underside; 1st tarsal segment of middle leg shorter than remaining 4 together, 1st segment of hind tarsi longer than remaining 4 combined, all claws very fine. Small terminal spine of middle and hind tibiae directed straight back, the posterior tibial fringe fine, close, and very short.

Holotype female, USNM 69921, Costa Rica, Province of Cartago, Turrialba, Instituto Interamericano de Ciencias Agricolas, R. E. Woodruff collection, 17–VIII–64, in black light trap.

REMARKS.—*Rhyparus suspiciosus* superficially resembles *R. blantoni* rather closely, especially in the very similar first two pairs of elytral costae. Even here, however, there are differences. In *suspiciosus* the costae are not as heavy, posteriorly the sinuation of the second pair starts farther back, is greater, with the inward curve less sharp and the less prominent tips ending closer to the first pair. The swollen, triangular, apical parts of the fourth costae are smaller and overhang the elytral apex less. A more noticeable difference is found between the ridges of the pronotum, those of *blantoni* being heavier with the third pair completely broken at the posterior third. *R. suspiciosus* has no such break. Punctures and midline depression of the metasternum are quite different, punctures being deep and coarse in *blantoni*, moderate and shallow in *suspiciosus*, the midline depression three times as wide as lateral groove in *blantoni*, about equal in *suspiciosus*. The transverse groove between the two edges of the clypeus is wide, long, and deep in *suspiciosus*, reduced to a few punctures leaving a wide, flat, scabriculate edge in *blantoni*.

8. *Rhyparus sculpturatus*, new species

FIGURE 12

HOLOTYPE MALE.—Length 5.0 mm, width 1.7 mm. Elongate, subparallel, dull, black; genae and legs dark reddish brown. Clypeus with double anterior edge, lower edge with wide, median angular tooth pointing downward; separated from upper edge by a wide, shallow furrow extending from gena to gena, the median third with several deep, coarse punctures; upper edge with 4 obtuse angles or teeth about equally spaced, median pair separated by nearly straight anterior margin, lateral margin moderately emarginate between teeth; genae broadly rounded; almost circular, convex disc with 2 low elongate tubercles; disc separated from slightly concave surrounding area by a deep groove around slightly more than anterior half, posteriorly similar sinuate grooves follow clypeal frontal suture inward from each side then curve sharply posteriorly to unite between middle basal ridges, leaving disc with a noticeable angle basally; front with 4 moderately high tubercles or ridges, middle 2 rather narrowly separated by the furrow mentioned above, the outer tubercles separated away by twice the distance between middle 2; from base of outer tubercle a deep furrow follows curvature of the eye to a deep pit behind the gena; surface of head minutely alutaceous, otherwise with scattered, moderate, setigerous punctures, generally sepa-

rated by a distance about equal to their diameters, the setae appressed, short, about as long as diameter of its puncture. Pronotum quadrate, with 8 moderately high longitudinal ridges, the 2nd pair completely, narrowly interrupted at anterior third by deep transverse fossae or pits, the others depressed at anterior third leaving the high, elongate anterior ends about equally spaced across anterior fourth of pronotum, a square of large deep punctures between them, those posteriorly on each side of 2nd pair of ridges forming elongate furrows converging downward into the deep transverse pits; the flattened surface between 2nd and 3rd ridges here extends diagonally backward behind the 2nd ridge to nearly meet the longer posterior part of the 2nd ridge; behind the transverse pits the pronotal ridges continue on to posterior margin. The middle ridges converge at anterior third with a rather narrow, strongly punctate bridge, then diverge arcuately to basal margin; the basal parts of 2nd pair of ridges straight to margin; at basal third middle ridges with 2 deep, coarse punctures between them, 3 punctures between 1st and 2nd pair, and a single large puncture on each side of 3rd ridges so close as to constrict the ridges; basally 2 large punctures between adjoining ridges form a row close to the sharp cariniform margin.

