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NOTES ON ARADIDAE IN THE U.S. NATIONAL MUSEUM, IV
(HEMIPTERA: HETEROPTERA) ¹

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For the privilege of studying the unidentified Aradidae in the collections of the U.S. National Museum, Smithsonian Institution, I wish to express my sincere appreciation to Dr. J. F. Gates Clarke, former Chairman and presently Senior Scientist of the Department of Entomology, to Dr. Richard C. Froeschner, Associate Curator in Charge, Division of Hemiptera, and to the late Dr. Carl J. Drake, Honorary Research Associate. The deposition of types of new species is stated with the descriptions.

In the descriptions, 25 units equal 1 mm. The order of the figures in the ratios follows the descriptive text leading to the ratios.

Subfamily Aradinae Amyot and Serville, 1843

Except for a few strong flying species of the *lugubris* group which occur in the Southern Hemisphere, the subfamily Aradinae is holartic in distribution. The subfamily in North America was relatively

¹ Previous parts of this same series are: I, Kormilev, 1958, Proc. U.S. Nat. Mus., vol. 109, no. 3413, pp. 209-222; II, Kormilev, 1960, Journ. New York Ent. Soc., vol. 68, pp. 36-47; III, Kormilev, 1964, Proc. U.S. Nat. Mus., vol. 115, no. 3483, pp. 245-258.

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well worked out in the first half of the century by various American entomologists, particularly by Van Duzee, Parshley, and Usinger. Parshley's (1921) key for the species of the genus *Aradus* Fabricius, though now more than forty years old, is still the basic aid for identification of American species. Nevertheless, even today new species are being found. Three of them are described herewith.

Genus *Aradus* Fabricius

Aradus Fabricius, 1803, *Systema rhyngotorum*, p. 116.

Aradus saileri, new species

FIGURE 1

MALE.—Elongate ovate, slightly widening backward; body finely granulate.

Head shorter than width across eyes (22:26); distance between eyes shorter than length of the head (17:22). Anterior process moderately long, slightly tapering anteriorly, tip rounded. Antenniferous tubercles short, robust, acute, parallel exteriorly, reaching middle of antennal segment I. Eyes subpedunculate, kidney-shaped, almost touching foreborder of pronotum. Lateral tooth of antenniferous tubercles absent. Preocular tubercles small, acute; postocular small, slightly blurred. Depressions of vertex deep, curved, connected posteriorly. Antennae robust, less than twice as long as length of head (40:22): antennal segment I cylindrical; II clavate; III cylindrical, as thick as tip of II; IV ovate, thinner than III; proportions of segments 6:15:11:8. Rostrum reaching foreborder of mesosternum.

Pronotum less than half as long as width across humeri (20:44). Anterior border slightly sinuate; anterolateral angles rounded; lateral borders very finely crenulate, strongly convex, rounded at humeri, very finely granulate, slightly sinuate anteriorly. Inner carinae strong, parallel, running from the foreborder to hindborder; middle carinae much thinner and lower, restricted to posterior two-thirds of disc, reaching hindborder; outer carinae blurred. Disc densely, finely granulate.

Scutellum much longer than width at base (27:19); lateral borders slightly convex, rounded, moderately raised. Apex narrowly rounded. Prebasal elevation of disc small. Disc finely granulate.

Hemelytra complete, distinctly wider than pronotum (50:44), apex of membrane reaching expanded border of genital capsule. Corium long, reaching hindborder of connexival segment V, its basolateral border expanded and reflexed; apical border convex exteriorly, sinuate interiorly; veins raised, finely granulate.

Abdomen longer than width across segment VI; connexivum wide, finely granulate; postero-exterior angles II to V not protruding, VI slightly protruding, VII produced backward, rounded apically.

COLOR.—Black; posterior borders of connexiva, inner borders of expanded genital lobes, and tips of femora, white or whitish; remainder of femora and the tibiae dark brown.

MEASUREMENTS.—Total length 5.0 mm.; width of pronotum 1.76 mm.; width of abdomen 2.24 mm.

HOLOTYPE.—Male, Riverside Tanana R., Alaska, Lindroth collector, June 29, 1958. Bears label: "*Aradus* n.sp. nr *duzeei* det. R.I. Sailer" (USNM type 67580).

It is a pleasure to dedicate this species to Dr. Reece I. Sailer who first identified it as a new species.

Aradus saileri, new species, is related to *A. montanus* Bergroth but differs from it by the following characteristics: head is much shorter than its width across eyes; antenniferous tubercles without lateral tooth; connexivum bicolored; and size much smaller.

Aradus ovatus, new species

FIGURES 2, 3

FEMALE.—Brachypterous; ovate, regularly tapering forward, less so backward; densely and finely granulate.

Head as long as width across eyes (25:25.5); distance between eyes longer than length of antennal segment II (17:12). Anterior process long, parallel-sided, reaching basal fourth of antennal segment II. Antenniferous tubercles conical, acute, directed a little downward; outer borders parallel, without tooth. Preocular tubercles rather obsolete, postocular absent; depressions of vertex shallow, wide, not connected posteriorly. Eyes globose, very prominent, but not stalked. Antennae short, less than one and a half times as long as head, (32:25), slightly narrower than fore-femora (4:5); antennal segment I ovate, II clavate, III tapering toward base, IV obovate; proportions of segments 5:12:8:7. Rostrum short, reaching front coxae.

Pronotum one-third as long as width across humeri (14:41). Anterior border deeply sinuate, finely crenulate; anterior angles rounded; lateral borders finely crenulate, slightly reflexed, straight and convergent anteriorly, arcuate posteriorly; hindborder deeply sinuate. Disc rather flat, densely granulate; inner carinae thin, finely granulate, slightly convergent backward; middle and outer carinae obsolete.

Scutellum triangular, slightly longer than width at base (20:18); lateral borders very slightly reflexed at apical half; apex narrowly rounded; disc uneven, densely granulate, slightly depressed at two-fifths its length and before tip.

Hemelytra abbreviated, wider than pronotum; membrane reduced to a narrow rim at tip of corium interiorly; clavus not discernible; exocorium strongly developed, outer border arcuate, finely crenulate; posterolateral borders of main corium simple, not crenulate.

Abdomen ovate, slightly longer than width across segment V (70:67). Lateral borders finely crenulate, widely rounded; postero-exterior angles II to V not protruding, VI slightly protruding, VII almost forming a right angle. Connexivum wide, densely granulate, its limit with tergum rather blurred. Tergum flat, slightly convex medially; limit between terga VII and VIII clearly defined medially, almost indistinguishable laterally. Lobes of VIII large, pincer-shaped, surrounding small tergum IX, but not contiguous at tips. Tergum IX reaches middle of lobes.

