

A REVISION OF THE NEOTROPICAL
GENUS *METAMASIUS*
(COLEOPTERA, CURCULIONIDAE,
RHYNCHOPHORINAE)

PATRICIA VAURIE

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SPECIES GROUP III

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INTRODUCTION

IN THE FIRST PART of my revision (Vaurie, 1966) of the tropical curculionid genus *Metamasius* Horn, 1873, species groups I and II were discussed. The present paper is the second and final part and concerns species group III. The genus, as now outlined, includes 101 species: 55 in group I, two in group II, and 44 in group III. The three species groups, as stated previously, are defined on the basis of the presence of a lateral line on, or its absence from, the aedeagus (this line is absent from the species of group III) and, in addition, on external characters. A few species in each group are aberrant in some external characters of the respective group; in such cases the aedeagus is the final arbiter. For the key to the species of groups I and II, and for a discussion of the genus and its synonyms, the first part of the revision should be consulted.

I have examined approximately 1350 specimens of group III, including the types of 39 forms, and have designated lectotypes for an additional 13 forms described by Champion. I chose for lectotype the specimen in the British Museum (Natural History) that bore Champion's handwritten label. The only types not examined are those of *sanguinolentus* Olivier, *aurofasciatus* Brême, *validus* LeConte, and *procerus* LeConte. Nine new species are described—seven from South America, and two from Central America. One species (*mesomelas* Champion) is transferred from *Rhodobaenus* for reasons given under the species, and two (*laetus* Erichson and *strigosus* Erichson) are transferred from *Sphenophorus*. The remaining species, except for *Metamasius elegantulus* Hustache and *M. biguttatus* Champion, were described in or transferred to genera now considered synonymous with *Metamasius*.

Specimens of group III are far less numerous in collections than are those of groups I and II, only two species (*fahraei* and *spinolae*), both polytypic, exceeding 100 in specimens examined. As these weevils are scattered in many collections, and as the American Museum of Natural History, where this study was made, has fewer than half of the species of group III, I mention in the Appen-

dix from what institution or individual each specimen comes.

In the first part of this revision, I explained (Vaurie, 1966, p. 216) that the species of group III were not included there because I had yet to study the types of the species of a closely related genus, *Rhodobaenus* LeConte, some of which might be considered synonyms of *Metamasius*. I have now examined these types, as well as many additional specimens in European museums, and I have decided not to change the status of *Rhodobaenus*. It may be inconsistent to have synonymized seven other genera with *Metamasius*, and not *Rhodobaenus*, but the latter is a large, heterogeneous group of 75 or more described species, at least some of which differ evidently in their ecology from those of *Metamasius*, being found in Compositae and various flowers and weeds, whereas the species of *Metamasius* are found in bananas, orchids, bromeliads, palms, and cacti.

The majority of species of *Rhodobaenus* (including *Homalostylus*¹) are readily differentiated from species of *Metamasius* by the excavated (or bilamellate) inner apex of the the claw segment of the tarsus (text fig. 1), a character found also in some eastern species of different genera (*Sphenophorus basilanus* Heller from Celebes, *Cytorrhinus castaneipennis* Boheman from Africa, and possibly others). Twenty species or more, however, lack this claw character and could, therefore, conceivably be removed from the genus, perhaps to *Metamasius*, perhaps to a new genus. It seems to me, after an examination of these species, that other characters of these species (the width of the antennal scape, the size of the scutellum, the parallel general shape, the bent-backward pronotum, the subrostral hairs, the dull gray or black color, the irro-

¹ *Homalostylus* Chevrolat, 1885 (type, *Sphenophorus latiscapus* Kirsch, Colombia), is here considered a synonym of *Rhodobaenus* LeConte, 1876; new synonymy. The enlargement of the antennal scape is a relative character, thus not differing from the scape of *Rhodobaenus* when only slightly enlarged. Some species have the excavated claw segment of the majority of species of *Rhodobaenus*.

rate spots on the surface, and the contiguous front coxae) correlate quite well with those of the species that have the claw character, and that it is better to keep them all together, at least for the present. A revision of *Rhodobaenus*, which has not been made recently, may well show that the species have more in common with one another than with the species of *Metamasius*, although, as can be seen from the generic key below, a number of couplets are needed to distinguish those species of *Rhodobaenus* that lack an excavation on the claw from those of *Metamasius*. I am working now on a review of the species without the claw character (*R. nawradii* and allies). The fact that the excavated claw segment is not present in all species invalidates my former statements (Vaurie, 1951, p. 52, fig. 1; 1966, p. 230) that it is a generic character of *Rhodobaenus*.

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The acknowledgments given in the first part of this revision suffice also for the present part. Several people, in addition, have kindly sent second shipments of specimens or types for study: Mr. C. W. O'Brien of the University of California, Berkeley; Mr. H. B. Leech of the California Academy of Sciences, San Francisco; Dr. H. Freude of the Zoologische Staatssammlung, Munich; Dr. G. Frey, Museum G. Frey, Munich; Dr. R. Hertel, Staatliches Museum für Tierkunde, Dresden; Dr. H. Weidner, Zoologisches Museum, Hamburg; and Dr. E. Kjellander and B. Hanson, Naturhistoriska Riksmuseum, Stockholm. Shipments of specimens were received also from the University of California at Davis, and from the Instituto Nacional de Investigaciones Agrícolas in Mexico City. I am grateful to the museums in Berlin, Copenhagen, Leningrad, London, Moscow, Paris, and Stockholm for the opportunity to study their collections. Dr. John F. Lawrence of the Museum of Comparative Zoology supplied information on LeConte's types.

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ALLIED GENERA

The genus *Metamasius*, because of the fact that I (Vaurie, 1966) have recently combined many genera with it, contains more species (101) than any of the other calandrine genera of the tribe Rhynchophorini in the Western Hemisphere (see Csiki, 1936). In the Western Hemisphere there are only two other large genera of this tribe, *Sphenophorus* and *Rhodobaenus*, each with more than 75 described species. The remaining 16 genera (except for *Rhynchophorus* itself) have only from one to five species (table 1). The few genera (*Cactophagus*, *Eucactophagus*, and *Phyllerythrus*) that are medium-sized I have found to be congeneric with *Metamasius*. If the three large genera were to be split into smaller units we might have many very small, even monotypic genera, as in some sections of the Coccinellidae and Cerambycidae or as in the subfamily Barinae of the Curculionidae. In these groups the generic limits are so finely drawn that almost every new species must be placed in a new genus. Or we might have larger units based on a single character (male genitalia, tarsal claw, metasternal projection, enlarged antennal scape, antennal club), but a single character without relation to other characters is not very meaningful; the single character may also be either variable or relative. Large genera, of course, may contain so many diverse elements that a simple definition of the genus is impossible. Thus, in the key to the allied genera below, *Metamasius*, *Rhodobaenus*, and *Sphenophorus* must be keyed out more than once.

Perhaps, in the future, larval characters may be found to be helpful in the grouping of species into genera, but at present they are either not known for many species or, if known, their significance is not apparent. For instance, Cotton (1924, pl. 10, figs. 1-9) showed that the setae on the buccal side of the mala are arranged in the same way in "*Cactophagus*," *Metamasius*, *Rhodobaenus*, *Scyphophorus*, and *Sphenophorus* (as *Calendra*) but in a different way in *Cosmopolites*, *Sitophilus*, and *Yuccaborus*, and in a still different way in *Rhynchophorus*.

Possibly when the tribe Rhynchophorini

TABLE 1
DATA ON THE TRIBE RHYNCHOPHORINI^a IN THE WESTERN HEMISPHERE

Genus, Author, and Date	No. of Species	Distribution
<i>Belopoeus</i> Schoenherr, 1838	3	French Guiana, Brazil, Peru, Venezuela
<i>Cactophagoides</i> Champion, 1910	2	Costa Rica
<i>Cosmopolites</i> Chevrolat, 1882	1 ^b	Mexico to South America, Antilles
<i>Diocalandra</i> Faust, 1894	1? ^c	?Tobago
<i>Eucalandra</i> Faust, 1899	2 or 3	Mexico to South America
<i>Litosomus</i> Lacordaire, 1866	1	Colombia, Venezuela
<i>Melchus</i> Lacordaire, 1866	2	French Guiana, Venezuela
<i>Metamasius</i> Horn, 1873	101	Southwestern United States to South America, Antilles
<i>Paradiaphorus</i> Chevrolat, 1885	1	Brazil, Ecuador
<i>Phrynoides</i> Chevrolat, 1885	1	Panama to Brazil
<i>Polytus</i> Faust, 1894	1 ^d	Mexico, Antilles ^d
<i>Rhodoabaenus</i> LeConte, 1876	75?	United States to South America, Antilles
<i>Scyphophorus</i> Gyllenhal, 1838	2	United States to South America, Antilles
<i>Sitophilus</i> Schoenherr, 1838	5? ^e	United States to South America, Antilles
<i>Sphenophorus</i> Schoenherr, 1826	89? ^f	United States to South America, Antilles
<i>Toxorhinus</i> Lacordaire, 1866	2 ^g	Panama to South America

^a The genera of this tribe (as given by Csiki, 1936) differ from those of other tribes by having the pygidium exposed beyond the elytra.

^b This species, *sordidus*, and one or two others occur in the Eastern Hemisphere.

^c This species, *frumentii*, and three others are recorded from the Eastern Hemisphere.

^d This species, *mellerborgi*, occurs also in the Eastern Hemisphere; the record from the Antilles is a specimen from the island of Guadeloupe in the American Museum of Natural History.

^e Approximately 12 additional species are recorded from the Eastern Hemisphere.

^f Approximately 26 additional species are recorded from the Eastern Hemisphere.

^g A third species is recorded from the Eastern Hemisphere.

is studied in full and on a world-wide basis, more of the genera will be merged. I have already synonymized *Merothricus* Chevrolat with *Sphenophorus* (1966, p. 230, footnote), and *Homalostylus* Chevrolat with *Rhodoabaenus* (footnote on p. 179 above). Some of the genera from Africa appear separable from *Metamasius* on one character only. A number of other genera from the Eastern Hemisphere (*Diatethes* from Australia and various islands, *Odoiporus* from China, Japan, India, Ceylon, and elsewhere, *Rhabdoscelus* from Java, New Guinea, and other areas, and *Abacobius* and *Temnoischoita* from Africa) have widely separated front and middle coxae and the base of the prosternum overlapping the mesosternum, as described by Horn (1873) for his single species of *Metamasius*. The differences among the genera of the Western Hemisphere are of the same order as some of the differences between those of the Western Hemisphere and those of the

Eastern Hemisphere. Very few species in the east, however, have the wide-based triangular scutellum typical of the majority of species from the west. No western species has an enormous transverse club like that of species of *Cercidocerus*. The parts of the body on which generic characters have been based are the scutellum, pygidium, antennal club, mesepimeron, metasternum, metepisternum, tarsal claw segment, third tarsal segment, tibia, femur, intercoxal space, peduncle of the postmentum, and the aedeagus.

Until now there has been no key to all the New World genera. Faust (1899) published a key to 17 non-European genera, but only four of these (*Belopoeus*, *Eucalandra*, *Polytus*, and *Sitophilus*, the last-named as "*Calandra*") were from the west. Heller's key (1926) to 29 genera included the four above and four additional western genera (*Litosomus*, *Melchus*, *Phrynoides*, and *Toxorhinus*).

Anderson's key to the larvae (1948) differentiated 14 genera, seven being western (*Cactophagus*, *Cosmopolites*, *Metamasius*, *Polytus*, *Rhodoabaenus*, *Scyphophorus*, and *Sphenophorus*, the last-named as "*Calendra*"). As these keys treat of only half of the number of genera recorded from the Western Hemisphere, there is need for a more complete key. A preliminary key to 15 of the 16 genera is given below.¹ These genera, according to the catalogues of Junk (Csiki, 1936) and Blackwelder (1947), are in the subtribes Calandri, Sitophili, and Litosomi. According to Anderson's larval studies, the tribe Sitophilini is separate from the Calendrini and the Rhynchophorini, the last-named being composed of *Dynamis* and *Rhynchophorus* only. I omit these two genera (they are the subtribe Rhynchophori of Blackwelder) from the key. They contain very large species (30 to 50 mm.) which differ from those of the other genera of the Western Hemisphere by having the metepisternum very wide (viewed from the side it is as wide as one-half of the metasternum). A rather different classification of the tribes was given by Kissinger (1964) in his key to the genera of the United States; he considered the majority of the genera to belong in the tribe Sphenophorini, and the others, in the Sipalini, the Rhynchophorini, and the Sitophilini.

The genus *Aethes* Chevrolat, found to be preoccupied and then renamed *Billbergia* by Blackwelder (1947, p. 912), was given by him and by Csiki (*loc. cit.*) as a genus of the Western Hemisphere. Such allocation, however, is incorrect. Günther (1941, p. 42) has shown that the type of the only species in *Aethes*, *spinicollis*, is not from Mexico, as stated by Chevrolat, but from Java. Voss (1954, p. 334) made a subsequent error by recording under the name *Aethes* a species of the subfamily Cryptorhynchinae with a rather similar generic name, *Aeatus quadraticollis* Hustache, 1940, from South America.

Table 1 provides a summary of pertinent facts about the genera of the New World.

¹ *Diocalandra* Faust is omitted, as I have not examined its one species, *frumentii*, which may not actually be established in the west. Blackwelder (1947, p. 916) listed with a question mark a variety of *frumentii* as coming from the island of Tobago.

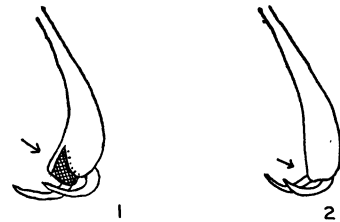
Very few of the genera have been revised; thus there is some doubt expressed as to the number of valid species.

In the key below, three species described in *Sphenophorus* are keyed out separately, as they do not agree with the genus as now defined. Also keyed out separately are two species of *Metamasius* that may have a slight variation in the shape of the peduncle that might otherwise identify them as *Rhodoabaenus*.

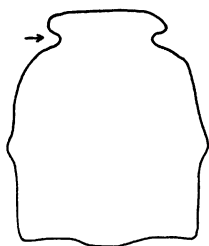
KEY TO THE GENERA AND SEVERAL ABERRANT SPECIES OF THE RHYNCOPHORINI (WITHOUT THE RHYNCOPHORI) OF THE NEW WORLD

(For data on the genera, see table 1 above.)

1. Front of metasternum with large protuberance between middle coxae (text figs. 67-70) six species of *Metamasius*
Front of metasternum flat or gently tumid 2
- 2(1). Apex of claw segment inferiorly excavate (text fig. 1) majority of species of *Rhodoabaenus*
Apex of claw segment convex or flat (text fig. 2) 3
- 3(2). Species with soles of third tarsal segment glabrous except for transverse fringe of hairs at extreme apex, and antennal club with apical spongy part either retracted or visible only as thin straight line *Scyphophorus*
Species with tarsi and club both not as stated. 4
- 4(3). Pronotum triangularly excised on each side near apex (text fig. 3); elytra with elongate, warty tubercles in three or more rows on each elytron *Cactophagoides*



FIGS. 1, 2. Claw segment, showing inner apex. 1. Excavated or bilamellate in *Rhodoabaenus*. 2. More or less convex or flat in *Metamasius* and other genera.

FIG. 3. Excised pronotum of *Cactophagoides*.

Pronotum at sides of apex slightly, if at all, emarginate; elytra either smooth or with only one or two slightly tumid areas 5

- 5(4). Tiny (5 mm. or less); tibia with distinct pincers at apex (text fig. 4); pronotum of some individuals almost as long as elytra 6

Longer than 5 mm.; tibia with single inner mucro (may have additional minute spur); pronotum various 7

- 6(5). Beak straight; in profile not constricted at base but continuous with head *Sitophilus*
Beak arcuate, constricted at base *Polytus*

- 7(5). Dorsum with lines of white, tomentose hairs, or venter with setae in scalelike, oval clusters 21
Dorsum not hairy as stated above, nor

FIG. 4. Apex of tibia of *Sitophilus* and *Polytus*, showing pincer effect.

venter scaly, but punctures may be surrounded by tomentose ring 8

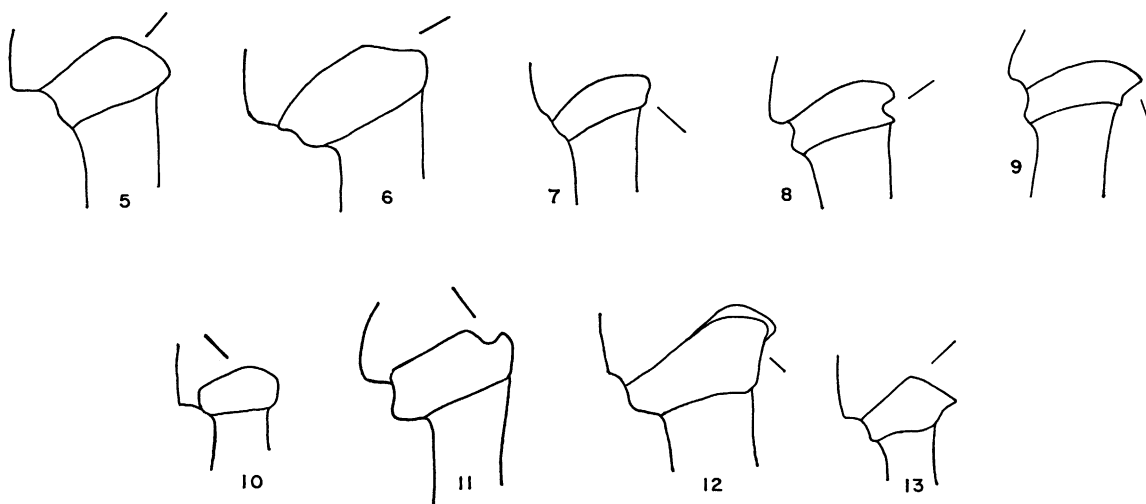
- 8(7). Mesepimeron of diamond, rhomboid, or lozenge shape (text fig. 13), front border strongly angulate; scutellum more or less round 9

Mesepimeron not of above shape, but with front border straight or arcuate (text figs. 5-12); scutellum elongate, triangular, or shield-shaped 10

- 9(8). Beak curved; antennal club dilated, its spongy apical part one-third of length of club; elytra grayish or buffy, with intervals black, shining, elevated in part, intervals punctate *Cosmopolites*

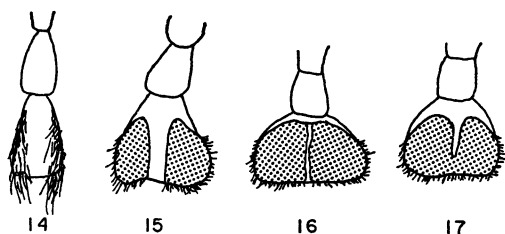
Beak straight; antennal club with sides subparallel, its spongy apex retracted, visible on inner side only; elytra with brownish yellow coating, intervals of same color, with sparse, setose nodules *Phrynoides*

- 10(8). Mesepimeron distally almost twice longer than entally, its front border sinuate-arcuate (text fig. 12); apex of pygidium



FIGS. 5-11. Mesepimeron of *Metamasius*. 5. *M. carinipyga*. 6. *M. spinolae*. 7. *M. validirostris*. 8. *M. hemipterus* (species group I). 9. *M. tuberculipectus* (species group I). 10. *M. inaequalis* (species group II). 11. *M. incisus*.

FIGS. 12, 13. Mesepimeron of other genera. 12. *Paradiaphorus*. 13. *Cosmopolites*.

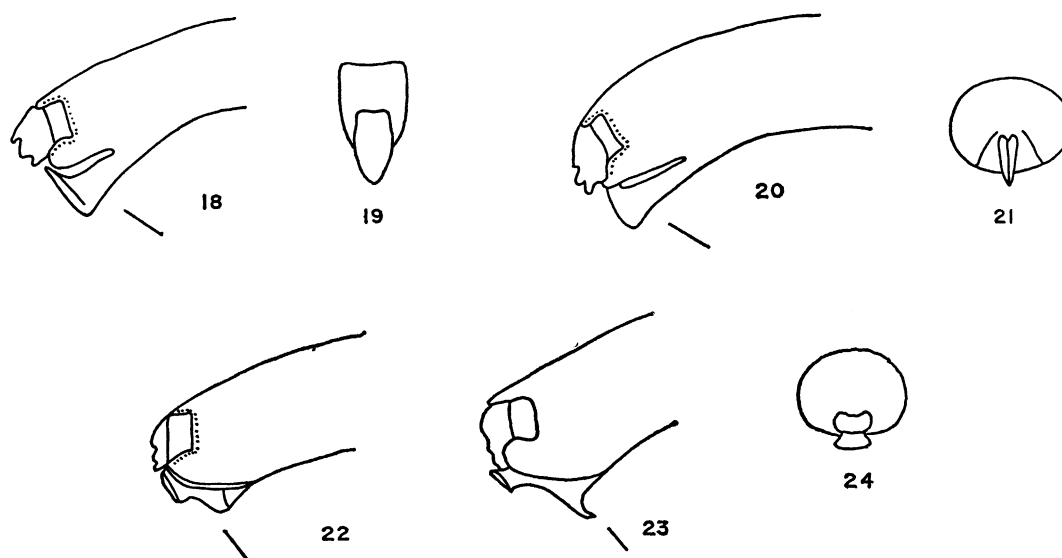


FIGS. 14-17. Third tarsal segment, ventral view. 14, 15. *Sphenophorus*. 16, 17. *Metamasius*, *Rhodobaenus*, and some aberrant species of *Sphenophorus*.

- fringed with dense, short, bronze setae *Paradiaphorus*
- Mesepimeron distally not, or only slightly, longer than entally, its front border straight or gently arcuate (text figs. 5-11); apex of pygidium hairy or not 11
- 11(10). Pygidium, measured from its apex to retracted apex of elytral suture nearly as long as one-half of length of elytra *Belopoeus*
- Pygidium much shorter than one-half of length of elytra 12
- 12(11). Third segment of posterior tarsus narrow, its apex not or scarcely wider than second segment (text fig. 14) 13
- Third segment of posterior tarsus widely dilated, its apex from two to four times wider than second segment (text figs. 15-17) 14
- 13(12). Soles of third segment of posterior tarsus almost entirely glabrous, sparse hairs present at extreme sides only (text fig. 14), and middle coxae separated by about one-half or less of diameter of coxa majority of species of *Sphenophorus*
- Soles of third segment of posterior tarsus with distinct hairy pads laterally, and middle coxae separated by at least diameter of coxa several species of *Metamasius*
- 14(12). Peduncle of postmentum (frontal view) elongate-oval or vaguely hexagonal, very long and wide in comparison with area of beak above it (text fig. 19); soles of third segment of all tarsi with glabrous V extending from base to apex, and hairy pads laterally (text fig. 15), but, if species has tarsal soles almost entirely hairy and its body has white or yellow enamel-like coating, it belongs here nine species of *Sphenophorus*
- Peduncle of postmentum (frontal view) of

various shapes, but short or narrow in comparison with beak above it (text figs. 21, 24, 60); soles of third segment of all tarsi entirely hairy or spongy-hairy except, perhaps, for glabrous median line (text fig. 16) or for glabrous V at base or middle which does not reach apex (text fig. 17) 15

- 15(14). Pronotum at center deeply, longitudinally sulcate from base to apex *Sphenophorus costatus* Waterhouse
- Pronotum either not sulcate or sulcate at base only 16
- 16(15). Species with following combination: color black; hind angles of pronotum with dimpled or disclike impression; metepisternum with front border equal to or narrower than posterior border plus metepimeron; pronotum as long as elytra from apex of scutellum to retracted apex of elytral suture; aedeagus with lateral line; South America *Sphenophorus austerus* and *atratus* Gyllenhal
- Species not exactly as above 17
- 17(16). Scutellum at extreme base not or scarcely wider than extreme base of adjacent sutural interval of each elytron several species of *Rhodobaenus*
- Scutellum at extreme base at least twice wider than extreme base of sutural interval 18
- 18(17). Species with following combination: pronotum at base without raised margin, furrow, or punctures; tibiae toothed at outer apex; middle coxae separated by more than diameter of coxa *Metamasius lojanus* and *transatlanticus*
- Species without such a combination of characters (may have one or two of them) 19
- 19(18). Peduncle of postmentum (gular peduncle) agreeing with any one of following: inferiorly and longitudinally, either broadly or narrowly, sulcate; strongly emarginate in front (text fig. 25); vertically bilamellate in front or at middle; with small but distinct tubercle or prominence in front only; form a large, V-shaped angle (text fig. 20) majority of species of *Metamasius*
- Peduncle of postmentum agreeing with any one of following: with sharp, backward-pointing angle behind (text fig. 23); "seesaw," i.e., with prominence in front and behind and dip at middle (text fig. 22); surface rather flat, not sulcate, possibly vaguely tuberculate 20



FIGS. 18–24. Peduncle of postmentum at apex of beak. 18, 19. *Sphenophorus maidis*. 18. Lateral view. 19. Frontal view. 20, 21. *Metamasius mesomelas*. 20. Lateral view. 21. Frontal view. 22. Male of *Rhodobaenus nawradii*, lateral view. 23, 24. Female of *Rhodobaenus nawradii*. 23. Lateral view. 24. Frontal view.

- 20(19). Middle coxae widely separated by about diameter of coxa several species of *Metamasius*
Middle coxae less widely, or narrowly, separated by from one-third to two-thirds of diameter of coxa several species of *Rhodobaenus*
- 21(7). Beak as long as or longer than body; antennae inserted at basal third of beak; apex of hind femur extending well beyond pygidium 22
Beak not longer than pronotum; antennae inserted at base of beak; apex of hind femur not extending beyond pygidium 23
- 22(21). Spongy apex of antennal club shorter than chitinized base; tarsi not noticeably hairy laterally *Toxorhinus*
Spongy apex of club as long as chitinized base; tarsi with very long hairs laterally *Litosomus*
- 23(21). Body linear, pronotum and elytra of nearly same width; third tarsal segment inferiorly with dense, hairy pad across apex *Eucalandra*
Body oblong-oval, pronotum at base narrower than elytra; third tarsal segment inferiorly with dense, hairy pads laterally *Melchus*¹

HISTORY

The species described in the genera that I synonymized with *Metamasius* were not included in the history of the genus (Vaurie, 1966), but they are given here. Champion (1910) described eight species of *Phyllerythrurus*, four of *Cactophagus*, three of *Metamasiopsis*, and five of *Eucactophagus*, and transferred two species from *Sphenophorus* and *Phyllerythrurus* to *Eucactophagus*. Heller (1912) described two species of *Metamasiopsis* from South America and gave a key to the known species. Barber (1917) described two species of *Eucactophagus*, and Fisher ("1926" [1927]) recorded a variety of *Cactophagus spinolae* from Mexico. Hustache (1936, 1938) described four species of *Cactophagus* and three of *Eucactophagus* from South America. Günther (1941) described four species of *Cactophagus* and three of *Phyllerythrurus*, and (1943) one of *Eucactophagus*. Voss (1953) described one species of *Eucactophagus*. These generic synonyms were discussed at length in the first part of the revision (Vaurie, 1966).

¹ The only specimen I have seen is one in the British Museum (Natural History) marked "*Melchus*, n. sp." It is 18 mm. long and has the femora toothed within,

the scutellum round, the claw segment inserted at the apex of the third segment, and the elytra with setose patches.

TABLE 2
DISTRIBUTION OF SPECIES OF *Metamasius*

Zone	Species Group III		Species Groups I and II		Total	
	Number of Species	Restricted to Zone	Number of Species	Restricted to Zone	Number of Species	Restricted to Zone
South America	34	18	40	23	74	41
Central America	25	5	24	2	49	7
Mexico	14	—	10	2	24	2
Antilles	—	—	9	6	9	6
United States	2	—	1	—	3	—

ECOLOGY

Even less has been published on the lives or habitats of the species of group III than on those of groups I and II. I have notes on only a dozen species. A list of the plant families and the species associated with them follows:

ARACEAE (ARUM FAMILY): *Metamasius miniatopunctatus*, *pulcherrimus*, *validirostris*, *viduus*. Genera include *Anthurium*, *Aracea*, and *Philodendron*.

BROMELIACEAE (*Bromelia* OR PINEAPPLE FAMILY): *Metamasius graphipterus*, *lojanus*, *miniatopunctatus* (breeding), *transatlanticus*. Genus *Ananas*.

CACTACEAE (CACTUS FAMILY): *Metamasius fahraei*, *spinolae*, both breeding. Genera include *Cereus*, *Ferocactus*, and *Opuntia*.

MUSACEAE (BANANA FAMILY): *Metamasius miniatopunctatus*, *validirostris*. Genus *Musa*.

ORCHIDACEAE (ORCHID FAMILY): *Metamasius aurocinctus*, *graphipterus*, both breeding. Genera *Cattleya*, *Cynoches*, *Lycaste*, *Odontoglossum*, *Oncidium*.

PALMAE (PALM FAMILY): *Metamasius amoenus* (?), *annulatus*, *circumjectus*, *miniatopunctatus*, *sanguinolentus*.

RUBIACEAE (MADDER FAMILY): *Metamasius validirostris* on *Cinchona*.

Bromeliads, bananas, orchids, and palms are the principal families with which species of groups I and II are also associated. The only families that are added, for the species of group III, are the Cactaceae, the Araceae, and the Rubiaceae.

DISTRIBUTION

The geographical distribution of the species of group III is about the same as that of

species of groups I and II, that is, the greatest number of species are found in South America, the number declining northward. There is the same high incidence of endemism in South America (table 2). With the exception of *spinolae*, the species of group III that occur in Mexico are found, as in the other groups, in the southern part (the states of Veracruz, Oaxaca, and Guerrero).

There are, however, a few differences. No species of group III has been recorded from the Antilles, or from Argentina, Chile, Paraguay, or Uruguay. One species (*spinolae*) occurs farther north than any species of the other groups, reaching the southwestern United States. Another species (*graphipterus*) was described from the United States where it was found in imported bulbs in greenhouses, but it is actually a southern species. More species extend from Mexico through Central America to South America (eight in group III, only three in the other groups). Central America and South America share 15 species in common, Central America and Mexico share 13, South America and Mexico share one species (*aurofasciatus*), which probably occurs also in the intervening zone. The countries of South America with the greatest number of species of group III are Ecuador (23), Colombia (14), and Peru (12). In Central America, Costa Rica leads with 20 species, eight of which are the same ones that occur in Ecuador. Panama has 15 species; Nicaragua, 10; and Guatemala, nine. The genus probably originated in the Antilles or South America, as there is a high percentage of species restricted to each of these zones.

SYSTEMATIC SECTION

TAXONOMIC CHARACTERS OF SPECIES GROUP III

THE REMARKS THAT FOLLOW on the anatomy and characters of species of group III supplement the discussions of the same characters of species groups I and II given previously (Vaurie, 1966).

Some characters of taxonomic importance which are useful in separating the species of *Metamasius* are as follows: the basic color pattern; the shape of the peduncle, scutellum, pronotum, apices of the elytra, and the mesepimeron; the extent of the spongy part of the antennal club; the place of the insertion of the antennae; the width and curvature of the beak; the presence of depressions on, or their absence from, the pronotum or at the base of the elytral intervals; the shape and vestiture of the pygidium; the presence of tubercles or tumidities between the front or middle coxae, or their absence therefrom; the width of the space between the coxae; the relative lengths of the femora and of the tarsal segments; the shape of the apices of the eighth tergum and of the aedeagus; and the secondary sexual characters.

COLOR

Although in *lojanus* and *transatlanticus* and scattered individuals of other species, such as *fahraei* and *spinolae*, the dorsal surface is polished and shining, in the species of group III in general the surface is more opaque, rather pruinose, or even covered by a thin, brownish, tomentose coating. Some species (*carinipyga*, *elegantulus*, *miniatopunctatus*, *pruinusus*, *viduus*, and others) have black velvety spots or oval patches on the pronotum and elytra. Many species, as is true also of the species of group I, are banded or spotted or streaked with red, orange, or yellow on a black background, but, in contrast to almost all species of group I, many species of group III have the colored areas raised or tumid (embossed). The tumid spots on the elytral intervals spread out in some species and distort the striae on either side. The colored spots or dashes, whether raised or not, have a tendency to disappear here and there within a species, the basic pattern, how-

ever, remaining the same. Some species may have entirely black as well as spotted individuals, and some have a reverse phase of yellow or red with a small amount of black, as opposed to black with yellow or red marks.

EYES

The eyes seem to be similar to those of species of groups I and II. In some species the eyes are closer together below than in others, but of course the entire eye cannot be seen unless the head is bent backward.

ANTENNAE

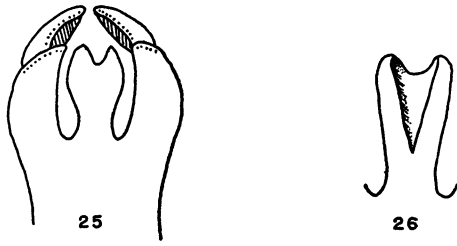
My remarks on the antennae (1966, p. 223) apply equally to the species of the present group, although there are some differences in respect to the club of the antennae. In general the club is more elongate, not so wedge-shaped, in more species of group III, and in a number of species (*aurocinctus*, *elegantulus*, *graphipterus*, *limulus*, *monilis*, *rubricatus*, and *strigosus*) the spongy apex of the club is very small. The apex is small also in four species of group I.

A feature of the club which I failed to mention previously and which holds true for all species of the genus is that the spongy apex of the club is slightly longer on the inner side than on the outer or distal side. I use the outer side for all comparisons of the relative length of the apex to the basal chitinated part.

For the insertion of the antennae, see below, under the heading Beak or Rostrum.

PEDUNCLE OF POSTMENTUM

The peduncle of the postmentum (gular peduncle of some authors) appears to be wider and more robust in this group than in species of groups I and II, chiefly because the beak itself is generally much stouter. In many species of the present group the peduncle is quite different from that of species of the other groups. It may be deeply emarginate in front, but horizontal, not angular, in profile, as in *annulatus*, *bolivari*, *pulcherrimus*, and *xanthozona* (text fig. 25), or it may be



FIGS. 25, 26. Peduncle of postmentum of *Metamasius*, ventral view. 25. *M. pulcherrimus*, showing also mandibles. 26. *M. spinolae*.

deeply emarginate in front, but with the sides of the emargination drooping downward forming two lamellae or angles, as in the majority of species of the *sanguinolentus* subgroup. Champion (1910, p. 90) expressed the angular lamellae for "*Phyllerythrurus*" as being "vertically bilamellate." Species with this type of peduncle are (text figs. 59–60) *amoenus*, *circumdatus*, *circumjectus*, *elegantulus*, *lacordairei*, *laetus*, *ohausi*, *ornatus*, *rubricatus*, *rudeli*, *sinuatus*, *spurius*, and *venezolensis*. Individuals vary somewhat in the depth of the emargination, and it is not possible in all cases to distinguish between "emarginate in front" and "vertically bilamellate," as some of the emarginated peduncles may be slightly bilamellate or angulate. The only species of groups I and II in which the peduncle could be considered vertically bilamellate are six of the seven species of the *sierrakowskyi* subgroup, and not in every individual. These six species were regarded by their authors as "*Cactophagus*," but that "genus," according to Champion, should have the peduncle "rounded in front," not, as here, rather angulate. Species of group III with the peduncle sulcate and rounded in front include *fahraei*, *rubrovariegatus*, *sanguinolentus*, *spinolae*, *viduus*, and some individuals of *imitator*, *incisus*, and *validirostris*. In some of these species the sulcus may be so deep in front as to appear vertically bilamellate.

The remaining species comprise nearly a dozen with the peduncle narrowly sulcate throughout or in front, and in profile either horizontal or angulate (*aurocinctus*, *biguttatus*, *condylus*, *graphipterus*, *limulus*, *mini-atopuncatus*, *monilis*, *pruinosis*, *rectistriatus*, and some individuals of *validirostris*); and

nine species (*aurofasciatus*, *carinipyga*, *duplocinctus*, *lojanus*, *mesomelas*, *orizabaensis*, *palisteri*, *strigosus*, and *transatlanticus*) either with no visible sulcus (it may have disappeared with wear), or with a small tubercle or prominence in front that may or may not be sulcate. Profiles of the peduncle are shown for two species (text figs. 20, 59). Also shown for contrast are profile and frontal views characteristic of the majority of species of *Sphenophorus* and of a male and female of *Rhodobaenus* (text figs. 18, 19, 22–24). It is noteworthy that the lateral views of *Metamasius mesomelas* and *Sphenophorus maidis* are rather similar, but that the frontal views are quite different.

BEAK OR ROSTRUM

In the majority of species of group III the beak in dorsal view is broader at the tip than the space between the front coxae. Exceptions are *biguttatus* and *validirostris* which have proportionately narrower beaks and the front coxae wider apart than usual for the group. About a dozen species of group I (*peruanus*, *rugipectus*, *scutellatus*, *sulcirostris*, and the seven species of the *sierrakowskyi* subgroup), which should have the beak narrower than the intercoxal space, approach the species of group III by having the beak as wide as the space.

The beak is cylindrical or subcylindrical. It is generally arcuate, but in *annulatus*, *biguttatus*, *lacordairei*, *lojanus*, *pulcherrimus*, *rudeli*, *transatlanticus*, and *venezolensis* it is nearly straight. The median impressed line at the base dorsally is strong and deep in the majority of species, but feeble or scarcely visible in *aurofasciatus*, *carinipyga*, *condylus*, *laetus*, *limulus*, *orizabaensis*, *rubricatus*, and some individuals of *strigosus*. The basal dilation over the scrobes is longer than wide in the majority of species, about as wide as long in *biguttatus*, *laetus*, *lojanus*, females of *rubricatus*, and the male of *xanthozona*, and the dilation is lacking in *aurofasciatus* and *orizabaensis*. Subrostral teeth under the scrobes are not so prevalent as in species of group I. No species of the present group has the large teeth of *cinnamominus*, *cornurostris*, *dasyurus*, *liratus*, and some others of group I, but some individuals of *condylus*, *fahraei*, *imitator*, *incisus*, and *spinolae* have slight subrostral

sinuations, and some individuals of *validirostris* have rather distinct teeth.

The scrobe or groove for the antennae is extremely close to the eye in the three species of the *pulcherrimus* subgroup, of the *graphipterus* subgroup, and in *bolivari*, *condylus*, *elegantulus*, *laetus*, *limulus*, *lojanus*, and a few others. It is distant from the eye in these species by about the width of the base of the scape, but is individually somewhat variable. The scrobe is distant from the eye by the width of the antennal club or more in other species (*aurofasciatus*, *spinolae*, and *validirostris* subgroups, also *mesomelas*, *ornatus*, *rubrovariegatus*, *sanguinolentus*, *sinuatus*, and *spurius*). An irregular fovea is present between the scrobe and the eye in quite a few species, but it is not necessarily distinct in every individual. In *annulatus* and *pulcherrimus* there is a narrow, longitudinal slit next to the eye.