Elytra feebly shining, elongate, widest at anterior third, length 3.1 mm, width 1.7 mm; each elytron with 4 costae between flattened sutural costa and lateral margin, separated by coarsely punctate intervals. First 2 pairs of costae arcuate inward, 1st pair more elevated basally, slightly sinuate apically, their tips slightly flaring away from each other; 2nd pair evenly elevated, apically curving inward; 3rd pair nearly straight, evenly elevated; 4th pair apically sinuate outward to an angular tubercle then curving upward to an enlarged more or less triangular mass then down to unite with the sutural costate above the elytral apex, on the inner side the 4th pair angles inward sharply opposite the ends of the 2nd pair with the area between covered by a whitish glandular mass, the mass not united but showing individual smaller areas around tips of first 3 pairs of costae and masses each side of the inner apical angle of the 4th; tip of the 1st separated by its greatest apical width from opposite 4th costae. First, 2nd, and 4th interval with 2 rows, 3rd with 3 rows, 5th with 1 row of large, coarse punctures; discal punctures separated by less than half their diameters, apically the innermost row becomes smaller and finally disappears in a shiny smooth surface, the outside row of each interval ends abruptly without change in size. Humeri noticeably prominent, coarsely, shallowly, setigerously punctate, the setae short, appressed. The coarse elytral punctures also bear a short, horizontal hair or setae from their upper anterior edge, recurving slightly down into the puncture. All ridges and costae have a row of short, close, appressed, fine whitish hairs directed obliquely backward along each side near their summits.

Prosternal processes greatly elevated above general surface as in Figure 5, the anterior process with a basal, elongate puncture behind a median longitudinal carina and lateral furrow each side, the posterior process a 4-pointed star with large central pit or puncture. Mesosternum shagreened with extremely fine, very close, short, appressed hairs; depressed posteriorly at middle before the carina between the coxae. Metasternum at much higher plane than mesosternum with intercoxal area connected at anterior tip with nearly vertical carina to lower mesosternal surface. Two large deep pits and wide lateral furrow narrowly separated from each other behind middle coxae, the 2nd or intermediate pit twice as large as the 1st pit; midline furrow wide and deep, extending over about posterior three-fifths, open at posterior end. The wide lateral furrow extends to posterior edge then changes direction abruptly to follow the margin inward three-fourths distance to midline, then forward in a vaguely depressed furrow parallel with the midline furrow, thus enclosing a square area covered by large, very shallow setigerous punctures; the remaining area each side of and in front of the midline furrow with moderately close, fine, setigerous punctures, all the setae or hairs very fine, appressed, and longer than the diameter of their punctures. Abdominal segments separated by wide, deep sutures, the segments and sutures about equal at middle; surface dull, finely alutaceous, with scattered, fine setigerous punctures, separated by 4 diameters or less, the fine hairs appressed; laterally a large triangular pit very noticeable on each of the 3 middle segments, lateral depressions much smaller on 1st visible and terminal segments. Terminal segment twice as long at middle as preceding segment but not otherwise modified. Pygidium with 3 deep, basal, narrowly separated depressions, the lateral 2 more than twice as wide as the middle and gradually shallower posteriorly; apically a few fine, setigerous punctures separated by a distance about equal to their diameter.

Anterior femora with perimarginal groove, widest in front, widely emarginate along posterior margin; surface dull, with close, moderately coarse, shallow, setigerous punctures; anterior tibiae explanate apically along two-thirds of outer margin, 2 apical teeth. Middle femora with 2 blunt, widely triangular teeth along posterior margin and constricted along anterior edge at apical fourth, surface minutely alutaceous, with close setigerous punctures about half the size of those on profemora; middle tibiae with strong, sharp, apical tooth set at right angle to tibia. Posterior femora longer than middle femora but similarly punctate, posterior margin constricted at knee, arcuate to conform to curvature of body; tibiae slightly arcuate outward, with fine setigerous punctures as on femora, a right-angled tooth on inner apical margin, apical margin fimbriate with very short, very close fimbriae; 1st tarsal segment equal in length to remaining 4 combined; claws short, hairlike.

Female unknown.

Holotype, only specimen known, USNM 69924, Costa Rica, Province of San Jose, San Isidro de Coronado, Finca Joseph Smids, 5500 feet, 11, 12–VI–67, E. B. Fagan, black light trap, R. E. Woodruff collection.

REMARKS.—*Rhyparus sculpturatus* is separated from other American species by the second elytral interval having two rows of deep, round, close, very coarse punctures, and the inner apical triangle of the fourth costa opposite the end of the second costa, the apical glandular areas distinctly separated, and fourth costa widely separated from the ends of the first three.