COLOR.—Testaceous; occiput, and postero-exterior angles of connexiva II to VII, pale reddish brown, almost whitish; outer borders of connexival segments in front of postero-exterior angles brown; head and pronotum ferruginous.

MEASUREMENTS.—Total length 5.2 mm.; width of pronotum 1.64 mm.; width of abdomen 2.68 mm.

HOLOTYPE.—Female, Onaga, Kans., Crevecoeur collector (USNM type 67581).

Aradus ovatus, new species, is related to *A. montanus* Bergroth but may be separated by the following characteristics: antennal segment III two-thirds as long as II; middle and outer carinae of the pronotum obsolete; pronotum widest far behind middle; size much smaller; and by color.

Aradus barberi, new species

FIGURE 4

MALE.—Elongate ovate, macropterous.

Head slightly longer than width across eyes (25:23); distance between the eyes less than length of antennal segment II (15:22.5). Anterior process long, slightly enlarged medially, produced beyond tip of antennal segment I. Antenniferous tubercles dentiform, acute, divergent, lateral tooth distinct. Eyes very prominent, kidney shaped. Preocular tubercles small, acute; postocular tubercles prominent, blunt. Depressions of vertex deep, slightly convergent backward, connected posteriorly. Antennae long, slender, less than twice as long as head (47:25). Proportions of antennal segments 5.5:22.5:9:10. Rostrum reaching to foreborder of mesosternum.

Pronotum less than half as long as width across humeri (19:43). Anterior border straight, anterolateral angles produced forward, subangular. Lateral borders sinuate and reflexed anteriorly, strongly

convex, rounded posteriorly. Hindborder sinuate. Interlobal depression shallow, distinct; inner carinae thin, parallel between themselves; middle carinae convergent on forelobe, parallel on the hindlobe; outer carinae short, robust, parallel.

Scutellum triangular, longer than basal width (23:18). Lateral borders slightly arcuate, rimmed, reflexed; tip narrowly rounded; disc slightly raised medially, densely granulate anteriorly and around elevation.

Hemelytra reaching lobes of genital capsule; exterior border of corium slightly arcuate, almost straight; hemelytra as wide as pronotum; clavus longer than scutellum; corium reaching hindborder of connexival segment IV; membrane large.

Abdomen elongate ovate, longer than width across segment IV (63:46); lateral borders evenly, widely rounded; postero-exterior angles not protruding; VII forms an acute angle. Connexivum narrow anteriorly, widening posteriorly; lobes of genital capsule large, contiguous at their tips.

COLOR.—Greyish brown to sepia; corium and membrane variegated with whitish spots. Each lobe of genital capsule with a large, whitish spot. Antennae sepia, tips of segments II and III whitish.

MEASUREMENTS.—Total length 5.32 mm.; width of pronotum 1.72 mm.; width of abdomen 1.84 mm.

HOLOTYPE.—Male, Evergreen, Colo., collector not known. Collected on *Pinus ponderosa*. Bears a label: "*Aradus* n.sp. near *marginatus* Uhl. det H. G. Barber" (USNM type 67582).

PARATYPES.—Five males, deposited in the same collection and in the collection of the author.

This species is dedicated to the memory of the late Mr. H. G. Barber, an eminent American hemipterologist, who first identified it as a new species.

Aradus barberi, new species, runs in Parshley's key to *A. marginatus* Uhler, as Barber has indicated. It differs by having antennal segment II one and one-half times as long as the distance between eyes, while in *A. marginatus* these two measurements are equal.

Subfamily Calisiinae Stal, 1873

Genus *Calisiopsis* Champion

Calisiopsis Champion, 1898, in Godman and Salvin, *Biologia Centrali-Americana*, Rhynchota: Heteroptera, vol. 2, p. 67.

The genus *Calisiopsis* Champion has had only three species: two from Central America, and one from southeast Brazil. Among specimens examined was one from Finca Florida, Valle Tablones, Colombia, 1300 m. that belongs to *Calisiopsis*. Judging by the shape of the

head and position of the eyes, it belongs to a new species; but because both of the taxonomically important antennae are missing, I prefer not to describe it.

Subfamily Aneurinae Douglas and Scott, 1865

Aneurinae contains only two genera: *Aneurus* Curtis, 1825, with a worldwide distribution, and *Aneuraptera* Usinger and Matsuda, 1959, with a single micropterous species from New Zealand. From the Western Hemisphere twenty species have been recorded. Two more are described herewith: one from Texas, the other from Guadeloupe.

Genus *Aneurus* Curtis

Aneurus Curtis, 1825, British Ent., vol. 2, pl. 86.

Aneurus pygmaeus, new species

FIGURES 5-7

MALE.—Elongate ovate, slightly widening backward. Head flat, almost as long as width across eyes (σ , 11:12; ρ , 12:13). Anterior process conical, rounded anteriorly, slightly produced over tip of antennal segment I. Antenniferous tubercles small, acute. Eyes moderately convex. Postocular tubercles blunt, slightly produced over outer border of eyes. Vertex with two (1+1) small, ovate callosities; surface finely, transversely rugose behind them. Antennae slender; first two segments obovate, last two cylindrical; proportions of segments σ , 4:3:4:8; ρ , 4:3.5:4.5:9.

Pronotum trapezoidal, shorter than width across humeri (σ , 10:22.5; ρ , 10:25). Collar very fine, slightly sinuate in front; antero-lateral angles rounded, slightly produced forward beyond collar; lateral borders of the forelobe straight, convergent; lateral borders of the hindlobe convex, rounded; both very finely crenulate; hindborder widely sinuate medially, convex at hindangles. Foredisc with two (1+1) round, callosities; hinddisc finely striated.

Scutellum semicircular, shorter than width at the base (σ , 9.5:14.5; ρ , 10:15); base slightly raised; disc concentrically striated.

Hemelytra long, reaching foreborder of tergum VII (σ), or almost to hindborder of tergum VII (ρ). Corium reaching two-fifths of length of scutellum; membrane large, finely wrinkled. Hindwings reduced, reaching only to hindborder of tergum III.

Abdomen ovate, much longer than width across segment IV (σ , 43:32.5; ρ , 48:33). Exterior borders slightly convex, moreso posteriorly; postero-exterior angles not protruding. Connexiva very finely granulate at exterior borders. Each connexival segment from III to VI with two ovate, calloused spots; connexival segment VII

with a single spot. Exterior borders of abdomen finely crenulate. Hypopygium small, ovate, slightly depressed, finely granulate; paratergites relatively large, flat, reaching tip of hypopygium. In females, tergum VII deeply sinuate posteriorly for reception of tergum VIII; segment IX very short and wide (1:5), straight posteriorly; paratergites small, rounded posteriorly, reaching to tip of segment IX. Spiracles II lateral; III to V ventral, not visible from above; VI and VII lateral, visible from above; VIII terminal.