The apex of the beak in dorsal view is truncate in some species and obliquely angulate in a few, but the shape varies individually. One species (*personatus*) has conspicuous hairs beneath the beak; one (*miniatopunctatus*) has very short hairs.

For sexual modification of the beak, see Sexual Dimorphism, below.

PRONOTUM

Whereas only eight or nine species of groups I and II have a pronotal depression medially at the base, almost all species of group III have a distinct depression. Those lacking a depression are *condylus*, *fahraei*, *limulus*, *lojanus*, *sanguinolentus*, *spinolae*, *transatlanticus*, and some individuals of *strigosus*. These species, except for *condylus*, *limulus*, and *strigosus*, lack also the sinuately produced basal margin characteristic of other species of group III. The sinuation of the margin cannot be seen in all specimens, as often the base of the elytra covers the margin laterally. The pronotum is almost as wide as long in some species.

SCUTELLUM

The scutellum takes various shapes, although, as is true of the species of the other groups, the most common shape is that of an isosceles triangle, with the base much wider

than the extreme base of the sutural interval at one side. In *carinipyga* and *duplocinctus* the scutellum is emarginate in front; in *graphipterus* it is very small and somewhat sunken; in *limulus* and some specimens of *rubricatus* and *strigosus* it is shield-shaped, with the sides subparallel to near the apex. It is more or less retracted behind the basal line of the elytra in the majority of species.

ELYTRA

Fifteen or 20 species of group III differ from the majority of species of the other groups by having one or more of the elytral intervals from the second to the fifth widened at the base and generally advanced beyond the scutellum onto the pronotum. In one species (*graphipterus*) the sutural interval is very narrow; in two (*rubrovariegatus*, *sanguinolentus*) the third interval or the third and fourth intervals are greatly swollen at the base. A few species have some intervals rather convex at the base, or (*laetus*, *limulus*, some individuals of *strigosus*) at the apex. In a number of species one or two intervals are turned inward toward the scutellum as in three species of group I. Overlaid stripes are visible in certain lights on the intervals of the two species of the *transatlanticus* subgroup, species in which the short tenth striae tends to become obsolete.

The striae of some species do not follow a straight line but are deflected or distorted around the raised, inflated, colored spots of the intervals. This character was not found in species of group I. Species with it are *biguttatus*, *incisus*, *ornatus*, *personatus*, *rubrovariegatus*, *sanguinolentus*, *sinuatus*, and *spurius*, and some but not all individuals of *lacordairei*, *miniatopunctatus*, *ohausi*, and *rudeli*.

Generally the apices of the elytra (text fig. 43) are either somewhat truncate or conjointly rounded, but they appear to be distinctly separately rounded in a few species (*condylus*, *elegantulus*, *imitator*, *limulus*, *ohausi*, *pallisteri*, *personatus*, and *strigosus*). The shape of the elytra is as variable as that of the species of groups I and II, the sides being nearly parallel in a few species, and feebly or strongly convergent to the apex in others, but variable individually. The colored markings are often erratic within a species.

PYGIDIUM

The pygidium of species of group III is considerably more prominent and tumid than that of the majority of the species of groups I and II, but it varies much less sexually. It is abruptly, bluntly carinate toward the apex in the six species of the *aurofasciatus* subgroup, and in *amoenus*, *mesomelas*, *ohausi*, *pallisteri*, and *rectistriatus* of the *sanguinolentus* subgroup. It has a virtual tubercle near the apex in *imitator* and *incisus* and apically in *condylus*, and it is ridged or merely convex in the remaining species. When viewed from below, the pygidium of many species extends beyond the apex of the abdomen. Abundant hairs in fringes or in tufts are present subapically or apically. The shape and vestiture are useful for the separation of species, but unfortunately the pygidium is seldom in perfect condition.

PROSTERNUM, MESOSTERNUM,
AND METASTERNUM

In the majority of species of group III the intercoxal process of the prosternum is much less prominent behind the front coxae than that of species of the other groups, and it does not overlap the mesosternum as it does, for instance, in *M. hemipterus* of group I. There are a few species, however, that have a rather prominent process (*lacordairei*, *limulus*, *ohausi*, *personatus*, *pulcherrimus*, *rudeli*, *validirostris*, and *venezolensis*), and three (*biguttatus*, *lojanus*, and *transatlanticus*) with it just as prominent as in *hemipterus*. In front of the coxae or between them the prosternum is tumid or tuberculate in many species, and forms an upward-curving tooth in the males of some species (see below, under Sexual Dimorphism). About a dozen species have this part flat.

The intercoxal process of the mesosternum between the middle coxae is tumid where it meets the metasternum in more than one-half of the species of group III, and is virtually flat in the remainder. In *fahraei*, *spinolae*, *validirostris*, and perhaps a few other species, the mesosternum may be flat in one individual and tumid in another. There are more species with the mesosternal process flat than I indicated previously (Vaurie, 1966, p. 234, table 2).

The metasternum of *fahraei* is shorter than that of other species of the group, because the inner wings are rather shorter than usual, a condition present in two species of group I (*cornurostris*, *foveolatus*). The front of the metasternum of the six species of the *aurofasciatus* subgroup and of *graphipterus* is developed to an exaggerated degree in the form of a large conical projection (text figs. 67-70). This part is merely slightly tumid or conical in the majority of species, the tumidity causing a slight depression around the middle coxae which is generally lacking in the species of the other groups. *Metamasius lojanus*, *pulcherrimus*, *transatlanticus*, and some individuals of *fahraei*, *spinolae*, and *validirostris* have the front of the metasternum rather flat. It is not evident in some instances whether the area is flat or slightly tumid.

MESEPIMERON, METEPISTERNUM,
AND ABDOMEN

In all three groups of the genus, the mesepimeron (text figs. 5-11) varies somewhat in shape individually, even though this character may be used to distinguish genera, as the diamond-shaped mesepimeron of *Cosmopolites* and others. In the majority of species of group III, the mesepimeron appears to be proportionately larger than that present in species of groups I and II (larger than the mesepisternum). Two species (*incisus* and *pruinus*) have a rather peculiar mesepimeron (text figs. 11, 70) but do not otherwise differ from their congeners in any significant way. The elongate metepisternum is generally distinctly narrower at the apex than at the base.

The apex of the abdomen is more or less rounded or rounded-truncate; it usually has a slight depression which is either more distinct in the males than in the females or which is present in the males only. A dozen or more species lack the depression.

On the inside of the last ventral segment of the abdomen of males in some species is a triangular "flap," or thickening of the chitin, which is visible when the pygidium is pried open. I do not know what, if anything, this character signifies. I have noticed it in the species of the *aurofasciatus*, *graphipterus*, and *transatlanticus* subgroups and in *spurius* of the *sanguinolentus* subgroup; it occurs also

in a number of the larger species of *Rhodo-baenus* (*nawradii* and allies).

COXAE

The intercoxal widths are difficult to determine with accuracy except in cases in which they are either very wide or very narrow. The comparisons I make (with the antennal funicle, the antennal club, or with the diameter of the coxa) are only approximate, and the same observer might measure the width differently on different occasions. The intercoxal space varies also somewhat individually. Nonetheless, these relative distances were used as generic characters by former authors. Four species (*biguttatus*, *lojanus*, *pulcherrimus*, and *transatlanticus*) which have the front coxae widely separated by one-half of the diameter of a coxa and by at least the width of the club, resemble in this character the majority of species of groups I and II. In about a dozen species of group III the front coxae are moderately widely separated; in others they are narrowly separated by the width of the antennal funicle or less, or by from one-fourth to one-tenth of the diameter of a coxa. The most narrowly separated front coxae (virtually contiguous) are found in *graphipterus*, *limulus*, *mesomelas*, *monilis*, *ornatus*, *rubrovariegatus*, *sanguinolentus*, *sinuatus*, and *viduus*.

The distance between the middle coxae equals the diameter of a coxa in five or six species, almost equals it (or about two-thirds of the diameter) in about 25 species, and is one-half or less than one-half of the diameter in 11 species. Only two species (*biguttatus*, *transatlanticus*) of group III have the distance greater than the coxae, as is true of nearly half of the species of groups I and II.

On the inner face of the front coxae of several species (*elegantulus*, *mesomelas*, *ornatus*, *rubrovariegatus*, *sanguinolentus*, *sinuatus*, and *validirostris*) is a rather transverse tubercle or swelling which is stronger in the males of some of these species. Such a tubercle was not noted in any species of groups I and II. On the other hand, the hairs or hairy tufts of the inner face which are characteristic of the majority of species of the other groups are generally lacking on species of group III. Scanty hairs are present, however, on several species (*bolivari*, *circumdatius*, *laetus*, *mes-*

omelas, *ornatus*, *rubrovariegatus*, *sanguinolentus*, *sinuatus*, and *spurius*).

LEGS

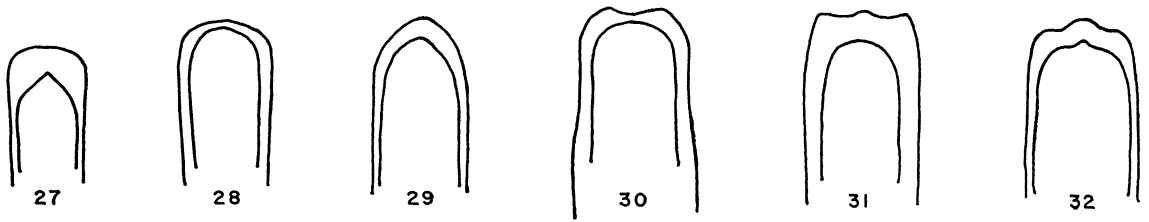
In the species of group III the middle and hind femora are generally longer, narrower, and more hairy within than those of groups I and II. About one-half of the species have distinctly long, sparse hairs on the inner side; the remainder have short (or worn?) hairs or no hairs visible. The femora are toothed or strongly emarginate within near the apex in two species. A few species (*biguttatus*, *lojanus*, *transatlanticus*, and *validirostris*) have bulbous femora as in the majority of species of the other groups, but most species have the femora gradually slightly widened to the apex. In the few species of groups I and II in which the hind femora are also gradually widened, the front and middle femora are usually bulbous.

As for the tibiae, they are slightly incurved toward the apex in seven species of the *sanguinolentus* subgroup, and are toothed at the outer apices in the two species of the *transatlanticus* subgroup. Males of five species have extremely long hairs on the inner side of the front tibia.

The second tarsal segment is as wide as long in *elegantulus* and *rubricatus*, almost as wide as long in *aurocinctus*, *graphipterus*, *lojanus*, *monilis*, and *pulcherrimus*, but longer than wide in the remaining species. The third tarsal segment is widely dilated in all species, whereas in four or five species of groups I and II it is scarcely dilated. The tarsi are rather tomentose dorsally in a dozen species or more, shining in the remainder. The claw segment and claws appear abnormally short in *elegantulus*, *limulus*, *rubricatus*, and *strigosus*.

GENITALIA AND EIGHTH TERGUM

All species of group III lack the lateral line of the aedeagus which is present in species of groups I and II, and all have the apodemes attached to the base of the aedeagus dorsally, as in species of group II, not laterally, as in those of group I. The apex of the aedeagus of the majority of species is truncate and has either a wide or narrow (text figs. 27, 28) chitinous apical border. Of the remaining species, it is rounded or rounded-acuminate (text



FIGS. 27-32. Apex of aedeagus of *Metamasius*, dorsal view. 27. Truncate, with wide border, *M. circumdatus* and seven other species. 28. Truncate, with narrow to medium border, *M. elegantulus* and 19 or 20 other species. 29. Rounded-acuminate, *M. annulatus* and five other species. 30. Strongly emarginate, *M. carinipyga* and *M. spurius*. 31. Slightly produced or sinuate, *M. venezolensis*; characteristic also of *M. circumjectus*, *lacordairei*, and *pruinus*. 32. Strongly produced, *M. incisus*.

fig. 29) in six (*annulatus*, *bolivari*, *lojanus*, *orizabaensis*, *pulcherrimus*, and *transatlanticus*), slightly emarginate in one (*validirostris*), strongly emarginate (text fig. 30) in two (*carinipyga*, *spurius*), slightly lobed or produced at the center (text fig. 31) in four (*circumjectus*, *lacordairei*, *pruinus*, and *venezolensis*), and strongly produced into a knob (text fig. 32) in one (*incisus*). It is not triangularly pointed in any species of this group.

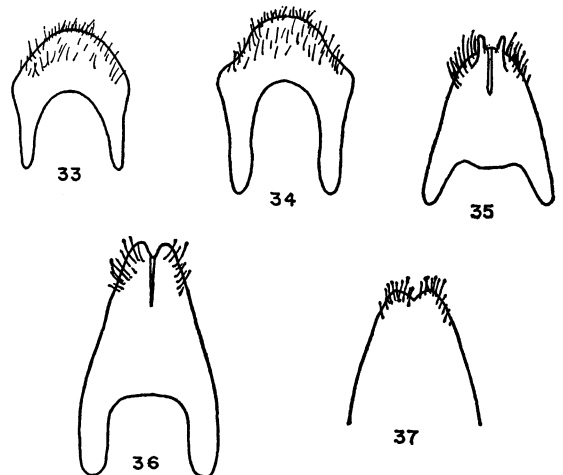
In contrast to the species of group I, those of the present group show a number of distinctive traits in the eighth tergum, which, in dissections, is usually pulled out from the body cavity along with the genitalia. Females of two species (*annulatus*, *pulcherrimus*) differ from others of the genus by having the eighth tergum wider and shorter and with the base strongly cut out (text figs. 33, 34). They differ further from all females except for some of *bolivari*, *rubricatus*, and *strigosus* by lacking any trace of the usual median, longitudinal, apical impression at the end of which the apices are slightly separated in the majority of species. In *circumjectus* and *elegantulus*, and in others to a lesser degree, the apices are virtually bidentate (text fig. 35), but in some species they are merely separately rounded (text fig. 36), or subtruncate.

Males normally do not have an apical impressed line, but one is present in a male of *strigosus* and in a number of males of *graphipterus*. There is no separation, as in the females, at the end of the line, the apical margin being invariably entire. The shape of the apex of the tergum varies from rounded-truncate to truncate to slightly or strongly emarginate, with individual variation in some species. A distinctly emarginate apex is present in *auro-*

fasciatus, *carinipyga*, *duplocinctus*, *elegantulus*, *lojanus*, *orizabaensis*, *pallisteri*, *spurius*, and *transatlanticus* (text fig. 37).

SEXUAL DIMORPHISM

The majority of species of group III, in contrast to those of groups I and II, show fewer secondary sexual characters. The sex of many species, in fact, is not readily discernible externally, as even the ventral depression common to many male weevils is generally feeble or obsolete in these species. A notable secondary sexual character, however, is the presence of a tubercle or toothlike projection (text fig. 45) jutting forth between



FIGS. 33-36. Eighth tergum of females of *Metamasius*. 33. *M. pulcherrimus*. 34. *M. annulatus*. 35. *M. circumjectus*; characteristic also of *M. elegantulus*. 36. *M. aurofasciatus*, *carinipyga*, and *duplocinctus*.

FIG. 37. Emarginate apex of eighth tergum of male of *M. orizabaensis* and of eight other species.

the front coxae of males of about half of the species of group III. The projection is especially sharp and prominent in *circumjectus*, *imitator*, *incisus*, *lacordairei*, *ohausi*, and *rudeli*. The only species of group I with such a character is *tuberculipectus*, but the projection in that species is more of a ledge or shelf than a sharp tubercle.

Another character found in some males is the sinuation or angulation of the sides of the apex of the beak, near the base of the peduncle of the postmentum (text fig. 59). This can be seen in males of *amoenus*, *condylus*, *lojanus*, and *ohausi*, and rather obsoletely, but recognizably, in *lacordairei*, *rudeli*, and *venezolensis*. In some species the beak of the male is more extensively, or more densely and deeply, punctate than that of the female; the female may have the beak impunctate. The toothed femora of males of *lojanus* and *transatlanticus* are additional sexual characters (text fig. 44).

Some of the sexual dimorphism is about the same as that of species of group I, but is pres-

ent in fewer species. Thus there are long hairs on the front tibiae of males of *biguttatus*, *fahraei*, *ohausi*, *spinolae*, and *validirostris* of this group, but males of as many as 30 species of group I have long hairs on one or more than one pair of legs. The lower edge on each side of the beak is crenulate or scalloped in some males of *transatlanticus*; it is crenulate in males of nearly a dozen species of group I. The femora are very long in males of *biguttatus*, as they are also in *rimoratus* of group I. A depression of some kind, with or without hairs, is found on the side of the beak in front of the antennal groove in males of *elegantulus* and of some males of *miniatopunctatus* (in both sexes, however, of *viduus*), and in *anceps* of group I. Although the presence of hairs underneath the beak is a character of males of *cinnamominus* and *peruanus* of group I, it is a character of both sexes in *miniatopunctatus* of the present group and probably also of *personatus* (male unknown). I have seen only females of *personatus* and *monilis*, and only the male of *xanthozona* and *spurius*.

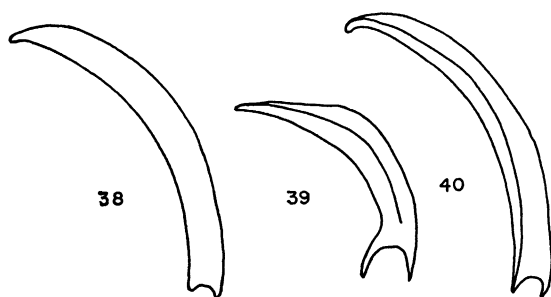
KEY TO THE SPECIES OF *METAMASIUS*

Unfortunately I have not been able to key the three species groups except on the basis of the male genitalia, because several species combine one or more external characters of each group. Therefore, if no male is available, recourse to both keys of the species groups is recommended (species groups I and II are in the same key; Vaurie, 1966, pp. 238–245). There are, however, a few conditional statements on some external characters which will facilitate the placement of about half of the species in their proper groups without the use of the aedeagus. These are: (1) if the apex of the beak in dorsal view is distinctly narrower than the distance between the front coxae, the species is in the key to groups I and II; (2) if the middle coxae are widely separated by more than the diameter of a coxa and the metasternum in front is flat, the species is in the key to groups I and II; (3) if the tibiae are dentate at the outer apex, the species is in the key to groups I and II; (4) if the femora are dentate at the inner apex, the species is in the key to group III; (5) if the front of the metasternum has a large protuberance (text figs. 67–70), the species is in the key to

group III; (6) if the elytra have tumid or raised spots or marks of color, the species is in the key to group III. The converse of these statements does not necessarily place the species in a different group.

1. Aedeagus with partial or complete lateral line (text figs. 39, 40)
 species groups I and II¹
 Aedeagus lacking lateral line (text fig. 38) species group III, 2
- 2(1). Beak at apex in dorsal view only as wide as about one-half of distance between front coxae; beak at least one-third longer than pronotum, nearly straight, cylindrical (text fig. 41) . . . *biguttatus*
 Beak at apex in dorsal view wider than, or about same width as, distance between front coxae; beak various 3
- 3(2). Outer apices of tibiae unidentate or bidentate, and femora of males toothed within (text fig. 44) 4
 Outer apices of tibiae rounded or obtusely angulate; femora not toothed 5

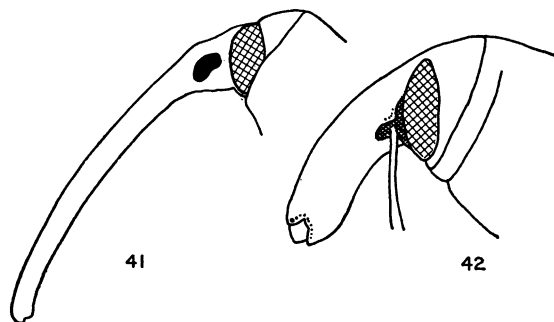
¹ For key to these groups, see Vaurie (1966, pp. 238–245). The aedeagus need not be pulled out in its entirety, as the lateral line is visible near the apex.



FIGS. 38-40. Profile of aedeagus of *Metamasius*. 38. Without lateral line, species group III. 39. With incomplete lateral line, species group II. 40. With complete lateral line, species group I.

- 4(3). Tibiae with one outer apical tooth; base of pronotum slightly sinuate at middle *lojanus*
Tibiae with two outer apical teeth; base of pronotum subtruncate *transatlanticus*
- 5(3). Front of metasternum at middle feebly tumid or flat 6
Front of metasternum with round or conical protuberance between coxae, at least as large in profile as middle coxa (text figs. 67-70) 34
- 6(5). Antennal club, viewed distally, with spongy apical part one-third or more of length of club (text figs. 48-49) . . . 7
Antennal club, viewed distally, with spongy apical part very small, less than one-fifth or one-fourth of length of club (text figs. 50-52) 40
- 7(6). Under side of beak glabrous 8
Under side of beak with long or short hairs 45
- 8(7). Elytra black, with transverse red band at extreme base (band may be incomplete at middle or divided at sides) . . . 9
Elytra without red band or band not at base 11
- 9(8). Elytral intervals at base flat or feebly tumid *mesomelas*
Some elytral intervals at base abruptly bulbous 10
- 10(9). Elytra with one red band; third interval (first is that adjacent to sutural interval; text fig. 53) at base bulbous and wider than other intervals; pronotum black *sanguinolentus*
Elytra with two red bands; third and fourth intervals at base bulbous, and third interval not wider than others; pronotum usually with some red *rubrovariegatus*

- 11(8). Mesosternal process at apex as wide as at least one-half of diameter of coxa . . 12
Mesosternal process at apex distinctly narrower than one-half of diameter of coxa 46
- 12(11). Beak stubby, along lower edge only three or four times longer than wide (text fig. 42) 13
Beak elongate, at least five times longer than wide 15
- 13(12). Distance between middle coxae equal to diameter of coxa, between front coxae at least as wide as antennal club; spongy apex of club only one-third of whole (text fig. 49) . . . *pulcherrimus*
Distance between middle coxae two-thirds or one-half of diameter of coxa, between front coxae narrower than antennal club; spongy apex of club about one-half of whole (text fig. 48) . . 14
- 14(13). Antennal club narrower than third tarsal segment of front legs; pronotum black, with oblique red or yellow stripes; elytra with elliptical yellow ring or oblique red bands *annulatus*
Antennal club widely dilated, wider than third tarsal segment; pronotum black; elytra with transverse yellow band in front of middle; known from type only *xanthozona*
- 15(12). Species with combination of large size (15 to 25 mm.); elytra black or dark red or with two transverse red bands; pronotum virtually impunctate, its basal margin subtruncate and basal depression indistinct or absent; peduncle of postmentum in profile rounded, not angulate, and, viewed from below, with broad, anteriorly divergent sulcus (text fig. 26); distribution in southwestern United States south to South America (pl. 12, figs. 1, 2) 16

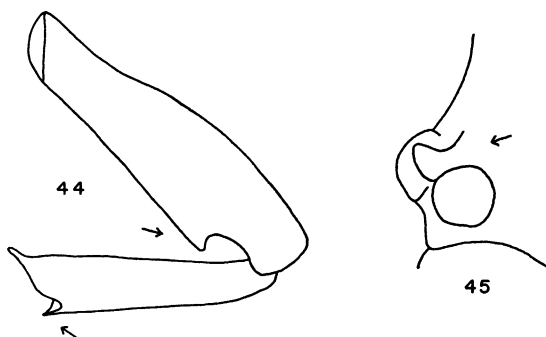


FIGS. 41, 42. Extreme type of beak of *Metamasius*. 41. Very long and narrow, *M. biguttatus*. 42. Short and stubby, *M. annulatus*.

- Species lacking one or more of characters given above17
- 16(15). Punctures of elytral striae minute, shallow, in some individuals scarcely visible *spinolae*
- Punctures of elytral striae large, fovea-like, deeply impressed *fahraei*
- 17(15). Species with combination of beak at apex in dorsal view scarcely, if at all, wider than distance between front coxae, latter with inward-pointing tubercle; femora slightly bulbous apically; pronotum densely punctate; pygidium acuminate, not hairy apically; black or brown with two transverse curved lines of red marks on elytra, some obsolete; distribution mostly Mexico, but sparsely southward into northern South America *validirostris*
- Species lacking one or more of characters given above18
- 18(17). Mesepimeron at outer front edge distinctly semicircularly emarginate (text fig. 11); large (14 to 18 mm.); elytral pattern as shown in plate 12, figure 3 *incisus*
- Mesepimeron at outer front edge oblique, arcuate-angulate, or vaguely emarginate; large or small; elytral pattern not as given above19
- 19(18). Apices of elytra separately rounded, forming broad, reversed V at suture (text fig. 43)20
- Apices of elytra conjointly rounded, subtruncate25
- 20(19). Pronotum dark, with two oblique, colored stripes from near apex to sides of base, and basal depression usually distinct21
- Pronotum dark or light, with three colored stripes, or with black stripes, or no stripes at all, and basal depression, if present, indistinct22
- 21(20). Prosternum between coxae toothed in male (text fig. 45), somewhat tuberculate in female; mesosternal process as wide as two-thirds or more of diameter of coxa *circumjectus* (in part)

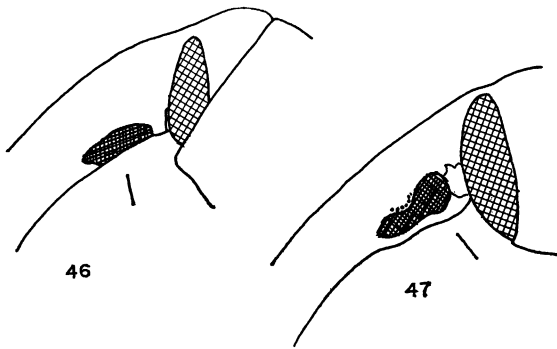


FIG. 43. Apices of elytra of *Metamasius*; above, conjointly rounded; below, separately rounded.



FIGS. 44, 45. Leg and prosternum of *Metamasius*. 44. Toothed femur and tibia of *M. lojanus* (*transatlanticus* subgroup). 45. Prosternal tooth between front coxae of some males.

- Prosternum between coxae virtually flat in both sexes; mesosternal process no wider than one-half of diameter of coxa *amoenus* (in part)
- 22(20). Second and fourth intervals of elytra (first interval is that adjacent to sutural interval) abruptly wider at base, more or less enclosing first and third intervals (text fig. 62) *ohausi*
- Third interval, or third and fifth intervals, of elytra abruptly wider at base (text figs. 63, 64)23
- 23(22). Small (7 to 8 mm.); antennae inserted close to eye *condylus*
- Large (15 to 18 mm.); antennae inserted far from eye (by at least width of club)24
- 24(23). Peduncle of postmentum (under apex of beak) broadly sulcate at center, its apex in profile rounded off; humerus of elytra black *imitator*
- Peduncle of postmentum with small tubercular prominence in front, its apex in profile angulate and produced forward; humerus of elytra red or yellow *pallisteri*
- 25(19). Second interval of each elytron (first is that adjacent to sutural interval) with isolated, tumid, orange spot near base, spot expanding interval and distorting striae on each side (pl. 13, fig. 4) *spurius*
- Second interval of each elytron with colored spot, if present, not near base, or not isolated from other spots, or not tumid or distorting striae26
- 26(25). Peduncle of postmentum (under apex of beak) at apex not emarginate, but either shallowly sulcate from apex to near base, or smooth and flat27



FIGS. 46, 47. Base of beak, showing antennal scrobe and fovea in front of eye. 46. *M. aurofasciatus* and *orizabaensis*. 47. *M. pruinus*; characteristic of majority of species.

- Peduncle of postmentum at apex feebly or strongly emarginate (may also be vertically bilamellate), toward base flat, not sulcate 28
- 27(26). Shoulders of elytra black or brown; each elytron, in addition to other orange marks, with row of three tiny orange spots in basal fourth; pronotum and elytra, in fresh condition, with contrasting black velvety areas (pl. 13, fig. 5) *miniato-punctatus* (in part)
- Shoulders of elytra red or orange; each elytron with slightly oblique orange or red stripe (text fig. 57); pronotum and elytra without velvety areas *rectistriatus*
- 28(26). Pronotum black, with orange or yellow stripes or transverse band 29
- Pronotum dark red, gray, or black, without colored stripes or band 31
- 29(28). Pronotum either with broad, colored stripes laterally (each stripe nearly as broad as median dark area), or with colored transverse band; beak not foveate between eye and scrobe; pygidium only vaguely tumid apically *circumdatus* (in part)
- Pronotum with narrow, colored stripes laterally (each stripe about one-fifth of width of median dark area); beak deeply, irregularly foveate between eye and scrobe; pygidium abruptly, bluntly carinate apically 30
- 30(29). Shape more fusiform, stouter at middle; prosternum between coxae toothed in male (text fig. 45), tuberculate in female; beak of male not angulate on under side . . . *circumjectus* (in part)
- Shape narrow, more parallel-sided; pro-

sternum between coxae flat or slightly tumid; beak of male with two small angles on under side behind apex (text fig. 59) *amoenus* (in part)

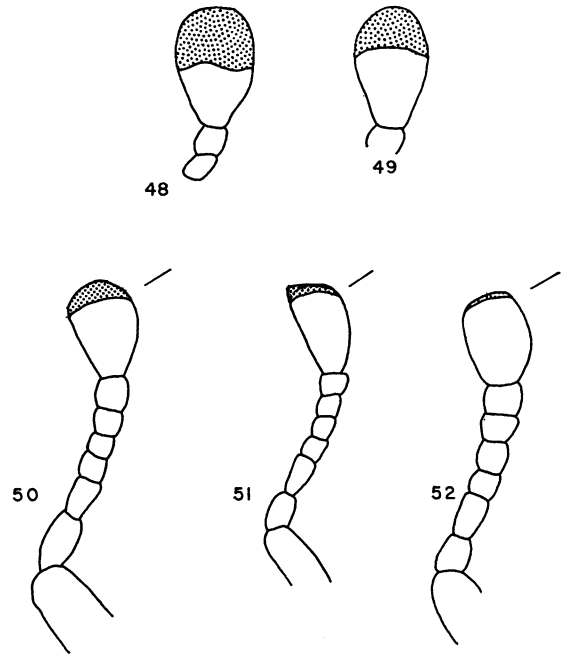
- 31(28). Smaller (8.5 to 12 mm.); mesosternal process not more than one-half of diameter of coxa; peduncle of postmentum feebly emarginate at apex (pl. 13, fig. 6) *bolivari* (in part)

Larger (12 to 17 mm.); mesosternal process two-thirds of diameter of coxa; peduncle deeply emarginate or vertically bilamellate at apex 32

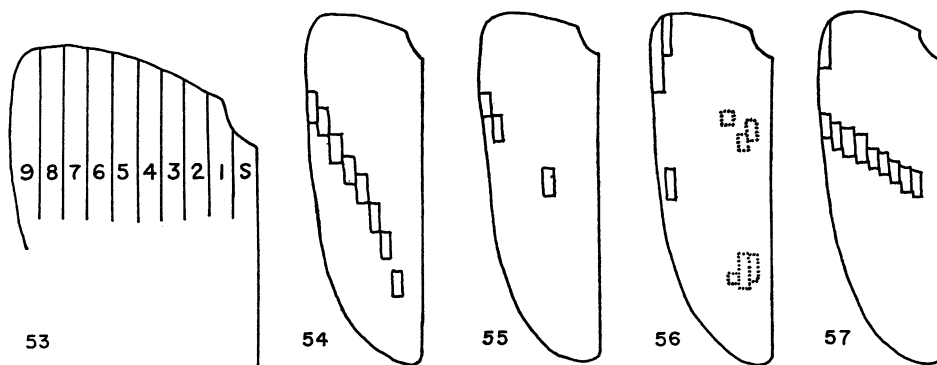
- 32(31). Elytra with somewhat tumid orange markings in oblique stripes or dorsal spots, spots may be bordered with black (pl. 12, figs. 7, 8) *rudeli*

Elytra without tumid, dorsal, orange spots 33

- 33(32). Each elytron with three or four long red stripes (pl. 12, fig. 9) that are brighter than dull red background; next to outermost interval bright red from be-



FIGS. 48-52. Antennal club of *Metamasius*, showing size of apical spongy part. 48. Apex one-half of length of club, *M. validirostris* and others. 49. Apex one-third of club, *M. pulcherrimus* and others. 50. Tiny apex of *M. rubricatus*; characteristic also of *M. aurocinctus*, *graphipterus*, and *monilis*. 51. Tiny apex and oblique side margin of *M. strigosus* and *limulus*. 52. Barrel-shaped club and small apex of *M. elegantulus*.



FIGS. 53–57. Diagram of left elytron of *Metamasius*. 53. Numbering of intervals used in present paper. 54. *M. personatus*, type. 55. *M. personatus*, paratype. 56. *M. lacordairei*, black phase with reddish marks; dotted marks are indistinct. 57. *M. rectistriatus*.

- hind shoulder to apex; pronotum much wider at base than at apex
- *venezolensis*
- Elytra with yellow center and black borders (text fig. 61), or black, with scattered indistinct red markings; next to outermost interval yellow or red at middle third or less (text fig. 56); pronotum elongate. *lacordairei*
- 34(5). Pronotum with three round, equidistant depressions; antennal club with spongy apex one-fourth or less of entire club (text fig. 50); elytra usually yellowish, with black borders and spots
- *graphipterus*
- Pronotum with only one depression at middle of base; antennal club with spongy apex one-third or more of club; elytra black, or black with colored bands or stripes 35
- 35(34). Base of pronotum gently sinuate at middle; metasternal protuberance rounded, not larger than bulge of coxa; mesepimeron with outer front corner turned upward or backward (text fig. 70)
- *pruinus*
- Base of pronotum strongly sinuate; metasternal protuberance conical, large (text figs. 67, 68); mesepimeron with outer front corner flat 36
- 36(35). Beak densely, coarsely punctate laterally in basal half; sides of beak with hairy, elongate depression of punctures in front of scrobe *viduus*
- Beak very finely punctate or impunctate; sides of beak smooth in front of scrobe 37
- 37(36). Upper edge of antennal scrobe straight (text fig. 46); base of beak in dorsal view not dilated over scrobes . . . 38
- Upper edge of scrobe with usual small angulation or sinuation (text fig. 47); base of beak, in dorsal view, dilated, if slightly, over scrobes 39
- 38(37). Elytra with transverse orange or yellow band just in front of middle, band narrower at suture than at sides of elytra; pronotum in profile feebly, if at all, sinuate *orizabaensis*
- Elytra with transverse red band covering basal half, band of same width throughout; pronotum in profile strongly sinuate (text fig. 66) *aurofasciatus*
- 39(37). Elytra black, with large black velvety patch on each elytron, in some specimens feebly defined; prosternum in front of each coxa with round swelling *carinipyga*
- Elytra black, with transverse orange or red bands; prosternum smooth in front of each coxa *duplocinctus*
- 40(6). Pronotum with basal depression and two or more additional depressions . . . 41
- Pronotum with only one or with no depression 42
- 41(40). Colored elytral band, if present, transverse, irregular, narrowing toward suture (pl. 13, fig. 7); no subapical spots; front coxae separated by about one-fourth of diameter of coxa
- *aurocinctus*
- Colored elytral band curving, beadlike, narrow throughout (pl. 13, fig. 8); subapical colored spots or vague band present; front coxae separated by about one-tenth of diameter of coxa
- *monilis*
- 42(40). Antennal club barrel-shaped, sides sub-

- parallel (text fig. 52); color purplish brown or reddish, with large, black, velvety patches on elytra and pronotum (pl. 13, fig. 9) *elegantulus*
 Antennal club with sides widening toward apex; color uniform red, or red with longitudinal black stripes 43
- 43(42). Club in profile with sides widened symmetrically from base to apex (text fig. 50); bases of pronotum and of fifth elytral interval abruptly, deeply depressed; peduncle of postmentum strongly emarginate in front *rubricatus*
 Club in profile with one side more oblique and longer than other (text fig. 51); bases of pronotum and fifth elytral interval feebly, if at all, depressed (but pronotum depressed in two specimens of *strigosus*); peduncle of postmentum not strongly emarginate 44
- 44(43). Beak one and one-half times as long as pronotum; sutural intervals of elytra bright or dark red, fifth interval (first is one adjacent to sutural interval) not, or not entirely, black; larger (9.5 to 14 mm.) (pl. 13, fig. 11) *strigosus*
 Beak not more than one and one-fourth times as long as pronotum; sutural intervals of elytra black, fifth interval entirely black; smaller (7.5 to 8 mm.) (pl. 13, fig. 12) *limulus*
- 45(7). Subrostral hairs sparse, tiny, basal; pronotum and elytra with velvety black patches; elytral apices truncate (pl. 13, fig. 5.) *miniatopunctatus* (in part)
 Subrostral hairs dense, long, in two readily visible rows; pronotum and elytra without velvety patches, but elytra with tumid orange spots (text figs. 54, 55); elytral apices separately rounded *personatus*
- 46(11). Posterior edge of antennal scrobe distant from eye by nearly length of antennal club; inner side of front coxa, at least of male, with inward-pointing tubercle 47
 Posterior edge of antennal scrobe distant from eye by not more than twice width of scape; front coxae without tubercles 48
- 47(46). Each elytron with colored, subapical spot on second interval (first is one adjacent to sutural interval) elongate and nearly reaching apex; humeral spot longer than adjacent spot *sinuatus*
 Each elytron with colored, subapical spot on second interval, if present, nearly round, situated far from apex; humeral spot short, not larger than other spots (pl. 13, figs. 13, 14) *ornatus*
- 48(46). Apical fourth of elytra striped with black and yellow, yellow intervals rather tumid at apex (pl. 13, fig. 10) *laetus*
 Apical fourth of elytra black, intervals not tumid at apex 49
- 49(48). Pronotum black, with yellow or orange-red stripes or transverse band; apex of peduncle of postmentum angularly prominent and vertically bilamellate *circumdatus* (in part)
 Pronotum entirely black; apex of peduncle flat, shallowly emarginate in front (pl. 13, fig. 6) *bolivari* (in part)

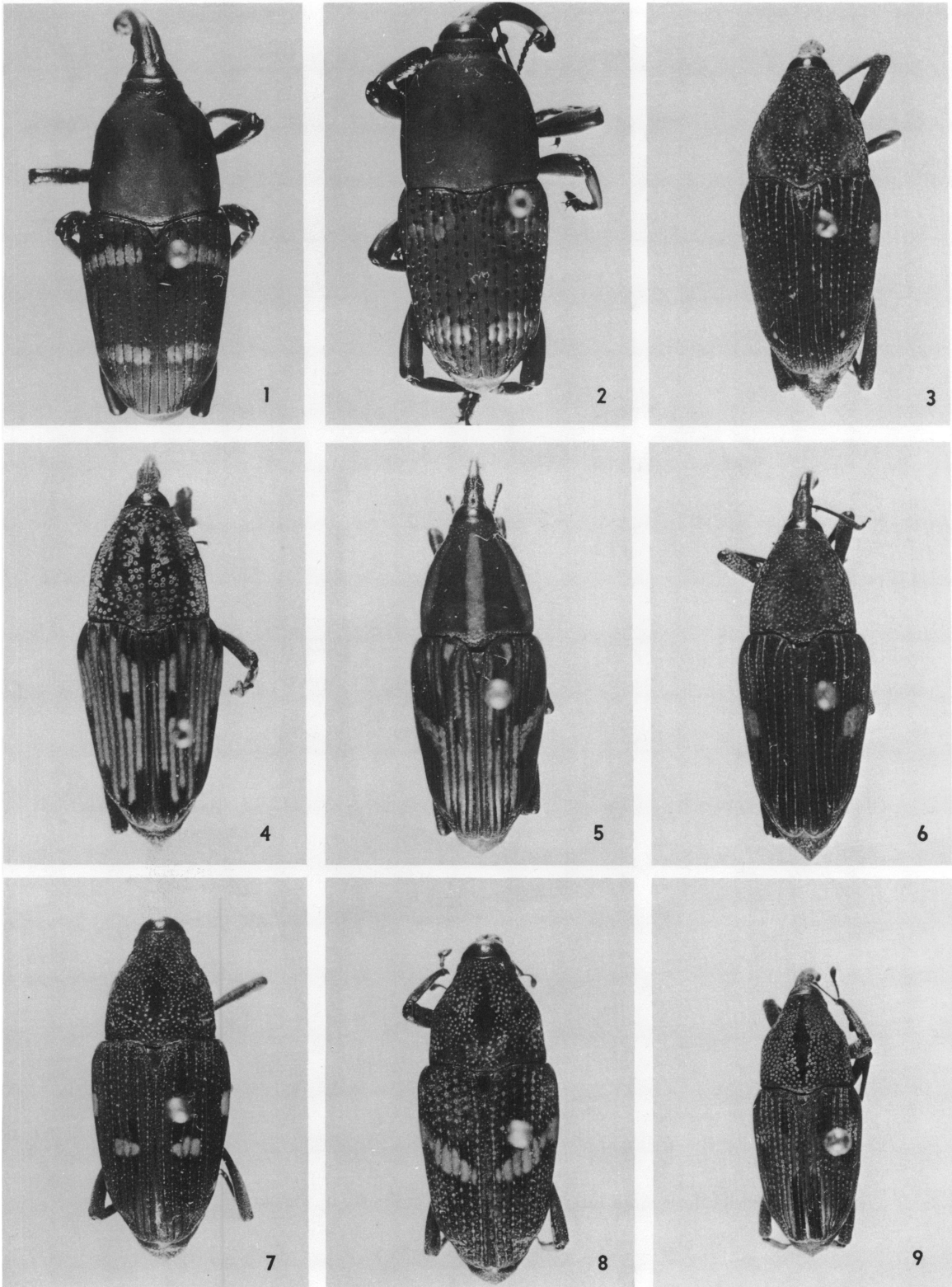
SUBGROUPS OF SPECIES GROUP III

The eight subgroups are arranged with those most typical of the species group placed first, and those farthest from the typical, last. The last subgroups are composed of but one or two species each, which seem to show closer affinities with the species of groups I and II and perhaps are even intermediate between them and those of group III.