9. *Rhyparus mexicanus*, new species

FIGURE 10

HOLOTYPE MALE.—Length 5.0 mm, width 1.8 mm. Elongate, parallel, shining. Clypeus with double anterior edge, lower edge with median mustache of close, fine, golden hairs, the 2 edges separated by a deep furrow extending from gena to gena, the furrow punctured with very large punctures; upper of the 2 thin edges angulate each side of shallow emargination, edge continuing about same distance to similar angles each side just in front of genae. Oval disc of clypeus surrounded by a deep furrow, leaving disc with rounded anterior outline and somewhat angulate (or pointed) posteriorly between the anterior ends of middle pair of 4 elongate frontal tubercles; discal area convex, surface shining and smooth except for 2 low elongate tubercles at middle and scattered shallow punctures, each bearing a fine, very short, anteriorly directed hair. Middle 2 of 4 elongate frontal tubercles separated by half the distance to outside tubercles, wider areas between tublercles, and basal area of the head covered with close, shallow, coarse punctures separated by a distance equal to about one-half their diameter and each bearing a very fine, golden, anteriorly directed hair, hairs slightly longer than the diameters of the punctures.

Pronotum quadrate, with the characteristic pattern of deep foveae, coarse punctures, and ridges. Viewed from directly above there are 6 longitudinal ridges widely interrupted, except middle pair, by very deep transverse irregular foveae just in front of middle, whole pronotum depressed each side of middle in same area. Along anterior pronotal margin the ends of the 6 carinae form high elongate tubercles about equally distant from each other with a square of 4 coarse punctures between them, anterior pair of punctures smaller than posterior pair, leaving a shining transverse connection between the bases of the large tubercles. Middle pair of longitudinal ridges obsolete over punctate, slightly constricted bridge between the deep transverse pits each side at anterior third, then continuing on to base of pronotum arcuately curving first away then toward each other approaching the basal margin; the 2nd pair widely interrupted by the transverse pits, with basal segments curving parallel with 1st pair; close outside 2nd pair a secondary, less elevated, shorter pair of similarly interrupted ridges do not extend to either anterior or posterior pronotal margins; 3rd pair of ridges complete, depressed at anterior third and posterior fourth with the middle section bowing outward laterally. Large posterior marginal pits or punctures separate bases of the long carinae and leave a sharp fine posterior margin. A transverse row of 6 large punctures in pairs noticeable at basal third between the carinae.

Elytra shiny, elongate, subparallel, length 3.0 mm, width 1.8 mm, each elytron with 4 costae between the flat sutural costa and lateral margin, separated by coarsely punctate intervals. First costa slightly higher basally and wider and bulbously enlarged apically, 2nd costa about uniform width for its entire length, 3rd costa not quite reaching humerus, 4th costa appearing as elytral margin when viewed from directly above; 2nd and 3rd costae shorter than the 1st and only slightly enlarged apically; 4th costa angles upward

apically to an enlarged point or knob near end of the 1st, then curves downward to tip of elytron. The 2 apical angles of the 4th costa are enlarged and prominent. All costae have rows of fine, very close punctures each side of their summits with short, extremely fine, appressed silvery hairs directed diagonally backward toward top of costa. The apical enlarged ends of 1st costae almost touch inner points of upper knobs of the 4th, a slightly yellowish material, possibly a compact glandular substance (see Figure 10), is present on the upper side of the 4th and ends of the inner 3 costae. First, 2nd, and 4th punctured intervals have 2 discal rows of coarse punctures, 3rd has 3 rows, and 5th a single row; basally a short 3rd row on 1st interval, 1st costa diverging slightly from sutural costa in this area. Coarse punctures over discal area separated by a distance less than their diameter and about as wide as sutural costa. Terminal area at apex below 4th costa filled with close, medium punctures above marginal row of coarse punctures, mixed fine and very fine punctures along extreme edge. Humeri convex, somewhat bulbous, finely punctate with fine, short, appressed hair from each puncture. Most coarse elytral punctures with an extremely fine, inconspicuous, appressed hair backward from anterior edge and equaling in length the diameter of the puncture. Sutural costae show a single row of close, minute punctures their full length.