COLOR.—Dark ferruginous, partially blackish; tergum and venter yellow brown; membrane white, transparent, brownish at the base.

MEASUREMENTS.—Total length: ♂, 3.0 mm.; ♀, 3.28 mm.; width of pronotum; ♂, 0.9 mm.; ♀, 1.0 mm.; width of abdomen: ♂, 1.3 mm.; ♀, 1.32 mm.

HOLOTYPE.—Male, Aransas Co., Tex., Mar. 31, 1954, D. J. and J. N. Knull collectors, ex J. L. Lutz collection, USNM collection (USNM type 67583).

ALLOTYPE.—Female, collected with holotype; in the same collection.

PARATYPE.—One female, Mississippi, Jan. 9, 1946; deposited in the collection of author.

Aneurus pygmaeus, new species, is related to *A. minutus* Bergroth, from which it differs by the following: scutellum regularly semi-circular, in *A. minutus* more narrowed at the tip, almost subtriangular; paratergites of male larger, and widened toward the tip, in *A. minutus* narrower, almost subcylindrical; whitish semitransparent membrane, in *A. minutus* brown and not transparent; dark ferruginous body, in *A. minutus* yellow brown (I hold the former color as distinctive); in the female, abdomen narrow and long, in *A. minutus* more ovate; paratergites are also different.

Aneurus nasutus, new species

FIGURES 8, 9

MALE.—Elongate ovate, shiny; lateral borders of pronotum and abdomen with semiobliterated granulation.

Head as long as width across eyes (13:13.5); anterior process stout, tapering forward, rounded apically, reaching tip of antennal segment I. Antenniferous tubercles small, blunt, convex exteriorly. Eyes semiglobose, moderately protruding. Postocular tubercles small, blunt, not reaching outer border of the eyes. Mesad of the latter two (1+1) large, ovate, glabrous spots. Vertex roughly, transversely rugose. Antennae slender, less than twice as long as head (24:13); proportions of antennal segments 5:4:5:10.

Pronotum half as long as width across humeri (14:30). Collar thin, sinuate anteriorly. Anterolateral angles rounded, neither produced forward nor sideways; lateral borders of forelobe straight,

strongly convergent; lateral borders of hindlobe parallel, rounded and convergent anteriorly. Hindborder sinuate medially. Foredisc with four (2+2) large, flat callosities. Hind-disc finely, transversely rugose; with two (1+1) large, transverse, elongate, glabrous spots mesad of humeri.

Scutellum short, wide at base (12:21), widely rounded apically; disc concentrically rugose.

Hemelytra almost reaching hindborder of tergum VII. Corium very short, reaching middle of scutellum. Membrane large, finely wrinkled.

Abdomen ovate, longer than width across segment IV (52:39). Outer borders of connexiva with semiobliterated granulation; hindborders of connexival segments glabrous, shiny. Spiracles II lateral and visible from above; III to V sublateral, but not visible from above; VI and VII lateral and visible; VIII terminal. Paratergites small, strongly divergent, not reaching tip of hypopygium. Latter small, lateral borders convergent; tip rounded; disc moderately convex.

Femora moderately inflated, fusiform.

COLOR.—Dark brown; hindhalf of head, middle of pronotum, and base of scutellum, yellow brown; membrane black.

MEASUREMENTS.—Total length 3.84 mm.; width of pronotum 1.2 mm.; width of abdomen 1.56 mm.

HOLOTYPE.—Male, Guadeloupe; deposited in Drake collection (USNM type 67584).

Aneurys nasutus, new species, is not particularly related to any of Central American species; it appears to be most like *A. subdipterous* Burmeister from southeastern Brazil, but is smaller. Antennae are similar to those of *A. tenuis* Champion but the shape of the head is quite different: antenniferous and postocular tubercles small, and blunt; scutellum of different shape; lateral borders of the pronotum and abdomen are smoother, not finely crenulate; hypopygium is larger; and color is different.

Subfamily Carventinae Usinger, 1950

Usinger (1950, p. 176) divided the Mezirinae into two tribes, Mezirini and Carventini. Later, Usinger and Matsuda (1959a, p. 56) elevated the latter to a subfamilial rank. All members of the Carventinae are tropical or subtropical, none occur in the holarctic region. Many of them are apterous or micropterous. The ivory-like incrustation on the body of some species, as in the genus *Proxius*, may accumulate on tufts of hair and produce projections which give the insect a bizarre appearance.

Genus *Proxius* Stal

Proxius Stal, 1873, Kongl. Svenska Vet.-Akad. Handl., vol. 11, p. 141.

Proxius has had six species which Usinger and Matsuda (1959, pp. 113-114) placed into three subgenera: two of these, *Proxius* Stal sensu stricto, with a single species and *Neoproxius* Usinger and Matsuda, with four species, are American; the third one, *Nesoproxius* Usinger and Matsuda, with a single species, is Sumatran. One new species, belonging to the subgenus *Neoproxius*, is described herewith.

Proxius (Neoproxius) peruvianus, new species

FIGURES 10, 11

FEMALE.—Elongate ovate; partially incrustated with an ivory-like incrustation.

Head longer than width across eyes (20:16), as long as width across postocular projections (20:20). Anterior process long, parallel-sided, deeply cleft anteriorly; genae much longer than clypeus, cylindrical and truncate anteriorly, surpassing the tip of antennal segment I by one-fifth of their length. Antenniferous tubercles dentiform, slender, parallel-sided, reaching a little beyond middle of antennal segment I. Eyes small, semiglobose, moderately protruding. Postocular parts of head produced into large, partially punctured, triangular processes reaching far beyond outer border of eyes. Vertex with a punctured elliptical, flattened elevation running from clypeus to hindborder of head; head produced backward, forming a long "neck." Antennae, clypeus, and two (1+1) ovate, glabrous spots laterad of the elevated portion of vertex, rostral atrium, and rostrum, not incrustated; all other parts of head covered with thick, ivory-like, incrustations. Antennae long and slender, one and a half times as long as length of the head (32:20). Proportions of antennal segments 6:5:13.5:7.5. Rostrum short, reaching hindborder of narrow, deep, and short rostral groove; latter closed posteriorly. Rostral atrium closed.