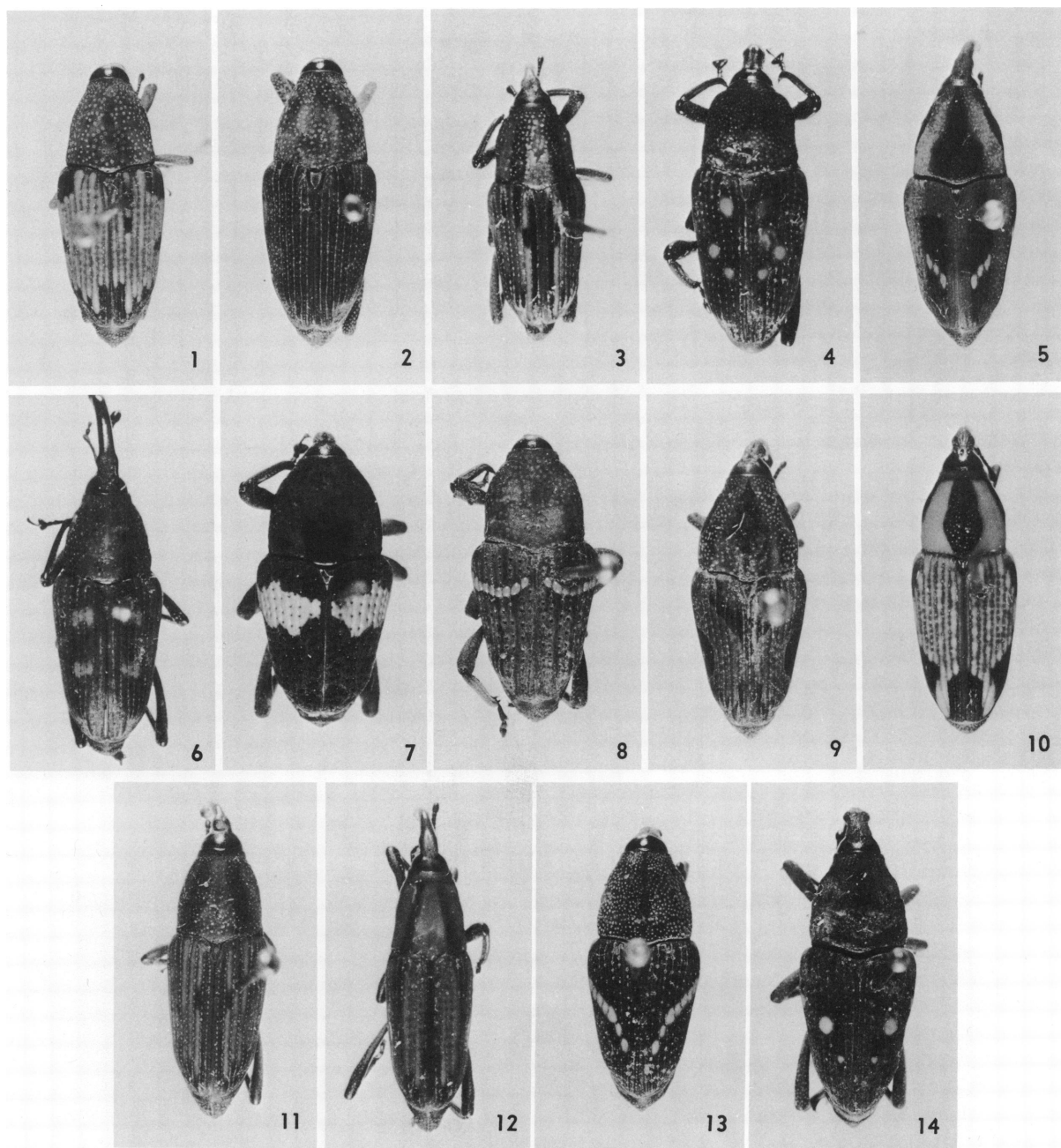
In the following pages each subgroup is discussed briefly and compared with other subgroups. In the two larger subgroups, characters that are similar in all the species are given first and are not repeated for each species. Measurements of the total length do not include the beak.

SUBGROUP *SANGUINOLENTUS*

This is the largest and most typical subdivision (26 species) and includes the majority of species considered by Champion (1910) and Günther (1941) as belonging in the genera *Phyllerythrus* and *Cactophagus*. The species are arranged more or less according to whether the colored markings are flat, as in the first six species, or tumid and embossed as in the majority of the remaining species. In some species, the marks may appear tumid in one individual, rather flat in another. Of the species with tumid marks, those with contiguous front coxae are placed together. Four species at the end of the sub-



1. *Metamasius spinolae*. 2. *M. fahraei*. 3. *M. incisus*, type. 4. *M. imitator*, type. 5. *M. pallisteri*, type; yellow of humerus not visible. 6. *M. pallisteri*, Ecuador, paratype; red of humerus not visible. 7. *M. rudeli*, Ecuador; humeral spot and spot on eighth interval behind middle barely visible. 8. *M. rudeli*, Colombia; humeral spot and spot on eighth interval behind middle not visible. 9. *M. venezolensis*. Figures not to scale



1. *Metamasius ohausi*, yellow phase. 2. *M. ohausi*, dark phase (red spot on sides barely visible). 3. *M. condylus*, paratype. 4. *M. spurius*, type. 5. *M. miniatopunctatus*. 6. *M. bolivari*, type. 7. *M. aurocinctus*. 8. *M. monilis*, type. 9. *M. elegantulus*. 10. *M. laetus*. 11. *M. strigosus*. 12. *M. limulus*, type. 13. *M. ornatus*. 14. *M. ornatus*, variety. Figures not to scale. Colored spot on humeri or eighth or ninth intervals not visible in some figures (but see text)

group have flat markings like those at the beginning, but they differ from all the species by having the spongy apex of the antennal club very tiny and the tarsal claws seemingly shorter. These might be regarded as a separate subgroup.

The species are characterized chiefly, but not exclusively, by having the front of the peduncle of the postmentum, or the gular peduncle, distinctly, deeply sulcate in front in such a manner as to be, or to appear, vertically bilamellate, with the edges of the lamellae rather sharp. Where the edges of the lamellae are worn smooth, the peduncle resembles the sulcate, but anteriorly rounded, peduncle of species of the *spinolae* subgroup, or of *viduus* of the *aurofasciatus* subgroup. In the males of some species the lamellate part droops prominently forward or downward (text fig. 59). In a number of species, however, the peduncle is either not sulcate (but perhaps worn), or is broadly or narrowly sulcate but not bilamellate.

All but a few species are bicolored and have both the mesosternal process and the front of the metasternum tumid, but the latter not projecting as in the *aurofasciatus* subgroup. The space between the front coxae is rather narrow in the majority of the species and virtually contiguous in six. Five of these six (*mesomelas*, *ornatus*, *rubrovariegatus*, *sanguinolentus*, and *sinuatus*) might be considered a subgroup apart, as they share two additional characters, i.e., an inward-pointing tubercle, more marked usually in the male, on the inner side of the front coxae, and the antennae inserted close to the eye. The tubercles, however, are present also in *elegantulus* and *validirostris*, and they are not evident in every individual.

The middle coxae are separated by one-half or two-thirds of the diameter of a coxa, but in four species (*circumdatus*, *laetus*, *ornatus*, and *sinuatus*) they are very narrowly separated by about one-third of a coxa. Prosternal tubercles or tumidities between or in front of the coxae are characteristic of this subgroup as also of species of the *aurofasciatus* and *spinolae* subgroups; in males of some species they are large and toothlike.

COMMON CHARACTERS OF SUBGROUP¹

Apical half of beak in profile as wide as

apex of front femur. Antennal club elongate, sides in profile gently dilated, but not dilated in *elegantulus*. Elytra, measured at midline, one-third to one-half longer than pronotum. Scutellum elongate-triangular, but more shield-shaped in *limulus* and *strigosus*, flat; more or less retracted behind basal line of elytra in species with base strongly sinuate. Venter of males feebly, if at all, depressed. Last segment of abdomen rounded or rounded-truncate. Punctures of femora same as those of under side of body. Tibiae straight, but appearing somewhat curved in *circumdatus*, *circumjectus*, *condylus*, *lacordairei*, *laetus*, *miniatopunctatus*, *personatus*, and male of *rubricatus*. Femora widened gradually, long; middle femur extending to hind coxa (but not so far in *laetus*), hind femur to or beyond apex of elytra. Tarsus with third segment widely dilated, spongy-hairy inferiorly (extreme base may have short, glabrous, median line); second segment longer than wide, but about as wide as long in *elegantulus* and *rubricatus*; claw segment longer than first segment, inserted rather nearer to base than to middle of third segment; tarsi dorsally shining in most species, but distinctly tomentose in *elegantulus*, *imitator*, *incisus*, and *rubricatus*; probably tarsi tomentose in other species, but worn.

Metamasius circumdatus (Champion)

Text figure 27

Phyllerythrurus circumdatus CHAMPION, 1910, p. 95, pl. 4, figs. 29, 29a, type locality not specified; lectotype, male, Chontales, Nicaragua, here designated from original specimens from Nicaragua and Costa Rica in the British Museum (Natural History), examined.

DIAGNOSIS: Pronotum and elytra with bright yellow or orange stripes or transverse bands. Sexes differing in punctuation of beak. Most similar to *laetus*, but differing as shown in table 3.

RANGE: Nicaragua to Panama; also Colombia and Ecuador. (For data on the 41 specimens examined, see Appendix.)

DESCRIPTION: (See above for common characters of subgroup). Length, 12 to 13 mm. Peduncle vertically bilamellate at apex, angulate and prominent in profile. Beak slightly

¹ Not repeated in the formal descriptions.

TABLE 3
SOME SPECIFIC DIFFERENCES AMONG FOUR SPECIES OF *Metamasius*

	<i>circumdatus</i>	<i>laetus</i>	<i>circumjectus</i>	<i>amoenus</i>
Elytral pattern	As described under the species	As shown in plate 13, figure 10	As described under the species	As shown in text figure 58
Colored markings of pronotum	In broad stripes or band	In broad or narrow stripes	In narrow stripes	In narrow stripes
Space between eye and scrobe	Punctate, not foveate	Punctate, not foveate	Deeply foveate	Deeply foveate
Male: sides of beak under apex	Not angulate	Not angulate	Not angulate	Angulate (text fig. 59)
Prosternum between front coxae	Feebly tuberculate	Flat	Toothed in male, tuberculate in female	Flat
Mesosternum between middle coxae	Narrow, one-third of diameter of coxa	Narrow, one-third of diameter of coxa	Broad, two-thirds of diameter of coxa	Broad, one-half of diameter of coxa
Pygidium	Convex, more tumid near apex	Evenly convex	Bluntly carinate in apical half	Bluntly carinate or produced toward apex
Female: apices of eighth tergum	Slightly separated	Conjointly rounded	Strongly bidentate (text fig. 35)	Feebly bidentate
Male: apex of aedeagus	Truncate	Truncate	Slightly produced at middle	Truncate

longer than pronotum, slightly to strongly arcuate, cylindrical; in dorsal view, basal dilation of beak sharp, longer than wide; scrobe with posterior edge about twice width of scape from eye; no distinct fovea in front of eye; beak of male densely punctate in basal two-thirds, in some specimens bent rather sharply downward in apical fourth, under side punctate on each side of glabrous median line; of female densely punctate at base, remainder scarcely punctate or impunctate, under side impunctate. Antennal club with spongy apex one-half or more of whole. Pronotum and elytra as described for *circumjectus*, but pronotum as wide as long, punctures finer, sparser, and base more sinuate. Pygidium obsoletely tumid medially in apical half, apex hairy, truncate.

Under side rather feebly punctate; distance between front coxae as wide as or wider than antennal funicle, between middle coxae about one-third of diameter of coxa and only slightly wider than distance between front coxae; prosternum between coxae feebly tuberculate in both sexes, behind coxae truncate, flat; mesosternal process and front of metasternum tumid; last segment of

abdomen slightly depressed at apex; mesepimeron with front border feebly arcuate, outer border truncate or rounded. Aedeagus truncate at apex, with wide border (text fig. 27). Eighth tergum of male slightly emarginate to truncate, of female narrowly rounded, apices slightly separated.

Surface somewhat opaque; color black, with orange or yellow markings as follows: oblique stripe on each side of pronotum from apex to side of base, stripe continued (in lectotype and some additional specimens) on each elytron as broad area extending from shoulder to or across suture at level of subapical callus; or (Carare, Colombia) a subapical transverse band covering almost half of pronotum and similar broad transverse band across elytra; or (Cauca Valley, Colombia) semilunar band from outer edge of each elytron to first interval.

ECOLOGY: No information.

REMARKS: Although Champion's seven specimens from Costa Rica and Nicaragua showed no sign of variation, the two mentioned above from river valleys in Colombia differ in color pattern from each other as well as from the specimens from Central America.

Males of *circumdatus* differ from males of *circumjectus* by having only a slight tumidity, not a sharp tooth, between the front coxae, and from males of *amoenus* by lacking the two little angles on the under side of the beak near the base of the peduncle.

Three males and two females were dissected.

***Metamasius laetus* (Erichson)**

Plate 13, figure 10

Sphenophorus laetus ERICHSON, 1847, p. 136, Peru; type, female, in Zoologisches Museum, Berlin, examined.

Rhodoaenus luteus HUSTACHE, 1938, p. 232, Peru; type, male, Callanga, Peru, in Muséum National d'Histoire Naturelle, Paris, examined. GÜNTHER, 1941, fig. 5.

Rhodoaenus luteus var. *aequatorialis* HUSTACHE, 1938, p. 232, Santa Inez, Ecuador, type, male, in Deutsches Entomologisches Institut, Berlin.

DIAGNOSIS: Pronotum and elytra narrowly or broadly striped with yellow or red. Sexes differing in punctuation of beak. Most similar to *circumdatus*, but differing as shown in table 3.

RANGE: Ecuador, Peru, and Brazil. (For data on the 37 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 10 to 12 mm. Peduncle vertically bilamellate at apex, in profile horizontal, but apex extending forward. Beak as long as pronotum, strongly arcuate, cylindrical; in dorsal view, basal dilation strong, about as wide as long; scrobe with posterior edge scarcely farther from eye than width of scape; no fovea between scrobe and eye; beak of male densely punctate above and on sides in basal half or two-thirds, on under side punctate on each side of glabrous median line; of female virtually impunctate and smooth above and below. Antennal club variable in shape from elongate to widely dilated, spongy apex less than one-half of whole. Pronotum scarcely longer than wide, finely, irregularly punctate; sides subparallel in basal half, basal depression deep, transverse; base slightly sinuate at middle. Elytra almost twice as long as pronotum in some specimens; intervals impunctate, at base virtually straight, and not advanced in front of scutellum,

fourth interval at apex very convex in majority of specimens (including types) and squeezing third to narrow point; striae punctures indistinct or showing as black spots; apices conjointly rounded. Pygidium rounded-truncate, convex, apex hairy.

Under side well punctate; distance between front coxae slightly wider than base of antennal funicle (but not wider in type of *laetus* and one other specimen), between middle coxae about one-third or one-fourth of diameter of coxa; prosternum between coxae flat, behind them truncate, flat; mesosternal process and front of metasternum tumid; last segment of abdomen not noticeably depressed; mesepimeron with front border feebly arcuate, outer border truncate or rounded. Middle femur slightly shorter than that of other species of subgroup, not reaching hind coxa. Aedeagus truncate at apex, with wide border. Eighth tergum of male slightly emarginate, of female with apices conjointly rounded.

Color of head, beak, and under side black or dark red or mixture of both. Pronotum black, with two yellowish or red lateral stripes, stripes either very broad and parallel or (a variety) narrow and oblique; scutellum black; elytra mostly yellow or red, with black on sides and apex; specimens of variety with additional short or long black marks on discal intervals of elytra, or blackish striae.

ECOLOGY: No information.

REMARKS: This species has an involved nomenclatural history. It was described by Erichson as *Sphenophorus*, transferred by Hustache (1936, p. 109, footnote) to *Rhodoaenus*, then described later by Hustache (1938) as a new species, *luteus*. *Rhodoaenus luteus* was transferred by Günther (1941, p. 40) to *Phyllerythrurus*, then synonymized by Kuschel (1950, p. 20), who saw Erichson's type, with *laetus*, but still in *Phyllerythrurus*. *Rhodoaenus luteus* appeared in Voss' paper on Peru (1954, pp. 334, 335) not only as a synonym of *Phyllerythrurus laetus*, but also as a separate species. No explanations were given for these changes, but indecision as to the correct genus is quite understandable. This species at first glance resembles many species of *Rhodoaenus* in its small size, color, rather narrowly separated coxae, and the proportions of long, subparallel elytra to short pronotum. On closer examination,

however, it shows no bilamellate claw segment, and it has a triangular, wider scutellum and less closely placed front coxae than those of the smaller species of *Rhodobaenus*. It also has the peduncle vertically bilamellate. In comparison with allied species, in addition to the characters given in table 3, *laetus* has generally more dilated antennal club and shorter middle femur.

The types of *laetus* and *luteus*, both of which I have examined, differ only in the sex, and in the fact that *laetus* is more reddish, less yellowish, and has an additional tiny black mark on the second elytral interval near the base. Specimens of Hustache's variety *aequatorialis* from Ecuador are mostly black, but do not differ in other characters from *laetus*.

Only two of the many individuals examined lack the notable convexity at the apex of the fourth interval of the elytra. Erichson did not mention this convexity, but Hustache did (as the fifth interval).

Five males and one female were dissected. Very few females of this species have been seen.

***Metamasius circumjectus* (Champion)**

Text figure 35

Phyllerythrus circumjectus CHAMPION, 1910, p. 94, pl. 4, figs. 26, 26a, type locality not specified; lectotype, female, Bugaba, Panama, here designated from original specimens from Panama and Costa Rica in the British Museum (Natural History), examined.

DIAGNOSIS: Pronotum and elytra with narrow yellow-orange stripes or elytra mostly yellow. Sexes differing in punctuation of beak and sharp prosternal tooth of male. Very similar to *amoenus*, differing as shown in table 3.

RANGE: Costa Rica, Panama, and Ecuador. (For data on the 13 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 12 to 18 mm. Peduncle vertically bilamellate at apex, angular and prominent in profile, especially so in male. Beak as long as pronotum, slightly arcuate, cylindrical; in dorsal view basal dilation sharp, longer than wide; posterior edge of scrobe distant from eye by one or two widths of scape; irregular deep

fovea present between eye and scrobe; beak of male densely punctate in basal half or two-thirds, impunctate at apex, below punctate on each side of median glabrous line; of female impunctate above and below except for base behind scrobe. Antennal club with spongy apex somewhat pointed, one-half or slightly less of whole. Pronotum slightly longer than wide, with distinct, "dusty" punctures, sides subparallel in less than basal half, thence sloping to apex; basal impression distinct, base scarcely sinuate at middle. Elytra, intervals flat, not or scarcely advanced in front of scutellum, row of punctures not visible in all specimens; at base straight; stria punctures tiny, but appearing large in colored areas; apices conjointly rounded or slightly separated. Pygidium abruptly, bluntly keeled medially in apical half, apex hairy, truncate.

Under side densely punctate; distance between front coxae almost twice wider than antennal funicle, or about one-third of diameter of coxa, between middle coxae almost equal to diameter of coxa; prosternum between coxae of male with sharp, conical projection readily visible in profile view, of female slightly tuberculate; prosternum behind coxae subtruncate but prominent; mesosternal process and front of metasternum tumid; last segment of abdomen at apex with small, round depression in male, slightly broadly emarginate in female; mesepimeron with front border strongly or feebly arcuate, outer border truncate. Aedeagus at apex truncate but may have slight median sinuation. Eighth tergum of male rounded, of female with two sharp, separately pointed projections (text fig. 35).

Surface pruinose; color black or dark red, with orange or yellow markings as follows: an oblique stripe on each side of pronotum from apex to sides of base, stripe continued on shoulder of each elytron and swirling inward either in narrow stripe obliquely across to sutural interval at about one-fourth from apex (lectotype and others), or stripe broadening out at middle third of elytra and spreading across suture or stopping at second interval, whence stripe may bend backward toward sides (three individuals) or bend backward to continue on fourth interval to apex (three from Panama) as in *amoenus*.

Tibia and base of femur red in one individual.

ECOLOGY: A female at San Carlos, Ecuador, was taken "*an Palmen*" on December 22, 1935.

REMARKS: The female mentioned above is from the type locality of *amoenus*, but collected on a different date. The swirling elytral pattern of these two species is very similar, and individuals of both species may have the striae near the suture reddish, but they are distinct species as shown by the characters of the males (table 3). This species and *circumdatus* have both been found on Barro Colorado Island, Panama.

The strongly toothed projection between the front coxae of the males was not mentioned by Champion. Günther noticed such a projection for the male of his *venezolensis*, but not for his *ohausi*.

One of each sex was dissected.

***Metamasius amoenus* (Günther)**

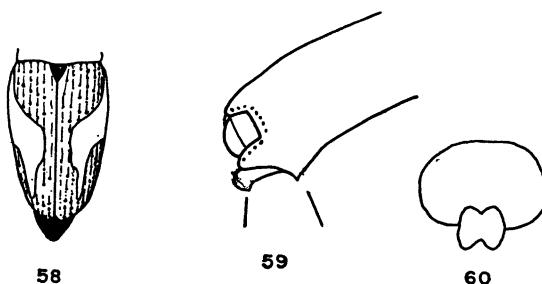
Text figures 58–60

Phyllerythrurus amoenus GÜNTHER, 1941, p. 38, fig. 4, San Carlos, Ecuador; type, male, in Staatliches Museum für Tierkunde, Dresden, examined.

DIAGNOSIS: Pronotum and elytra with broad orange or red stripes. Hind femora narrow throughout. Sexes differing in punctuation of beak and angulation under apex of beak of male. Very similar to *circumjectus*, differing as shown in table 3.

RANGE: Western Ecuador. (For data on the 16 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 11 to 15 mm. Peduncle vertically bilamellate at apex; profile of male angulate and prominent, of female rounded. Beak as long as pronotum, slightly arcuate, cylindrical; in dorsal view basal dilation sharp, longer than wide; median impressed line at base of beak in one specimen continuing as slight keel beyond scrobe; beak of male densely punctate above except at extreme apex, and sharply angulate on each side of base of peduncle (text fig. 59), punctate below on each side of median glabrous line; beak of female entirely impunctate above and below; posterior edge of scrobe distant from eye by one and one-half times width of scape; fovea present in front of eye. Antennal club with spongy apex from one-third to one-half of whole.



FIGS. 58–60. *Metamasius amoenus*. 58. Dark elytra, with swirling orange stripes. 59. Apex of beak of male, showing drooping peduncle of postmentum, also angle on sides of beak near base of peduncle; characteristic also of several other species. 60. Frontal view of apex of beak, showing bilamellate peduncle.

Pronotum as described for *circumjectus*, but more elongate, distinctly longer than wide, sides tumid at middle and emarginate in basal half, strongly punctate. Elytra, intervals with some punctures, flat, at base either straight or with second and third intervals turned toward scutellum, but not advanced in front of scutellum; striae punctures distinct, well separated, in some specimens almost as large as punctures of pronotum; apices conjointly rounded or slightly separated at suture. Pygidium rounded-truncate, strongly, bluntly keeled at middle subapically, forming obtuse angle when viewed in profile.

Under side rather densely punctate, especially on prosternum; distance between front coxae equal to or greater than width of antennal funicle, from one-fourth to one-sixth of diameter of coxa, between middle coxae about one-half of diameter; prosternum between coxae virtually flat, behind coxae truncate, and tumid or flat; mesosternal process and front of metasternum slightly tumid; last segment of abdomen with apex slightly foveate in male; mesepimeron with front border feebly arcuate, outer border truncate. Femora narrower than those of other species of subgroup, scarcely widened to apex. Aedeagus and eighth tergum of male truncate at apex, eighth tergum of female with apices separately pointed.

Surface pruinose, color black, with red or orange marks as follows: an oblique stripe on each side of pronotum from apex to sides of

base, stripe continued on shoulder of each elytron, swirling in broad stripe either obliquely across to second interval (text fig. 58), whence bending backward to apex of fourth interval (as in type and other specimens), or (Santo Domingo, Balzapamba) stripe reaching to third or second interval, but not to apex of fourth interval. A female from Balzapamba has small spot on eighth interval near apex. Base of femur red in two individuals, and reddish suffusions on suture and other intervals present in some individuals, some of this red visible only when specimen is wetted.

ECOLOGY: No certain information, but I have seen two individuals of *amoenus* and one specimen of *circumjectus* from San Carlos, Ecuador, and the label on the latter states "alle" on palms. The dates, however, are different.

REMARKS: This species from the Pacific slope and lowlands of Ecuador is narrower and more elongate than the quite similar *circumjectus* which occurs in some of the same localities, as well as in Central America. Champion (1910, p. 95) had a specimen from Nanegal, Ecuador, which he mentioned in his discussion of *circumjectus* as "a closely allied unnamed form with the stripe [of the elytra] extending along the fifth [my fourth] elytral interstice to the tip." He marked it "*Phyllerythrurus*, n. sp."

The small angles or teeth behind the apex of the beak inferiorly occur also in males of *ohausi* and *condylus*, and are substituted by vague sinuations instead of angles in males of *lacordairei*, *lojanus*, *rudeli*, and *venezolensis*. They are not a part of the peduncle but are on the sides of the beak. No author has mentioned these angles previously.

One male and two females were dissected.

Metamasius bolivari Vaurie, new species

Plate 13, figure 6

TYPE MATERIAL: Type, male, and one female paratype, Balzapamba, province of Bolivar, Ecuador, March-April, 1894, M. de Mathan, collector, in Muséum National d'Histoire Naturelle, Paris; one male paratype, same data, in the American Museum of Natural History; one male paratype, San Carlos, Ecuador, December 8, 1935, Schultze-Rhnhof, collector, in Zoologisches Museum, Berlin.

RANGE: Western Ecuador.

DIAGNOSIS: Black, with four large spots and humeri of elytra orange, or spots and humeri confluent. Differing from four preceding species by having no color on pronotum, peduncle of postmentum flat, with small emargination in front, not vertically bilamellate or extending far forward, and beak proportionately longer and narrower.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 9 mm. Peduncle not truly vertically bilamellate, but emarginate in front; in profile flat, horizontal. Beak one-fourth longer than pronotum, slightly arcuate, cylindrical; finely, sparsely punctate on top, coarsely on sides and on under side on each side of glabrous median line; in dorsal view, basal dilation sharp, longer than wide; scrobe with posterior edge distant from eye by scarcely width of scape; no fovea in front of eye. Antennal club with spongy apex about one-half of whole. Pronotum actually about as wide as long, with "dusty" punctures on sides, center impunctate; sides sloping gently from base to apex; basal depression distinct, transverse; basal margin sinuate at middle. Elytra, intervals flat, impunctate, inner ones at base slightly turned toward scutellum; striae punctures tiny, sparse; apices conjointly rounded.

Under side densely punctate on prosternum and femora, less densely elsewhere; distance between front coxae slightly wider than antennal funicle, between middle coxae one-half of diameter of coxa; prosternum between coxae rather flat, behind coxae truncate; mesosternal process and front of metasternum tumid; last segment of abdomen not depressed at apex; mesepimeron with front border rather angulate, outer border truncate. Aedeagus with apex rounded, border apparently narrow, but center of border transparent, not sclerotized. Eighth tergum rounded apically.

COLOR OF TYPE: Surface dull; black, with flat orange-red markings on each elytron as follows: two large, slightly irregular spots in front and behind middle on second, third, and fourth intervals, color of forward spot spreading diffusely toward sides where elongate spot covers base of eighth and ninth intervals (ninth interval is humerus).

VARIATION FROM TYPE: The length of specimens ranges from 8.5 to 12 mm. The female differs by having the beak impunctate above and below, somewhat longer (one and one-third times the length of the pronotum), its basal dilation scarcely longer than wide, the spongy apex of the antennal club shorter, not quite one-half of the entire club. The eighth tergum of the female is conjointly rounded and appears to lack the median impression. Two of the paratypes have a longitudinal impression on the prosternum between the front coxae. The middle coxae of two of the paratypes are separated by less than one-half of the diameter of the coxa. The slight suffusion of red on the elytra beyond the borders of the spots on the type and paratypes from Balzapamba is greatly increased on the male from San Carlos which has the spots and the humeral marks fused, as well as the spots on each side of the suture; thus the elytra on this specimen are chiefly orange-red except for the base and the apical third.

ECOLOGY: No information.

REMARKS: The fusiform shape (pl. 13, fig. 6) is much like that of *circumjectus*, *rectistriatus*, and *miniatopunctatus*. Differences from *circumjectus* are given above in the Diagnosis. Differences between *bolivari* and the other two species relate to the elytral pattern which has no colored marks on the humerus in *rectistriatus* and *miniatopunctatus*; the size, which is generally smaller in *bolivari*; and the pygidium, which in *bolivari* is shorter broadly rounded, and evenly convex, not tumid or ridged medially.

The type locality, Balzapamba, is in the "humid tropical forest" of western Ecuador (Brown, 1941) and San Carlos is about 25 miles to the northwest. A number of similar species have been taken at Balzapamba (*amoenus*, *circumdatus*, *circumjectus*, and *miniatopunctatus*), and *amoenus* and *circumjectus* also were collected at San Carlos.

All four specimens were dissected.

***Metamasius rectistriatus* (Champion)**

Text figure 57

Phyllerythrus rectistriatus CHAMPION, 1910, p. 92, pl. 4, figs. 22, 22a, type locality not specified; lectotype, male, Chontales, Nicaragua, here designated from original specimens from Nica-

ragua, Costa Rica, and Panama in the British Museum (Natural History), examined.

DIAGNOSIS: Similar in shape and general pattern to *sinuatus* and some individuals of *ornatus*, but oblique red band of elytra not distorting striae and flat, not tumid. Differing from *amoenus*, *circumdatus*, *circumjectus*, and *laetus*, but agreeing with *miniatopunctatus*, by having peduncle of beak narrowly sulcate, not vertically bilamellate, and generally no colored stripes on pronotum. Sexes differing in punctuation of beak and squarish (on top) apex of beak of male.

RANGE: Nicaragua to Panama, and Ecuador. (For data on the six specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 12 to 14 mm. (Champion gave 16.5). Peduncle narrowly sulcate or worn smooth. Beak slightly longer than pronotum, strongly arcuate, feebly compressed; basal dilation very sharp, much longer than wide; posterior edge of scrobe distant from eye by two widths of scape; irregular fovea between scrobe and eye; beak of male coarsely, densely punctate in more than basal half, apex impunctate and rather flattened on top, with sides of apex squared off; of female coarsely, densely punctate in basal third only, remainder impunctate, apex cylindrical. Antennal club, spongy apex slightly more than one-half of whole. Pronotum scarcely longer than wide, with "dusty" punctures, sides emarginate in basal half, tumid in one specimen at middle before converging to apex; basal impression distinct, base strongly sinuate at middle. Elytra as described for *circumjectus*, but inner intervals advanced at base in front of scutellum. Pygidium narrowly rounded, abruptly, bluntly keeled at middle in apical half, forming obtuse angle when viewed in profile, apex hairy.

Under side densely punctate; distance between front coxae slightly wider than antennal funicle, between middle coxae almost equal to diameter of coxa; prosternum between coxae of male with sharp little tubercle visible in profile, of female slightly tumid; prosternum behind coxae truncate, slightly tumid; mesosternal process and front of metasternum tumid; last segment of abdomen with small, transverse, hairy depression

at extreme apex; mesepimeron, front border strongly arcuate-angulate, outer border truncate. Aedeagus rounded-truncate at apex, with wide border. Eighth tergum of male rounded, of female with apices separately acuminate.

Surface pruinose; color black, with red or orange, narrow, oblique stripe on each elytron extending from shoulder (red of shoulder not visible dorsally) across elytron to but not on sutural interval; one specimen (Cariblanco, Costa Rica) with disconnected red spot on fifth interval behind oblique band, another (Ecuador) with spot connected to band, and red stripes on pronotum.

ECOLOGY: No information.

REMARKS: The rather squared-off apex of the beak of the male is diagnostic, but it is rather slight. This species seems allied to *amoenus*, both having a large spongy apex on the antennal club, a strongly carinate pygidium, a fovea in front of the eye, and widely separated middle coxae. It differs by having the elytra proportionally shorter and stouter, and wider at the base, and a dissimilar elytral pattern and peduncle.

The pattern of the elytra is almost like that of some specimens of *circumjectus*, but, as stated by Champion (1910, p. 93), the oblique stripe is shorter in *rectistriatus* (text fig. 57), and at a different angle. A specimen from Ecuador resembles *circumjectus* by having colored stripes on the pronotum, and the elytral stripe in this specimen is turned angularly at the apex in the direction of the subapical callus, like the side of an X. A tendency toward this angulate pattern is revealed in one of Champion's specimens of *rectistriatus* (Cariblanco) when it is wet with a brush.

Two males and one female were dissected.

***Metamasius condylus* Vaurie, new species**

Plate 13, figure 3

TYPE MATERIAL: Type, male, Turrialba, Costa Rica, June 19, 1951, O. L. Cartwright, collector, in the United States National Museum of the Smithsonian Institution, and one female paratype, San Jose, Costa Rica, Werckle, collector, in Zoologisches Museum, Berlin.

DIAGNOSIS: Known by combination of characters: small size (7 to 8 mm.); red or

yellow pronotum and elytra striped with black; bulbous, glabrous apex of pygidium; widened base of third elytral interval; non-bilamellate peduncle of postmentum; slightly curved tibiae, and two subrostral angles behind apex in male.

RANGE: Highlands of Costa Rica.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 7 mm. Peduncle shallowly sulcate throughout; in profile flat, horizontal. Beak slightly longer than pronotum, straight in basal two-thirds, arcuate before apex; cylindrical; coarsely punctate at base, finely at middle, impunctate in apical third and on under side; at base inferiorly slightly sinuate; at apex inferiorly sharply angulate at base of peduncle; in dorsal view, basal dilation sharp, longer than wide; scrobe with posterior edge distant from eye by only one-half of width of scape; no fovea in front of eye. Antennal club with spongy apex slightly less than one-half of whole. Pronotum longer than wide, with irregularly spaced, sparse punctures; sides slightly emarginate in basal half, tumid at middle, arcuate to apical constriction; no basal depression; basal margin sinuate at middle. Elytra, intervals impunctate, second and third at base turned toward scutellum, third wider at base and advanced onto pronotum, second, third, and fourth intervals convex at apex; striae punctures indistinct on disc, stronger on outer striae; apices separately rounded. Pygidium narrowly rounded, its apex shining and bulbous, almost tuberculate, extending well beyond apex of abdomen.

Under side and femur strongly punctate; distance between front coxae one and one-half times width of antennal funicle, between middle coxae one-half or more of diameter of coxa; prosternum between coxae virtually flat, behind coxae truncate, flat; mesosternal process and front of metasternum flat; last segment of abdomen with small, round, hairy depression at apex; mesepimeron with front border rather angulate, outer border truncate. Aedeagus truncate apically, border narrow. Eighth tergum rounded-truncate.

COLOR OF TYPE: Surface dull; beak, head, legs, outer intervals of elytra and parts of under side reddish, dorsum yellow, with black marks as follows: slightly oblique stripe on pronotum on each side of center;

on each elytron on entire first interval, on second interval in front of middle, at base and apex of third, fifth, and seventh intervals, at apex of fourth and sixth, at middle of seventh, at middle and apex of eighth.

VARIATIONS FROM TYPE: The length of the paratype is 8 mm. This individual, a female, differs from the type by having the dorsal colored areas orange-red instead of yellow, the beak virtually impunctate and uniformly gently arcuate, not bent in apical third. There are no angles under the beak of the female, and the apex of the abdomen is not depressed. The eighth tergum is truncate at the apex, and the bulbous area at the apex of the pygidium seems proportionally somewhat smaller. The scutellum of the paratype is more elongate, less triangular.