Prosternal processes before and behind anterior coxae subequal in length to width of profemur. Anterior process pointed, a carina extending back from tip and dividing midway to surround a deep elongate sulcus, laterally a similar sulcus, constricted at middle, for full length; posterior process similar to a 4-pointed star with a deep round puncture at middle of star, 1 point of which extends forward between the coxae. Both prosternal processes are set up high above general surface of prosternum. Mesosternum densely, finely punctate, punctures bearing fine hairs. Metasternum with sharply angulate process extending between the middle coxae; midline furrow wide, deep, extending three-fourths length of sternum, open at its posterior end; 2 deep triangular fosssae behind each coxae, flat discal surface each side as wide as midline furrow, shining and bearing fine shallow punctures; outside the narrow flat discal area the surface with shallow, moderately coarse punctures separated generally by a distance less than their diameters, a wide, depressed shallow furrow with close moderate punctures more or less in 3 rows just inside the finely carinate extreme lateral edges, basal edge with finely carinate edge but the enclosed depressed furrow decreasing in width to disappearance at middle third, depressed furrow area in posterior lateral angle slightly undercutting angle of coarsely punctate central area to leave a noticeable point or corner; all punctures bearing the usual extremely fine, silvery, appressed hair.

Six visible abdominal segments deeply separated, 2nd and 5th eroded or closely coarsely punctate along each edge (impossible to be sure which because of the encrusted surface) leaving only the middle 3rd more or less shining, minutely alutaceous and with rather numerous long, appressed, silvery hairs; laterally just inside cariniform edge a large, deep, triangular puncture or sulcus extends inward about one-fifth entire width; terminal segment slightly angulate anteriorly, as long as 2 preceding together, with close, moderately deep punctures bearing usual fine long hair. Pygidium basally with a median sulcus and large lateral depression each side with very close coarse punctures, apically becoming slightly convex, smooth with rounded apex.

Anterior femur with deep perimarginal groove, posterior edge sinuate, surface convex, with dense, deep, moderate, setigerous punctures; trochanter long, thin, sulcate medially with very fine shining cariniform edge; tibia with straight inner margin, outside margin laterally expanded over apical half and with a line of close shallow punctures, a single apical tooth. Middle femur similar to anterior except in shape, the femur being constricted along anterior and posterior margin at apical fourth, and with 2 wide, inconspicuous teeth or angles at middle and apical fourth; tibia straight, a sharp conspicuous tooth or spine on inner apical margin, ventrally the apex with fringe of close, short, even fimbriae; opposite margin with a single needle-like spine and a few long hairs; tarsus hairy, 1st segment equal in length to next 3 combined. Posterior femora longer and narrower than middle femora, slightly swollen and widest slightly beyond middle, slightly curved to fit curvature of body, punctures moderate over apical third, perimarginal groove much wider along posterior margin; tibiae arcuate, with strong internal apical spine, strong marginal line along inner edge, lower apical margin with fringe of close, short, equal fimbriae and 3 strong setae but without spine on upper edge near lateral spine; tarsi hairy, 1st segment longer than next 4 combined.

ALLOTYPE FEMALE.—Length 4.7 mm, width 1.7 mm. Appears identical to male except middle and hind tibiae lack the strong, sharp spines turned inward at apex; a small terminal tooth is found on inner apex of the front tibiae along with median and external teeth; pygidium bears a strong, sharp apical spine much like an ovipositor.

Holotype, USNM 69922, allotype, 1 male and 1 female paratypes, Mexico, Veracruz, North Chocaman, 23 July 1966, Flint and Ortiz; 1 female paratype, Costa Rica, Province of Puntarenas, 2 miles southwest of San Vito de Java, Finca R. Wilson, 22–24 June 1964, black light trap, R. E. Woodruff, Woodruff collection; 1 male paratype, Costa Rica, Turrialba, 13–17 March 1965, S. S. and W. D. Duckworth.

10. *Rhyparus denieri* (Martinez), new combination

FIGURE 15

Termitodius denieri Martinez, 1950, p. 167.

HOLOTYPE MALE.—length 4.5 mm, width 1.6 mm. Elongate, parallel, shinning, reddish brown. Agrees in all essential features with Central American species. It keys out with *mexicanus*, new species, but may be recognized by the characters listed in the key. Punctures of the pronotum follow the same pattern as in other species but those on the midline across and slightly beyond the bridge between the transverse fossae are coarse and united into a punctate furrow. Punctures of the metasternum are deeper, closer, and not quite so coarse as in other species. The terminal abdominal segment is anteriorly angulate at middle and at least four times as long at middle as the preceding segment. The tibiae have the usual sharp spurs of the male. Type from Bolivia, Province of Nor Yungas, Caranavi.