Pronotum subrectangular, shorter than width across humeri (20:35). Forelobe almost as wide as hindlobe (32:35). Collar small, convex, foreborder straight. Anterior angles produced forward far beyond collar as two (1+1) lobes, these rounded interiorly and sinuate exteriorly. Anterolateral angles subrectangular; lateral borders of forelobe slightly sinuate, provided with a row of short, erect bristles projecting through incrustation. Interlobal notch deep and narrow. Lateral borders of hindlobe short, convex, deeply notched medially. Hindborder slightly convex medially, posterior angles angularly pro-

duced backward. Foredisc flat medially, with a small, relatively high, median ridge on posterior half of disc; strongly inflated laterally in a shape of an S with eight (4+4) dots on inner sides, deeply excavated laterad of these inflations. Collar, and two (1+1) round dots laterad of the median ridge, without incrustation; other parts of forelobe heavily incrustated. Hind-disc with two (1+1), L-shaped, high, transverse carinae medially, turned with their bases to each other, and with four (2+2) short, oblique ridges laterally. Latter produced over actual lateral border forming lateral teeth of the hindlobe. Hind-disc without incrustation, except along carinae.

Scutellum subtriangular, shorter than width at base (11:19), rounded posteriorly. Disc flat, without incrustation except on the two (1+1) lateral, high, hatchet-shaped ridges with their blades sideways.

Hemelytra reaching apical third of tergum VII. Corium very short, outer border carinate, incrustated; membrane transparent, finely corrugate.

Abdomen ovate, longer than width across segment IV (59:45). Lateral borders slightly, evenly convex. Connexival segments II and III fused, provided with two longitudinal ridges converging anteriorly. Other connexival segments rather flat, heavily incrustated; their outer borders slightly convex from II to IV, angularly produced on hindhalves from V to VII. Tergum incrustated laterally, posteriorly on tergum VII; outer margin of incrustation obliquely raised. Paratergites small, triangular, incrustated, reaching tip of segment IX. Latter subtruncate posteriorly. Spiracles very small, from II to IV ventral but progressively nearing margin; lateral and visible from above from V to VIII. Venter incrustated only laterally. Sternum incrustated along borders. Propleura incrustated.

Legs relatively long, slender; femora fusiform; tibiae cylindrical, slender. Tarsi with arolia.

COLOR.—Under incrustation and on free parts, yellow brown to brown; incrustation ivory.

MEASUREMENTS.—Total length 4.44 mm.; width of pronotum 1.4 mm.; width of abdomen 2.36 mm.

HOLOTYPE.—Female, Satipo, Peru, P. Paprzycki collector, Apr. 26, 1941 (USNM type 67585).

Proxius peruvianus, new species, is related to *P. palliatus* Champion and may be separated from the latter by the following: genae produced beyond the tip of antennal segment I; absence of excavation on postocular lobes; median ridge of the pronotum reduced to a very short, thin carina on the hindhalf of forelobe; different shape of carinae on the hindlobe of pronotum and scutellum.

Genus *Kolpodaptera* Usinger and Matsuda

Kolpodaptera Usinger and Matsuda, 1959, Classification of the Aradidae, p. 144.

***Kolpodaptera minuta*, new species**

MALE.—Apterous; subovate; from metanotum to abdominal segment VI lateral borders parallel. Entire body covered with thick layer of greyish incrustation.

Head shorter than width across eyes (11:12.5). Anterior process short, robust, sides parallel; genae slightly produced beyond the tip of clypeus, not contiguous, forming a shallow notch. Antennal segment I produced by two-thirds its length over tip of anterior process. Antenniferous tubercles robust, subacute apically, outer borders subparallel. Eyes moderately protruding. Postocular borders convergent backward. Vertex with a thin, triple, longitudinal carina, laterally with two (1+1) oblique rugae. Antennae strong, almost twice as long as head (19.5:11); proportions of the antennal segments 7:3:4.5:5. Rostrum reaching hindborder of rostral groove; latter wide, shallow.

Pronotum much shorter than width across humeri (8:21). Collar slender. Anterolateral angles together with lateral borders form a regularly rounded arc. Disc with a median carina occupying posterior three-fifths of disc and running backward across meso- and metanotum and tergum I, progressively widening, becoming a double carina on metanotum and tergum I. Pronotum irregularly rugose laterad of median carina. Mesonotum wider than pronotum (24:21). Metanotum wider than mesonotum (25:24). Mesonotum laterad of median carina with four (2+2) larger, and two (1+1) smaller, flattened elevations separated from each other by fine sulci. Mesonotum rugose along lateral borders. Median carina of mesonotum fused posteriorly with median portion of metanotum; latter in turn fused posteriorly with tergum I; all together forming a longitudinally rugose triangular plate. Laterad of triangular plate metanotum has two (1+1) rugose elevations.

Abdomen subrectangular, slightly longer than width across segment II (27.5:26). Tergum I fused with metanotum anteriorly and with tergum II posteriorly; latter placed at a slightly lower level. Central dorsal plate consist of terga III to VI, limited by fine sulci. Median portion of central dorsal plate elevated, forming a median ridge, laterad of it with pattern of rugae and round callous spots. Tergum VII raised posteromedially for reception of hypopygium. Connexivum broad, segments II and III fused, others separated from each other by fine sulci; disc of each segment bearing round calloused

spots with rugae around them; postero-exterior angles II to V not protruding; VI makes a step with VII; the latter produced backward as a triangular process, reaching to tip of hypopygium. Paratergites cylindrical, directed obliquely up and backward. Hypopygium dorso-caudal, flattened on disc, with an ovate median elevation on lower half. Spiracles II to VII lateral, visible from above; those of VIII terminal.

COLOR.—Yellow brown, partially darker.

MEASUREMENTS.—Total length 2.36 mm.; width of pronotum 0.84 mm.; width of abdomen 1.04 mm.

HOLOTYPE.—Male, Livingston, Guatemala; deposited in Drake collection (USNM type 67586).

Kolpodaptera minuta, new species, is related to *K. panamensis* Usinger and Matsuda from which it may be separated by head shorter than width across the eyes; eyes less prominent; antenniferous tubercles relatively shorter; postero-exterior angle of connexival segment VII also relatively shorter; proportions of antennal segment 14:6:9:10, whereas in *K. panamensis* they are 15:9:10:14.

Kolpodaptera rugosa, new species

FEMALE.—Apterous; ovate; thickly covered with greyish incrustation and accumulated dirt; under incrustation glabrous and shiny.

Head shorter than width across eyes (14:15.5). Anterior process short and robust, cleft anteriorly, genae longer than clypeus and pointed, reaching basal one-third of antennal segment I. Antenniferous tubercles short, robust, broad at base, subacute apically. Eyes moderately prominent, with convex facets. Postocular borders strongly convergent. Vertex with a short longitudinal ridge flanked by two (1+1) thin carinae, behind them with two (1+1) small, but prominent tubercles. Antennae strong, more than twice as long as head (29.5:14); proportions of antennal segments 10:5:7:7.5. Rostrum short, reaching hindborder of shallow, wide rostral groove.