ECOLOGY: No information.

REMARKS: In its small size and red and black stripings, this species, like *laetus*, *limulus*, and *strigosus*, resembles superficially the characteristic species of the genus *Rhodoaenus* rather than those of *Metamasius*. I am not sure to which species of *Metamasius* it is most closely related, as some characters agree with those of one species and some with those of another. The angles under the apex of the beak of the male are like those of *amoenus* and *ohausi*, both of which differ from *condylus* chiefly by having the peduncle of the postmentum distinctly vertically bilamellate. A number of species have the third elytral interval widened and pushed forward (*imitator*, *incisus*, *limulus*, *pallisteri*, and *spurius*), or the tibiae curved (*laetus*, *miniato-punctatus*, and others). Many species of group III of *Metamasius* have the pygidium strongly tumid or carinate subapically, but none has it so bulbous and shining at the extreme apex. Two additional characters of this species are the insertion of the antennae very close to the eye and the separately rounded elytral apices. The latter, however, are not so extreme as those of *limulus*, *ohausi*, and a few others. The placing of *condylus* between *rectistriatus* and *miniato-punctatus* and not far from *amoenus*, *bolivari*, and *pallisteri* seems reasonable enough, although greater knowledge of the genus may later require some reshuffling of present relationships.

There is a male specimen from Colombia in the Zoologisches Museum, Berlin, bearing a

manuscript name, which at first sight seemed to be this species, having a similar aedeagus and peduncle, curved tibiae, and general color pattern. It differs, however, by having no angle under the beak at the apex, a stronger sinuation at the base of the beak, the beak thicker and shorter, and the pygidium evenly convex, not abruptly bulbous.

Both specimens were dissected.

***Metamasius miniatopunctatus* (Chevrolat)**

Plate 13, figure 5

Caclophagus miniato-punctatus CHEVROLAT, 1882, p. 580, Mexico; type, male, in Naturhistoriska Riksmuseet, Stockholm, examined. CHAMPION, 1910, pl. 4, figs. 23, 23a.

DIAGNOSIS: Characterized by unique elytral pattern (see below for color); pronotum usually with dark, velvety black areas; sexes differing in punctuation of beak. Beak slightly hairy below at base.

RANGE: Veracruz in southern Mexico south to Costa Rica and Ecuador. (For data on the 26 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 10 to 14 mm. Peduncle rather narrowly sulcate, sulcus worn smooth or at least not visible in type and many specimens. Beak as long as pronotum or slightly longer, slightly arcuate, cylindrical; inferiorly at base slightly hairy; in dorsal view, median impressed line continuing in type and some specimens as slight keel to middle of beak, basal dilation sharp, longer than wide; posterior edge of scrobe about width of scape from eye; irregular fovea between scrobe and eye, type and majority of specimens with elongate, pitted impression, stronger in males, on sides in front of scrobe; beak of male coarsely, confluent punctate in basal four-fifths, inferiorly narrowly sulcate; of female scarcely punctate except for basal area. Antennal club, spongy apex one-half or more of whole, obliquely pointed in many specimens. Pronotum about as wide as long, with large, "dusty" punctures; sides subparallel in basal third, thence tumid before converging to apex; at base broadly, shallowly impressed; base margined and strongly sinuate at middle, but sides partly hidden by base of elytra. Elytra, intervals straight, impunctate, base of second and third intervals advanced

slightly onto pronotum; stria punctures obscured; apices conjointly rounded. Pygidium narrowly rounded, feebly ridged medially (but abruptly in two specimens from Ecuador), slightly hairy apically.

Under side well punctate; distance between front coxae about twice width of antennal funicle (less in one specimen), or from one-third to one-fourth of diameter of coxa, between middle coxae somewhat less than diameter of coxa; prosternum between coxae flat or slightly tumid, behind coxae, truncate, flat; mesosternal process and front of metasternum slightly tumid; mesepimeron with front border gently arcuate, outer border truncate; last segment of abdomen with extreme apex foveate, fovea deeper in male. Front and middle tibiae of male slightly incurved. Aedeagus, apex truncate, border medium in width. Eighth tergum of male slightly emarginate at apex, hairy; of female, with apices separately rounded.

Surface pruinose, color brown or grayish purple or reddish; pronotum with large, median, pear-shaped, velvety, dark patch and two narrow lateral patches; each elytron on disc with black or brown or velvety black, elongate patch bordered in front with row of three parallel, small, red or orange, flat or tumid spots on second, third, and fourth intervals, bordered behind with three larger, oblique spots on same intervals, also spot on eighth interval near apex and on eighth and ninth intervals near base; some specimens with spots on intervening intervals 5, 6, and 7, forming an oblique stripe as in *ornatus* (pl. 13, figs. 5, 13).

ECOLOGY: According to the labels, specimens from Hamburg Farm, Reventazon, Costa Rica, were taken on "*Blüten*" (blossoms) of Araceae in June, and of palms in September; specimens in the United States National Museum coming from Mexico were intercepted at Laredo and El Paso, Texas, and at New Orleans either "on pineapple," "in pineapple," or "in banana debris." A specimen from Cordoba, Veracruz, Mexico, was "reared from pineapple."

REMARKS: Champion (1910, p. 93) regarded this species as belonging with *Phyllerythrurus*, even though it does not have the vertically bilamellate peduncle postulated for that "genus." Aside from the dorsal pattern,

it resembles *validirostris* in general shape, in the large basal impression of the pronotum and its sinuate base, but it differs from that species by having the femora gradually widened, not bulbous, the antennal club more elongate, the front coxae closer together, and the mesosternum and the front of the metasternum distinctly tumid. It is very similar in the non-bilamellate peduncle and in the general shape and coloring also to *rectistriatus* and *personatus*, but these species, among other differences, have no velvety parts to the elytra or pronotum.

The elytral pattern is quite constant in all the specimens examined from Central America and Mexico, except for a fading of the velvety parts in several specimens, and for a specimen from Mexico that shows the colored spots only after being wet. Two specimens from South America (Ecuador), however, have more colored spots which make an oblique stripe, much as in some specimens of *ornatus*, *sinuatus*, *personatus*, and *rectistriatus*. The specimen illustrated by Champion from Guatemala is rather purplish in ground color. Two individuals from British Honduras are greased and appear reddish, but they have the typical pattern.

The inner wing of a specimen 10 mm. long measures 11 mm., almost twice the length of the elytra alone.

Four males and three females were dissected.

***Metamasius pallisteri* Vaurie, new species**

Plate 12, figures 5, 6; text figure 63

TYPE MATERIAL: Type, male, Tingo Maria, Huanuco, Peru, 2200 feet, November 27, 1941, J. C. Pallister, collector, in the American Museum of Natural History; two female paratypes, one from middle Rio Ucayali, Peru, December 6, 1923, Bassler collection, one from Puyo, Oriente, Ecuador, December 5, 1938, F. M. Brown, collector, in the same institution; one male paratype, Essequibo River, Moraballi Creek, Guyana (former British Guiana), August 13, 1929, Oxford University Expedition, in the British Museum (Natural History), and one male paratype from the Chapare region, upper Rio Chipiriri, Bolivia, 400 meters, October 31, 1953, W. Forster, collector, in Zoologische Staatssammlung, Munich.

DIAGNOSIS: Colored markings flat, not tumid; two color phases; sexes alike. Differing from species with non-bilamellate peduncle by having third interval of elytra greatly widened at base and turned, along with second interval, strongly toward scutellum (text fig. 63).

RANGE: Central and northern Peru, eastern Ecuador, Bolivia, and Guyana.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 16 mm. Peduncle apparently not sulcate, apex with tubercular prominence, in profile angulate in front. Beak slightly longer than pronotum, slightly arcuate, especially at apex, slightly compressed; in dorsal view, basal dilation distinct, almost twice longer than wide; finely, sparsely punctate; scrobe with posterior edge distant from eye by about twice width of scape; no fovea between scrobe and eye. Antennal club, spongy apex one-third of whole. Pronotum slightly longer than wide, disc appearing impunctate, sides and apex finely punctate, sides sloping gently to apex, basal depression not evident, base strongly sinuate and margined at middle. Elytra, intervals with row of scarcely visible punctures, second and third intervals at base strongly turned toward, and advanced beyond, scutellum, third interval strongly widened, convex at base and advanced beyond scutellum; striae punctures fine, dense; apices distinctly separately rounded, retracted at line of suture. Pygidium narrowed to truncate apex, median ridge strong and hairy toward apex, apex hairy.

Under side well punctate, more densely on prosternum; distance between front coxae not quite twice wider than antennal funicle, between middle coxae about two-thirds of diameter of coxa; prosternum between coxae slightly tumid, behind coxae subtruncate, prominent; mesosternal process and front of metasternum slightly tumid; last segment of abdomen at middle of apex with small, deep, roundish depression; mesepimeron with front border strongly arcuate, outer border truncate. Aedeagus truncate at apex, with narrow border. Eighth tergum emarginate at apex.

COLOR OF TYPE: Under side blackish and dark red; beak and head dark red; pronotum with five alternating black and yellow, longitudinal stripes, with yellow at middle (black

of under side visible laterally); elytra black, with yellow on and behind shoulder extending to point in front of middle whence yellow turning inward in oblique stripe to fourth interval, continuing on this interval to apex; yellow also on other intervals as shown in plate 12, figure 5; sides of abdomen under edge of elytra bright red; markings flat, not elevated.

VARIATIONS FROM TYPE: The size ranges from 15 to 18 mm. The paratypes from Guyana and Bolivia are colored like the type, but the former has more extensive yellow on the elytra. The paratypes from Peru and Ecuador, which are females, are black and opaque, with a large orange spot on each elytron, and the beak and head are mostly black (pl. 12, fig. 6). These individuals are not striped, but the colored markings are actually present as dashes or streaks in the areas where, on the other specimens, the broad yellow stripes occur. On each elytron of the paratype from Peru the colored marks are in the same place as the yellow in the type, but they are more restricted, consisting of a small spot on the humerus and the eighth interval in front of the subapical callus, a large spot at the middle spreading from the eighth to the fifth interval, a long mark on the fourth interval to the apex, and scattered dashes on the third and second intervals near the apex. The elytra of the paratype from Ecuador differs from those of Peru by having only the humeral spot, the large median spot, and a tiny spot at the apex of the fourth interval. One of the paratypes has a shallow basal depression on the pronotum, and one female has a fovea in front of the eye. The eighth tergum of the female is broadly rounded at the apex.

ECOLOGY: No information.

REMARKS: It gives me pleasure to name this large, handsome species for John C. Pallister, of the American Museum of Natural History, who was instrumental in starting me on the taxonomy of beetles, and who collected the type specimen.

Although the yellow striped individuals are males and the black ones are females, I believe that additional specimens will show that the coloration is not sexual. In *ohausi*, for instance, the black and yellow phases are not sexual. Both phases of that species, as of

pallisteri, are found in Peru. This species is difficult to classify. The eyes, especially those of the females, seem to be closer together on the frons than those of the majority of species, being separated by less than one-half of the width of the beak at its base. The separation of the elytral apices (occurring also in *elegantulus* and a few other species), the strong incurving and widening of the elytral intervals (found also in *condylus*, *elegantulus*, and *rubricatus*), and the retracted, rather narrow scutellum, as in *limulus*, are also rather unusual, but not unique. The colored stripes of the elytra, which are reduced to spots in two of the paratypes, are of the same order as those of *amoenus*, *circumdatus*, *circumjectus*, and *rectistriatus*, being flat, not embossed, and having the striae running across them, not around them, as is the case with *sinuatus*, *ornatus*, and the dark phase of *ohausi*. The dark phase of *pallisteri* resembles that of *incisus*, but the colored spots are arranged in a different manner in the two species, and those of *incisus* are tumid.

The species differs from those mentioned above (except for *rectistriatus*) by having the peduncle of the postmentum neither sulcate nor bilamellate, but tuberculate in front, about like that of *mesomelas*.

All five specimens were dissected.

***Metamasius lacordairei* (Chevrolat)**

Text figures 31, 56, 61

Cactophagus Lacordairei CHEVROLAT, 1882, p. 581, Colombia; type, female, in Naturhistoriska Riksmuseum, Stockholm, examined.

DIAGNOSIS: Sexes differing in punctuation of beak and in prosternal projection of male. Very similar to *venezolensis* and *rudeli* in many details, but differing as shown in table 4.

RANGE: Known only from Colombia. (For data on the four specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 14 to 15 mm. Peduncle vertically bilamellate at apex, in profile angulate and prominent in male, horizontal in female. Beak as long as pronotum, slightly arcuate, cylindrical; in dorsal view, basal dilation sharp and twice as long as wide; posterior edge of scrobe distant from eye by one or two widths of scape;



FIG. 61. Diagram of left elytron of *M. lacordairei*, yellow phase with black borders.

fovea in front of eye; beak of male densely punctate, except for apex, and each side of beak at base of peduncle slightly sinuate; of female impunctate except for base. Antennal club, spongy part slightly pointed, less than one-half of whole. Pronotum slightly longer than wide, with dense, "dusty" punctures, median line impunctate; sides gently sloping to apex and slightly emarginate in basal half; basal depression distinct, base sinuate at middle. Elytra, intervals with single row of punctures or appearing impunctate, at base virtually straight, not advanced in front of scutellum; striae punctures distinct, larger than those of intervals; apices conjointly rounded. Pygidium narrowly rounded or rather truncate, ridged and hairy medially, apex hairy.

Under side well punctate; distance between front coxae scarcely wider than antennal funicle, less than one-fourth of diameter of coxa, between middle coxae from one-half to two-thirds of diameter of coxa; prosternum between coxae with (male) sharp, conical projection visible in profile view, and (female) slight swelling; prosternum behind coxae subtruncate, prominent; mesosternal process and front of metasternum tumid, but latter flat in one specimen; last segment of abdomen with small, round, distinct depression in male only; mesepimeron arcuate in

front, truncate at outer side. Aedeagus truncate at apex, but with slight sinuation at middle (text fig. 31). Eighth tergum of male very slightly emarginate, of female with apices sharply, separately acuminate, bidentate.

Surface pruinose; black color phase (as in type) with orange or red marks longitudinally on humerus of elytra and at base of outermost interval, at base and middle of eighth interval, and on disc in form of various spots or lines; yellow phase with elytra mostly yellow, but borders and sutural interval black or dark red in varying amounts (text figs. 56, 61). Beak, head, and part of under side reddish; pronotum black or dark red.

ECOLOGY: No information.

REMARKS: The phase with yellow elytra resembles that of *ohausi*, but the pattern is not exactly the same, and *lacordairei* differs further by having the elytral intervals straight and flat at the base, not widened and elevated. Although males of *lacordairei*, *rudeli*, and *venezolensis* have a slight sinuation under the apex of the beak on each side, they have no true angle like that of males of *amoenus*, *condylus*, and *ohausi*. (See *rudeli* for further discussion.)

One of each sex was dissected.

Metamasius venezolensis (Günther)

Plate 12, figure 9: text figure 31

Cactophagus venezolensis GÜNTHER, 1941, p. 33,

Venezuela; cotype, female, in Staatliches Museum für Tierkunde, Dresden, examined.

DIAGNOSIS: Almost exactly like *lacordairei*, including genitalia and eighth terga of both sexes, but differing in that sides of pronotum are more arcuate, and in distinctly striped color pattern of elytra.

RANGE: Known only from Venezuela, without more precise locality. (For data on the two specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 12 to 15 mm. Peduncle, beak, and antennal club as described for *lacordairei*, but beak shorter than pronotum. Pronotum as described for *lacordairei*, but sides in basal half subparallel, at middle slightly tumid, and more strongly arcuate to apex. Elytra, intervals impunctate, straight at base, not advanced in front of scutellum; stria punctures spaced regularly, distinct, surrounded by whitish ring; apices conjointly rounded. Pygidium with hairy median keel, apex hairy, of male truncate, of female narrowly rounded.

Under side as described for *lacordairei*, but prosternum of female between coxae flat, and mesosternal process flat.

Surface pruinose; color of pronotum dark red, with median longitudinal black velvety stripe from apex to near base; each elytron red, with black marks as follows: on sutural and first intervals in less than apical half, on second interval near base, on fifth, sixth, and

TABLE 4
SOME DIFFERENCES AMONG THREE SPECIES OF *Metamasius*

	<i>rudeli</i> (Six specimens)	<i>lacordairei</i> (Three specimens)	<i>venezolensis</i> (Two specimens)
Elytral pattern	As shown in plate 12, figures 7, 8	As shown in text figures 56, 61	As shown in plate 12, figure 9
Prosternal process of female	With blunt tubercle	With blunt tubercle	Flat
Space between front coxae	Twice width of antennal funicle	No wider than funicle	No wider than funicle
Mesosternal process	Distinctly tumid	Tumid in two specimens, flat in one	Flat
Prosternum	Distinct hairs in some specimens	Not hairy	Not hairy
Pronotum	Much broader at base than at apex	Narrower, more elongate	Much broader at base than at apex

seventh intervals at middle and again at apex, on seventh and eighth at base, on tenth interval throughout. Some of the "red" of intervals is orange and contrasts with red areas, especially on first, second, eighth, and ninth intervals.

ECOLOGY: No information.

REMARKS: The pronotum is not quite so elongate as that of *lacordairei* and is more constricted toward the apex; it is more like that of *elegantulus*. Günther compared *venezolensis* with *validirostris*. (For further discussion, see *rudeli* below.)

Both specimens were dissected.

***Metamasius rudeli* (Voss)**

Plate 12, figures 7, 8

Eucactophagus rudeli Voss, 1953, p. 81, locality not specified other than in title of paper, i.e., Colombia or Bolivia; type, male, from Rio Aguacatal, Colombia, in Zoologisches Museum, Hamburg, examined.

DIAGNOSIS: Similar to *lacordairei* and *venezolensis*, but differing as discussed below and as shown in table 4. Similar to *ornatus* and *sinuatus* in having raised elytral spots and same general elytral pattern, but intercoxal space at mesosternum wider in *rudeli*. Sexes differing in beak and sharp prosternal projection of male.

RANGE: Ecuador and western Colombia. (For data on the 10 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 14 to 17 mm. Peduncle, beak, and antennal club as described for *lacordairei*, but basal dilation of beak of female scarcely longer than wide and posterior edge of scrobe distant from eye by from one to one and one-half times width of scape. Pronotum and elytra as described for *lacordairei*, but sides of pronotum more strongly curved to apex, and suture and second interval of elytra with two rows of punctures. Pygidium broadly rounded-truncate, vaguely ridged at center, hairy on ridge and at apex.

Under side well punctate; distance between front coxae nearly twice width of antennal funicle, or less than one-fourth of diameter of coxa, between middle coxae about two-thirds of diameter of coxa; proster-

num between coxae with sharp, conical projection, visible in profile, in male, with blunt tubercle with large punctures in female; prosternum behind coxae subtruncate, prominent, and in front of coxae in some specimens with conspicuous hairs emerging from punctures; mesosternal process and front of metasternum tumid; apex of abdomen of male with distinct, round depression, of female with broader, shallower depression; mesepimeron arcuate in front, truncate at outer border. Aedeagus truncate at apex in type and in males from Ecuador, but slightly sinuate at middle in one male from Colombia. Eighth tergum of male rounded-truncate, of female as described for *lacordairei*.

Surface pruinose; ground color of some specimens on beak, head, legs, dorsum, and venter dark red, with varying amounts of black; ground color of others, such as type, chiefly blackish gray but showing reddish areas on pronotum and elytra when wet with brush; all specimens with orange or red embossed spots or elongate marks on elytra on humerus, on outermost (ninth) interval at middle, on eighth at base, middle, and behind middle. Type, in addition, with orange spot on fourth and second intervals at about middle, specimens from Ecuador with row of parallel spots on fourth, third, and second intervals, these and other spots bordered with black; two specimens from Colombia with intervening intervals spotted, thus forming oblique orange stripe (pl. 12, figs. 7, 8).

ECOLOGY: No information.

REMARKS: Although this species was described in the genus *Eucactophagus*, it does not have the chief feature of that "genus," a large protuberance on the front of the metasternum. The metasternum in the type is merely slightly tumid. The mesosternal process, which Voss (1953, p. 82) described as "*mit querem Höcker*," is what I would call tumid at the middle. Voss' type, which he thought was a female of 17.5 mm., has been dissected and it is a male; it has the male characters of a more strongly punctate beak and of a toothlike prominence between the front coxae.

This species is very similar to both *lacordairei* and *venezolensis*. In fact these

three species scarcely differ from one another except for the color and the elytral pattern, and even the pattern varies in *rudeli* and in *lacordairei*. Unfortunately, I have for comparison only one of each sex of *venezolensis* and only three specimens of *lacordairei*, an insufficient number on which to judge the range of variation. Some of the differences among the three species are shown in table 4.

A specimen from Ecuador illustrated by Günther (1941, p. 30) above the name *aurantiacus* Hustache, and which I have examined (through the courtesy of Dr. Hertel of the Staatliches Museum in Dresden), is not that species, but is *rudeli*, with the elytral pattern as shown in plate 12, figure 7 (black borders on the elytral marks). Hustache's *aurantiacus* is a synonym of *ornatus* Champion (I have compared the types of both forms) from which *rudeli* differs by having the coxae more widely spaced, the beak less arcuate, and the elytral striae scarcely, if at all, sinuate around the colored marks. *Metamasius rudeli*, *ornatus*, and *incisus* all occur in north-central Ecuador (as well as elsewhere) in the vicinity of the Pastaza, Blanco, and Napo rivers which are situated (Brown, 1941) on the low or eastern slopes of the Andes. The type locality of *rudeli*, Rio Aguacatal, or Rio Augatal, or Rio Agua, at 2000 meters in the western cordilleras of Colombia, is apparently the same as that of *metamasioides* Günther and of its synonym, *impressipectus* Voss, both of species group I. Rio Aguacatal is a small stream just east of Manizales.

All six specimens of *rudeli* were dissected.

Metamasius ohausi (Günther)

Plate 13, figures 1, 2; text figure 62

Phyllerythrurus ohausi GÜNTHER, 1941, p. 40, Zomora [=Zamora] and Santa Inez, Ecuador; co-type, male, Santa Inez, in Staatliches Museum für Tierkunde, Dresden, examined.

Phyllerythrurus decoratus GÜNTHER, 1941, p. 41, Peru; type, female, in Staatliches Museum für Tierkunde, Dresden, examined. New synonymy.

DIAGNOSIS: Differing from others of subgroup by having second and fourth elytral intervals abruptly wider at base and enclosing first and third intervals which usually fail to reach base (text fig. 62); two color

phases (pl. 13, figs. 1, 2); colored spots elevated; male differing from other males by having long inner hairs on front tibiae and from all males except for those of *amoenus* and *condylus* by having sharp angles under apex of beak (text fig. 59).

RANGE: Ecuador and Peru. (For data on the 34 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 12 to 15 mm. Peduncle vertically bilamellate at apex, horizontal in profile. Beak as long as pronotum, scarcely arcuate, cylindrical; basal dilation rather sharp, longer than wide; irregular fovea between scrobe and eye; posterior edge of scrobe distant from eye by one or two widths of scape; beak of male densely punctate to near apex, and sides inferiorly sharply angulate near base of peduncle; of female impunctate except for base. Antennal club and pronotum as described for *lacordairei*, but basal depression of pronotum not distinct in some specimens. Elytra and pygidium as described for *lacordairei*, but intervals of elytra as stated in Diagnosis, and apices separately rounded.

Under side well punctate; distance between front coxae about twice width of antennal funicle, one-third to one-fourth of diameter of coxa, between middle coxae about two-thirds of diameter; prosternum between coxae with sharp, conical projection or tooth in male, and rounded tubercle in female; prosternum behind coxae subtruncate, prominent; mesosternal process and front of metasternum tumid; last segment of abdomen depressed apically, depression seeming larger in male; mesepimeron arcuate in front, truncate on outer border; front tibia of male with long, very fine, sparse hairs on inner edge, hairs as long as tibia is wide. Aedeagus truncate at apex. Eighth tergum of both sexes as described for *lacordairei*.

Surface pruinose, color of pronotum grayish black or yellowish; elytra with two color phases: (1) each elytron almost entirely yellow (dark red in one specimen), with black marks as follows: on outer intervals on shoulder (except for corner), on last interval, on last three or four intervals at middle, on all intervals at apex, on second interval near middle; (2) each elytron black, shot through

with large red dots that can be brought into view more clearly by wetting specimen, but five or six marks distinct, bright, elevated (on shoulder, on eighth and ninth intervals in front of middle, on eighth at apical third, and on fourth at base, latter spot distorting striae on each side).

ECOLOGY: No information.

REMARKS: This is the only species with (in its dark phase) a tumid, colored spot at the base of the fourth elytral interval. The color phases outlined above were, naturally enough, described as two species, *ohausi* for the black phase with red dots, and *decoratus* for the yellow with black border. Although the black form was described from Ecuador and the yellow one from Peru, I have seen both forms from Peru (one black male from Rio Santiago, three yellow males and six yellow females from other localities). Essentially the same yellow pattern occurs in a number of species, with or without another color phase, such as *aurocinctus*, *graphipterus*, *imitator*, *lacordairei*, *laetus*, and *pruinus*.

The type of *decoratus*, which I dissected, is not a male as Günther stated, but a female, and has the beak virtually impunctate and lacking the little angles behind the peduncle. These angles are present in the male only and are found also in males of *amoenus* and *condylus*. Günther did not mention the angles, but they are present in his male cotype from Santa Inez.

One male and two females were dissected.

***Metamasius incisus* Vaurie, new species**

Plate 12, figure 3; text figures 11, 32

TYPE MATERIAL: Type, male, Jatun Yacu, Rio Napo watershed, Ecuador, February 16, 1937, Clark-MacIntyre, collector, in the American Museum of Natural History; three paratypes from Ecuador, as follows: a male, Mera, October, 1956, R. W. Portman, collector, in the University of Idaho, Moscow, and two females, El Partidero, November 14 and 27, 1935, W. MacIntyre, collector, in the American Museum of Natural History; two paratypes from Rio Santiago, Peru, Bassler collection: a male, December 2, 1924, in the American Museum of Natural History, and a female, October 20, 1930, in the British Museum (Natural History).

DIAGNOSIS: Differing from other species of

genus, except possibly for *pruinus*, by having outer front edge of mesepimeron strongly emarginate. Similar in large size, shape, under side, and conical tufted pygidium to *imitator*, but differing in color (black, with tumid red spots, not mostly yellow or reddish), and by having apices of elytra conjointly rounded, beak somewhat stouter, and apex of aedeagus sinuate, not truncate.

RANGE: The Jatun Yacu River, a tributary of the Napo River, in northeastern Ecuador south to the Santiago River in northwestern Peru.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 17 mm. Peduncle shallowly but broadly sulcate, sides subparallel; rounded in profile. Beak very slightly longer than pronotum, slightly arcuate in basal four-fifths, thence strongly bent downward at apex, slightly compressed; in profile narrowing gradually to apex, sides under scrobe slightly sinuate, but not toothed; in dorsal view, basal dilation sharp, almost twice as long as wide; densely, coarsely punctate in about basal half, sparsely punctate in part of apical half, impunctate at apex; scrobe with posterior edge twice width of scape from eye; irregular fovea between scrobe and eye. Antennal club with spongy apex rather pointed, less than one-half of whole. Pronotum as wide as long, parts of median stripe and of two vague lateral stripes impunctate, but sides and most of base and apex with large, "dusty" punctures, sides sloping gently to apex; basal depression broad, shallow, but distinct; base sinuate at middle, basal line covered by base of elytra. Elytra, intervals with single row of punctures, bases of second and third intervals very slightly turned toward, and advanced in front of, scutellum; third, fourth, and fifth intervals slightly wider at base than other intervals; striae punctures distinct, larger than those of intervals; apices conjointly rounded. Pygidium behind apex with distinct, conical tubercle under tuft of hairs, tubercle in dorsal view hiding apex of pygidium.

Under side well punctate, very densely so on prosternum; distance between front coxae slightly wider than antennal funicle, between middle coxae about two-thirds of diameter of coxa; prosternum between coxae

with sharp, conical projection visible in profile, behind coxae truncate, flat; mesosternal process and front of metasternum tumid; mesepimeron large, arcuate in front, its front outer corner emarginate (text fig. 11); last segment of abdomen slightly depressed at apex. Tarsus dorsally tomentose, not shining. Aedeagus truncate at apex, but apex produced at center into small "knob" (text fig. 32). Eighth tergum rounded-truncate.

COLOR OF TYPE: Surface pruinose, black, but pronotum and scutellum with faded, greenish yellow coating and elytra with faint red stripes showing through at random under coating; each elytron, in addition, with two bright, yellow-orange, elevated spots, a large oblong one on sides (eighth interval) behind humerus, and a tiny, roundish one on fourth interval at subapical callus; base of fifth interval vaguely red.

VARIATION FROM TYPE: The size ranges from 13 to 18 mm. The color is essentially the same in all six specimens, although in two the pronotum is blackish and the surface is rubbed or greased; and in one of the males from Ecuador (Mera), a basal spot on the fifth interval of the elytra is distinct and bright red (it is vague and dark red in the type). The females differ from the males by having the beak evenly arcuate and cylindrical, less punctate, and with the apical half or two-thirds virtually impunctate; one female (Rio Santiago) has the beak of the same length as the pronotum. The eighth tergum

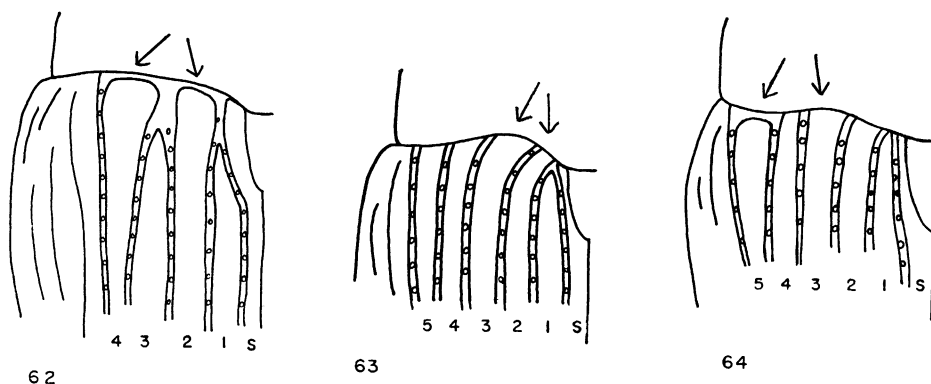
of the female is broadly rounded to the apex, and the prosternum between the front coxae has only a tiny swelling. In two paratypes the center of the peduncle under the beak appears to be filled in, or perhaps it is merely worn smooth; in any case there is no visible sulcus; in two paratypes the sulcus is wider at apex.

ECOLOGY: No information.

REMARKS: The emarginate mesepimeron (text fig. 11), which differentiates this species from all others except *pruinosis*, is entirely on one plane, whereas in *pruinosis* it is turned backward (or upward) and is less strongly emarginate. The projecting metasternum (text fig. 70) of *pruinosis* differentiates that species at once from *incisus*.

The black elytra, with the red streaks showing through in varying degrees, are very similar to those of the black phase of *ohausi* Günther, but *incisus* differs by lacking the orange humeral spot, by having only a vague mark on the eighth interval subapically, and on the fifth interval basally, and by having the basal striae straight, not distorted around the colored spot or spots. It is interesting that *ohausi* has also a phase with the elytra virtually entirely yellow and quite similar to the elytra of *imitator*, a species I thought at first to be conspecific with *incisus*.

The small knob or projection at the apex of the aedeagus is similar to that of *benoisti* Hustache, a species of group I. No other species of group III has such a distinct knob,



FIGS. 62-64. Diagram of base of left elytron of *Metamasius*, showing enlarged or twisted intervals and numbering of intervals. 62. *M. ohausi*. 63. *M. pallisteri*. 64. *M. imitator*.

although a trace of sinuation is present in a few species (*circumjectus*, *lacordairei*, *pruinatus*, and *venezolensis*).

This species differs further from *sinuatus* and *ornatus* by having more widely separated front and middle coxae and the spots of the elytra in different places.

The sulcus of the peduncle of *incisus* and *imitator* is more like that of the species of the *spinolae* subgroup than it is like that of the majority of species of the present subgroup.

All three males and two of the females were dissected.

***Metamasius imitator* Vaurie, new species**

Plate 12, figure 4; text figure 64

TYPE MATERIAL: Type, male, Rio Santiago, Peru, November 21, 1924, Bassler collection, and two female paratypes, same locality, December 2, 1924, in the collection of the American Museum of Natural History; one male paratype, Tarapoto, Peru, May to August, 1886, M. de Mathan, collector, in Muséum National d'Histoire Naturelle, Paris.

DIAGNOSIS: Most similar to *incisus*, differing in color pattern and mesepimeron as shown below in description. Elytra almost exactly same color pattern as that of yellow phase of *ohausi*, but yellow humeral spot lacking in *imitator*, and fourth interval at base narrower, not wider, than adjacent intervals (text fig. 64).

RANGE: North-central Peru.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 17 mm. Peduncle as described for *incisus*. Beak about one-sixth longer than pronotum, evenly arcuate, slightly compressed, in profile narrowing gradually to near apex, where slightly wider again; remainder of beak, also antennal club, as described for *incisus*. Pronotum as described for *incisus*, but punctures surrounded by yellowish ring and some punctures confluent. Elytra and pygidium as described for *incisus*, but each elytron with third and fifth intervals at base wider than fourth interval, and elytral apices separately rounded.

Under side and tarsus as described for *incisus*, except for mesepimeron which is oblique but not emarginate on front outer

edge, and for prosternum behind coxae which is more prominent, less truncate. Aedeagus truncate at apex. Eighth tergum rounded-truncate.

COLOR OF TYPE: Surface pruinose, pronotum velvety brownish green, scutellum coated and brownish; elytra in great part yellow, with an oblong, small, black spot on disc at middle of second interval and similar spots at bases of all intervals except for sutural, third, and fifth intervals; apex of elytra with black lineolate marks, those of seventh, eighth, and ninth intervals longer than others, extending from apex to middle of elytra, but leaving yellow spot at apex of eighth interval, spot not visible in dorsal view.

VARIATIONS FROM TYPE: The size of one paratype is 18 mm. The color pattern differs only by being red in one of the paratypes instead of yellow. The females differ by having no widening of the profile of the beak toward the apex, the beak virtually impunctate except over the scrobe, the prosternum only slightly tumid between the front coxae, and the eighth tergum broadly rounded to the apex. One paratype has the basal depression of the pronotum deeper and larger than that of the type.

ECOLOGY: No information.

REMARKS: This species seems to mimic *incisus* in all characters, except for the mesepimeron, prosternal process, aedeagus, and coloration, and to mimic *ohausi* (taken also on the Rio Santiago, Peru) in the color pattern of the elytra, even to having the colored parts red in one specimen, but yellow in other specimens. A male of *incisus* (the black phase with red marks) and a female of *imitator* (yellow with black border) were collected on the same date at Rio Santiago, and I considered these at first to be the same species. Champion's *ornatus* has been collected also at the same locality. It differs from *imitator* in a number of characters (subcontiguous front coxae; narrowly separated middle coxae; truncate elytral apices; convex, not conical, pygidium; and elytral pattern).

The pygidium of both *imitator* and *incisus* is more abruptly conical than that of *amoenus* or *rectistriatus*.

All four specimens were dissected.

***Metamasius personatus* Vaurie, new species**

Text figures 54, 55

TYPE MATERIAL: Type, female, Bugaba, Panama, Champion, collector, in the British Museum (Natural History), and one female paratype, Orosi, Costa Rica, 1500 meters, Fassl, collector, in the Staatliches Museum für Tierkunde, Dresden.

DIAGNOSIS: Black, with tumid orange spots on elytra; superficially resembling *spurius*, *ornatus*, and *sinuatus*, but differing from them by having more widely spaced middle coxae, antennae inserted close to eye, and no orange marks on humerus. Differing from all of subgroup by having abundant long hairs under beak from base to about apical third. Male not known.

RANGE: Costa Rica and Panama.

DESCRIPTION OF TYPE, FEMALE: (See p. 199 for common characters of subgroup). Length, 12 mm. Peduncle shallowly, broadly sulcate; in profile horizontal. Beak scarcely longer than pronotum, arcuate, cylindrical; in profile with two blunt tubercles under base; in dorsal view, basal dilation sharp, longer than wide; inferiorly with double row of yellow hairs from base to about apical third, hairs about as long as second segment of antennal funicle; scrobe with posterior edge distant from eye by width of scape; triangular fovea in front of eye; beak virtually impunctate except for coarse, dense punctuation of basal dilation. Antennal club with spongy apex more than one-half of club. Pronotum at least as wide as long, finely punctate; sides parallel in basal half, whence oblique to apical constriction; basal impression shallow, basal margin slightly sinuate and margined at middle, but sides covered by base of elytra. Elytra, sides strongly convergent from base to apex; intervals flat, straight at base; base of second and third intervals slightly advanced onto pronotum; striae punctures very fine, separated; apices separately rounded. Pygidium rather acuminate, vaguely convex, with tufts of denser hairs each side of apex.

Under side finely punctate; distance between front coxae twice width of antennal funicle, about one-third of diameter of coxa, between middle coxae almost equal to diameter of coxa; prosternum between coxae

flat, behind coxae truncate, rather prominent; mesosternal process flat, front of metasternum convex; last segment of abdomen with tiny depression at extreme apex; mesepimeron with front border gently arcuate, outer border truncate. Eighth tergum with apices bidentate, separately acuminate.

COLOR OF TYPE: Surface pruinose except for shining beak and tarsi; color blackish gray with, on elytra, elevated, embossed orange spots in oblique stripes (text fig. 54) from below humerus across to second interval near apex. Striae sinuate or distorted around colored spots.

VARIATIONS FROM TYPE: The paratype is a little longer (13 mm.) than the type, and lacks all but three of the orange spots, having only those on the ninth, eighth, and fourth intervals (text fig. 55). This specimen is rather greased, so appears more black than gray.

ECOLOGY: No information.

REMARKS: The only other species of the genus with such abundant subrostral hairs are *cinnamominus* (Perty) and *peruanus* Hustache of species group I, but abundant hairs are found in species of *Rhodoabaenus* (*nawradii* complex). Whether the male of *personatus*, like the males of the other species mentioned, will prove to have hairs will be of interest. Both sexes of *miniatopunctatus* have some hairs, but in the 26 specimens examined the hairs are sparse and short and in some specimens not visible. Further differences between this species and *miniatopunctatus* are that the former has the elytral spots distinctly tumid and the striae distorted around them, no velvety areas, the eighth tergum bidentate, not separately rounded, and the apices of the elytra separately, not conjointly, rounded.