This specimen is unique among all those examined in showing the posterior glandular areas as masses of coarse, sticky hairs, and all parts protruding into the deep, transverse pronotal fossae to be bordered by very fine, very close, very short individual hairs.

We are greatly indebted to Dr. Antonio Martinez, and most grateful for the loan of his type of *T. denieri*. It is the only species from South America known to us.

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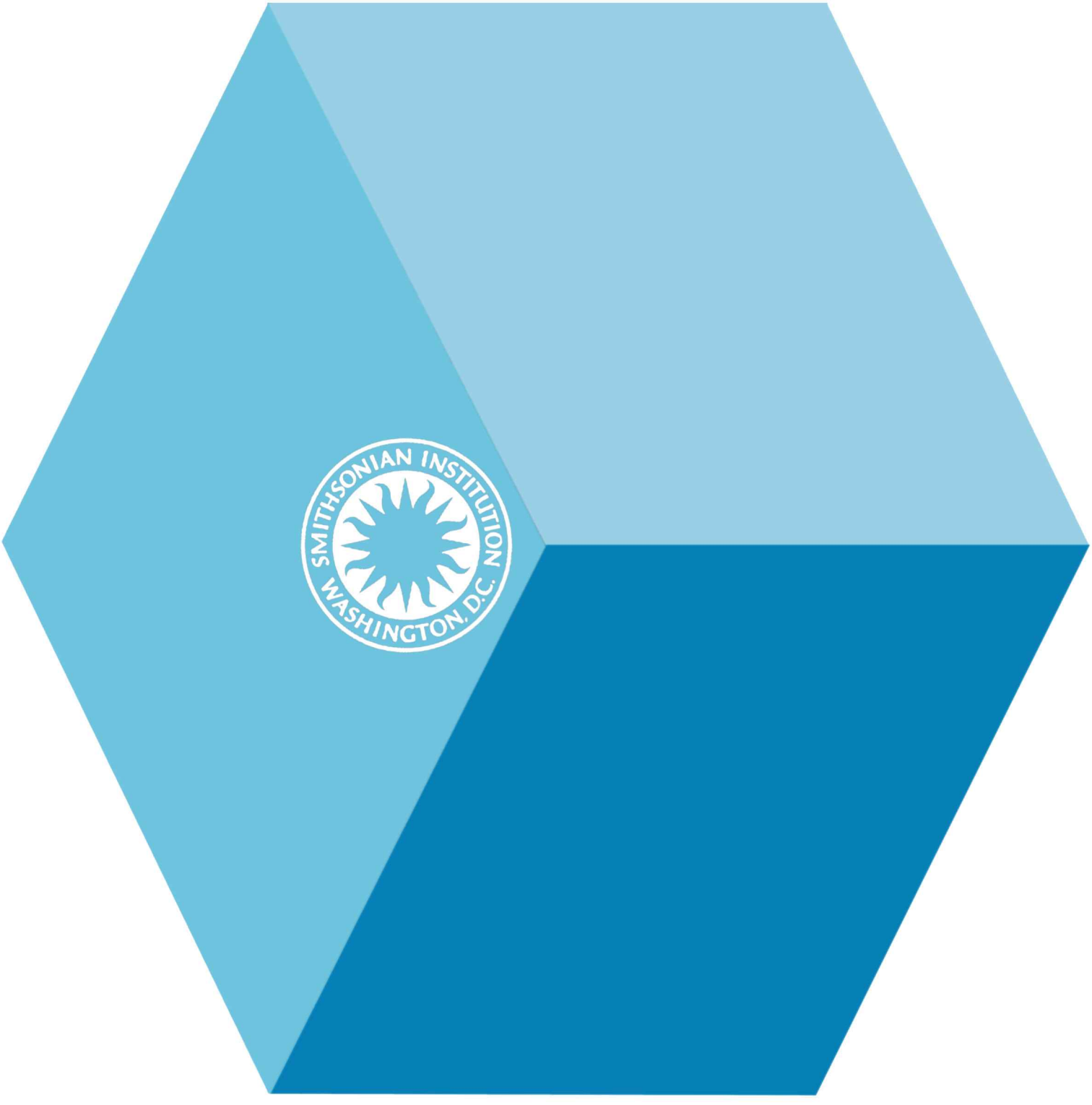
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