Pronotum much shorter than width across humeri (8:28); mesonotum wider than pronotum (34:28); metanotum wider than mesonotum (39:34). Anterolateral angles of the pronotum rounded; lateral borders divergent backward. Collar thin, smooth. Median carina starts at middle of disc and fuses posteriorly with triangular plate formed by median portions of meso-, metanotum, and tergum I. Laterally pro-, meso-, and metanotum separated from each other by deep, transverse furrows. Median, triangular plate on meso-, and metanotum with a double median carina, roughly, longitudinally rugose laterally. Laterad of the median triangular plate, pro-, meso-, and metanotum roughly, irregularly rugose. Along lateral borders pro-, meso-, and metanotum roughly granulate.

Abdomen as long as width across segment IV (42:42.5). Tergum I completely fused with metanotum (median, triangular plate), and with tergum II; latter can be recognized only because it is at a slightly lower level. Central dorsal plate of the abdomen consists of terga III to VI, with a slightly elevated median line narrowed on tergum III, much wider on terga IV and V, and with a double longitudinal carina on tergum VI; laterad of the median elevation disc has a pattern of irregular rugae and round callous spots. Tergum VII convex medially, sloping laterally; VIII very short and wide. Connexivum wide; discs of connexival segments with a pattern of rough rugae and granules; exterior borders of each segment slightly convex, entire lateral border weakly festooned; postero-exterior angles from II to IV not protruding, V slightly protruding, VI forming an obtuse angle, and VII forming a right angle. Paratergites rounded, produced backward beyond tip of very short segment IX. Spiracles II to VIII lateral, visible from above.

COLOR.—Brown; lateral borders and central dorsal plate of the abdomen partially mottled with black.

MEASUREMENTS.—Total length 3.24 mm.; width of pronotum 1.12 mm.; width of abdomen 1.56 mm.

HOLOTYPE.—Female, Cayamas, Cuba; deposited in the Drake collection (USNM type 67587).

Kolpodaptera rugosa, new species, is related to *K. prominens* Usinger and Matsuda and may be separated from it mainly by head shorter than width across the eyes; antennae relatively longer, more than twice as long as the head (less than twice in *K. prominens*); and different proportions of the antennal segments which are 20:10:14:15, whereas in *K. prominens* they are 25:11:16:17.

Subfamily Merizinae Oshanin, 1908

Mezirinae is the largest subfamily of the Aradidae. Previously, it was considered as a family under the name of Dysodiidae Reuter, but, as Usinger and Matsuda pointed out (1959, p. 54), that would distort the actual relationship between subfamilies so far included in Dysodiidae; therefore, they accepted Aradidae as a single family, consisting of eight subfamilies, including Mezirinae, and leaving only Termitaphididae as a second family in the superfamily Aradoidea.

Mezirinae has an almost worldwide distribution. It is absent from the frigid areas and develops the highest number of genera and species in the tropical and subtropical zones. Strange as it may seem, from the entire European and Siberian part of the Palaearctic region there is recorded only a single species of Mezirinae, *Mezira tremulae* (Germar), 1822. The Manchurian subregion of the Palaearctic region contains several genera and numerous species.

Genus *Miorrhynchus* Champion

Miorrhynchus Champion, 1898, in Godman and Salvin, *Biologia Centrali-Americana*, Rhynchota: Heteroptera, vol. 2, p. 75.

The genus *Miorrhynchus* Champion has contained ten species which may be separated into two groups: those with spiracles from VI to VIII lateral and visible from above; and those with only spiracles VII to VIII lateral and visible from above. Two new species belonging to the first group are described herewith.

Miorrhynchus angulatus, new species

FIGURES 16, 17

MALE.—Elongate, widening backward, subtruncate posteriorly, partially covered with relatively long, incrustated, curled hairs.

Head longer than width across eyes (25:22). Anterior process long and moderately stout, covered with incrustated hairs which make it look stouter; reaching basal fourth of antennal segment I. Antenniferous tubercles parallel, directed forward. Eyes moderately large, semiglobose, protruding. Postocular borders straight; postocular tubercles placed far from eyes, dentiform, directed sideways. Vertex with two (1+1) rows of parallel, setigerous tubercles, running from base of clypeus to hindborder of head, two (1+1) pyriform callosities laterad of each row. Antennae very long, more than three times as long as head (81:25); first two segments covered with incrustated hairs, those on first segment longest; apical two segments except for a brush of erect bristles on tip of IV, naked. Proportions of the antennal segments: 29:12:30:10. Rostral groove long, deep, closed posteriorly; rostrum reaching hindborder of latter.

Pronotum much shorter than width across the humeri (32:50); forelobe much narrower than hindlobe (36:50); interlobal depression deep. Collar wide, with strongly sinuate foreborder. Antero-lateral angles rounded, with a fringe of long, incrustated hairs; lateral borders slightly convex on the forelobe, more convex on the hindlobe; hindborder almost straight. Foredisc with two (1+1) round callosities; laterad of them with two (1+1) ridges covered with incrustated hairs; hinddisc rather flat, covered with remote granulations and short, incrustated hairs.

Scutellum shorter than width at base (20:28); carinate at all borders; lateral borders straight; tip pointed; disc rugose, with a low, median ridge, covered with long, curled, incrustated hairs.

Hemelytra reaching middle of tergum VII. Basolateral borders of corium reflexed; apical border convex exteriorly, sinuate interiorly; apical angle rounded, reaching hindborder of connexivum II. Membrane large, veins anastomosed.

Abdomen longer than width across segment VI (90:72.5); lateral borders feebly convex from II to V; angularly produced on VI and VII. Exterior borders of connexival segments II to V slightly convex, making lateral borders look festooned. Connexival segment VI trapezoidal, with postero-exterior angle rounded at tip; VII angularly produced backward as far as the tip of hypopygium. Paratergites flat, fusiform, reaching to tip of hypopygium. Latter subcordate, shorter than maximal width (15:19), divided by a transverse furrow in upper and lower lobes. Upper lobe subtriangular, with a relatively narrow median ridge; lower lobe semiglobose; both lobes covered with incrustated, curled hairs. Spiracles from II to V ventral, placed far from borders; VI to VIII lateral and visible from above.

COLOR.—Ferruginous; base of antennal segment I, antennal segment III, with exception of tip, and apical half of IV, yellow brown. Round calloused spots on connexival segments III to VII yellow.

MEASUREMENTS.—Total length 6.8 mm.; width of pronotum 2.0 mm.; width of abdomen 2.9 mm.