Champion (1910, p. 94) included the type of *personatus* in his original series of *ornatus*, explaining that it lacked the humeral spot of the elytra and differed by having the "rostrum shallowly grooved and ciliate beneath." He thought the hairs might be due to the fresher condition of the specimen. Actually, there are as many differences between *personatus* and *ornatus* or *sinuatus* as there are between it and *miniatopunctatus* (intercoxal space, subrostral hairs, eye fovea, peduncle, apex of club, pronotal depression, pygidium, elytral pattern).

It may be unwise to describe this species on the female only, but it seems quite distinctive, and I am almost certain that the male, when found, will have the aedeagus similar to that of other species of group III.

Both females were dissected.

Metamasius spurius Vaurie, new species

Plate 13, figure 4

TYPE MATERIAL: Type, male, Balzapamba, Ecuador, R. Haensch, collector, in the Zoologisches Museum, Berlin.

DIAGNOSIS: Differing from other dark species with tumid, orange elytral spots pushing into and distorting adjacent striae, by having large spot (size of scutellum) on second interval of each elytron at about level of apex of scutellum, as well as additional spots. Prosternum between front coxae wider than that of most species of subgroup.

RANGE: Known only from the type locality in western Ecuador.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 12 mm. Peduncle vertically bilamellate at apex, in profile strongly angular and prominent. Beak about as long as pronotum, strongly arcuate, cylindrical, coarsely punctate around base, remainder finely punctate; in dorsal view, basal dilation sharp, about twice as long as wide, median impressed line deep; scrobe with posterior edge distant from eye by slightly more than width of antennal club; no fovea in front of eye. Antennal club with spongy apex nearly one-half of whole. Pronotum no longer than wide, but appearing longer; uniformly finely punctate, but impunctate at middle; sides subparallel from base to near apex where arcuate to apex (mechanical injury has apparently caused retraction of front of pronotum, as if head had been pushed into pronotum); basal depression deep, transverse; basal margin sinuate at middle. Elytra, intervals impunctate, second and third at base turned strongly toward scutellum, third interval wider at base than other intervals, parts of second and fourth enlarged around tumid colored spots; striae punctures distinct, well separated; apices conjointly rounded. Pygidium rounded-truncate, fringed with hairs at apex and with slight median ridge.

Under side and femur well punctate; dis-

tance between front coxae as wide as antennal club, or one-half of diameter of coxa, between middle coxae two-thirds of diameter of coxa; prosternum between coxae very slightly tumid, behind coxae truncate, flat; mesosternal process strongly tumid, front of metasternum flat, center of metasternum deeply concave; last segment of abdomen depressed near apex; mesepimeron with front border gently arcuate, outer border truncate. Aedeagus and eighth tergum emarginate, center of apex of aedeagus transparent, without sclerotized border.

COLOR OF TYPE: Black, with seven large, rather tumid, orange spots on each elytron, two on second interval before and behind middle, one on fourth near middle, two adjacent spots on eighth and ninth intervals near base, and two fused on shoulder; discal spots distorting striae and intervals. Faint suffusion of red, stronger when wet, connecting discal spots.

ECOLOGY: No information.

REMARKS: Probably another color phase of this species exists, as shown by the red suffusion mentioned above. This single specimen, however, differs from all others by having a large, tumid spot on the second interval near the apex of the scutellum, and emarginate apex of the aedeagus. The only other species with the aedeagus emarginate is *carinipyga*, which differs strikingly from *spurius* by having a large, conical protuberance on the front of the metasternum. Two species do have a spot on the second elytral interval (*bolivari*, *miniatopunctatus*), but it is a small, flat spot and is merged with two similar spots on the third and fourth intervals (pl. 12, figs. 5, 6). The peduncle of the postmentum of *spurius* differs from that of these two species by being strongly bilamellate in front and angular in profile; the antennae are inserted far from the eye in *spurius*, but close to it in *bolivari*. If this spot of *spurius* were found not to occur in additional specimens (and such happens in a number of species) *spurius* might then resemble in pattern *ornatus* or *sinuatus*, but it would differ from them by having the front and middle coxae more widely spaced. The widely spaced coxae agree quite well with those of *personatus*, a species known from the female only, and which also has tumid spots distorting the

elytral striae and intervals. However, *spurius* differs from *personatus* by having the mesosternal process tumid at the middle, not flat, the apices of the elytra conjointly, not separately, rounded, and the beak without hairs on the under side (the last may be a sexual character).

***Metamasius sinuatus* (Champion)**

Phyllerythrurus sinuatus CHAMPION, 1910, p. 93, pl. 4, figs. 23, 23a, Volcan de Chiriqui, Panama; lectotype, male, here designated from three original specimens in the British Museum (Natural History), examined.

DIAGNOSIS: Differing from quite similar *ornatus* by having oblique, tumid stripes of elytra reaching as far as apex on second interval, and humeral spot elongate, almost touching next spot in line. Sexes differing in punctuation of beak.

RANGE: Costa Rica and Panama. (For data on the 10 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 15 to 17 mm. Peduncle vertically bilamellate at apex; in profile angular and prominent in male, and extending forward horizontally in female. Beak from one-fourth to one-fifth longer than pronotum, strongly arcuate, cylindrical; in dorsal view basal dilation sharp, that of male nearly twice longer than wide, but of female slightly longer than wide; median impressed line extending, in male, as keel to middle of beak; scrobe with posterior edge distant from eye by one and one-half to two times width of antennal club; no fovea in front of eye; beak of male densely, confluent punctate except for apical fourth or fifth, under side behind scrobe obsoletely toothed; of female virtually impunctate except for scrobal basal area or slightly beyond. Antennal club with spongy apex one-half of whole. Pronotum about as wide as long, on sides densely, rather confluent punctate, punctures "dusty," but impunctate along broad median area; sides subparallel in basal half, tumid or slightly angulate before converging to apex; basal impression deep, distinct, more or less transverse, basal margin sinuate at middle, margined and furrowed at sides. Elytra as described for *circumjectus*, but stria punctures inconspicuous throughout and

striae themselves distorted or sinuate around raised colored spots; apices truncate. Pygidium rounded-truncate, with slightly tumid ridge subapically, apex hairy.

Under side densely punctate; front coxae virtually contiguous, separated by less than width of antennal funicle; distance between middle coxae only about one-third or one-fourth of diameter of coxa; prosternum between coxae with tiny, backward-pointed tubercle, behind coxae truncate, flat; front coxae of male produced on inner side as blunt tubercle; mesosternal process tumid at middle; front of metasternum flat or subconical; mesepimeron strongly or feebly arcuate in front, truncate on outer edge. Last segment of abdomen, in male, foveate at center of apex; in female, not depressed. Aedeagus truncate at apex, border wide. Eighth tergum of male slightly emarginate at apex, in female, apices separately rather pointed, but not bidentate.

Color black, surface pruinose, with eight separate, more or less elevated, red-orange spots on each elytron arranged one after another in oblique, rather sinuous stripe extending from humerus to apex of second interval; humeral spot and spots of inner intervals (second, third, and fourth) much longer than wide, but intermediate spots more or less square; striae sinuate around spots. Beak and venter reddish in one specimen.

ECOLOGY: No information.

REMARKS: This is one of the four or five species of group III that appear to be restricted to Central America. The specimens examined are quite uniform in all characters. One of each sex was dissected. (See also discussion of *ornatus*.)

***Metamasius ornatus* (Champion)**

Plate 13, figures, 13, 14

Phyllerythrurus ornatus CHAMPION, 1910, p. 94, pl. 4, figs. 25, 25a, type locality not specified; lectotype, male, Chontales, Nicaragua, here designated from five of original specimens from Nicaragua and Ecuador in the British Museum (Natural History), examined.

Cactophagus aurantiacus HUSTACHE, 1936, p. 89, Jarugui, El Napo, Ecuador; type, female, in Muséum National d'Histoire Naturelle, Paris, examined. New synonymy.

DIAGNOSIS: Similar to *sinuatus* in aedeagus, narrow width of intercoxal spaces, sinuate elytral striae around elevated colored spots, but differing by having subapical elytral spot of second interval in front of subapical callus, not at apex of elytra, and humeral spot short, not elongate. Sexes differing in punctuation of beak.

RANGE: From Nicaragua south to Colombia, Ecuador, Bolivia, Peru, and northern Brazil (For data on the 43 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 12 to 18 mm. Peduncle vertically bilamellate at apex where it extends forward horizontally, but apex in profile angulate. Beak, antennal club, and pronotum as described for *sinuatus*, but punctuation of pronotum finer in some specimens, and basal impression may be shallow. Elytra as described for *sinuatus* and *circumjectus*, stria punctures being conspicuous in majority of specimens. Pygidium, under side, aedeagus, and terga as described for *sinuatus*, except for last segment of abdomen of male which is not depressed.

Surface pruinose, color black, with variable red-orange elytral spots, those on disc so tumid as to force striae to be sinuous around them. Humeral spots present on all specimens, but other spots varying as follows: lectotype and some specimens from Central and South America with spots in oblique, sinuous stripe across each elytron (pl. 13, fig. 13); six specimens from Ecuador (Santo Domingo, Chimbo, Balzapamba) with subbasal spot of ninth interval lacking (not visible in dorsal view in any case), those from Chimbo lacking also spot on third interval, and additional spot present at apex of eighth interval; specimen from Panama lacking alternate spots (pl. 13, fig. 14); majority of specimens from South America, including type of "*aurantiacus*," with only two or with three dorsal spots. Several specimens red or reddish on body below.

ECOLOGY: No information.

REMARKS: Champion (1910, p. 94) wrote that this species "appears to be the low country form of *P.[hyllerythrurus]* *sinuatus*, but it cannot be treated as a variety of that insect, the fulvous spots (which are sometimes tumid and shining) being placed in a

different position." The spots also do not extend to the apex of the elytra in *ornatus* as they do in *sinuatus*. Other characters (see description above) are very similar.

In addition to the five or six different elytral patterns of *ornatus*, there are other individual differences. In some specimens the surface of the pronotum or elytra is rough and uneven; in some it is smooth owing to the pruinose coating; in several it is black and shining. A male from Pirri Range, Panama, has rather distinct but small subrostral teeth under the antennal scrobe, whereas some males show no trace of teeth. The male from Panama and a few other individuals have two additional rather vague and irregular depressions on the sides of the pronotum in front of the basal depression.

This species has been taken in some of the same localities in Ecuador and Peru as *incisus*. Those individuals of *ornatus* with only a few spots resemble specimens of *incisus*, but they differ from *incisus* by having the coxae more approximate, the mesepimeron not emarginate, and a humeral spot on the elytra. The humeral spot and the intercoxal space distinguish *ornatus* also from *rudeli* from Colombia and Ecuador, which differs further from *ornatus* by having the beak very feebly, not strongly, arcuate.

The type of Hustache's *aurantiacus* (a female from Jarugui, El Napo, Ecuador), which I have examined, is a specimen with only three dorsal spots on each elytron and two humeral spots; it is like the majority of specimens from South America, and I consider it a synonym of *ornatus*. The characters Hustache gives for his "♂ type" (=allotype?), which I did not examine, and for another male from "Napo" are the characters of the male of *ohausi* Günther, i.e., long hairs on the inner side of the front tibia, and the apex of the beak inferiorly angulate on each side, "*de chaque côté avec une petite dent*." He mentioned also the presence of a colored spot at the base of the fourth interval which is diagnostic of *ohausi*.

In Champion's original series there is also a different species. His female from Bugaba, Panama, is the new species described above as *personatus*, which differs from *ornatus* by having long hairs under the beak, no humeral spot on the elytra, the coxae more widely

spaced, and the antennae inserted close to the eye.

Five males and two females were dissected.

***Metamasius sanguinolentus* (Olivier)**

Curculio sanguinolentus OLIVIER, 1790, p. 473, "en Amérique, dans l'île de Tabago [Panama]"; probably no type exists; 1808, no. 83, pl. 10, fig. 116. CHAMPION, 1910, pl. 4, figs. 20, 20a.

DIAGNOSIS: Similar to *rubrovariegatus* and *mesomelas* in having red transversely across base of elytra, and front coxae virtually contiguous, with blunt swelling on their inner face, but differing by having third interval of elytra at base abruptly wider than adjacent intervals, and extremely bulbous and swollen. Sexes differing in punctuation of beak.

RANGE: From southern Mexico to Colombia. (For data on the 49 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 17 to 19 mm. (one only, 13 mm.). Peduncle broadly sulcate or vertically bilamellate. Beak slightly longer than pronotum, arcuate, cylindrical; in dorsal view, basal dilation sharp, much longer than wide; beak of male densely punctate except for tip, of female densely punctate on or slightly beyond scrobe, remainder impunctate; scrobe with posterior edge distant from eye of male by more than width of antennal club, of female by about width of club; no fovea in front of eye. Antennal club with spongy apex about one-half of whole. Pronotum slightly longer than wide, finely punctate; sides subparallel in more than basal half; basal impression very shallow, area in front of impression tumid, tumidity visible in profile in some specimens; basal margin strongly sinuate at middle, margined and furrowed to sides, but sides covered by elytra in many specimens. Elytra, third interval bulbous or swollen, advanced in front of scutellum, at base abruptly widened to twice width of adjacent intervals, so wide as to distort striae around it; intervals impunctate; striae punctures tiny, scarcely visible in some specimens; apices conjointly rounded. Pygidium narrowly rounded, at center rather tumid and hairy, but not abruptly ridged, extreme apex with hairy tufts on each side.

Under side well punctate; front coxae virtually contiguous, separated by less than width of antennal funicle; distance between middle coxae from one-half to two-thirds of diameter of coxa; prosternum between coxae with tiny, backward-pointed, tongue-like process, behind coxae truncate, flat; front coxae produced on inner side as blunt tubercle; mesosternal process and front of metasternum tumid, subconical; last segment of abdomen not depressed at apex; mesepimeron arcuate-angular in front, truncate on outer border. Aedeagus truncate at apex, with wide border. Eighth tergum of male slightly emarginate, of female with apices separately pointed but not bidentate.

Surface pruinose, color black, with slightly irregular basal red band on elytra, scutellum and sutural interval at base black.

ECOLOGY: According to the label on the specimen, a male from Limon, Costa Rica, in the collection of the United States National Museum, was captured on a palm leaf, in July.

REMARKS: This "*charanson sanguinolent*" of Olivier is the type species of Chevrolat's *Phyllerythrurus*. The species of that "genus," as Champion stated (1910, p. 90), were not characterized beyond the fact of having red bands on the elytra, and this species has already been classified by various authors in five genera (*Curculio*, *Calandra*, *Rhynchophorus*, *Sphenophorus*, and *Phyllerythrurus*). There are no type specimens for the majority of Olivier's species (Kuschel, 1955, p. 267), but Olivier's colored illustration of *sanguinolentus* leaves no doubt as to its identity. It is, however, very similar to *rubrovariegatus*, differing as stated in the Diagnosis, and also by having only one red band on the elytra, the pronotum black, without any red, the apical collar of the pronotum less constricted, and the apical border of the aedeagus flat, not somewhat sunken. The peduncle of both these species appears similar, in the majority of specimens, to that of *spinolae*, i.e., more broadly sulcate in front than behind, with the apex rounded, and the peduncle rounded in profile, but in several specimens the peduncle is like that of *pulcherrimus*, *amoenus*, and others, i.e., either strongly emarginate in front, without being sulcate behind, or vertically bilamellate.

Five males and one female were dissected.

***Metamasius rubrovariegatus* (Bovie)**

Text figure 65

Cactophagus rubrovariegatus BOVIE, 1907, p. 328, Brazil; type, male, in the United States National Museum, examined.

Phyllerythrurus quadrinotatus CHAMPION, 1910, p. 92, pl. 4, figs. 21, 21a, type locality not specified; lectotype, male, Chiriqui, Panama, here designated from four original specimens from Panama and Costa Rica in the British Museum (Natural History), examined. New synonymy.

DIAGNOSIS: Scarcely differing from *sanguinolentus*, but having two red bands on elytra instead of one band, pronotum usually marked with red, not entirely black, and both third and fourth elytral intervals swollen at base, not just third interval. Sexes differing in punctuation of beak.

RANGE: Costa Rica and Panama; Brazil (type specimen only). (For data on the 11 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 18 to 24 mm. Peduncle broadly sulcate, rounded in front. Beak and antennal club as described for *sanguinolentus*, but basal dilation of beak of male nearly three times longer than wide, and posterior edge of scrobe in both sexes even farther away from eye. Pronotum as described for *sanguinolentus*, but basal depression deep, and apical constriction

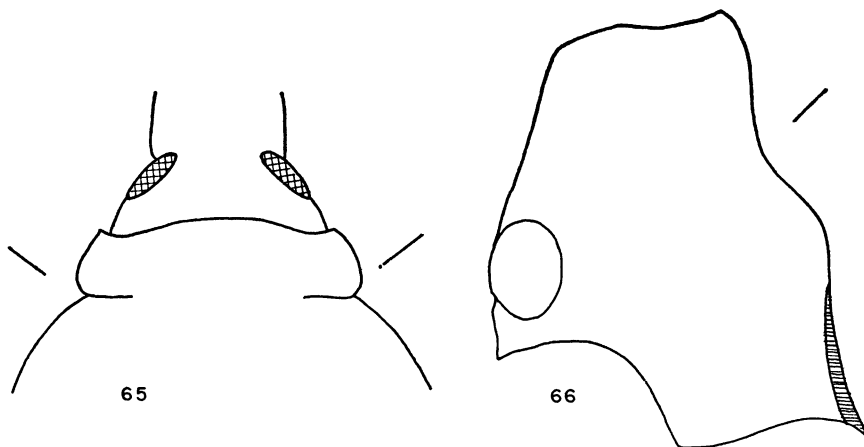
strongly marked, cutting in on sides (text fig. 65). Elytra and pygidium as described for *sanguinolentus*, but both third and fourth intervals of elytra swollen and of same width, third interval not distorting striae, and pygidium with hairs across apex. Under side, aedeagus, and eighth tergum of female as described for *sanguinolentus*; eighth tergum of male truncate at apex.

Surface pruinose or shining; color black, with red marks on elytra as follows: transverse basal band interrupted at sutural interval and scutellum, both of which are black, band forked at sides; transverse subapical band, not forked. Pronotum entirely black, or black with two oblique, separated, red stripes from front near center to middle of sides, or black with subapical red band.

ECOLOGY: No information.

REMARKS: Although described from Brazil, this species appears to be chiefly Central American. I question the locality of Brazil, but it may be correct, as there exist several single records of "Brazil" for a number of species known chiefly from Central America.

Bovie's brief description of his unique type of *rubrovariegatus*, which I have examined, could apply to other large, red-banded species except for his mention of three red bands, not two or one (three bands, including the pronotal band). The lectotype of Champion's *quadrinotatus* has no red on the pronotum, but two of his other specimens had red. I have



FIGS. 65, 66. Pronotum of *Metamasius*. 65. Apex, dorsal view, of *M. rubrovariegatus*, showing constriction. 66. Profile view of *M. aurofasciatus*, showing double sinuation.

examined Champion's specimens and consider them synonymous with *rubrovariegatus*. One of each sex was dissected.

***Metamasius mesomelas* (Champion)**

Text figures 20, 21

Rhodobaenus mesomelas CHAMPION, 1910, p. 121, pl. 6, figs. 1, 1a, type locality not specified; lectotype, male, Chiriqui, Panama, here designated from seven original specimens from various countries in the British Museum (Natural History), examined.

DIAGNOSIS: Similar in red markings to *sanguinolentus*, but differing from it and from *rubrovariegatus* by being narrower, more elongate, by having all intervals of red elytral band flat, not swollen, and by having pygidium abruptly, sharply carinate. Sexes differing in peduncle of postmentum.

RANGE: Veracruz in southern Mexico south to Colombia and Ecuador. (For data on the 13 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 16 to 18 mm. Peduncle narrowly vertically bilamellate, appearing slightly sulcate; of male tipped forward and showing in profile as acute, triangular prominence; of female horizontal, extending forward. Beak as described for *sanguinolentus*, but basal dilation of male nearly three times longer than wide, and posterior edge of scrobe even farther from eye in both sexes. Antennal club with spongy apex less than one-half of whole. Pronotum distinctly longer than wide, finely punctate, at least on disc; sides subparallel in basal half; basal depression distinct, transverse; basal margin sinuate at middle, furrowed and margined to sides. Elytra, intervals impunctate, slightly more convex at base in red areas than remainder of intervals where black, but intervals not bulbous; second and third intervals slightly turned toward scutellum, but not advanced in front of it; stria punctures not visible in many specimens; apices conjointly rounded. Pygidium truncate at apex, abruptly keeled at middle of apex, forming obtuse angle in profile view, keel and apex hairy.

Under side and aedeagus as described for *sanguinolentus*, but last segment of abdomen of male shallowly depressed at apex. Eighth

tergum at apex rounded in male, apices conjointly rounded in female.

Surface pruinose, color black, except for red band in basal third or fourth of elytra, band interrupted at scutellum and in some specimens with black spot near humerus.

ECOLOGY: No information.

REMARKS: Although described as belonging to *Rhodobaenus*, this species lacks the excavated tarsal claw segment of the majority of species of that genus, and it lacks the narrow, subparallel scutellum of *R. plicatus* and others. It seems to me to belong with *Metamasius*. The male has the peduncle of the postmentum quite similar in profile (text fig. 20) to the acute, triangular peduncle of males of *M. maculiventris* and *liratus* of species group I; the peduncle is narrowly sulcate in front, although Champion (1910, p. 122) thought it was "narrow and not sulcate." I have seen specimens of *mesomelas* in collections misidentified as *sanguinolentus* and *aurofasciatus*, both of which are large and black and have a basal red band on the elytra. The pygidium is strongly carinate as in species of the *aurofasciatus* subgroup.

A male from Costa Rica in the United States National Museum of the Smithsonian Institution has two additional depressions on the pronotum on each side of the center in front of the basal depression. These depressions are small and indistinct, as they are also in several specimens of *ornatus* Champion, not deep and round as is characteristic of the species of the *graphipterus* subgroup. The antennal scrobe on the male mentioned appears to be farther front than normal, being at about the basal third of the beak. The "bluish-grey-pruinose" apical portion of the elytra described by Champion is not evident in some of the specimens I have examined; perhaps this is a kind of bloom which wears off.

Two of each sex were dissected.

***Metamasius elegantulus* Hustache**

Plate 13, figure 9; text figures 28, 35, 52

Metamasius elegantulus HUSTACHE, 1936, p. 105, Brazil; type, female, in Muséum National d'Histoire Naturelle, Paris, examined.

DIAGNOSIS: Similar to *rubricatus* in several respects, but differing from all species in that elytra are purplish, with velvety dark

patches; characterized further by having antennal club barrel-shaped, with tiny, spongy apex (text fig. 52), third interval of elytra widened and elevated, and beak of male foveate and hairy in front of scrobes.

RANGE: Central Ecuador and eastern and southern Brazil. (For data on the nine specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 11 to 15 mm. Peduncle vertically bilamellate, profile of male sharply angular and prominent, of female horizontal, extending forward. Beak as long as pronotum, slightly arcuate, cylindrical; in dorsal view basal dilation feeble, longer than wide; scrobe with posterior edge one scape width from eye; fovea between scrobe and eye in some specimens; beak of male punctate densely throughout, sides in front of scrobe with elongate, depressed area with long, curling hairs emerging, of female finely punctate at or slightly beyond base, apex virtually impunctate. Antennal club narrow, sides subparallel, not dilated, not more than twice wider than apex of funicle, spongy part barely visible from sides, about one-fifth of length of whole. Pronotum slightly longer than wide, well punctate; sides subparallel in basal third or less; base at center broadly depressed, base margined and sinuate at middle, hidden at sides under base of elytra. Elytra, intervals with row of distinct, large punctures (not visible in every specimen), third interval at base strongly widened, elevated, and advanced in front of scutellum onto pronotum, second and third intervals at base turned toward scutellum, fourth and fifth intervals depressed at base; striae punctures distinct; apices separately rounded. Pygidium rounded-truncate, with median ridge more tumid at middle than at apex, ridge and apex hairy.

Under side well punctate; distance between front coxae equal to width of last antennal funicle (but narrower in one male), between middle coxae about two-thirds of diameter of coxa; prosternum between coxae flat, behind coxae truncate, flat; mesosternal process flat; front of metasternum tumid, subconical; mesepimeron with front border obtusely angulate, outer border truncate; last segment of abdomen with small, sparsely hairy,

transverse or round depression at extreme apex. Front femur slightly clavate. Second segment of tarsus as wide as long, tarsi dorsally heavily tomentose. Aedeagus (text fig. 28) with apex truncate, border narrow. Eighth tergum of male emarginate at apex, of female with apex bidentate (text fig. 35).

Surface pruinose, color of beak and head reddish, of dorsum grayish, reddish, or purple, with black or deep brown, large, velvety patches, patches on some specimens edged with white or reddish.

ECOLOGY: No information.

REMARKS: Velvety patches or spots occur in several other species (*miniatopunctatus*, *pruinus*, *carinipyga*, and *viduus*), but not with the same pattern as those of *elegantulus*. This species seems to me to be most closely allied to *rubricatus* Hustache, although Hustache considered them to be in different genera (see Diagnosis of *rubricatus*). The spongy apical part of the antennal club is even smaller than that of *rubricatus* and of a different shape. Other species with the spongy apex small (*limulus*, *pulcherrimus*, *strigosus*, and the three species of the *graphipterus* subgroup) are also rather atypical in some characters, and they differ in turn from *elegantulus*. The tergum of the female (text fig. 35) is bidentate, as in *circumjectus*, *lacordairei*, and others.

This is the only species of group III that is known to occur as far south as the state of Santa Catarina in Brazil, but five or six species of groups I and II occur that far south. It would be interesting to know what kind of plant or tree this weevil feeds on, as the localities where it has been taken are so widely separated, i.e., southern Brazil, and Ecuador on the upper part of the Rio Santiago (Brown, 1941).

One of each sex was dissected. The type was not dissected, but the fine punctures of the beak and the horizontal peduncle show it to be a female.

***Metamasius rubricatus* (Hustache)**

Text figure 50

Cactophagus rubricatus HUSTACHE, 1936, p. 88, St. Laurent du Maroni, French Guiana; type, female, in Muséum National d'Histoire Naturelle, Paris, examined.

DIAGNOSIS: Similar to *elegantulus* in hav-

ing small spongy area of antennal club, short second segment of tarsus, drooping, angular, bilamellate peduncle under beak of male, and overlapping of base of pronotum by elytra, but differing by having red elytra without definite pattern or velvety marks, more abrupt pronotal depression, antennal club of different shape (text fig. 50), no lateral hairs on beak of male, and eighth tergum of both sexes of different shape.

RANGE: Ecuador, French Guiana, and northern Brazil. (For data on the 12 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 10 to 12 mm. Peduncle of male vertically bilamellate, in profile angular and prominent, of female emarginate in front, broadly, shallowly sulcate behind, in profile horizontal, flat. Beak longer than pronotum, scarcely arcuate, cylindrical; notably thicker in male than in female; in dorsal view, basal dilation feeble, longer than wide; scrobe with posterior edge distant from eye by about width of scape; no fovea between scrobe and eye; beak of male densely punctate throughout, of female virtually impunctate. Antennal club scarcely dilated, more or less conical, narrow; spongy apex less than one-fourth of whole, scarcely visible in some specimens. Pronotum slightly longer than wide, apparently impunctate; sides gently arcuate or oblique to apex; basal depression deep, transverse; base strongly sinuate at middle, margin hidden laterally under base of elytra. Elytra, intervals impunctate; bases of second, third, and fourth intervals convex, advanced strongly in front of scutellum onto pronotum, fifth interval depressed at base, third widest, second and third intervals turned slightly toward scutellum; apex of second and sutural intervals elevated; striae punctures distinct; apices truncate. Pygidium as described for *elegantulus*, but ridge present at apex only.

Under side with punctures not evident (muddy in type); distance between front coxae about one and one-half times width of antennal funicle, between middle coxae about two-thirds of diameter of coxa or less; prosternum between coxae flat, behind coxae truncate, flat; mesosternal process and front of metasternum tumid in type, but flat in some specimens; mesepimeron with front border

arcuate-angulate, outer border truncate; last segment of abdomen slightly depressed near apex. Tibia of male slightly curved, of female straight. Second segment of tarsus nearly as wide as long, tarsi dorsally tomentose. Aedeagus truncate at apex, border narrow. Eighth tergum of male truncate, of female rounded, that of female lacking usual median impressed line at apex.

Color dark red, with or without black on apex of scutellum, on entire scutellum, on pronotum in three stripes, on elytra in short discal mark on second interval.

ECOLOGY: No information.

REMARKS: This is the only species of group III, except for *strigosus*, reported from French Guiana. The small size, red coloration, and deeply transversely indented base of the pronotum might lead one to identify this species with the genus *Rhodobaenus*. It is certainly different from many other species of *Metamasius*, but it nonetheless shares its unusual characters with several other species. Thus the small spongy area of the club is found also in specimens of *elegantulus*, *limulus*, and *strigosus*, and the three species of the *graphipterus* subgroup; the humped and forward-produced intervals of the elytra are found in *elegantulus*, *limulus*, *pallisteri*, and several other species; the curved tibia of the male occurs in *inaequalis* of group II and in *miniatopunctatus*. The shield-shaped scutellum occurs in *limulus* and *strigosus*. These two species differ from *rubricatus* by having the peduncle of a different shape, the apices of the elytra separately rounded, not truncate, and the sexes virtually alike. From the females of *rubricatus*, and a few, but not all, females of *strigosus*, and the single female of *bolivari*, the impressed median line of the eighth tergum is lacking. The tarsal claws seem proportionally shorter in *elegantulus*, *rubricatus*, and *strigosus* than in other species.

Two males and six females were dissected.

Metamasius strigosus (Erichson)

Plate 13, figure 11; text figure 51

Sphenophorus strigosus ERICHSON, 1847, p. 137, Peru; type, female, in Zoologisches Museum, Berlin, examined.

DIAGNOSIS: Red or yellowish, with long and short black stripes on elytra as in small species of *Rhodobaenus*; antennal club with

spongy apex very small as in *rubricatus*, *limulus*, and *elegantulus*, club slightly askew, with sides of unequal length as in *limulus* (text fig. 51), latter differing from *strigosus* in elytral pattern and beak. Peduncle not bilamellate; elytral apices separately rounded; beak very long; sexes virtually alike.

RANGE: River valleys of northeastern Peru to northwestern Brazil, east to French Guiana. (For data on the 17 specimens examined, see Appendix.)

DESCRIPTION: (See p. 199 for common characters of subgroup). Length, 9.5 to 14 mm. Peduncle not broadly sulcate or vertically bilamellate, but with tiny apical tubercle which is sulcate in front, tubercle rather flattened in female, peduncle in profile angulate in front. Beak of male one and one-half times length of pronotum, of female only slightly less; feebly arcuate, cylindrical; in dorsal view, basal dilation feeble, that of male longer than wide, of female scarcely longer; scrobe with posterior edge close to eye or separated by width of scape; vague, elongate fovea present in some males in front of scrobe; finely, sparsely punctate; under side of beak smooth or with sulcus widening toward apex, sulcus stronger in male. Antennal club dilated more obliquely on one side, spongy apex only about one-sixth of whole, part of it barely visible in profile. Pronotum scarcely longer than wide, sparsely punctate or impunctate; sides gently arcuate to apex; basal depression shallow, vaguely transverse, or lacking; basal margin hidden laterally under base of elytra. Elytra with intervals impunctate; third and fourth intervals at base wider than other intervals, second, third, and fourth turned slightly toward scutellum and advanced onto pronotum, second interval at apex rather tumid in some specimens; striae punctures distinct; apices separately rounded. Pygidium rounded-truncate, with strong median ridge in about apical half, ridge in about apical half, ridge and apex hairy.

Under side well punctate; distance between front coxae equal to width of last segment of antennal funicle, or about one-sixth of diameter of coxa, between middle coxae about two-thirds of diameter of coxa; prosternum between coxae flat or slightly swollen or tuberculate, behind coxae truncate, flat;

mesosternal process flat, front of metasternum tumid, subconical; mesepimeron with front border angulate, outer border truncate; last segment of abdomen with short, transverse, slightly hairy depression at apex. Second segment of tarsus longer than wide, tarsi dorsally shining. Aedeagus truncate at apex, border narrow as shown in text figure 28 of *elegantulus*. Eighth tergum of male slightly emarginate and with slight median longitudinal impression at apex, of female truncate.

Surface not shining; color chiefly orange-red (two specimens from Cayenne entirely reddish) with two broad black stripes on each side of center of pronotum; elytra (pl. 13, fig. 11) variable, but sutural interval usually darker red, first interval partially black, or entirely so, as in type, third to ninth intervals black apically, black spreading toward middle or base on outer intervals, fifth interval black in basal half in some specimens, including type. Type with bright orange on parts of eighth interval.

ECOLOGY: No information.

REMARKS: For comparison with the very similar *limulus*, see that species.

The long beak of *strigosus* is like that of females of *rubricatus*, whereas the male of *rubricatus* has a shorter, stouter, densely punctate beak and the antennae inserted farther from the eye. Some females of both these species differ from most females of the genus by lacking the normal longitudinal impression at the apex of the eighth tergum. In *strigosus*, however, the impression is absent only from the type and one of the six other females.

Superficially this species resembles *laetus* in general color, size, and subparallel elytra, but it differs from *laetus* by having the sponge of the club very small, no median black stripe on the pronotum, and the peduncle not at all bilamellate. Both species, as well as *limulus*, were collected in 1883 from the same locality, São Paulo de Olivença, in northwestern Brazil.

Two specimens from French Guiana are larger than other individuals (14 mm.), have no black markings, and have the bases of the elytra strongly scalloped, without a unified border. I believed that this species might be distinct, but one of two females from Rio Santiago, Peru, also has a suggestion of

scalloping, and another specimen from French Guiana is smaller and has no scalloping.

The elongated fovea at the base of the beak of some males is not readily visible; it is a slightly eroded impression of sunken punctures and has no long hairs emerging as have the males of *elegantulus*. The scutellum of some individuals is more shield-shaped than triangular, but it is distinctly wider than the base of the sutural interval in all the specimens examined.

Five males and seven females were dissected.

***Metamasius limulus* Vaurie, new species**

Plate 13, figure 12; text figure 51

TYPE MATERIAL: Type, male, Benjamin Constant, Rio Javari, Amazonas, Brazil, March, 1942, August Rabaut, collector, in the American Museum of Natural History, and four paratypes from Brazil: a female collected by Bates in the British Museum (Natural History); two males, "Sto. Paulo d'Oliveira" [=São Paulo de Olivença], Amazonas, May and June to July, 1883, M. de Mathan, collector, in Muséum National d'Histoire Naturelle, Paris, and one male, Benfica [=Bemfica] bei Belem, Para, October 23, 1962, C. Lindemann, collector, in Zoologische Staatssammlung, Munich.

DIAGNOSIS: Very similar to *strigosus* (same kind of antennal club, with lower edge oblique and spongy apex scarcely visible, same separation of elytral apices), but differing by having more black on elytra, their basal lobes stronger; shorter, stouter beak, and peduncle of postmentum not angulate in front (may be angulate behind). Sexes differing in prosternum and peduncle.

RANGE: Northwestern Brazil along the Amazon River to the east coast at Belem.

DESCRIPTION OF TYPE, MALE: (See p. 199 for common characters of subgroup). Length, 8 mm. Peduncle narrowly sulcate, but not vertically bilamellate, in profile mostly flat but slightly angulate behind. Beak one and one-fourth times length of pronotum, strongly arcuate, cylindrical; in dorsal view, basal dilation feeble, longer than wide; scrobe with posterior edge distant from eye by width of scape; no fovea in front of eye; under side of beak sulcate in center, sulcus

widening toward apex; beak finely, sparsely punctate, virtually impunctate in apical part. Antennal club as described for *strigosus*. Pronotum slightly longer than wide, impunctate, sides oblique from base to apex; basal depression scarcely visible; basal margin covered by advancing sinuous lobes of elytra. Elytra with intervals impunctate, third interval at base wider than other intervals, second and third intervals turned toward scutellum and advanced onto pronotum; second interval strongly tumid at apex; striae punctures distinct; apices separately rounded. Pygidium as described for *strigosus*.

Under side well punctate; distance between front coxae slightly less than width of last segment of antennal funicle, or about one-eighth of diameter of coxa, between middle coxae about two-thirds of diameter of coxa; prosternum between front part of coxae tuberculate, behind coxae truncate, prominent; mesosternal process flat, front of metasternum slightly tumid; mesepimeron, abdomen, tarsi, and aedeagus as described for *strigosus*. Eighth tergum truncate at apex.

COLOR OF TYPE: Red, with two narrow oblique black stripes on each side of center of pronotum, black scutellum, and black on elytra as follows: on sutural intervals, at apex of second, third, fourth, and eighth intervals, on all of fifth, sixth, and last outer intervals, and on all but base of ninth interval (pl. 13, fig. 12). Under side and legs red, with vague black stripes on sides.

VARIATIONS FROM TYPE: One of the paratypes lacks the black sixth interval of the elytra; one has a distinct basal depression on the pronotum; one is 7 mm. long. The female has no tubercle or swelling on the prosternum and shows scarcely any angulation of the base of the peduncle when viewed in profile. The front of the metasternum is rather flat in some individuals, and the apex of the second interval of the elytra may be rather flat, not tumid. The eighth tergum of the female has slightly separated apices.

ECOLOGY: No information.

REMARKS: This species is like *strigosus*, *elegantulus*, and *rubricatus* in having a very small spongy apex to the antennal club (text figs. 50–52). It resembles *strigosus* and differs from the other two species by having the lower side of the club oblique, the peduncle

of the postmentum shallowly sulcate instead of vertically bilamellate, and by being generally elongate and more parallel-sided, not so fusiform.

The four species mentioned appear to have proportionally shorter tarsal claws than those of the majority of species, and all but *elegantulus* appear to have proportionally shorter hind tibiae in comparison with the length of the hind femora. Both *limulus* and *strigosus* at first sight resemble small red and black species of *Rhodobaenus*, even to the slightly backward-bent pronotum characteristic of some species of that genus, but they lack the excavated claw segment of small species of *Rhodobaenus*, and the scutellum, although rather parallel-sided, is much wider at the base than the base of the sutural interval.

SUBGROUP *PULCHERRIMUS*

Perhaps the three species of this subgroup should be included with those of the previous subgroup (*sanguinolentus*), as they have a rather similar peduncle. The apex of the peduncle, however, is not exactly lamellate in these three species, although it is deeply emarginate in front, but the sides of the apical emargination are not enlarged. The three species differ from other species by having an exceedingly short, very stout beak and from the majority of species of group III by having the antennae inserted very close to the eye. The females of *pulcherrimus* and *annulatus* (*xanthozona* is known from the male only) differ from those of all other species by having the eighth tergum deeply cut out basally and rather squat, not elongate (text figs. 33, 34). The tergum lacks the apical impressed line. Both *pulcherrimus* and *annulatus*, which seem to me very similar, were regarded by Champion (1910) as belonging in different genera, the former in *Cactophagus*, and *annulatus* in *Phyllerythrurus*, probably because of the different widths separating the coxae. Both species are reminiscent, in their short beaks and stout, roundish bodies, of *mosieri* of group I, a species differing by having the coxae even more widely distant than those of *pulcherrimus*, the femora short and bulbous, and the aedeagus with a lateral line.