HOLOTYPE.—Male, Callanga, Peru, 1300 m., F. Woytkowski collector, Feb. 13, 1953 (USNM type 67588).

Miorrhynchus angulatus, new species, is related to *M. longipes* Champion and may be separated from the latter by the angularly produced connexivum VI, which is rounded in *M. longipes*.

Miorrhynchus undulatus, new species

FIGURES 18, 19

MALE.—Elongate ovate; partially covered with curled, incrustated hairs.

Head longer than width across eyes (25:21). Anterior process moderately stout, covered laterally with incrustated hairs; reaching basal fourth of antennal segment I. Antenniferous tubercles short, blunt, slightly divergent. Eyes semiglobose, protruding, but less than in preceding species. Postocular borders convex; postocular tubercles spiniform, placed far behind eyes, directed sideways and a little backward. Vertex with V-shaped row of setigerous tubercles, and laterad of them with two (1+1) ovate callous spots. Antennae long, more than three times as long as head (80:25); proportions of antennal segments 28:12.5:28:11.5. Rostrum reaching hindborder of rostral groove, latter closed posteriorly.

Pronotum shorter than width across humeri (35:53). Forelobe much narrower than hindlobe (36:53). Collar wide, slightly sinuate anteriorly. Anterolateral angles rounded; lateral borders convex on the forelobe, strongly convex on the hindlobe. Hindborder slightly

convex in the middle. Foredisc with two (1+1) ovate calloused spots, laterad of them with two (1+1) longitudinal ridges, the latter covered with incrustated, curled hairs. Hind-disc partially rugose with half obliterated setigerous granules. Humeri raised.

Scutellum shorter than width at base (20:26). All borders carinate; lateral borders straight, tip pointed. Disc transversely rugose; median carina tapering backward, covered with dense, curled, incrustate hairs.

Hemelytra reaching apical third of tergum VII. Basolateral borders of corium reflected; apical border straight exteriorly, sinuate interiorly. Apical angle of corium pointed, reaching slightly over the hindborder of connexival segment II. Membrane large, with anastomosed veins, thickly covered with whitish incrustation.

Abdomen longer than width across segment IV (90:66); lateral borders moderately convex. Exterior borders of connexival segments II to V slightly convex; postero-exterior angles protruding, and rounded on connexival segments II to IV; subangular but not protruding on VI and VII; VI forms a slightly obtuse angle, with rounded tip; VII forms a slightly acute angle, directed backward and slightly sideways, tip rounded reaching to middle of paratergites. Paratergites small, clavate, reaching to middle of hypopygium; latter large, subcordate, with a moderately wide median ridge. Spiracles ventral on II to V; lateral and visible from above on VI to VIII.

COLOR.—Ferruginous to dark ferruginous; tibiae with a wide yellow-brown subbasal ring. Connexival segments III to VI each with two, connexival segment VII with one, round, yellow-brown, calloused spots.

MEASUREMENTS.—Total length 6.84 mm.; width of pronotum 2.14 mm.; width of abdomen 2.64 mm.

HOLOTYPE.—Male, Callanga, Peru, 1300 m., F. Woytkowski collector, Feb. 13, 1953 (USNM type 67589).

Miorrhynchus undulatus, new species, is closely related to *M. championi* Kormilev but differs from it by the undulate lateral borders of abdomen which are not undulate in *M. championi*.

Genus *Placogenis* Usinger and Matsuda

Placogenis Usinger and Matsuda, 1959, Classification of the Aradidae, p. 352.

Diphyllonotus Kormilev, 1959, Proc. Ent. Soc. Washington, vol. 61, p. 61.

In a manuscript submitted for publication in 1955, the author originally proposed the name *Diphyllonotus* with the single included species *D. explanatus*. Unfortunately, the manuscript was lost by the printer. Thus the second species of the genus, *D. brachypterus*, was published in 1956 before the genus was validated. It was not

Scutellum shorter than width at base (15:22). Lateral borders carinate, almost straight; tip rounded. Disc inflated, transversely rugose, provided with a stout median carina, tapering backward.

Hemelytra complete, reaching apical fourth of tergum VII. Corium short, not reaching hindborder of connexival segment II; basolateral border straight and reflexed, then flat and convex; apical border evenly sinuate; apical angle rounded.

Abdomen longer than width across segment IV (72:63). Lateral borders evenly convex; postero-exterior angles not protruding. Suture between connexival segments II and III not discernible. Tergum VII with a transverse carina along the hindborder, and a transverse sulcus in front of it. Paratergites large, triangular, reaching middle of segment IX; latter notched posteriorly. Spricles II to V ventral, placed far from border; VI to VIII lateral and visible from above. Female with second valvula longer than second valvifer.

COLOR.—Ochraceous; lateral borders and apex of scutellum, antero-exterior angles of connexiva II to VII, spots on terga near joints of connexival segments III and IV, IV and V, V and VI, a spot in middle of hindborder of tergum VII, and the base of tergum VIII, fuscous to piceous.

MEASUREMENTS.—Total length 5.28mm.; width of pronotum 1.76 mm.; width of abdomen 2.52 mm.

HOLOTYPE.—Female, Ciudad Universitaria, Tucuman, Argentina, J.F.G. Clarke collector, Feb. 19, 1959 (USNM type 67590).

It is a pleasure to dedicate this species to the collector, Dr. J. F. Gates Clarke, Senior Scientist in the Department of Entomology in the U.S. National Museum, Washington, D.C.

Placogenis clarkei, new species, is related to *P. brachyptera* (Kormilev) from which it may be separated at once by different proportions of antennal segments, particularly by the relatively longer segment III.

Genus *Notapictinus* Usinger and Matsuda

Notapictinus Usinger and Matsuda, 1959, Classification of the Aradidae, p. 361.

The genus *Notapictinus* was established by Usinger and Matsuda for reception of the American species lacking the stridulatory apparatus and previously referred to the genus *Pictinus* Stal, 1873.

Usinger and Matsuda originally referred six species to *Notapictinus* but the genus is much larger. In my key for separation of the species of the genus *Notapictinus* (1964) are included 25 species, three more are described herewith, and we may expect that further species will be described before long.

Notapictinus uruguayensis, new species

FIGURES 14, 15

FEMALE.—Elongate ovate, slightly widening backward; macrop-terous.

Head shorter than width across eyes (16:17.5). Anterior process moderately stout, reaching almost to apex of antennal segment I, sides slightly convex, tip deeply cleft; genae much longer than clypeus, with blunt tips. Antenniferous tubercles short, dentiform, divergent. Eyes large, protruding, their longitudinal diameter longer than antenniferous tubercles (5:4). Postocular tubercles slender, dentiform, reaching as far as, or a little beyond, the outer border of the eyes. Infraocular carinae low, finely granulate, converging from foreborder of eyes to union at middle of posterior border of head. Vertex with M-shaped row of granules, laterad of this with two (1+1) ovate callosities. Antennae moderately strong, more than one-and-a-half times as long as head (26:16); proportions of antennal segments, I to IV: 6:5:7.5:7.5. Rostrum reaches to hindborder of rostral groove, latter closed posteriorly.

Pronotum trapezoidal, much shorter than width across humeri (19:36). Forelobe narrower than hindlobe (27:36). Collar tiny, with a straight foreborder. Anterolateral angles slightly expanded, rounded, and reflexed, produced beyond the foreborder of collar. Lateral borders finely crenulate, straight and parallel at humeri, strongly converging anteriorly. Hindborder slightly convex medially and slightly sinuate mesad of hindangles. Foredisc with two (1+1) stout, granulate ridges, convergent anteriorly, laterad of them with two (1+1) lower, granulate inflations. Hind-disc roughly granulate.

Scutellum shorter than width at base (12:18). All sides carinate. Median carina T-shaped, moderately stout, granulate; disc also granulate.

Hemelytra complete, reaching apical fourth of tergum VII. Corium reaching middle of connexival segment III, basolateral border reflexed, forming a low carina, then slightly sinuate, receding, and not reflexed. Apical border bisinuate, shallowly exteriorly, and deeper interiorly. Membrane large and corrugate.

Abdomen longer than width across segment IV (60:45). Lateral borders evenly convex, rounded; postero-exterior angles barely protruding: VII forming a rounded lobe, reaching to the middle of tergum VIII. Posterior border of tergum VII carinate. Paratergites large, triangular, reaching apical fourth of segment IX. Latter tricuspidate; median portion acute, lateral (valves) rounded. Spir-

acles from II to VI ventral, placed far from border, VII and VIII lateral and visible from above.

COLOR.—Testaceous; head behind eyes, posterolateral angles of pronotum, lateral and basal carinae of scutellum, outer borders of connexiva, hindborder of tergum VII, entire terga VIII and IX, and two (1+1) large, dark spots on sterna III to V, infuscated. Hindborders of connexival segments II to VI yellow.

MEASUREMENTS.—Total length 4.40 mm.; width of pronotum 1.44 mm.; width of abdomen 1.80 mm.

HOLOTYPE.—Female, Atlantide (Maldonado), Uruguay, H.L. Parker collector, Dec. 24, 1942; deposited in the Drake collection (USNM type 67591).

Notapictinus uruguayensis, new species, is related to *N. incaicus* Kormilev (1964, p. 473), from which it may be separated by the longer anterior process of the head; much shorter antennae; more produced anterolateral angles of the pronotum; granulate and not transversely rugose scutellum; and yellow hindborders of connexival segments.

Notapictinus platyceps, new species

FIGURES 20, 21

MALE.—Elongate, with subparallel sides; macropterous.

Head shorter than width across eyes (15:17). Anterior process short, tapering forward, subtruncate anteriorly, reaching basal third of antennal segment I; genae as long as clypeus. Antenniferous tubercles short, dentiform, slightly divergent. Eyes relatively large, moderately prominent. Postocular borders rounded, without visible tubercle or tooth, not reaching outer border of eyes. Vertex with semiobliterated granulation. Entire upper surface of the head flattened. Antennae strong and long, more than twice as long as head (35:15). Proportions of the antennal segments 9:7:11:8. Rostrum reaching hindborder of rostral groove; latter wide, closed posteriorly.

Pronotum much shorter than width across humeri (20:37). Forelobe narrower than hindlobe (27:37). Collar sinuate anteriorly, rather indistinctly separated from the disc. Anterior angles produced forward far beyond the collar as rounded lobes. Lateral borders slightly convex, rounded on the forelobe; strongly convex on the hindlobe. Hindborder slightly convex in the middle. Interlobal sulcus thin but distinctly visible. Forelobe with two (1+1) almost obliterated callosities. Hindlobe granulate.

Scutellum shorter than width at base (12:18). All borders carinate; disc roughly, transversely rugose, with a moderately stout median carina.

Hemelytra reaching apical fourth of tergum VII. Basolateral border of corium reflexed forming a low carina. Apical angle

produced into a long point, reaching to middle of connexival segment III. Apical border of corium deeply and widely sinuate.

Abdomen longer than width across segment V (59:42); sides subparallel. Connexival segment II short, triangular, semifused with III; latter very long, more than twice as long as II (15:7); other connexival segments normal. Postero-exterior angles not protruding on II to IV; slightly protruding on V and VI; rounded on VII. Hypopygium conical, almost as long as its width at base (9:10). Paratergites wide, flat, curved, tips reposing on the sides of hypopygium. Spiracles II to V ventral, placed far from border; VI to VIII lateral, visible from above.

COLOR.—Head, pronotum, with exception of anterior angles, scutellum, hindhalves of connexival segments III to VI, middle of tergum VII, and hypopygium, ferruginous. Antennae, anterior angles of pronotum, connexival segment II, and paratergites ochre brown. Forehalves of connexival segments III to VI and almost entire VII, yellow. Ventral side of the body ferruginous, with yellow spots on connexivum.

MEASUREMENTS.—Total length 4.36 mm.; width of pronotum 1.48 mm.; width of abdomen 1.68 mm.

HOLOTYPE.—Male, Chapada, Brazil; September (USNM type 67592).

Notapictinus platyceps, new species, is related to *N. breviceps* (Champion) but is larger, has antennae with different proportions of segments; anterior angles of the pronotum produced forward as long lobes; and paratergites in the form of a hook.

Notapictinus ornatus, new species

FIGURES 22, 23

MALE.—Elongate ovate, regularly widening backward, then narrowing; macropterous.

Head almost as long as width across the eyes (16:16.5). Anterior process long and slender, cleft anteriorly; genae much longer than clypeus, reaching apical two-fifths of antennal segment I. Antenniferous tubercles long, dentiform, slightly divergent, reaching basal fourth of antennal segment I. Eyes moderately large, protruding. Postocular tubercles small, dentiform, slightly produced beyond outer border of the eyes. Vertex with V-shaped row of granules, and laterad of this with two (1+1) callosities; latter each with a thin, longitudinal carina. Antennae strong, twice as long as head (31.5:16). Proportions of antennal segments 8:5.5:11:7. Rostrum reaching hindborder of rostral groove; latter wide, closed posteriorly.