As there are only three species, no summary of characters is given, but subsequent

species are compared in the descriptions to *pulcherrimus*.

Metamasius pulcherrimus (Chevrolat)

Text figures 25, 33, 49

Sphenophorus pulcherrimus CHEVROLAT, 1882, p. 579, Mexico; type, sex not established, in Naturhistoriska Riksmuseum, Stockholm, examined. CHAMPION, 1910, pl. 4, figs. 16, 16a, 17.

DIAGNOSIS: Characterized by short, stout beak (as shown in text fig. 42 of *annulatus*); large mandibles; deeply emarginate peduncle under apex of beak: small, spongy apex of antennal club; widely separated front and middle coxae, flat metasternum; compact, short body, and red and black coloration. Very similar to *annulatus*, which follows (see that species).

RANGE: Mexico (no exact locality) and Costa Rica. (For data on the six specimens examined, see Appendix.)

DESCRIPTION: Length, 11 to 14 mm. Peduncle deeply emarginate in front (text fig. 25), in profile straight or angulate. Beak (without mandibles) shorter than pronotum, nearly straight, very stout (lower edge not more than three times longer than beak is wide); cylindrical, but slightly flat on top apically; densely punctate in male, densely only around base in female; depression in front of scrobe in several specimens; in dorsal view, deep median line, basal dilation feeble; scrobe opening almost onto eye; longitudinal slit in front of eye. Antennal club rather elongate, slightly flattened, spongy part about one-third of whole (text fig. 49), scape nearly as long as lower edge of beak. Pronotum scarcely, if at all, longer than wide, sides in basal half slightly emarginate or straight; at base transversely depressed in some, but not in all, specimens; sparsely, finely punctate; base margined to sides, but sides may be covered by base of elytra, base scarcely sinuate at middle. Elytra about one-third longer than pronotum, sides convergent to apex; second and third intervals slightly bent inward toward scutellum in some specimens; intervals with single row of very fine punctures which are not visible in all specimens; striae punctures small or large, widely separated by many times their diameters; apices rather truncate. Scutellum broadly triangular, flat, as wide at base as third

and fourth intervals combined. Pygidium broadly rounded-truncate, with slight median apical ridge, no apical hairs.

Under side, including legs, entirely punctate, but more densely on some parts than others; distance between front coxae about equal to width of antennal club, one-third to one-fourth of diameter of coxa, between middle coxae nearly equal to diameter of coxa; mesosternal process and front of metasternum flat; prosternal process slightly tumid between and behind coxae and rather prominent behind, but not overlapping mesosternum; mesepimeron with front border arcuate; last segment of abdomen not depressed; ventral depression of male very slight. Middle and hind femora gradually widened, slightly emarginate on inner side before apex; inner side of front femur of male slightly curved; middle femur long, covering trochanter of hind legs; tarsus appearing dorsally tomentose, third segment widely dilated, spongy-hairy below, second segment almost as wide as long, first segment twice as long as second, claw segment scarcely longer than first, inserted near base of third. Aedeagus rounded or rounded-truncate at apex, with narrow border. Apex of eighth tergum of male truncate, hairy, of female more or less rounded and lacking impressed median line (text fig. 33).

Color black, with variable red or orange markings; pronotum may have extensive, red, crescentic band covering most of surface except for apex and base, in some specimens its center with tiny and round, or large and triangular, black mark, as in type specimen; or red band reduced, transverse, basal; elytra with narrow or broad, transverse or oblique red band slightly interrupted at suture in front of middle.

ECOLOGY: According to the label, a female from Mexico, found alive on June 7, 1956, in the stem of *Anthurium* (Araceae) by Williamson and Allen, was reared July 9. A male collected by Nevermann at Hamburg Farm, Costa Rica, in November, 1923, has two labels, one reading "in dried wood," and one "*Luehea seamanni*" (linden or Tiliaceae family).

REMARKS: (See also discussion of subgroup, above). Chevrolat described this species in *Sphenophorus* along with *orizabaensis*

and *callizona*, but later in his posthumous work (1885, p. 92) these species appeared in his new genus *Phyllerythrurus*, with *aurofasciatus* Brême and *sanguinolentus* Olivier. Apparently the red bands on the elytra were the only character linking these quite diverse species. Champion (1910, p. 88) regarded *pulcherrimus* as belonging in *Cactophagus*, even though it has the "anterior coxae separated by about half their own width" in contrast to other species of the "genus" which he (1910, p. 82) wrote had "narrowly separated anterior coxae." This species appears to be an intermediate one in *Metamasius*, with the peduncle, long femora, and aedeagus of the majority of species of group III, but the widely spaced coxae and flat metasternum of the majority of species of group I.

The beak, by actual comparison, is as thick, in this small species of 11 to 14 mm., as the beak in a large specimen of *spinolae* (21 mm.). The reared specimen mentioned above (under Ecology) has a proportionally longer beak than that of other specimens.

The sexes, as is true also for those of *annulatus*, are not well differentiated externally, except for the difference in the punctuation of the beak.

Two males and one female were dissected.

***Metamasius annulatus* (Champion)**

Text figures 29, 34, 42

Phyllerythrurus annulatus CHAMPION, 1910, p. 95, pl. 4, figs. 27, 28, 28a, type locality not specified; lectotype, female, Volcan de Chiriqui, Panama, here designated from original specimens from Panama and Costa Rica in the British Museum (Natural History), examined.

DIAGNOSIS: Very similar to *pulcherrimus*, but differing by having spongy apex of antennal club about one-half, not one-third, of whole, beak even shorter, second segment of tarsus longer than wide, not transverse, tarsi dorsally shining, not tomentose, and elytra usually with large, yellowish ring.

RANGE: Costa Rica, Panama, and Ecuador. (For data on the 33 specimens examined, see Appendix.)

DESCRIPTION: Length, 11 to 16 mm. Peduncle and beak as described for *pulcherrimus*, but no depression in front of antennal scrobe and lower edge of beak only about twice length of diameter of beak (text fig. 42).

Antennal club elongate, flattened, its spongy apex about one-half of whole, scape nearly as long as lower edge of beak. Pronotum as described for *pulcherrimus*. Elytra rather longer proportionally than those of *pulcherrimus*, sides less convergent to apex; intervals straight at base, appearing impunctate; stria punctures very small or not visible, widely separated by many times their diameters. Scutellum flat, either elongate-triangular, or broadly triangular like that of *pulcherrimus*. Pygidium as described for *pulcherrimus*.

Under side, including legs, entirely punctate, but more densely on some parts than on others; distance between front coxae about twice width of antennal funicle, or about one-fifth of one-fourth of diameter of coxa, distance between middle coxae less than diameter of coxa; mesosternal process and front of metasternum slightly tumid, subconical; prosternal process slightly or strongly tumid between coxae, less prominent behind than that of *pulcherrimus*; mesepimeron large, front border arcuate; last segment of abdomen not depressed; ventral depression of male slight. Middle and hind femora gradually widened, not emarginate; front femur straight within; middle femur reaching to trochanter of hind legs; tarsus dorsally shining, third segment widely dilated, second segment longer than wide, first segment slightly more than twice length of second, claw segment slightly longer than first and inserted near base of third. Aedeagus rounded at apex (text fig. 29), with suggestion of central projection in some specimens. Eighth tergum of male and female as described for *pulcherrimus*.

Color variable, black, with red or yellow markings as follows: majority of specimens from Central America, including lectotype, with two narrow oblique stripes on pronotum from apex (where touching or almost touching) to base or to under side at base, and elytra with narrow, somewhat elliptical, colored ring, or ring entirely filled with yellow that is darker, almost black, in some specimens because of black around elytral punctures. Several specimens from Costa Rica and specimens from Ecuador with elytral ring reduced to slightly oblique red band interrupted at suture or at middle of band.

ECOLOGY: According to labels on the speci-

mens, two males were found on leaves of palms or on young palms in April and May at Hamburg Farm, Reventazon, Costa Rica.

REMARKS: (See also discussion of subgroup above). The differences given in the Diagnosis between this species and *pulcherrimus* are the most constant ones, but there are other more relative differences. Thus the front of the metasternum of *annulatus* is rather tumid and subconical, whereas that of *pulcherrimus* is flat (but that of one specimen of *pulcherrimus* is slightly tumid). The aedeagus of *annulatus* has a slight trace of a median projection at the apex that is lacking in that of *pulcherrimus*. The eighth tergum of females of both species differs slightly (text figs. 33, 34). The color pattern differs but is variable in both species. I have not, however, seen any specimens of *pulcherrimus* with the center of the elytra yellow or with a yellow ring pattern, as found in *annulatus*. The three specimens from Costa Rica mentioned above, with a narrow red band on the elytra, were identified by Günther as a variety of *pulcherrimus*, but they have the other characters of *annulatus*. A number of other species (*circumjectus*, *lacordairei*, *laetus*, *ohausi*, and *pallisteri*) also vary individually in elytral pattern. The patterns vary between one that is almost entirely yellow, with various black spots, and one that is black with reduced or expanded reddish bands or stripes.

Four males and three females were dissected.

Metamasius xanthozona (Champion)

Phyllerythrus xanthozona CHAMPION, 1910, p. 96, pl. 4, figs. 30, 30a, Senahu, Guatemala; type, male, in the British Museum (Natural History), examined.

DIAGNOSIS: Very similar to *pulcherrimus* and *annulatus* in having short, stubby beak and black and orange coloration, but differing from them by having very large antennal club with large, spongy apex, slightly curved, not so straight, beak, and pronotum entirely black, with sides more emarginate.

RANGE: Known only from the type locality.

DESCRIPTION (MALE ONLY): Length, 12 mm. Peduncle narrow, emarginate in front, in profile angulate. Beak much shorter than pronotum, gently arcuate, stout (in profile

twice as wide as base of front femur), cylindrical, well punctate at base and on sides near base, lightly punctate toward apex; in dorsal view basal dilation strong, about as long as wide, with deep impressed line; scrobe opening onto eye, longitudinal slit in front of eye. Antennal club almost square, widely dilated, larger than front third tarsal segment, spongy part more than one-half of whole; scape almost as long as beak. Pronotum distinctly elongate, sides tumid before middle, thence emarginate to base, basal depression transverse, remainder as described for *pulcherrimus*. Elytra almost twice length of pronotum, sides feebly convergent to apex; intervals equal in width, feebly punctate, straight at base; stria punctures distinct within orange band, indistinct in black areas; apices rather truncate. Scutellum and pygidium as described for *pulcherrimus*.

Under side sparsely, feebly punctate, but legs densely, strongly punctate; distance between front coxae scarcely wider than antennal funicle, or equal to about one-third or one-fourth of diameter of coxa, between middle coxae about two-thirds of diameter of coxa; mesosternal process flat, but front of metasternum rather convex; prosternal process flat, and flat and truncate behind, not overlapping mesosternum; last segment of abdomen not depressed; ventral depression distinct, reaching into metasternum. Femora gradually widened; middle femur not extending beyond hind coxa; tarsus as described for *annulatus*. Apex of aedeagus and of eighth tergum as described for male of *pulcherrimus*.

Color velvety black except for submedian, oblique, orange band on each elytron, band widening outward, not crossing sutural interval.

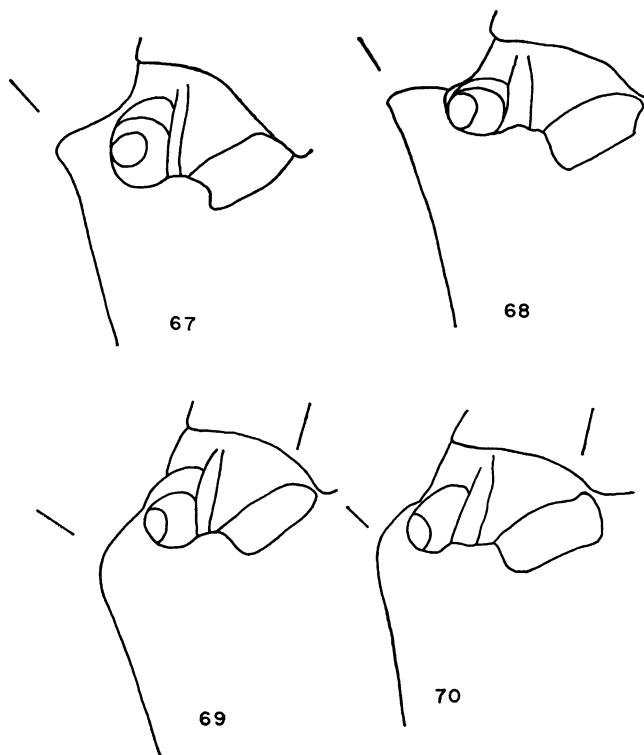
ECOLOGY: No information.

REMARKS: (See also discussion of subgroup above). Although it shares with *annulatus* and *pulcherrimus* the short, stout beak and very deeply emarginate peduncle of the postmentum, this species differs distinctly from them in its general shape (more elongate), and much larger antennal club. It differs from males of those species by having the metasternum more deeply depressed. The intercoxal spaces are more like those of *annulatus*, not so wide as those of *pulcherrimus*. Neither Hustache or Günther, both of whom worked

on *Metamasius* and "*Phyllerythrurus*," mentioned having seen this unique specimen.

SUBGROUP *AUROFASCIATUS*

One might regard the six species of this subgroup as a genus based on a combination of three characters: a prominent metasternal projection jutting out from the body between the middle coxae (text figs. 67-70); a small or large prosternal swelling or tubercle between or slightly in front of the front coxae; and an abrupt, subapical carina on the pygidium. Each of these characters is, however (or the two latter ones are), present in other species of the genus *Metamasius* (the prominent metasternum in *graphipterus*; the prominent prosternum in *amoenus*, *tuberculipectus*, and others; the carinate pygidium in *mesomelas*; and a prominently tumid, but not so abruptly carinate pygidium in *amoenus*, *circumjectus*, *ohausi*, *rectistriatus*, and *sinuatus*), and each character may be quite reduced in some individuals, i.e., the tubercle of the front coxae. Champion considered that these species composed a genus, *Eucactophagus*, which he described in 1910, with seven species. If we include, as he did, the species *graphipterus* and *aurocinctus* in "*Eucactophagus*," we no longer may use the above combination of characters, because *graphipterus* does not have the prosternal projection or the abrupt carina on the pygidium, and *aurocinctus* does not have any of the characters given, but is similar to *graphipterus* and different from the other species, in other characters (see *graphipterus* for details). If we include in the same subgroup, as I do, *viduus* Hustache, 1936, and five of the seven species included by Champion (six species of "*Eucactophagus*" have been described since Champion's time, but all except *viduus* are synonyms), we find that they are, perhaps, more homogeneous than are the species of some of the other subgroups, but that there are some rather clear-cut differences among them. The peduncle of the postmentum (on the under side of the apex of the beak), which Champion (1910, p. 96) wrote was "not sulcate or vertically bilamellate in front" in "*Eucactophagus*" is distinctly broadly sulcate in *viduus* and narrowly sulcate in *pruinosis*. The anterior coxae are "narrowly separated," it is true, but they are much less narrowly separated in *aurofascia-*



FIGS. 67-70. Protuberant front of metasternum of *Metamasius*, and mesepimeron. 67. *M. carinipyga* and *viduus*. 68. *M. duplocinctus*; characteristic also of *M. aurofasciatus*, *orizabaensis*, and some specimens of *carinipyga*. 69. *M. graphipterus*. 70. *M. pruinus*.

tus and *orizabaensis* than in the other four species. The middle coxae are separated by the diameter of the coxae in all the species except *pruinus*. The outer anterior edge of the mesepimeron is curled upward in *pruinus* only. The similarities are shown in the common characters listed below. The striking development of the front of the metasternum is in reality only an exaggeration of the tumid, subconical metasternum of the majority of species of group III. I think that the "generic" characters are not of sufficient weight for this subgroup to be kept as a genus.

The relationship of the six species of the subgroup seems to be correlated quite well with the shape of the apices of the eighth tergum. Thus in the first four species considered (*aurofasciatus*, *orizabaensis*, *duplocinctus*, and *carinipyga*), the tergum of the males is distinctly emarginate apically (text fig. 37), whereas in *pruinus* it is vaguely sinuate,

and in *viduus* it is rounded. In the first four species the apices of the tergum (text fig. 36) of the females are broadly (less broadly in *orizabaensis*), separately rounded, but in *pruinus* they are somewhat arcuminate, and in *viduus* they are subtruncate.

Sexual dimorphism is slight. The males of three species (*aurofasciatus*, *orizabaensis*, and *pruinus*) differ from the females by having a small depression at the apex of the abdomen. The males of *aurofasciatus* and *viduus* have slightly longer beaks than the females, and the males of *pruinus* have the beak more abruptly bent apically. There is also some individual variation; in several species I have not enough specimens to be certain whether the variation is sexual or individual.

COMMON CHARACTERS OF SUBGROUP¹

Beak, in profile, as wide as apex of front femur. Antennal club elongate, sides gently

¹ Not repeated in the formal descriptions.

dilated, but widely dilated in *viduus*, actual insertion of antenna at least a club width from eye. Pronotum twice or more than twice wider at base than at apex; basal depression present. Elytra distinctly broader than pronotum, sides strongly convergent to apex. Scutellum flat, retracted behind basal line of elytra, elongate-triangular or broadly triangular, but individually variable. Pygidium abruptly, broadly, bluntly carinate; hairs probably present on carina of all species, but actually hairs seen by me on specimens of *duplicinctus* and *pruinus* only. Prosternal process truncate or slightly sinuate at middle, flat, not overlapping mesosternum. Mesepimeron proportionally rather large (text figs. 5, 67, 68, 70). Front of metasternum protuberant. Venter of males not or only feebly depressed. Legs punctate as on under side. Tibiae straight. Femora gradually widened, middle and hind femora long, middle ones extending to about level of trochanter of hind legs, hind ones to apex of elytra. Tarsi dorsally shining, but in some specimens of *pruinus* and *viduus* slightly tomentose; third tarsal segment widely dilated, slightly asymmetrical, spongy-hairy below; second tarsal segment longer than wide; claw segment inserted near base of third.

***Metamasius aurofasciatus* (Brême)**

Text figures 36, 46, 66, 68

Calandra aurofasciata BRÊME, 1844, p. 308, pl. 9, figs. 7, 7e, Colombia; type not examined.

DIAGNOSIS: Similar to *orizabaensis* in virtually impunctate beak, with scrobes opening inferiorly and base not dilated over scrobes. Agreeing with that species, but differing from other species of subgroup by having front coxae more widely separated. Differing from *orizabaensis* by having colored elytral band basal, not subbasal, and pronotum depressed behind collar as well as at base (text fig. 66).

RANGE: Northern South America; Mexico. (For data on the 17 specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 15 to 19 mm. Peduncle rounded at apex, with tubercular or angulate "knob" which may be worn flat or be narrowly sulcate. Beak not or scarcely longer than pronotum, that of male propor-

tionally longer than that of female; slightly arcuate, cylindrical, so finely punctate as to appear impunctate; in dorsal view without trace of dilation or constriction over scrobes at base, and impressed median line scarcely, if at all, visible; scrobe for antenna inferior in position (text fig. 46), but visible in profile, its posterior edge more than width of scape from eye. Antennal club with spongy apex less than one-half of whole, its apex narrower than middle portion. Pronotum slightly broader than long, sides arcuate from base to apex, finely punctate; basal impression round, deep; base sinuate and strongly lobed in front of scutellum, basal margin not impressed; transverse depression behind apical collar. Elytra, intervals impunctate, seemingly more convex in red than in black areas; second, and in some specimens fourth, interval at base wider than adjacent intervals; stria punctures dense but indistinct within impressed striae; basal line sinuous following base of pronotum. Scutellum gently emarginate in front.

Under side finely punctate, more distinctly or densely on prosternum, mesosternum, mesepimeron; prosternum slightly or sharply swollen between coxae; metasternal protuberance large, sharp, conical (text fig. 68); distance between front coxae about twice width of funicle, between middle coxae equal to diameter of coxa and twice width of space between front coxae; last segment of abdomen of male with tiny emarginate depression at apex, of female flat. Aedeagus truncate at apex. Eighth tergum of male emarginate at apex; of female, with apices separately rounded (text fig. 36).

Color black except for red transverse band in basal half of elytra; area behind band velvety black in some specimens; scutellum and extreme base of elytra black.

ECOLOGY: No information.

REMARKS: Champion (1910) designated *aurofasciatus* Brême the type species of his genus *Eucactophagus*, but he did not discuss this species, as he had no specimens from Mexico or Central America. It had been described in the genus *Calandra* and transferred later to *Phyllerythrurus* by Chevrolat (1885, p. 92, footnote). Neither Csiki (1936) nor Blackwelder (1947) was aware of Champion's designation, because each listed *aurofasciatus*

under *Phyllerythrurus* instead of under *Eucactophagus*. Brème's type, if he designated a type, may be in the University Museum in Turin, Italy, where his collection is said to be. His description and illustration of *aurofasciatus* seem, however, perfectly adequate for a determination of the species. The colored figure shows the large red band and the velvety black part behind it; the pen and ink figure shows the pronotum and beak in profile. Surprisingly enough, no mention or figure was made of the metasternal projection, but Chevrolat also evidently did not notice, or did not think important, this projection, either for *aurofasciatus* or for his own species *orizabaensis* (1882, p. 578). These two species are very similar, as stated in the Diagnosis above, but they are distinct species, as shown by the difference in the aedeagus, which at its apex is truncate and deflexed in *aurofasciatus* but vaguely acuminate and horizontal in *orizabaensis*.

The sexes are separable by the presence of an apical fovea on the abdomen of the male, which is lacking in the female, and by the fact that the beak is slightly longer in the male than in the female.

Two males and one female were dissected.

***Metamasius orizabaensis* (Chevrolat)**

Text figures 37, 46, 68

Sphenophorus orizabaensis CHEVROLAT, 1882, p. 578, Orizaba [Veracruz, Mexico]; type, sex not determined, in Naturhistoriska Riksmuseum, Stockholm, examined. CHAMPION, 1910, pl. 4, figs. 34, 34a.

DIAGNOSIS: Agreeing with *aurofasciatus* and differing from others of subgroup by having no dorsal dilation visible over scrobes of beak because of position of scrobes under beak rather than on sides (text fig. 46) and absence of usual scrobal angle. Differing from *aurofasciatus* in shape of aedeagus, position of colored elytral band, and profile of pronotum.

RANGE: Southern Mexico and Guatemala. (For data on the nine specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 12 to 17 mm. Beak and antennal club as described for *aurofasciatus*, but peduncle angulate, not rounded, in profile, and spongy apex of club in

some specimens as much as one-half of whole. Pronotum, elytra, and scutellum as described for *aurofasciatus*, but pronotum more punctate, perhaps less broad, with no subapical depression, and elytra with third interval slightly wider than other intervals. Under side as described for *aurofasciatus*. Aedeagus apically rounded-acuminate. Eighth tergum of male and female as described for *aurofasciatus*.

Color black except for orange-yellow, uninterrupted, transverse band in front of middle of elytra, band widening outward.

ECOLOGY: No information.

REMARKS: The many resemblances of this species to *aurofasciatus* can be seen from the above description. In fact Champion (1910, p. 97) regarded *orizabaensis* as "a northern representative of the Colombian *E. [Eucactophagus] aurofasciatus*." He did not have the latter from Mexico, but I have seen specimens of both species from "Mexico." I doubt that they are conspecific because of the difference in the apex of the aedeagus (truncate, as opposed to rounded with a tendency to a point) and the placement and shape of the colored elytral band. Chevrolat (1885), not having noted the metasternal projections, transferred both species to his new genus *Phyllerythrurus*, along with *callizona*, *pulcherrius*, and *sanguinolentus*, the only link, apparently, being a red band on the elytra.

One male and two females were dissected.

***Metamasius duplocinctus* (Champion)**

Text figures 36, 68

Eucactophagus duplocinctus CHAMPION, 1910, p. 97, pl. 4, figs. 31, 31a, 32, 33, type locality not specified; lectotype, male, Miravalles, Costa Rica, here designated from 12 original specimens from various countries in the British Museum (Natural History), examined.

DIAGNOSIS: Sexes similar. Scutellum strongly emarginate in front. Differing from other species of subgroup by having two transverse colored bands on elytra, not one band or no band, and by having elytra proportionally longer (almost twice length of pronotum, instead of about one and one-fourth longer). Most similar to *carinipyga* which, however, is entirely black.

RANGE: Veracruz in southern Mexico

south to Ecuador. (For data on the 24 specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 17 to 25 mm. Peduncle as described for *aurofasciatus*. Beak from one-third to one-fourth longer than pronotum, slightly arcuate, more arcuate toward apex, cylindrical, so finely punctate as to appear impunctate; in dorsal view base feebly dilated over scrobes; impressed median line faint; scrobe elongate, situated low on sides of beak, with posterior edge at least a club width from eye. Antennal club with spongy apex quadrate, about one-half of whole. Pronotum as described for *aurofasciatus*, but distinctly broader than long, its sides somewhat emarginate in basal half, basal impression broader in some specimens, shallower in others and no subapical impression. Elytra as described for *aurofasciatus*, but stria punctures not visible and third interval at base wider in some specimens. Scutellum strongly arcuate-emarginate in front.

Under side finely or strongly punctate, punctation variable; prosternum slightly tuberculate between coxae; metasternal protuberance large, sharp, conical (text fig. 68); distance between front coxae not or scarcely wider than antennal funicle, between middle coxae almost equal to diameter of coxa and about four times width between front coxae; last segment of abdomen not depressed. Aedeagus apically rounded-truncate. Eighth tergum of both sexes as described for *aurofasciatus*.

Color black, with two narrow or wide, red or orange, transverse bands on elytra, one band near base, one near apex, but in some specimens bands reduced to spots and in some each band equal to one-third of length of elytra; bands extending to or across suture. Legs black, or red and black; humerus red or black. (See below for variations.)

ECOLOGY: No information.

REMARKS: This is the largest and appears to be the most abundant species of the subgroup. Champion (1910) had 12 specimens, and I have examined 24. As Champion pointed out, there is great variation in body size as well as in the color and width of the elytral bands. There seems, however, to be no correlation between size or color and geography. Thus from Infernillo and Pejivalle,

Costa Rica, I have seen specimens with narrow red bands on the elytra, as in Champion's figure 33 of his second variety from southern Mexico. The latter has red and black legs, and those from Costa Rica have black legs. Specimens with larger, more irregular elytral bands occur also in Costa Rica (Monteverde, Miravalles), Guatemala, Nicaragua, and Panama (Chiriqui). Specimens with the largest, most regular bands (each band equal to one-third of the length of the elytra) are from Bucay, Ecuador, and Chiriqui, Panama. The specimen from Chiriqui was figured by Champion as his variety a (1910, fig. 32).

When Champion (1910, p. 97), in his list of localities for *duplocinctus*, gave "(Trotsch: type and var. a)" after the locality of Chiriqui, he evidently meant not that this place was the type locality of the species, but that he had from this locality the typical form and the variety.

The scrobes for the antennae differ from those of *aurofasciatus* and *orizabaensis*, but agree with those of the remaining species of the subgroup by being low on the sides of the beak but not actually inferior, and by having the usual angle over the opening. The sexes are virtually indistinguishable externally, as is true also for *carinipyga*.

One of each sex was dissected.

***Metamasius carinipyga* (Champion)**

Text figures 5, 36, 67

Eucactophagus carinipyga CHAMPION, 1910, p. 98, pl. 5, figs. 1, 1a, 1b, Chontales, Nicaragua; lectotype, female, here designated from original specimens (two females) in the British Museum (Natural History), examined.

DIAGNOSIS: Similar in dorsal pattern to black specimens of *pruinus* and *viduus*, and in shape of beak, pronotum, and emarginate scutellum to *duplocinctus*, but differing from all species of subgroup by having two distinct (indistinct in one specimen) swellings on prosternum in front of coxae, and aedeagus emarginate at apex. Sexes similar.

RANGE: Oaxaca in southern Mexico south to Peru. (For data on the eight specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 17 to 19 mm. Peduncle, beak, and antennal club as describ-

ed for *duplocinctus*, but in one specimen beak distinctly punctate. Pronotum about as broad as long, sides more or less rounded to apex; finely punctate; basal impression round or slightly transverse, deep; base strongly lobed in front of scutellum, no impressed margin at base, no subapical depression. Elytra, intervals flat, equal in width, or third interval at base slightly wider; striae punctures tiny but distinct, well separated; basal line sinuous following base of pronotum. Scutellum in two individuals from Peru strongly arcuate-emarginate, but in one individual from Mexico scarcely emarginate.

Under side finely punctate, more distinctly on prosternum and in one specimen on sides of abdomen; prosternum between coxae slightly tumid and in front of each coxa a pimple-like swelling; metasternal protuberance large, sharp, conical (text fig. 67); distance between front coxae not quite twice width of antennal funicle, between middle coxae equal to diameter of coxa and three to four times wider than distance between front coxae; last segment of abdomen not depressed. Aedeagus distinctly emarginate at apex. Eighth tergum of both sexes as described for *aurofasciatus*.

Color black, each elytron with large, velvety black patch extending inward to near suture.

ECOLOGY: No information.

REMARKS: Possibly additional specimens will show that this species, as is true of *pruinus* and *viduus*, is not invariably entirely black but has a red or orange phase. In the few specimens examined, there is considerable individual variation. Thus the scutellum in the female from Oaxaca, Mexico, is scarcely emarginate, whereas it is strongly emarginate in other individuals. The male from the Peru-Brazil frontier has the metasternal projection more conelike, not with the upper side (in profile view) horizontal. The base of the elytra is more strongly sinuous in some specimens. Hustache (1936, p. 92) saw two females from Chanchamayo, Peru.

One of each sex was dissected.

***Metamasius viduus* (Hustache)**

Text figure 67

Eucactophagus viduus HUSTACHE, 1936, p. 91, Ibagué and Villaviciosa, Colombia; type, male,

Ibagué, in Muséum National d'Histoire Naturelle, Paris, examined.

Eucactophagus peruanus GÜNTHER, 1943, p. 93, fig. 24, Peru; type, male, Huanuco, Peru, in Staatliches Museum für Tierkunde, Dresden, examined. New synonymy.

DIAGNOSIS: Black with red band or spots on elytra, or entirely black. Differing from other species of subgroup by having sides of beak in front of scrobe eroded and hairy, antennal club more widely dilated and with shorter spongy apex.

RANGE: Nicaragua south in western South America as far as Peru; in the east found in Surinam. (For data on the 11 specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 20 to 23 mm. Peduncle of male broadly sulcate in front, of female sulcate throughout, apex angulate in male, rounded in female. Beak subcylindrical, coarsely, densely punctate on sides, more sparsely and finely toward apex and on top; in dorsal view basal dilation feeble, impressed median line distinct, apex not flattened as in male of *pruinus*; scrobe elongate, its posterior edge distant from eye by from two to three widths of scape; no fovea in front of eye; sides of beak in front of antennal insertion with long, irregular, eroded fovea of confluent punctures with emergent hairs; beak of male nearly straight, but bent down toward apex, nearly one-fourth longer than pronotum; of female, evenly, gently arcuate, not or scarcely longer than pronotum. Antennal club rather widely dilated, truncate at apex, spongy apex less than one-half of whole. Pronotum slightly longer than wide, finely punctate or impunctate, sides subparallel in basal half; basal depression broad, rather shallow; no subapical depression; base strongly sinuate at middle where margin slightly raised. Elytra, intervals impunctate, flat, fourth interval at base slightly wider than others in one specimen; striae punctures distinct. Scutellum scarcely emarginate in front.

Under side well punctate; prosternum between coxae slightly tumid or with small tubercle; metasternal protuberance large, sharp, conical (text fig. 67); distance between front coxae scarcely wider than antennal funicle, between middle coxae about equal to diameter of coxa and four times wider than

space between front coxae; last segment of abdomen transversely depressed at extreme apex, in some specimens also with shallow, round depression behind apex. Aedeagus truncate at apex, border narrow, as shown in text figure 28 of *elegantulus*. Eighth tergum of male rounded at apex, of female, very long, narrow, and apices rather truncate.

Color variable; majority of specimens, including type of *viduus*, entirely black, with or without black velvety patches on each elytron as described for *carinipyga*; type of *peruanus* (Peru) and two specimens from Surinam black but with complete orange or reddish band across elytra in front of middle; specimens from Ecuador with partial band, red spots being present on only several intervals of each elytron; one, no locality, with only one spot on each elytron.

ECOLOGY: A female in the collection of the United States National Museum was reared from the stem of a *Philodendron* taken in the Canal Zone, Panama, December, 1954.

REMARKS: This species agrees with *carinipyga* in the large, sharp protuberance of the metasternum, and with *pruinus* in the coarse, dense punctation of the sides of the beak, and in the sulcate peduncle of the postmentum. The pattern of the elytra in its black phase is similar to that of both species, and in its colored phase is similar to that of some specimens of *pruinus*. The only other species of the group with the same general kind of erosion on the sides of the beak are *elegantulus* and *miniatoipunctatus*, much smaller species with different elytral patterns and no protuberance on the metasternum.

Günther's description of *peruanus* (1943) was not recorded in any catalogue and did not appear in the Zoological Record until as late as 1953. I have compared his type with the type of *viduus* and find that they differ only in the color, as explained above. Hustache wrote that his type of *viduus* was a female, but I partly dissected it and found that it is a male.

Two males and two females were dissected.

Metamasius pruinus (Champion)

Text figures 31, 47, 70

Eucactophagus pruinus CHAMPION, 1910, p. 99, pl. 5, figs. 2, 2a, Volcan de Chiriqui, Panama; lectotype, male, here designated from two original

male and female specimens in the British Museum (Natural History), examined.

Eucactophagus Appolinairei HUSTACHE, 1936, p. 90, Muza, Colombia; type, male, in Muséum National d'Histoire Naturelle, Paris, examined. New synonymy.

DIAGNOSIS: Differing from others of subgroup by having front outer edge of mesepimeron curled upward, and metasternal prominence smaller, evenly rounded, not conical (text fig. 70), also by having base of pronotum only gently sinuate, without strong median lobe, and males with median tubercle in front of front coxae. Black, or black with some red on elytra.

RANGE: Panama south to Colombia. (For data on the 13 specimens examined, see Appendix.)

DESCRIPTION: (See p. 232 for common characters of subgroup). Length, 18 to 22 mm. Peduncle narrowly sulcate, apex rounded or slightly angulate, base angulate in one specimen (Chiriqui). Beak about one-fourth longer than pronotum, compressed; densely, coarsely confluent punctate in basal three-fourths, punctures smaller and sparse near apex; in dorsal view, base sharply dilated, impressed median line very deep and long; scrobe very elongate (text fig. 47), its posterior edge about two widths of scape from eye, but actual insertion of antenna at least a club width from eye; irregular fovea in front of eye; beak of male strongly bent down toward apex, apical fifth or sixth flattened on top and sides, rather squared off; of female, evenly arcuate throughout, apex cylindrical, not flattened. Antennal club with spongy apex quadrate and one-half or more of whole. Pronotum about as broad as long, sides slightly emarginate near base, obliquely sloping to apex; scarcely punctate; basal depression shallow; no subapical impression; base at center with raised margin that is only slightly sinuate at middle. Elytra with second and third intervals widened at base and turned slightly toward scutellum; intervals impunctate, flat, but appearing slightly convex where colored red; stria punctures indistinct; base with thickened, rolled edge that, in male, is rather uneven and scalloped on outer intervals. Scutellum not emarginate in front.

Under side well punctate; prosternum between coxae slightly swollen (in female), or

(in four males, including types of *pruinus* and *appolinairei*) with round tubercle or transverse ledge slightly in front of coxae; metasternal protuberance rounded, moderate in size (text fig. 70); distance between front coxae about equal to or slightly wider than segment of funicle, between middle coxae slightly less than diameter of coxa and three times wider than space between front coxae; front outer edge of mesepimeron curled upward, away from body; last segment of abdomen with transverse row of hairs at apex, apex of male depressed, of female, flat. Aedeagus truncate at apex, but with slight median sinuation, as shown in text figure 31 of *venezolensis*, but apical border much broader. Eighth tergum of male very slightly emarginate, of female, with apices separately rounded-acuminate.

Color either black, with black, velvety patches on elytra (Panama), or (Colombia) central part of elytra orange or red, somewhat suffused with black, scutellum and borders of elytra black, and various lineolate spots on red intervals black; or black, with red spot on second elytral interval behind middle.

ECOLOGY: No information.

REMARKS: As stated in the Diagnosis, this species differs in quite a few details from the other species of the subgroup. It seems most similar, however, to *viduus*, as these two species have the base of the beak more distinctly dilated, the beak densely punctate, the median impressed line distinct, and the postmentum sulcate.

Of the unusual characters of *pruinus*, the prosternal ledge of the males is quite similar to that of *tuberculipectus* of group I, but that species differs radically by having very widely spaced coxae and a flat metasternum. The curled outer corner of the mesepimeron is present to a lesser degree in *incisus* (*sanguinolentus* subgroup), but in *incisus* the border is distinctly emarginate (text fig. 11). The scalloped bases of the outer elytral intervals are found also in two very different species, in males of *maculiventris* of group I, in which the intervals are also eroded, and in a male and female of *strigosus* (*sanguinolentus* subgroup).

The type of *appolinairei* Hustache from Muzo, Colombia, and additional specimens

from Colombia, differ from the lectotype of *pruinus* in color only, and I consider them conspecific.

Four males and one female were dissected. Males differ from females by having the apex of the abdomen depressed, the beak more abruptly bent at the apex, and the prosternal projection stronger.

SUBGROUP *GRAPHIPTERUS*

Two of the three species of this subgroup were formerly in Champion's genus, *Eucactophagus* (the *aurofasciatus* subgroup of the present paper); the third species is described herein as new. These species differ from those of the *aurofasciatus* subgroup (and other subgroups) by having the spongy apex of the antennal club small (text fig. 50), the club itself narrower, the pronotum trifoveate and rather parallel-sided, and the antennal scrobe closer to the eye. It is curious that the shape of the club and its apex were not mentioned by the authors of these forms (Barber, Champion, Hustache). Champion (1910), in fact, did not mention the club in any of his descriptions, although he mentioned the scape of the antenna in a few instances.