Pronotum much shorter than width across humeri (19:36). Collar wide, slightly sinuate anteriorly, clearly separated from disc. Fore-

lobe narrower than hindlobe (29:36). Anterior angles rounded, directed somewhat inward, produced beyond collar. Lateral borders of forelobe convex, rounded; those of hindlobe less convex, crenulate. Hindborder slightly convex medially and laterally. Foredisc with a deep median silcus, laterad with two (1+1) large, flat callosities. Inner borders of callosities carinate, discs each with two oblique carinae. Four (2+2) curved carinae between callosities and lateral borders. Hind-disc roughly granulate.

Scutellum shorter than width at base (12:19); all borders carinate; lateral borders sinuate medially. Median carina thin, but prominent; disc roughly, transversely rugose.

Hemelytra almost reaching hindborder of tergum VII. Basolateral border of corium reflexed; apical angle produced into a short point, reaching basal fourth of connexival segment III; apical border concave, forming two angles.

Abdomen longer than width across segment V (59:44). Connexival segments all of about the same length. Postero-exterior angles from IV to VI slightly protruding; on VII forming small rounded lobes. Paratergites small, clavate, reaching middle of hypopygium. Latter cordate, shorter than width at base (11:13.5); upper surface with a stout, subtriangular ridge not reaching hindborder of hypopygium. Spiracles II to V ventral; VI ventral but placed near margin; VII to VIII lateral.

COLOR.—Light ferruginous; connexival segments yellow brown, posterior borders yellow. Paratergites and tibiae ochre brown. Membrane light brown.

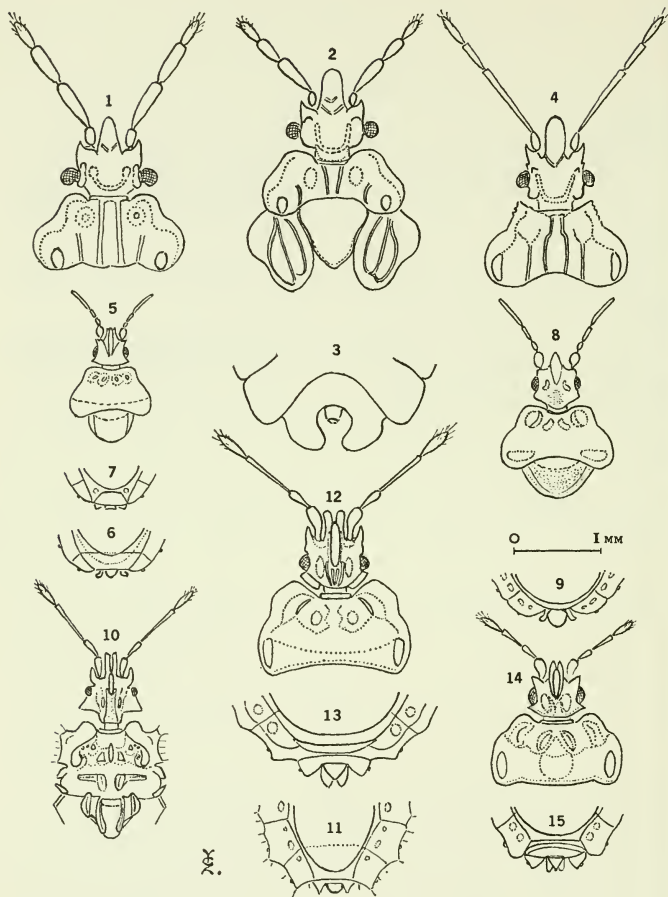
MEASUREMENTS.—Total length 4.32 mm.; width of pronotum 1.44 mm.; width of abdomen 1.76 mm.

HOLOTYPE.—Male, Rio de Janeiro, Brazil; October (USNM type 67593).

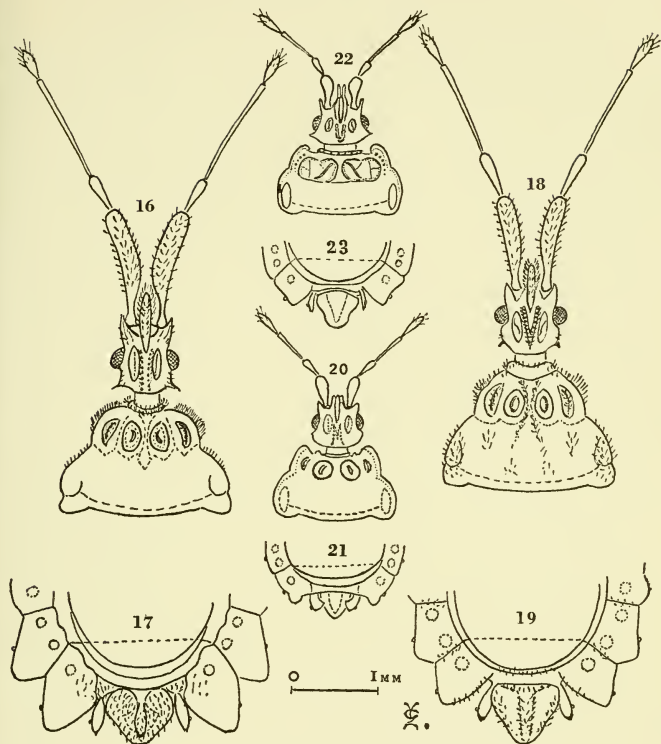
Notapictinus ornatus, new species, is related to *N. kjellanderi* Kormilev (1964, p. 472) from Peru, but the anterior angles of the pronotum are directed forward and inward; lateral borders of the hindlobe are less convex; postero-exterior angle VII forms small, rounded lobes; hypopygium more elongate, with sinuate lateral borders; antennal segment II much shorter than I (5.5:8), whereas in *N. kjellanderi* it is as long as I.

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FIGURES 1-15.—New species: *Aradus saileri*, male: 1, head and pronotum. *A. ovatius*, female: 2, head and pronotum, 3, tip of abdomen. *A. barberi*, male: 4, head and pronotum. *Aneurys pygmaeus*: 5, male, head, pronotum, and scutellum; 6, male, tip of abdomen; 7, female, tip of abdomen. *A. nasutus*, male: 8, head, pronotum, and scutellum; 9, tip of abdomen. *Proxius peruvianus*, female: 10, head, pronotum and scutellum; 11, tip of abdomen. *Placogenis clarkei*, female: 12, head and pronotum; 13, tip of abdomen. *Notapictinus uruguayensis*, female: 14, head and pronotum; 15, tip of abdomen.



FIGURES 16-23.—New species, male: *Miorrhynchus angulatus*: 16, head and pronotum; 17, tip of abdomen. *M. undulatus*: 18, head and pronotum; 19, tip of abdomen. *Notapictinus platyceps*: 20, head and pronotum; 21, tip of abdomen. *N. ornatus*: 22, head and pronotum; 23, tip of abdomen.