Although Champion wrote that *graphipterus* and the other species of "*Eucactophagus*" had a strong metasternal protuberance (text figs. 67-70), he admitted that in *aurocinctus*, which he included in the genus, "this feature is reduced to a minimum, but as that species is undoubtedly allied to *E. graphipterus* it is best placed here" (1910, p. 96). The peduncle of the postmentum, which Champion said was "narrow, not sulcate or vertically bilamellate in front," in the species of "*Eucactophagus*," I find to be distinctly, although narrowly, sulcate in both *aurocinctus* and *graphipterus*, also in *monilis*, the third species of the present subgroup. The sexes are difficult to separate on external characters.

Because there are only three species, no summary of characters is given, but species described after *graphipterus* are compared with that species.

Metamasius graphipterus (Champion)

Text figures 50, 69

Eucactophagus graphipterus CHAMPION, 1910, p. 98, pl. 4, figs. 35, 35a, type locality not specified;

lectotype, female, Miravalles, Costa Rica, here designated from two original specimens from Costa Rica and Colombia, in the British Museum (Natural History), examined. WEISS, 1917b, pl. 5, fig. 1.

Eucactophagus weissii BARBER, 1917, p. 21, pl. 4, figs. 4, 4a, 4b, Summit, New Jersey, in orchid house; type, probably female, in the United States National Museum, examined. New synonymy.

Eucactophagus fallaciosus HUSTACHE, 1936, p. 91, Muzo [Colombia]; type, sex not determined, in Muséum National d'Histoire Naturelle, Paris, examined.

DIAGNOSIS: Differing from other species of subgroup (*aurocinctus*, *monilis*) by having metasternum protuberant in front and as large in profile as middle coxa, base of pronotum more strongly sinuate, distinctly lobed, scutellum smaller, rather sunken, sutural interval of elytra very narrow, and median depression of pronotum round, deep, and abrupt, not broad and shallow. Sexes similar.

RANGE: Mexico, probably in the south, south to Venezuela and Colombia; introduced in greenhouses in northeastern United States. (For data on the 17 specimens examined, see Appendix.)

DESCRIPTION: Length, 12 to 18 mm. Peduncle of postmentum rounded in front, narrowly sulcate for most its length. Beak about same length as pronotum, slightly arcuate, slightly compressed; densely punctate; in dorsal view, base distinctly dilated over scrobe, two shallow impressions behind apex; sides of beak from near scrobe to apex longitudinally broadly, shallowly impressed, impressions in some individuals more noticeable because outlined by narrow impunctate area; scrobe proportionally rather small, its posterior edge distant from eye by width of scape. Antennal club slightly compressed, more or less cone-shaped, not abruptly dilated (text fig. 50), spongy apex from one-third to one-fifth of whole. Pronotum as wide as long, sides parallel in basal half, thence strongly arcuate to apical collar; finely punctate or impunctate; trifoveate, foveae about equidistant, deep, round, abrupt, one fovea at middle of base, other foveae on each side in front of middle; base strongly sinuate and lobed at middle. Elytra broader than pronotum, sides strongly convergent to apex;

intervals feebly punctate or impunctate, somewhat convex, third and fifth intervals at base wider than others, some intervals turned inward toward scutellum; sutural interval very narrow, less than one-half of width of first interval; striae punctures deep, distinct, well separated, cutting slightly into intervals; basal line sinuous. Scutellum narrowly triangular, very small, but variable (in two specimens much narrower at base than base of second interval, in others as wide or wider) slightly concave in front. Pygidium convex, with ill-defined, narrow, apical ridge, no hairs.

Under side, including legs, well punctate, but variable; prosternum somewhat tuberculate between front coxae; behind coxae truncate or sinuate at middle; front of metasternum protuberant, round (text fig. 69); front coxae virtually contiguous, separated by space narrower than width of funicle; distance between middle coxae almost as great as diameter of coxa and five or six times wider than prosternal process; male with no ventral depression; last segment of abdomen with tiny but distinct round apical depression and emergent short hairs. Middle femur extending to base of first abdominal segment; hind femur, to apex of pygidium. Tarsi dorsally tomentose, third segment widely dilated, spongy-hairy below, second segment scarcely longer than wide, claw segment inserted at base of third. Aedeagus truncate at apex, but one specimen with slight median sinuation. Eighth tergum of male subtruncate, with median impressed line in apical half; of female, with apices narrowly rounded.

Color black (or dark red) with any of following elytral patterns: mostly yellow or orange, with or without black or blackish, lineolate, short marks on second and fifth intervals at middle and on third and fifth near base, some of these marks joined together longitudinally or horizontally, apical third of elytra usually black, borders and sutural intervals and scutellum black; or elytra black, with two irregular yellow transverse bands joined together longitudinally on fourth interval; or black, with red C on left elytron and side piece passing under humerus; or entirely black (see below for localities of color phases).

ECOLOGY: When Champion described

graphipterus he had only two specimens, but mentioned a third specimen in the United States National Museum which a "Prof. Britton" had found in a greenhouse in Connecticut. Subsequently, Harry B. Weiss found five specimens in orchid houses in Summit, New Jersey, in 1914, 1917, and 1918. Another specimen (at the United States National Museum) was collected "with orchids" from the Canal Zone, Panama, March, 1956. Additional specimens have been taken "on plant *Cattleya*," an orchid, at Washington, D. C., October, 1937, and on *Cycnoches ventricosum* in Guatemala City in March, 1948. According to Weiss ("1916" [1917a], p. 93): "[The] larvae have been found infesting *Lycaste*, *Odontoglossum* and various other species having large, soft bulbs. The larva excavates a large cavity in the bulb, destroying much of the interior and paving the way for decay, which of course finally results in the death of the bulb. Pupation takes place inside the infested bulb and the adults feed on the leaves and other portions of the plant disfiguring them to a certain extent." The adult (Weiss, 1917b, pp. 25, 26) "feeds chiefly on such plants as *Oncidium oblongatum*, etc. . . . and . . . gnaws large irregular depressions in the pseudo-bulbs and also feeds on the bases of the leaves, usually cutting them off more or less completely."

REMARKS: (See also discussion of subgroup above). This species has the prominent metasternal protuberance characteristic of species of the *aurofasciatus* subgroup, but it differs from them and agrees with species of the present subgroup (*aurocinctus*, *monilis*) by having an apparently square, trifoveate pronotum, a small spongy apex on the antennal club, which is quite narrow, two shallow, elongate impressions on the dorsal apex of the beak, a vague median ridge on the pygidium, and the tarsi rather tomentose dorsally. It differs from the two species just mentioned in the ways stated in the Diagnosis. Males examined from New Jersey, Mexico, Guatemala, and Colombia have a distinct, impressed, median line in the apical half of the eighth tergum. This line is a normal characteristic of the eighth tergum of the female, but is not found in males of other species of the genus, except for one of three males of *strigosus*, in which the impression is very

feeble. The scutellum in several of the specimens from Summit, New Jersey, is so small and narrow that one might question the retention of the species *graphipterus* in the genus; in other individuals, however, the scutellum, although still proportionally rather small, is not much smaller than is normal.

The types of *fallaciosus* Hustache (Muzo, Colombia) and *weissi* Barber (Summit, New Jersey), which I have examined, agree in all essential characters with the lectotype of *graphipterus* (Costa Rica), differing only by having much more yellow on the elytra and lacking the black, saddle-like, median mark of the lectotype of *graphipterus*. Kuschel (1955, p. 281) has already synonymized *fallaciosus* with *graphipterus*. The elytra, however, are extremely variable in the apportionment of the yellow (or red) and black (see color phases, above). Six specimens from Summit are fairly uniform, although some of the black lineolate marks are quite vague, but a male from Colombia has a black saddle, as in the lectotype, and a large male (18 mm.) from Guatemala City and a specimen from Venezuela both have more black than yellow, the yellow appearing in two transverse bands joined longitudinally on the fourth interval. The specimen from Venezuela was identified by Günther as *fallaciosus*, and an identically colored specimen without locality was identified by Champion as *graphipterus*. Still other varieties include an entirely black specimen from "Mexico," which Champion considered to be a variety of *aurocinctus*, but which has the large metasternal projection, tiny scutellum, and strongly lobed base of the pronotum characteristic of *graphipterus*, and a specimen from Tapachula, Mexico, with a red C on the left elytron, the C being reversed on the right elytron. The shape of *graphipterus* is about like that of *monilis* (pl. 13, fig. 8), and the coloration of the elytra of many specimens is like that of *ohausi* (pl. 13, fig. 1).

Five males and four females were dissected.

***Metamasius aurocinctus* (Champion)**

Plate 13, figure 7; text figure 50

Eucactophagus aurocinctus CHAMPION, 1910, p. 99, pl. 5, figs. 3, 3a, type locality not specified; lectotype, male, Chontales, Nicaragua, here designated from two of original specimens from

Nicaragua and Mexico in the British Museum (Natural History), examined, and one from Costa Rica in the United States National Museum, examined.

Eucactophagus biocellatus BARBER, 1917, p. 22, pl. 4, fig. 5, Las Cascadas, Canal Zone, Panama; type, probably male, in the United States National Museum, examined. New synonymy.

DIAGNOSIS: Resembling *graphipterus* in peduncle, beak, antennal club, trifoveate pronotum, and one color phase (elytra yellow, with small amount of black), but differing by having no protuberance on front of metasternum, larger scutellum, and shallower pronotal depressions. Sexes similar. Differing from *monilis* in various respects, as stated under that species, below.

RANGE: Mexico, Nicaragua, Costa Rica, and Panama. (For data on the six specimens examined, see Appendix.)

DESCRIPTION: Length, 10 to 12 mm. Peduncle, beak, and antennal club as described for *graphipterus*, but no impression on sides of beak, and beak of one male less densely punctate than that of one female. Pronotum as described for *graphipterus*, but median depression less deep, not abrupt, and basal margin not so strongly sinuate at middle. Elytra broader than pronotum, sides strongly convergent to apex; intervals feebly punctate or impunctate, scarcely convex, third interval at base wider than others and turned slightly toward scutellum, sutural interval about same width as other intervals; striae punctures as described for *graphipterus*; basal line only slightly sinuous. Scutellum broadly triangular, proportionally wider than that of *graphipterus*, flat in one specimen, concave in another. Pygidium as described for *graphipterus*.

Under side well punctate; prosternum between coxae flat; behind coxae truncate or sinuate; front of metasternum triangularly tumid or gently convex between coxae, tumidity much smaller than coxa; distance between front coxae equal to or slightly wider than funicle segment, between middle coxae about equal to diameter of coxa and four or five times wider than space between front coxae; male with no ventral depression; last segment of abdomen not depressed. Legs as described for *graphipterus*, but femora slightly bulbous on inner side before apex.

Aedeagus truncate at apex. Eighth tergum of male subtruncate, without median line; of female, as described for *graphipterus*.

Color black, or black with brownish tomentosity, elytra with any of following patterns: with irregular, yellow or orange, transverse band (pl. 13, fig. 7) in front of middle extending from first interval to outer margin (lectotype of *aurocinctus* and three other specimens); or basal three-fourths yellow, but with black lineolate marks at middle of third, fourth, and fifth intervals (type of *biocellatus*); or uniformly black (variety from Mexico).

ECOLOGY: A specimen from Costa Rica in the United States National Museum was collected in an orchid, "*Cynoches pseudobulb*," on February 18, 1957.

REMARKS: (See also discussion of subgroup above). One of the reasons I synonymized *Eucactophagus* with *Metamasius* is that the chief and only reliable character of the former, i.e., the metasternal protuberance, is lacking in *aurocinctus*, and *aurocinctus* is closely allied to one of the species (*graphipterus*) with the protuberance. The type of *biocellatus* Barber (Panama) also lacks the protuberance, although it was described as belonging to "*Eucactophagus*." I have examined the type specimen; it has the pygidium partly open and appears to be a male. Its elytral pattern is almost like that of some specimens of *graphipterus*, although lacking the black at the sides, but I consider it to be a synonym of *aurocinctus*. Barber (1917, p. 22) thought that it was "improbable that it might be merely a form of [*aurocinctus*] with the yellow fascia more extended," because he thought that the black elytral spots were in the same area as the yellow transverse band of a cotype of *aurocinctus*. I find, however, that the yellow band of *aurocinctus* is in front of the middle, whereas the black part of "*biocellatus*" is at the middle. Therefore there is no conflict.

The scutellum in the lectotype of *aurocinctus* is approximately twice as wide at the base as the base of a sutural interval, but in one specimen it seems to be not quite so wide as the base of the interval.

One of two "females" of an entirely black variety from Mexico, mentioned by Champion (1910, p. 99), is not *aurocinctus* but

graphipterus, with a large protuberance, and it is not a female but a male (dissected). The other, smaller specimen from Mexico is *aurocinctus*.

One of each sex was dissected.

Metamasius monilis Vaurie, new species

Plate 13, figure 8; text figure 50

TYPE MATERIAL: Type, female, Ambato, Ecuador, in the American Museum of Natural History, and paratype, female, "Peru," in the United States National Museum.

DIAGNOSIS: Markedly similar to *aurocinctus*, but larger, and with different kind of elytral pattern composed of bulbous, bead-like drops of orange color; differing further by having base of pronotum somewhat more sinuate, median depression of pronotum more transverse, and front coxae closer together. Male not known.

RANGE: Ecuador, Peru. Ambato, the type locality, is in the interandean region of Ecuador in the arid temperate zone. According to Brown (1941), however, it was the base for many tropical expeditions, so that specimens that are not associated with the names of certain collectors probably do not come from Ambato itself, but from more tropical areas. (For data on another specimen, see Appendix.)

DESCRIPTION OF TYPE, FEMALE: Length, 15 mm. Peduncle, beak, and antennal club as described for *graphipterus*, but no impression on sides of beak in front of scrobe. Pronotum as described for *graphipterus*, but rather sparsely punctate, and basal depression transverse, not round. Elytra and pygidium as described for *graphipterus*, but third interval of elytra, not fifth, wider at base than other intervals, and striae punctures larger, deeper, more separated, sutural interval almost as wide as first interval. Scutellum proportionally wider than that of *graphipterus*, and flat, not concave.

Under side, including legs, well punctate; prosternum feebly tumid between front coxae which are virtually contiguous, separated by only about one-half of width of segment of funicle; prosternum behind coxae sinuate at middle; front of metasternum feebly triangularly tumid; distance between middle coxae slightly narrower than diameter of coxa and about six times wider than space

between front coxae; last segment of abdomen with feeble transverse depression at extreme apex, but not visible at low magnification. Legs and eighth tergum as described for female of *graphipterus*.

COLOR OF TYPE: Black, with brownish coating or tomentosity; elytra with small, orange, embossed spots, longer than wide, forming on each elytron a curving, regular, subbasal line from behind humerus to edge of sutural interval, and two similar spots in front of subapical tumidity, one on fourth and one on eighth interval.

VARIATIONS FROM TYPE: The paratype from Peru is 16 mm. long, black and shining, with no brownish coating (perhaps rubbed?); the elytral pattern is the same as that of the type, but the colored spots are smaller, and round instead of elongate. A third specimen, a damaged female of unknown origin, agrees with the type in the brownish coating and elongate spots, but differs from both the type and the paratype by having seven, instead of two, spots near the apex, forming a transverse band, and by having the subbasal band not curving, but transverse, and with the alternate spots of the band advanced slightly.

ECOLOGY: The damaged female (it has the prothorax and elytra cracked as if it had been stepped on) mentioned above was collected in the New York Botanical Garden, Bronx, New York, May, 1944, by H. Fox and E. Alexander "On Plant," probably an orchidaceous plant. The paratype from Peru was collected "alive in pseudobulb" at San Francisco, California, November 25, 1938, by Ting.

REMARKS: This species is so similar to *aurocinctus* that possibly it is the same species. The elytral pattern, however, seems to be of a different sort, as the colored band of *aurocinctus* is not at all beadlike or bulbous like that of *monilis*, and it becomes narrower toward the suture; there are no subapical colored marks in *aurocinctus*. Other differences are slight (the prosternum is feebly tumid in *monilis*, flat in *aurocinctus*; the front coxae are closer together in *monilis*). The difference in pattern may be found to be bridged when more specimens are available, as was found with *ohausi* and its synonym *decoratus*, and with *aurocinctus* and its synonym *biocellatus*.

The type and paratype were dissected; the third specimen has the pygidium partly open and appears also to be a female.

SUBGROUP *SPINOLAE*

The two members of this subgroup, the single members of the *validirostris* and *biguttatus* subgroups, and *ohausi* of the *sanguinolentus* subgroup are the only species of group III in which the males have long hairs on the front tibia, a trait rather common in more than half of the species of group I. Both *spinolae* and *fahraei* are the only species in the genus known to breed in plants of the Cactaceae family; *spinolae* is the only species of group III that inhabits the United States and Baja California, and it is the type species of LeConte's genus *Cactophagus*.

Although the morphological characters of the adults do not separate *spinolae* and *fahraei* from other species as a distinct genus or subgenus, possibly the larval characters do so. Differences between the larva of "*Cactophagus*" *spinolae* on the one hand and that of certain species of *Metamasius* (of authors), *Rhodobaenus*, *Sphenophorus*, and *Scyphophorus* on the other have been reported by Dugés (1881, 1886), Cotton (1924), and Anderson (1948). According to Anderson (1948, pp. 421, 426), the larval body of *spinolae* has stout, hook-shaped asperities arranged in regular rows, whereas the larvae of the other genera mentioned have finer asperities not arranged in regular rows. Perhaps this character is significant. Might these hooked asperities be a protection for the larvae against the spines of the cactus? There are so many stated differences among the larvae of the various genera and so many characters shared by some genera and not by others that it is difficult to know how much weight to give each character. It must be remembered, too, that some larvae may be as variable as some adults, and that the larvae of only four species of *Metamasius* (*hebetatus*, *hemipterus*, including two subspecies, *ritchiei*, and a species that is probably *anceps*) were examined by Anderson, and only *sericeus* (a subspecies of *hemipterus*) was seen by Cotton. If the genus *Cactophagus* were to be reinstated, it should in my opinion include only *fahraei* and *spinolae*, unless other species are

found to be cactus-loving and to have the same larval asperities.

The species that were included in *Cactophagus* by Champion (1910) are in my group I of *Metamasius* except for *fahraei*, *pulcherrimus*, *spinolae*, and *validirostris* (my group III). These species were *ciliatus* Champion and *sierrakowskyi* Gyllenhal, and three species of Champion's (*cirratus*, *rufocinctus*, and *rufomaculatus*) which I synonymized with the latter. They differ from *fahraei* and *spinolae* by having a lateral line on the aedeagus. Species that have been described subsequently in *Cactophagus* are *foveolatus*, *hustachei*, and *metamasioides* of Günther, *consularis* and *sanguinipes* of Hustache, and *impressipectus* Voss, some of these being synonyms (in my group I). In group III, species regarded as *Cactophagus* by their authors are *aurantiacus* and *rubricatus* of Hustache, *lacordairei* and *miniatopunctatus* of Chevrolat, and *venezolensis* of Günther. These five species differ from *fahraei* and *spinolae* in the manner specified in the key to the species under couplet 15.

In all individuals of the subgroup that were examined, the peduncle of the postmentum is broadly sulcate, usually apically widened, rounded both in front and in profile. The few species of other subgroups with such a peduncle are *validirostris* (not every specimen), which differs by having more bulbous, not gradually widened, femora, and the base of the beak inferiorly rather angulate, and *viduus* of the *aurofasciatus* subgroup, which differs by having a large metasternal projection (text fig. 67). The peduncle of *sanguinolentus* and *rubrovariegatus* is similar to that of *spinolae* in one or two specimens, but it is actually vertically bilamellate. In other individuals of the *sanguinolentus* subgroup the bilamellate front edges may be so worn as to resemble the rounded condition of *spinolae* and *fahraei*.

As there are only two species, no summary of characters is given; *fahraei* is compared with *spinolae* in the descriptions.

Metamasius spinolae

Plate 12, figure 1; text figures 6, 26, 71

DIAGNOSIS OF SPECIES: Differing from very similar *fahraei*, which also has both a fasciate and an immaculate form, by having

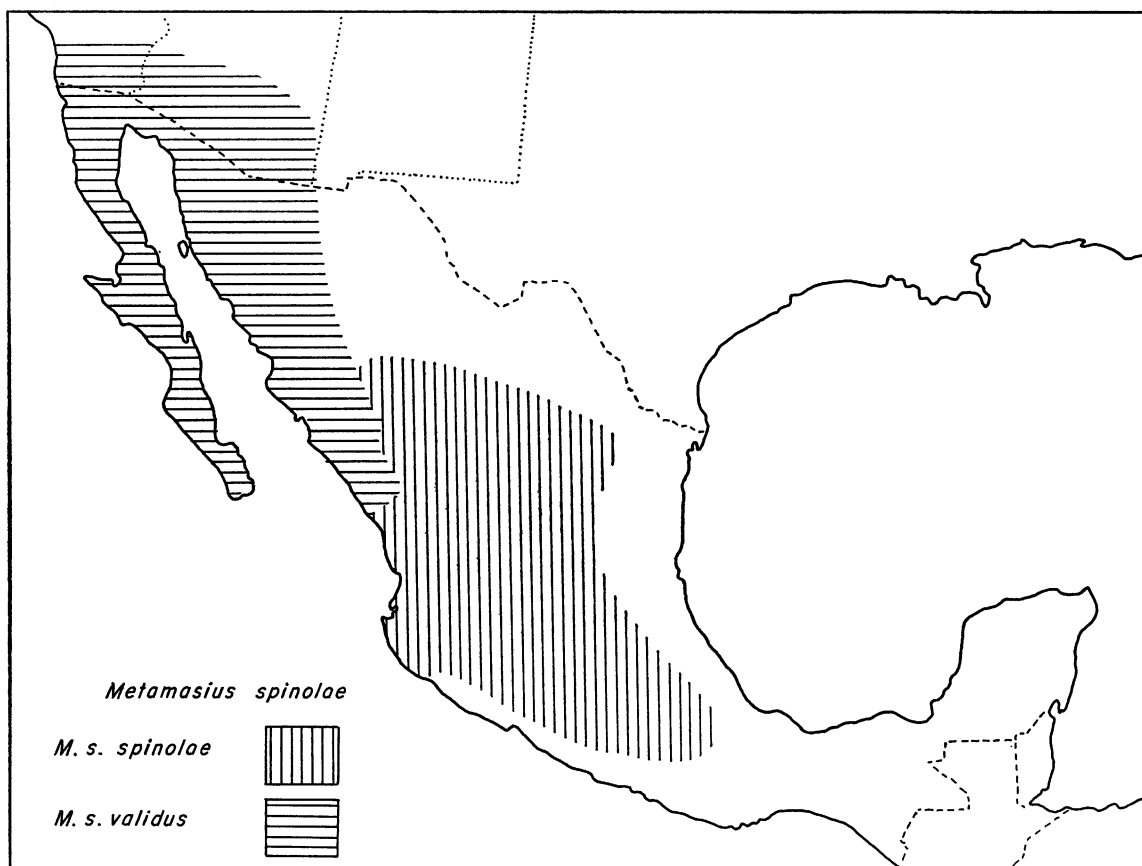


FIG. 71. Distribution of the subspecies of *Metamasius spinolae*. The nominate subspecies may occur also farther south (see text).

punctures of elytral striae very fine, shallow, rather dense, scarcely visible in majority of individuals, not deep and large and widely separated; red marks of elytra flat, not tumid. Male with long hairs on front tibia.

RANGE OF SPECIES: Southern California and southern Arizona south to northern Oaxaca, Mexico; one specimen each (accidental introduction?) in Costa Rica, Colombia, Brazil, without precise locality. (See below for subspecies; also text fig. 71.)

DESCRIPTION OF SPECIES: Length, 15 to 25 mm. Peduncle of postmentum deeply channeled, channel wider in front (text fig. 26); in profile rounded. Beak of same length as pronotum, in some females slightly shorter than pronotum, cylindrical, arcuate, in male more arcuate near apex, in female evenly arcuate; in profile extreme base or base under scrobes slightly sinuate or angulate in many

specimens; in dorsal view distinctly dilated over scrobes; densely, finely punctate throughout; posterior edge of scrobe distant from eye by almost width of club; no fovea in front of eye. Antennal club elongate, flattened, sides only moderately dilated, spongy part slightly shorter than base, its dividing line sinuous. Pronotum slightly longer than wide, sides strongly or slightly emarginate in basal half or three-fourths, arcuate to apex; impunctate or very finely punctate except for basal line of dense punctures; basal depression lacking, but basal margin somewhat furrowed, margined at center, sides of base covered by base of elytra. Elytra only about one-fourth longer than pronotum, sides only slightly convergent to apex; intervals straight at base, very finely punctate, appearing impunctate in many individuals; striae punctures minute

but visible in most specimens, not visible within impressed striae in others; apices truncate. Scutellum almost an equilateral triangle. Pygidium variably punctate, narrowly rounded, slightly tumid or keeled medially, no apical hairs.

Under side, including legs, finely punctate; distance between front coxae varying from less than, to somewhat more than, width of antennal funicle, about one-third to one-sixth or one-seventh of diameter of coxa; distance between middle coxae slightly less than diameter of coxa; mesosternal process and front of metasternum slightly tumid in majority of specimens, but one or other or both rather flat in some; prosternal process slightly tumid behind coxae, prosternum at middle in front of coxae tumid or tuberculate in most specimens, but flat or depressed in a few, and in males usually with tiny dark hairs in punctures; mesepimeron with front border arcuate-angulate; last segment of abdomen not depressed or hairy; ventral depression of male scarcely discernible. Tibiae straight; front tibia of male with dense fringe of golden or dark hairs as long as one-half of width of tibia, longer at apex if not worn short. Femora slightly bulbous just before inner apex, but appearing gradually widened in many individuals; middle femur reaching at least as far as hind border of hind coxa, in some specimens to base of first segment of abdomen. Tarsi with third segment dorsally shining, widely dilated, ventrally entirely hairy-spongy; second segment longer than wide, about two-thirds of length of first; claw segment longer than first, inserted near base of third. Aedeagus more or less truncate at apex. Eighth tergum rounded at apex in male, apices subtruncate or broadly rounded in female.

Surface shining or dull, color with any of following patterns: entirely black (*validus*); or (typical nominate *spinolae*) black, with two red spots at front of pronotum (spots may spread toward base), two on metasternum on each side at base, and two red-orange, slightly irregular bands across elytra (parts of bands in some individuals elevated), band in basal third usually oblique, in apical third transverse, bands not crossing sutural intervals, basal band extending from first to ninth intervals, subapical band from first to

eight; or (variety of nominate *spinolae*) legs, beak, and abdomen black, but dorsum vaguely entirely reddish, with pronotum in some specimens mixed with black, and elytra in a few specimens with trace of red bands.

DISCUSSION OF SPECIES: (See also discussion of subgroup above). This large cactus weevil of desert areas is very abundant. I have seen more than 500 specimens of *spinolae* as opposed to about 150 of its near relative *fahraei*. The number of specimens examined of both species is far higher than that of any other species of group III.

The name *spinolae* Gyllenhal, 1838, antedates the name *validus* LeConte, 1858, but LeConte (1876) used *validus* as the type of his new genus *Cactophagus*. At that time the two forms were considered to be separate species, and perhaps LeConte did not examine any specimens of *spinolae*. Later they were considered as varieties of the same species by Champion (1910) and Fisher ("1926" [1927]), and as subspecies by Anderson (1948).

The species is divisible into two subspecies: a more northern, black form, *validus* (type locality, Sonora, Mexico), ranging from southern California and southern Arizona south through Baja California and Sonora into southern Sinaloa (Mazatlan); and a southern, red-fasciate form, *spinolae* (restricted type locality, Mexico City), ranging from southern Sinaloa (Escuinapa), Durango, and Nuevo Leon south (except on the Gulf coast) throughout the rest of Mexico to northern Oaxaca (text fig. 71). I have seen three specimens of the fasciate nominate *spinolae* from "Costa Rica," "Brazil," and "Colombia," but I question the presence of the species in these countries except possibly as accidental introductions.

The two subspecies probably meet along the Pacific coast in the state of Sinaloa or Nayarit. All specimens examined from as far south as the area around the port of Mazatlan, Sinaloa (numbering about 20), are entirely black (*validus*). Two specimens from Escuinapa, about 50 miles south of Mazatlan, have two red bands across the elytra, and red spots on the pronotum and metasternum (nominate *spinolae*). Twenty-two specimens from seven localities farther south in Nayarit might be said to show some degree of inter-

mediacy between the two subspecies, but I regard them as nominate *spinolae*. Although one of these specimens (from Chacala) is entirely black, as in *validus*, all the other specimens have the typical red elytral bands of nominate *spinolae*, and six have the usual amount of red elsewhere on the body. Of the others, 10 lack the red on the pronotum and metasternum, resembling *validus* in this respect; two have all the red marks very faint; three have red on the metasternum but not on the pronotum; one has red on the pronotum but not on the metasternum; and one has the pronotum uniformly vaguely red. An almost entirely dull reddish phase of nominate *spinolae* is discussed below, under that subspecies.

The species is variable in many characters, some of which were used previously to separate "genera." Thus, with no apparent correlation of sex, locality, or color, the front coxae may be separated by no more than the width of a segment of the antennal funicle, or by as much as twice the width; the prosternum in front of the coxae may vary from flat to slightly or strongly tumid; the metasternum and mesosternal process may be tumid where they meet, or one or the other may be nearly flat. In males, the long hairs of the front tibia vary in color from yellow to bronze to black. The length of specimens varies greatly within a population. From Real de Arriba, Temascaltepec, Mexico, 40 specimens range from 14 to 24 mm., and from Calcaloapan, Puebla, 22 specimens from 15 to 24 mm. The deeply channeled peduncle of the beak and the thick, spongy-like, tarsal soles are, however, quite constant.

The inner wing was dissected on four specimens (two from Calcaloapan, and one each from Patagonia, Arizona, and San Jose del Cabo, Baja California). Although it is folded twice and appears fully formed, the wing is slightly shorter than the length of the entire weevil (the latter measured from the pygidium to the base of the beak). Presumably these weevils are able to fly, but I am sure that they do not do so often or very efficiently, as a true flying wing in the Coleoptera is usually rather longer than the entire beetle. I have collected many individuals of *spinolae* in Mexico, but never saw any fly

by day or by night. The wing is proportionally longer than the wing of *fahraei*.

Additional differences between this species and *fahraei* are given under the latter. Although *fahraei* is generally more southern in distribution, the ranges of the two species approach each other in southern Mexico. In Guerrero we have *spinolae* from Amula, Chilpancingo, and Mochitlan, and *fahraei* from Acapulco and Mochitlan. From Oaxaca we have *spinolae* in the northern part of the state and *fahraei* in the southern part, and both species from the state of Colima.

ECOLOGY OF SPECIES: Although LeConte (1876) said of *validus* that "specimens [from San Diego, California, to Cape San Lucas, Baja California] were found exclusively under decaying *Opuntia* leaves," we now have records of two additional hosts. Anderson (1948) reported larvae of *spinolae validus* in *Cereus giganteus* in Tucson, Arizona, collected by Hubbard and Schwarz, and of "*Cactophagus* spp." from "Mexico" in *Fero-cactus*, March 25, 1946, collected by V.O. Miller. Five specimens of nominate *spinolae* in the United States National Museum were collected by A. C. Baker, June, 1946, at Tlalnepantla, Mexico, "Ex spineless Cactus." Dugés (1881) found the larva of nominate *spinolae* in decaying pads of the nopal, *Opuntia pseudo-tuna* Oliva.

An interesting report by Pettey (1953) on the importation of individuals of *spinolae* from Mexico to Africa to combat the prickly pear gave many details of the life history. A total of 17,769 individuals of *spinolae* were imported in 1946 and 1948 to Uitenhage in South Africa, where the prickly pear (*Opuntia*) is a pest, particularly in the coastal and subcoastal areas. Although the weevils destroyed the plants they were placed on and later traveled to plants nearby, the over-all progress of destruction was slow, mainly because the unusually low winter temperatures killed the weevils before they oviposited.

Pettey reported that *spinolae* breeds on the segments and "stems" of *Opuntia* and *Cereus* and that "no other plants are known to be attacked by this beetle in its native country." The injuries are mainly in the larval stage. "The grubs burrow in the segments and 'trunks' of the plants, eventually

causing rot and collapse of the whole plant. They attack or burrow in both the succulent and the non-succulent or woody segments, with the exception usually of the terminal segment or young leaf pads. The adults do little damage, although they nibble at the succulent segments of the pears in feeding." A cocoon of fibers is made by the larva inside a pear segment or near the joints between the segments. "The adult usually emerges . . . on warm days and nights of high humidity, just before, just after or during rainy days, when the moisture tends to soften the fibre of which the cocoon is made."

***Metamasius spinolae spinolae* (Gyllenhal)**

Sphenophorus Spinolae GYLLENHAL, 1838, p. 883, "Mexico," here restricted to Mexico City; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined. DUGÉS, 1886, pl. 2, figs. 1-10. CHAMPION, 1910, pl. 4, figs. 6, 6a, 7, 7a.

Cactophagus oblique-fasciatus CHEVROLAT, 1882, p. 580, Puebla, Mexico; type, female, in Naturhistoriska Riksmuseum, Stockholm, examined.

Cactophagus spinolae var. *rubronigrum* FISHER, "1926" [1927], p. 217, Tehuacan, Puebla, Mexico; type, male, in the United States National Museum, examined.

DIAGNOSIS: Similar to black northern form (*validus*) but differing by having some red color, either as narrow incomplete bands across elytra near base and near apex, or as vague spots on sides of pronotum in front and on sides of metasternum, or by being entirely dark reddish, with red elytral bands scarcely, if at all, visible.

RANGE: Mexico from Nuevo Leon (one specimen), Durango, southern Chihuahua (one specimen) southward, including southern tip of Sinaloa, to northern Oaxaca, but not on east coast or extreme southwestern coast (text fig. 71). Three specimens examined from "Costa Rica," "Colombia," and "Brazil" may be accidental or labeled in error. (For data on the approximately 400 specimens examined, see Appendix.)

DESCRIPTION: (See the species).

REMARKS: The type of *spinolae* has very faint, narrow, red bands on the elytra. The type of *oblique-fasciatus* has somewhat larger red bands. Champion (1910) synonymized the latter as a color variety of *spinolae*, an action with which I agree. The type of *rubro-*

nigrum is chiefly dull red mixed with black and appears also to be a color variety. Fisher ("1926" [1927]) gave this "good color form" a name because he had so many specimens (six in his type series and about 15 additional ones) of the same coloration from the same locality (Tehuacan, southeastern Puebla). This variety is now found to occur elsewhere. These dark red specimens have some blackish areas that blend into the red without any clear dividing line, or they have the elytral punctures or the scutellum blackish. The majority have the beak, legs, and abdomen uniformly black. Fisher (*loc. cit.*) remarked that he thought at first that they were immature specimens of the black "variety" *validus*, and it is true that some of them are so dark as to appear black. They are not *validus*, however, because some of them have the characteristic red elytral bands of nominate *spinolae*, although the bands are faint, and the faint red bands on the reddish, instead of the usual black, elytra are not readily noticeable. One of the reddish specimens examined from Tehuacan, Puebla, the type locality of "*rubronigrum*," also has vague elytral bands. Additional localities from which I have examined this variety are as follows: Tlacotepec, between Tehuacan and the city of Puebla, three reddish specimens; near Calcoapán, a tiny settlement about 38 miles northeast of the city of Puebla, 22 specimens, dark red with some blackish areas; Tepeaca, Puebla, and Tecamachalco, south of Tepeaca, five reddish specimens, four with faint bands; Tamazulapan, Oaxaca, four individuals, of which three are the red variety (one without red bands showing, two with them visible), and one black with red bands; Nochixtlan, southeast of Tamazulapan, one reddish specimen with faint red bands; Sierra de las Mixtecas, Oaxaca, southwest of Veracruz, eight specimens, of which five are reddish, one reddish, with the apices of the elytra black, one reddish with faint red bands, one black with red bands, but the pronotum red with a black streak at the center; Mexico City, four reddish specimens, one black, with faint red bands, and three entirely black as in *validus*. From some other localities in the state of Puebla (Acatlan, Atlisco, Tehuizingo) and in Oaxaca (Huahuapán de León),

the few specimens examined are the usual black, with red bands.

Three males and one female were dissected.

***Metamasius spinolae validus* (LeConte)**

Sphenophorus validus LECONTE, 1858, p. 80, Sonora [Mexico]; type not found in the Museum of Comparative Zoology.

Sphenophorus procerus LECONTE, 1858, p. 80, San Diego, California; two cotypes in the Museum of Comparative Zoology, one cotype, examined, in the Motschoulsky collection, Moscow.

Cactophagus subnitens CASEY, 1892, p. 685, Arizona; type, male, in the United States National Museum, examined.

DIAGNOSIS: Differing from more southern form (nominate *spinolae*) in color only, *validus* being truly black, without red or reddish infuscations.

RANGE: Southern California and southern Arizona south into Sonora and southern Sinaloa and throughout Baja California, Mexico. (For data on the 100 or more specimens examined, see Appendix.)

DESCRIPTION: (See the species).

REMARKS: LeConte's *procerus* (1858) was based on specimens with the apical constriction of the pronotum less marked, the pygidium supposedly not carinate, and the size somewhat smaller, but LeConte himself later (1876) considered these characters individually variable. Horn (1873) had synonymized *procerus* with *validus*. I have not seen the two "types" of *procerus* at the Museum of Comparative Zoology, but I examined another "type" in Moscow (from California) in the Motschoulsky collection. Evidently there was some exchange of cotypes at that time. LeConte's *validus* was based on a single specimen, the sex not stated, but Dr. John F. Lawrence of the Museum of Comparative Zoology was not able to find the type, which may be in the Academy of Natural Sciences of Philadelphia. Casey's *subnitens*, which I have examined, is also an individual variant, smoother and more shining than some specimens. Shining or dull specimens occur in many localities.

A catalogue name of Sturm's (1843) and an unpublished name of Chevrolat's (1882) were listed by Champion (1910, p. 84) as synonyms of *spinolae* and of the "variety" *validus*. These names appear in various modern

catalogues, but they are *nomina nuda* and are omitted from the citations above.

One of each sex was dissected.

Metamasius fahraei

Plate 12, figure 2; text figure 72

DIAGNOSIS OF SPECIES: Very similar to *spinolae*, but differing in large, deep, widely separated, not fine and dense, punctation of elytral striae; fasciate specimens differing by having tumid and more irregular red elytral bands, and subbasal band starting from second, not first, interval. Male with long hairs on front tibia.

RANGE OF SPECIES: Mexico City (one specimen only) and Veracruz in the east, and Colima in the west, south to Venezuela and Colombia, possibly to the "Guianas" and Brazil (one specimen each). (See below for ranges of subspecies; also text fig. 72.)

DESCRIPTION OF SPECIES: Length, 18 to 22 mm. Peduncle, beak, antennae, pronotum, elytra, scutellum, and pygidium as described for *spinolae*, but elytral striae with large, deep, round or elongate foveae cutting into sides of intervals and irregularly separated longitudinally by from one to nearly six times their diameters; male with beak slightly longer than pronotum. Under side as described for *spinolae*, but distance between front and middle coxae narrower on an average. Legs and sexual characters as described for *spinolae*.

Color either uniformly black (*striatoforatus*), or (*fahraei*) black with prothorax (except for apical constriction) and most of metasternum dark red, occasional specimen with prothorax black, and two red transverse bands on elytra as described for nominate *spinolae*, but bands of nominate *fahraei* more irregular, more elevated, even tumid in many specimens, red subbasal band extending from second to ninth intervals, subapical band from first to eighth. Surface dull or shining.

DISCUSSION OF SPECIES: (See also discussion of subgroup above). Until now this species, as well as *spinolae*, has been considered a member of the genus *Cactophagus* LeConte, which I (Vaurie, 1966) synonymized with *Metamasius*. Both species have an immaculate and a red-banded form. Curiously enough, the red-banded form of

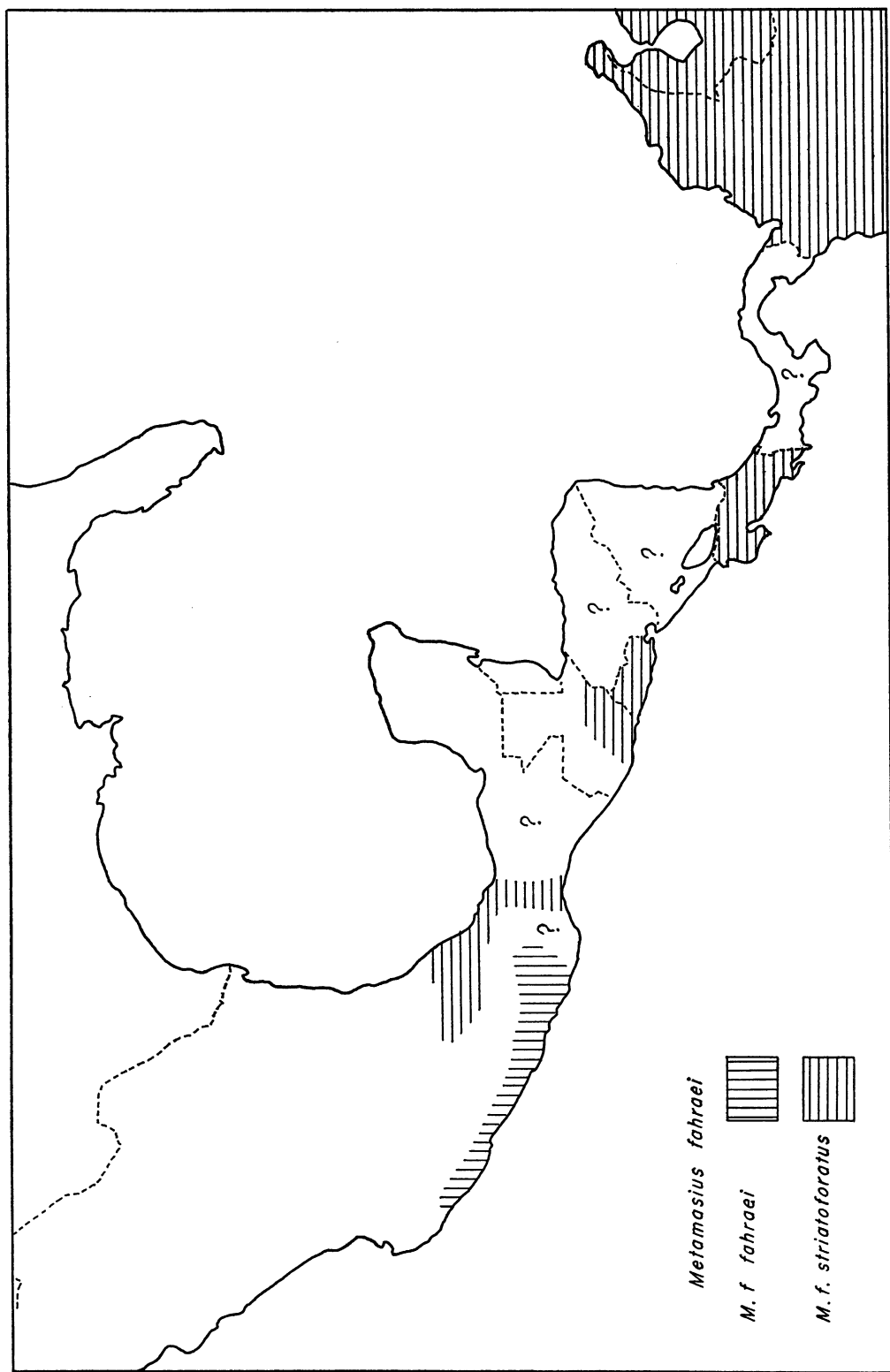


FIG. 72. Distribution of the subspecies of *Metamasius fahraei*. The subspecies *striatoforatus* occurs also on the island of Trinidad and possibly in the Guianas and Brazil, areas that are not shown on the map.

fahraei is more northern in distribution, whereas in the case of *spinolae* the reverse is true, the red-banded form being more southern. The species *fahraei* occurs farther south than *spinolae*, not being found north of Mexico City and extending as far south as northern South America.

This species can be separated into two subspecies: nominate *fahraei* (type locality, between Oaxaca and Acapulco, Mexico), with two red bands across the black elytra and the pronotum reddish, ranging from Colima in western Mexico south to central Oaxaca and possibly into southwestern Veracruz (three specimens labeled "Colombia" and "Brazil" are suspect); and the subspecies *striatoforatus* (type locality, Colombia), uniformly black, ranging from Mexico City east to eastern and central Veracruz and extreme northeastern Oaxaca south across the Isthmus of Tehuantepec to Guatemala, El Salvador, and Costa Rica in Central America and to Colombia, Venezuela, the Guianas, and Trinidad in northern South America, and possibly to Brazil (text fig. 72).

The aedeagus of nominate *fahraei* from Oaxaca is similar to that of *striatoforatus* from Jalapa and from Zacapa, Guatemala, and also to that of *spinolae validus* from Arizona. There is apparently no specific or subspecific differences in the aedeagus or in the eighth terga of either sex, or in the genitalia of the females.

In addition to the characters given in the Diagnosis and in the descriptions, this species differs from *spinolae* by having the metasternum in front slightly more tumid in a greater number of specimens, and the hairs on the front tibia, at least in some males, longer than those of males of *spinolae*. The prothorax also seems to be proportionally longer in *fahraei*, but the shape varies individually in both species. Some individuals have shorter inner wings than those of some specimens of *spinolae*, although the wings appear to be folded in normal fashion. Thus a male of nominate *fahraei* from Tlacolula, Oaxaca, is 21 mm. long but has a wing of only 11 mm., 1 mm. shorter than the elytra. Another male (*fahraei striatoforatus*) from Jalapa, Veracruz, is 19 mm. long, with a wing of 17 mm., and a female of this subspecies from Tehuantepec, Oaxaca, and a male from Zacapa, Guatemala,

both 20 mm. long, have wings of 16 mm., the elytra being only 10 mm. long. In fully winged species, however, the wing is longer than the entire weevil. Thus a specimen of *M. miniatopunctatus* Chevrolat of 10 mm. has a wing of 11 mm., and the elytra 6 mm. long.

ECOLOGY OF SPECIES: This species, like its close relative, *spinolae*, breeds in *Opuntia* and *Cereus*. A male of the subspecies *striatoforatus* in the collection of the United States National Museum was taken "on *Opuntia*," November, 1927, by Mortenson at Zacapa, Guatemala. Champion (1910, p. 84) wrote that this form in Costa Rica "lives in a species of *Cereus*, according to Biolley, and there is an example from Colombia in the Fry collection labelled as having been found on the same genus of Cactaceae."

***Metamasius fahraei fahraei* (Gyllenhal)**

Sphenophorus Fahraei GYLLENHAL, 1838, p. 884, type locality, "*Mexico, inter Oaxaca et Acapulco*," here restricted to state of Oaxaca; type, female, in Naturhistoriska Riksmuseum, Stockholm, examined. CHAMPION, 1910, pl. 4, figs. 5, 5a.

DIAGNOSIS: Similar to eastern and southern form (*striatoforatus*) which is uniformly black, but differing by having two red bands across elytra, and pronotum and part of metasternum usually reddish.

RANGE: Southwestern Mexico (text fig. 72) on the coast from Colima to Acapulco, Guerrero, thence inland to central Oaxaca and probably southwestern Veracruz (only the state name is given on the labels of specimens examined). Two specimens from Colombia, one specimen from Brazil, and one from Cuba, without precise locality, are probably labeled in error, or are accidental importations. (For data on the 87 specimens examined, see Appendix.)

DESCRIPTION: (See the species).

REMARKS: According to Champion (1910), this form is very common in Oaxaca, and it is from that state that I have seen the majority of specimens.

The red elytral bands are quite constant in their extent, although in one specimen part of the sutural interval on the subapical band is red instead of black. Two specimens from Guerrero and Mochitlan, Guerrero, in the

British Museum have the pronotum black, instead of reddish (see discussion of the species).

Two males and one female were dissected.

***Metamasius fahraei striatoforatus* (Gyllenhal)**

Sphenophorus striatoforatus GYLLENHAL, 1838, p. 878, Colombia; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined.

Sphenophorus perforatus FAHRAEUS, 1845, p. 236, Santa Fe de Bogota, N. Granada [= Colombia]; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined.

DIAGNOSIS: Resembling nominate *fahraei* from Oaxaca and southwestern Mexico in almost every detail except color, which is black in this subspecies, but black and red in nominate *fahraei*.

RANGE: Northern South America (Colombia, Brazil, the Guianas, Venezuela, and island of Trinidad) north to Costa Rica, Nicaragua, El Salvador, and Guatemala to Isthmus of Tehuantepec, Mexico (text fig. 72), thence up east coast of Mexico (Jalapa, Almolonga, and Orizaba in Veracruz, Temascal in northern Oaxaca) and across to Mexico City (one specimen). (For data on the 60 specimens examined, see Appendix.)

DESCRIPTION: (See the species).

REMARKS: Fahraeus' *perforatus* was synonymized with *striatoforatus* both by Chevrolat (1882) in his list of species assigned to *Cactophagus*, and by Champion (1910). I have examined the types of both forms and find them synonymous. Neither of these authors regarded *striatoforatus* as conspecific with *fahraei*, but Champion (1910, p. 83) wrote that it "is probably nothing more than an immaculate form" of *fahraei*. He mentioned also the similarity of this form to the immaculate form (*validus*) of *spinolae*, and that "*Cactophagus striatoforatus* 'bears much the same relation to the Mexican *C. fahraei* as the northern *C. validus* does to *C. spinolae*, and replaces the former as we go southward." In the case of *fahraei* the immaculate form is more southern, but with *spinolae* the immaculate form is more northern.

Three specimens examined from the Isthmus of Tehuantepec (Matias Romero, Salina Cruz, Tehuantepec) and one of five individuals from Colombia (in the Zoologisches Museum, Berlin) appear to be this species

and referable to the subspecies *striatoforatus*, even though they have larger foveae on the elytral striae. The majority of *striatoforatus* have rather smaller striae foveae than those of nominate *fahraei*, but the foveae of the specimens mentioned are even larger. Two of these specimens have only eight or 10 foveae on the sutural stria, whereas the majority of individuals of both subspecies have from 12 to 19 foveae. The specimens from the Isthmus are rather shining, without coating, and this condition may explain the larger foveae. A comparison of many individuals of both subspecies shows that the punctures or foveae are very variable, not only in size, but in shape and spacing. In typical nominate *fahraei* from Tlacolula and the city of Oaxaca, the punctures are distinctly elongate, but in specimens from nearby Mitla they are round, and in some specimens of both subspecies they are twice as large as in other specimens. The only constant feature of the foveae is that they are in no case minute or fine, as are those of *spinolae*.

A varietal name of *perforatus* listed by Chevrolat (1882), Blackwelder (1947), and Csiki (1936), and attributed to Fahraeus (1845, p. 236) is not on the page cited of Fahraeus, and I cannot find it elsewhere.

Two of each sex were dissected.

SUBGROUP *VALIDIROSTRIS*

The single species of this subgroup appears to be intermediate between the species of groups I and II on the one hand and those of group III on the other. It has the prosternal process as prominent, at least in some specimens, the mesosternal process as flat, the beak as narrow, and the front coxae as widely separated, as those of species of group I, but the male lacks the dividing lateral line on the aedeagus that is characteristic of all species of group I. The male has long hairs on the front tibia which is a trait of males in about half of the species of groups I and II, but of only five species of group III. Three of these five species (*biguttatus*, *fahraei*, and *spinolae*) also show some "intermediate" characters. The hind femora of *validirostris* are very long, as in the majority of species of group III, but they are bulbous, as in the majority of species of group I. There are subrostral basal sinuations or teeth, as in group

I. The raised, embossed spots of the elytra, which are not visible on every specimen, the shape of the pronotum, the inner tubercle of the front coxa, and the brownish coating are more characteristic of species of group III. The peduncle of the postmentum could belong with either group, its sulcus or channel being rather long and narrow in some specimens, but widened in front in others.

***Metamasius validirostris* (Gyllenhal)**

Text figures 7, 48

Sphenophorus validirostris GYLLENHAL, 1838, p. 886, "Mexico," here restricted to state of Veracruz; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined. CHAMPION, 1910, pl. 4, figs. 8, 8a (as *Cactophagus*).

Sphenophorus bifasciatus GYLLENHAL, 1838, p. 885, Mexico; type, apparently male, in Naturhistoriska Riksmuseum, Stockholm, examined.

DIAGNOSIS: In dorsal view quite similar to *biguttatus*, similar also in bulbous femora, and fringed front tibia of male, but differing in elytral pattern, less widely spaced coxae, and notably in stouter, arcuate, not nearly straight, beak furnished at base with subrostral angles or teeth. Generally distinctly smaller than *fahraei* or *spinolae*, more attenuate (fusiform) in shape, and pronotum at base sinuate, not nearly straight, and with distinct basal depression.

RANGE: Southern Mexico (Veracruz, Oaxaca) south to Guatemala and Panama. One specimen each examined from Ecuador and Colombia. (For data on the 78 specimens examined, see Appendix.)

DESCRIPTION: Length, 11 to 15 mm. Peduncle of postmentum sulcate, sulcus subparallel in some specimens, wider in front in others, in profile horizontal. Beak arcuate, in profile distinctly wider at base where double teeth or angles present under scrobes, narrower (near apex) than apex of front femur; basal dilation sharp; beak of male thicker than that of female, longer than pronotum, narrowing (viewed in profile) strongly to apex, slightly compressed, bent rather abruptly before apex, densely punctate; of female, same length as pronotum, more cylindrical, evenly arcuate, punctate at base only; posterior edge of scrobe distant from eye by, in male, nearly width of club, in female, one-half of width of club; fovea present in front of eye. Antennal

club dilated, compressed, spongy part more than one-half of whole. Pronotum densely punctate, sides subparallel in basal half, basal depression shallow, broad; base margined to sides, distinctly sinuate at middle. Elytra one-third longer than pronotum, sides distinctly convergent to apex; intervals straight at base, punctate or not; striae punctures tiny but distinct. Scutellum elongate-triangular, flat. Pygidium rather acuminate, tumid or slightly keeled medially, no apical hairs.

Under side, including legs, well punctate; distance between front coxae at least twice width of funicle, about one-third or one-fourth of diameter of coxa; between middle coxae equal to diameter of coxa; prosternum between front coxae flat or hollow, but behind coxae rather prominent or tumid; front coxae produced within as tubercle or swelling; mesosternal process flat, front of metasternum flat or rather tumid; mesepimeron with front border arcuate; last segment of abdomen rather acuminate, not depressed or hairy; ventral depression of male shallow, hairy. Femora bulbous, middle femur long, reaching hind coxa. Front tibia of male densely fringed with hairs nearly as long as one-half of width of tibia. Tarsi, third segment dorsally shining, ventrally entirely hairy or with short, basal, glabrous line; second segment longer than wide, about one-half of length of first; claw segment longer than first, inserted at base of third. Aedeagus slightly emarginate at apex. Eighth tergum of male rounded, apices of female separately, narrowly rounded.

Color smoky brown or grayish, but black or reddish in some specimens; elytra with distinct and tumid, but usually faint tiny red spots arranged in two slightly curved, transverse bands which converge laterally, but some spots lacking in many specimens.

ECOLOGY: This species has been reported from plants of three different families, i.e., bananas, Musaceae, as shown by two females collected August, 1928, in Cordoba, Veracruz, in "*platano*"; Araceae, as shown by a male taken in some cuttings of *Philodendron pertusum*, March, 1937, that arrived in Brunswick, Texas, from Mexico, and a male and female in *P. hastatum*, August, 1959, that arrived in Brownsville, Texas, from

Fortin, Veracruz; and Rubiaceae, as shown by a female "on *Chinchona*" [*Cinchona*], taken July, 1944, in Guatemala, by Hambleton. The foregoing specimens are in the collection of the United States National Museum. The only other information I have from labels is of a male in Coatepec, Veracruz, collected "at light in coffee grove" by R. K. and B. J. Selander, in the collection of J. M. Kingsolver.

REMARKS: (See also discussion of subgroup above). Champion (1910) mentioned the great variability of the 30 specimens he had, in the length of the beak, the shape of the pronotum, the depth of the pronotal basal depression, and the number of spots on the elytra. In a series of 23 specimens from Jalapa, Mexico, collected by W. Schaus and deposited in the American Museum of Natural History, the elytral spots are not obvious to the unaided eye, except on one rather reddish specimen. Under the light of a microscope a number of specimens are reddish, and the red spots of the elytra may be bordered with black.

The type of *validirostris* is a large specimen with deeply impressed pronotum and nearly obsolete elytral spots. The type of *bifasciatus* is smaller (12 mm.), with the pronotum rather flat and the elytral spots distinct; its beak is slightly damaged on top. Champion (1910) synonymized *bifasciatus* with *validirostris*, an action with which I agree. He placed *validirostris* directly after *spinolae* and *fahraei* in his classification of the genus *Cactophagus*. I find it rather similar also to *biguttatus*, which Champion regarded as belonging in the genus *Metamasius*.

One specimen of each sex was dissected.

SUBGROUP *BIGUTTATUS*

The single species of this subgroup (Guatemala and Mexico) presents a mixture of characters of groups I and III. It agrees with the majority of species of group I by having the front and middle coxae very widely separated (the front ones even more widely separated), the prosternal process enlarged behind the coxae and overlapping the mesosternum, the mesosternal process flat, and the femora distinctly bulbous or clavate. It differs from them and agrees with the species of group III by having no lateral line on the aedeagus.

The metasternum is gently, broadly convex as in *sellatus*, *mosieri*, and *nudiiventris* of group I, not narrowly tumid in front as in the majority of species of group III. The peduncle of the postmentum is narrow and obsoletely sulcate as in species of group I; the beak is long and narrow. The front tibia of the male is fringed with long hairs as in many species of group I but few of group III. Other characters of *biguttatus* more typical of, but not exclusive in, species of group III are the very long femora, the distinct basal depression and sinuate basal margin of the pronotum, and the fact that the tumid, embossed, orange spots of the elytra are wider than the intervals, so that the striae bend around the spots.

This is one of the species that make definition of the genus difficult. It is not alone in its deviation, however, as the species of the *transatlanticus* subgroup are aberrant also in the same characters, as is described above. The species of that subgroup, however, differ distinctly from *biguttatus* and from other species in additional characters (very short femora, toothed femora in the males, the absence of a raised margin at the base of the pronotum, and the obsolescence of the tenth elytral stria).

Among the species of group III, *biguttatus* is perhaps more similar to *validirostris*, but differs from it by having more widely separated coxae, longer femora, a longer, straighter, narrower beak, a convex metasternum, and a different elytral pattern.

Metamasius biguttatus Champion

Text figure 41

Metamasius biguttatus CHAMPION, 1910, p. 108, pl. 5, figs. 13, 13a, Cerro Zunil, Guatemala; type, male, in the British Museum (Natural History), examined.

Metamasius bigeminatus CHAMPION, 1910, p. 108, pl. 5, figs. 14, 14a, Toxpam [=Tuxpan?], Veracruz, Mexico; type, female, in the British Museum (Natural History), examined.

DIAGNOSIS: Elytra with two or four tumid orange spots. Differing from other species of genus by combination of characters, as follows: front coxae separated by as much as three-fourths of diameter of coxa; front of metasternum broadly convex; front femur as long as pronotum; beak very slender (text fig.

41), nearly straight, longer than pronotum; femora very slender at base and strongly clavate toward apex; pronotum subconical, with transverse basal depression and bisinuate basal margin. Sexes differing in beak and in long tibial hairs of male.

RANGE: Atlantic coast of southern Mexico and Pacific slope of Guatemala. (For data on the six specimens examined, see Appendix.)

DESCRIPTION: Length, 11 mm. Peduncle of postmentum narrowly, obsoletely sulcate, in profile horizontal in front, angulate behind. Beak about one-third longer than pronotum, nearly straight, cylindrical, scarcely wider than front tibia, not toothed at base inferiorly; of male densely, coarsely punctate on sides in front of scrobes, but virtually impunctate dorsally in apical half, basal dilation slightly longer than wide, rather feeble; in profile, sides feebly crenulate inferiorly when viewed at high magnification; beak of female narrower than that of male, virtually impunctate, basal dilation abrupt, scarcely longer than wide. Posterior edge of scrobe distant from eye by width of scape in female, by half again the width in male; no fovea in front of eye. Antennal club elongate, spongy part longer than basal part. Pronotum only slightly longer than wide, well punctate at sides and at center of base; basal depression round, rather deep; sides sloping obliquely to apex; basal margin sinuate at middle, margined and furrowed to sides but latter may be covered by base of elytra. Elytra, sides strongly convergent to apex; intervals impunctate, straight at base, second interval of each elytron (or second and fourth intervals) distorted or widened around elevated, round or oblong, orange-red spot or spots; striae punctures well separated, striae sinuate around elytral spots; apices truncate. Scutellum narrowly triangular, flat, set back slightly from basal line of elytra. Pygidium rounded-truncate, subcristate at center, slightly wider in male than in female.

Under side, femora and center of venter feebly punctate, remainder strongly but sparsely punctate; distance between front coxae wider than antennal club, about three-fourths of diameter of coxae; middle coxae separated by their diameter or slightly more; coxae without hairs or tubercles; prosternal

process strongly developed behind and overlapping mesosternum; mesosternal process flat but front of metasternum gently convex; mesepimeron with front border gently arcuate; last segment of abdomen not depressed or evidently hairy; male without ventral depression. Front tibia with, in male, fringe of long, dense hairs longer than width of tibia, in female, with very short hairs. Femora strongly clavate from very narrow base; middle femur extending beyond hind coxa, hind femur beyond apex of elytra and as long as pronotum; front femur of male as long as pronotum, of female, nearly as long. Tarsi, third segment wider than antennal club, almost twice as wide in male, nearly four times wider than second segment, ventrally entirely hairy; second segment longer than wide; claw segment slightly longer than first and inserted near base of third. Aedeagus truncate at apex which is slightly deflexed. Eighth tergum in male truncate, in female, apices conjointly rounded.

Color dull black, except for one or two tumid orange spots on each elytron behind middle on second interval or on second and fourth intervals, spots distorting striae.

ECOLOGY: No information.

REMARKS: (See also discussion of subgroup above). The beak of both sexes is proportionally even longer than that of females of *applicatus*, *benoisti*, *rimoratus*, and *vicinus* of group I, and it is likewise very narrow, cylindrical, and nearly straight.

Kuschel (1955, p. 281) synonymized *bigeminatus* with *biguttatus*, and I agree with this synonymy. The type of *biguttatus*, a male from Guatemala, differs from the type of *bigeminatus*, a female from Veracruz, Mexico, by having only one tiny orange spot instead of two large, nearly contiguous spots on each elytron. Four additional males examined have two spots on each elytron. Champion placed these two forms one after the other in his classification, mentioning the widely spaced front coxae for both, but evidently he did not realize their conspecificity, or surmise that some of the embossed orange spots could be present or absent within the same species, as is true in many species of the genus.

The type specimens of both forms and one additional specimen were dissected.

SUBGROUP *TRANSATLANTICUS*

The two species of this subgroup, formerly in the genus *Metamasiopsis* Champion, lack the lateral line on the aedeagus that is characteristic of species of group I, yet they agree with the species of that group by having the front and middle coxae widely separated and the prominent prosternal process overlapping the mesosternum as in *M. hemipterus*. They differ from the species of group I (except for *flavopictus*, *rugipectus*, and some individuals of *cinnatus*) and from all the species of group III by having the outer apices of the tibiae toothed. They differ further from the majority of species by having the short tenth elytral stria obsolete in most specimens. The stria is present, however, in at least one individual of *lojanus* (from Huascary, Peru), and the tendency to obsolescence of this stria is found also in a few species of group I (*bruneri*, *guentheri*, *ritchiei*, and some of the *hebetatus* subgroup). The scutellum is very long and narrow as in *ritchiei*. The strongly emarginate eighth tergum of the male is about the same as that of the majority of the species of the *aurofasciatus* subgroup, and of *elegantulus*, *pallisteri*, and *spurius*.

Additional differences between these two species and other species are that the basal margin of the pronotum is obsolete, the base ending without raised edge or furrow or punctures. Many species, however, have no margin on the sides of the base, and some have a not very distinct margin at the center. Another unusual character is a sexual one—the toothed femora of the males (text fig. 44). In females the tooth is replaced by a sinuation or slight angulation.

Possibly these two species should be placed in a separate genus. If they were, the name *Metamasiopsis* cannot be used for them, because the type species of that "genus" (*rugipectus*) is now in *Metamasius* (Vaurie, 1966). I prefer to keep them in *Metamasius*, at least for the present. There are many quite "different" species in the genus *Sphenophorus* in North America, for instance, yet they seem to form a related conglomeration, and I believe the many diverse species of *Metamasius* also belong together.

Metamasius lojanus and *transatlanticus* are evidently forest species occurring in the

Andes, mostly on the eastern slopes from Ecuador south to Bolivia, as well as in Central America in the mountains around San Jose and Cartago, Costa Rica. They are recorded from altitudes of from 1000 to 3000 meters and are associated with bromeliads.

Additional characters of the subgroup can be noted by a comparison of the descriptions of *lojanus* and *transatlanticus*.

***Metamasius lojanus* (Heller)**

Text figure 44

Metamasiopsis lojanus HELLER, 1912, p. 391, Ecuador, "on the way from Loja to Sabanilla"; type, female, Loja, in Staatliches Museum für Tierkunde, Dresden, examined.

DIAGNOSIS: Very similar to *transatlanticus*, differing from it by having only one tooth or spine on outer angle of tibia, base of pronotum sinuate, not subtruncate, at middle, males differing further by having abdomen and pygidium very hairy and sides of beak near apex inferiorly sinuate; females, by having femora sinuate or emarginate within, but not toothed or angulate.

RANGE: Ecuador, Peru, and Bolivia in the mountains; one specimen from Brazil. (For data on the 17 specimens examined, see Appendix.)

DESCRIPTION: Length, 21 to 26 mm. Frons between eyes about equal to one-half of width of beak at base. Peduncle of postmentum not sulcate, but with small angular prominence in front, flat behind. Beak only two-thirds of length of pronotum, cylindrical, nearly straight on top edge, slightly arcuate on lower edge, impunctate; in profile distinctly wider than antennal club, slightly wider at base and apex than at middle; inferiorly with two parallel impressed lines from base to near apex; in dorsal view, apex slightly emarginate, basal dilation feeble, scarcely longer than wide; beak of male with sides behind apex sinuate or bluntly angulate on each side of base of peduncle; posterior edge of scrobe distant from eye by width of scape, no fovea in front of eye. Antennal club compressed, elongate, sides scarcely dilated, spongy part shorter than base. Pronotum much longer than wide, sides subparallel at base to or beyond middle, thence oblique to strong apical constriction, impunctate; basal depression absent; base distinctly sinuate at

middle, not margined or furrowed. Elytra not margined at base, sides nearly parallel, scarcely tapering; striae punctures dense and distinct within striae; intervals rather convex with shiny, overlain stripe, when present, tapering off toward apex, virtually impunctate; second and (one specimen) also fourth interval at base wider than other intervals, second in one specimen turned toward scutellum; first interval at base squeezed between sutural and second intervals in some specimens; apices truncate. Scutellum elongate-triangular, flat or slightly concave in front. Pygidium finely, densely punctate in more than apical half, impunctate at base, with narrow median ridge; apex rounded; in male, convex, with apical and dorsal hairs, in female, rather flat, no hairs.

Under side impunctate except for sides and apex of abdomen; distance between front coxae equal to or wider than antennal club, about one-third or less of diameter of coxae; distance between middle coxae at least equal to diameter of coxae; prosternal process strongly developed behind coxae and overlapping mesosternum; mesosternal process and front of metasternum flat; mesepimeron with front border straight or slightly sinuate; coxae without hairs or tubercle on inner face; no ventral depression in male; last segment of abdomen in male with patch of apical hairs, no hairs in female. Tibiae gradually widened to apex, virtually impunctate or with rows of very faint punctures, outer apical angle of front tibia produced, of other tibiae with single straight tooth or spur, inner angle with smaller, subapical spur conspicuous in some specimens. Femora bulbous, short, middle femur extending not to base of metasternum but about halfway, hind femur not extending to apex of elytra, femora of male with backward-pointing tooth on inner side near apex (text fig. 44), of female, strongly sinuate and emarginate at same area. Tarsi, third segment on front legs much wider than antennal club, soles of tarsi entirely hairy; second segment almost as wide as long, one-half or one-third of length of first; claw segment inserted nearer base than middle of third. Aedeagus wider at apex, apex truncate or subacuminate, deflexed. Eighth tergum in male strongly emarginate, in female broadly rounded.

Color black or dull reddish, elytra of some

specimens bright red; surface generally shining.

ECOLOGY: Heller (1912, p. 392, footnote) mentioned a specimen collected by Ohaus in 1909 at 3000 meters between Loja and Sabanilla, southern Ecuador, as being found in leaves of *achupalla* "(*Bromeliaceae*: *Pourretia pyramidata*, *oder andere Art*)". These localities are in the Cordillera de Zamora in the Andes.

REMARKS: (See also discussion of subgroup above). Heller (1912), in his key to "*Metamasiopsis*," mentioned the single tooth at the apex of the front tibia of *lojanus*, but not the tooth on each of the other tibiae. He wrote that *lojanus* recalled the monotypic South American species *Paradiaphorus crenatus* Billberg, which also has toothed apices of the tibiae. That species differs, however, from *lojanus* and from other species of *Metamasius* in its exaggerated mesepimeron (text fig. 12), squared-off pygidium, and in the method of attachment of the apodemes of the aedeagus. It differs further from *lojanus* and *transatlanticus* by having a lateral line on the aedeagus, the femora not toothed, the coxae abundantly hairy, the front and middle coxae narrowly separated, and the pronotum margined at the base.

The obtuse angles or sinuations under the apex of the beak of males of *lojanus* are not sharp, like those of males of *condylus*, *ohausi*, and *amoenus*, but more rounded, like those of *lacordairei* and *venezolensis* (species of the *sanguinolentus* subgroup). The scutellum on two specimens is no wider than the base of the second elytral interval, but on another specimen it is slightly wider. One specimen has the third interval of the elytra on the disc cut through by the striae on each side.

One of each sex was dissected.

Metamasius transatlanticus (Kirsch)

Text figure 44

Heterotoxus transatlanticus KIRSCH, 1889, p. 35, pl. 3, fig. 67, Ecuador ("Baños-Pintuc, regione silvarum . . ."); type, male, Ecuador, in Staatliches Museum für Tierkunde, Dresden, examined.

Metamasiopsis transatlanticus var. *maculicollis* HELLER, 1912, p. 390, Sabanilla, Ecuador; type, male, in Staatliches Museum für Tierkunde, Dresden, examined.

DIAGNOSIS: Very similar to *lojanus*, dif-

fering in ways listed in description below, but chiefly by having outer apices of tibiae bidentate, not unidentate.

RANGE: Southern Ecuador, Colombia, Venezuela, and Costa Rica. (For data on the 13 specimens examined, see Appendix.)

DESCRIPTION: Length, 13 to 22 mm. Peduncle about as described for *lojanus*, but in some specimens rather more prominent behind as well as in front; in profile angulate. Frons and beak as described for *lojanus*, except for following features: beak of male at center of under side with four or five contiguous, flattish tubercles, these making beak appear crenulate in profile, but tubercles almost obsolete in one of two males from Costa Rica and apparently absent from two males from Baños and El Partidero, Ecuador; basal dilation rather stronger; sides behind apex not sinuate; beak of female with under side smooth. Antennal club, pronotum, elytra, and scutellum as described for *lojanus*, but club with spongy apex somewhat larger in some specimens, base of pronotum subtruncate, not sinuate, at middle, and apices of elytra rather oblique. Pygidium as described for *lojanus*, but punctures coarser, some specimens with raised, impunctate area at apex, males with no hairs visible.

Under side as described for *lojanus*, but distance between front coxae may be more than one-third of diameter of coxa and between middle coxae may be wider than diameter; last segment of abdomen feebly depressed at extreme apex and with few fine hairs. Tibiae as described for *lojanus*, except for outer apical angles which have two tiny teeth or spurs instead of one, the additional tooth of front tibia situated on sides behind outer apical tooth. Femora, tarsi, aedeagus, and eighth tergum as described for *lojanus*, but male often with small angle opposite femoral tooth and female with femora on inner side more angulate than sinuate, even vaguely toothed in some females; second segment of tarsus longer than wide in a specimen from Ecuador; apex of aedeagus may be rounded or subacuminate.

Color either black or with red marks on elytra in form of two or three incomplete red bands interrupted at suture, basal band lacking or partial in some specimens, or (variety *maculicollis*) pronotum black, with red

spot on sides near base, and elytra mostly red but with large black spots on sides and disc, and black on scutellum, sutural interval, and apex of elytra. Surface polished, shining, or elytra dull.

ECOLOGY: Specimens in the United States National Museum from Costa Rica are labeled as having been taken "on Bromeliad" in September, at Estrella, 2000 meters, by Picado, and "in Bromelia," at Tablazo, in May.

REMARKS: (See also discussion of subgroup above). The other species of the genus (*Heterotoxus*) in which Kirsch described *transatlanticus* occur in the Orient (Java, Sylhet). The type of the genus (*gratus*) was said by its author, Lacordaire (1866, p. 284), to resemble species of the genus *Sphenophorus* in its depressed form, but to differ in other ways (the scutellum, epipleurae, and intermediate segments of the abdomen). Heller (1912) transferred *transatlanticus* to *Metamasiopsis* Champion, and at the same time described the color variety synonymized above. Ohaus collected this variety with *lojanus* Heller at Sabanilla, Ecuador. MacIntyre collected an entirely black specimen at El Partidero, Ecuador, at about the same time that he collected specimens of *ornatus* Champion and *incisus* Vaurie of the *sanguinolentus* subgroup.

The overlain stripes on the elytral intervals cause them to appear narrower at the point where the shiny stripes tend to fade out. These stripes are present in some specimens of *lojanus*, and also in *bruneri* Buchanan from the Greater Antilles (group I); they may go halfway or wholly to the apex.

There is much variability in some of the characters, even in the apex of the aedeagus. Thus a male (Ecuador, in the Muséum National d'Histoire Naturelle) has the apex rather broadly rounded-truncate, a male (El Partidero, Ecuador, in the American Museum of Natural History), has it quite pointed, and a male (Estrella, Costa Rica, in the United States National Museum) has it rather narrowly rounded. The rolled, chitinated borders at the apex are of slightly different thickness in these three specimens, but all have the apex bent downward, perhaps more strongly in the specimen from El Partidero. This last specimen differs further from the

others of the species seen by being entirely black, by having the impressed lines under the beak much stronger at the base, by having no tubercles visible under the beak, and by having the middle femora somewhat longer. Possibly this male represents a distinct species, but the male from Estrella also has scarcely visible tubercles under the beak, and I believe it is more likely to be an individual variant.

The type locality given by Kirsch, Baños-Pintuc, is a combination of names, according to Brown (1941, pp. 818, 841, 842). He wrote that Baños is a famous collecting station on the Pastaza River south of Quito, and Puyo

(formerly known as Jivaria de Pintuc) is about 30 miles east of Baños on a tributary of the Pastaza. Much of the country around Puyo "is covered with virgin jungle," and as yet "no entomologist has spent much time there." The type was taken in "*región silvarum, 1000-2000 m.*" The type was from northern Ecuador as well as the black specimen from El Partidero, a locality in the "humid foothill forest of the Amazon basin type" (Brown, *loc. cit.*), just north of Puyo. The type locality of the variety *maculicollis*, Sabanilla, is in southern Ecuador.

Three males and two females were dissected.

INCERTAE SEDIS

Metamasius semirubripes HUSTACHE, 1936, p. 106, Chanchamayo, Peru; type, female, in Muséum National d'Histoire Naturelle, Paris, examined.

The unique type, which I have examined and dissected, is a female. Some of its external characters agree with those of the majority of species of group III, whereas other characters agree with those of some species of group I. As I have no male, I cannot be sure to which species group this species belongs. Judging, however, from its resemblance to *scutellatus* Hustache and *sulcirostris* Champion, both of which resemble the species of group III, but have the aedeagus and widely spaced coxae of species of group I, I believe *semirubripes* also will be found to belong with species of group I.

Five specimens have been seen (one an illustration) that may be this species, but they come from Colombia, not from Peru, and they differ from the type specimen in a number of details. The two males have the aedeagus with the lateral line, as in species of group I. The male and two females from Colombia (Bogota and San Carare) agree almost exactly with one another in their shape and coloration and agree also with a female from Pacayacu, Ecuador, illustrated by Günther (1941, p. 30, fig. 3), and called by him *semirubripes*. Günther, however, was not certain of his identification; nor am I. The second male resembles the type of *semirubripes* in shape, punctuation, and lack of red color on the dorsum, but unfortunately it lacks locality data. Thus the group position

of this species is left in doubt, but a description of the type is given below.

DESCRIPTION: Length, 14 mm. Peduncle narrowly sulcate throughout, showing slight sinuation or angulation in front when viewed in profile. Beak shorter than pronotum, evenly arcuate, cylindrical, virtually impunctate; in profile, slightly narrower at apex than apex of front femur; in dorsal view, basal dilation strong, scarcely longer than wide; scrobe with posterior edge distant from eye by less than width of scape; no fovea between scrobe and eye; beak inferiorly narrowly sulcate, not toothed at base. Antennal club elongate, compressed, sides slightly dilated, spongy part not quite one-half of whole. Pronotum longer than wide, with large, deep, irregularly placed punctures; short, impunctate, narrow space medially; surface uneven; sides in basal half slightly concave or emarginate; basal depression shallow; base margined but not impressed, strongly sinuate at middle. Elytra about one-third longer than pronotum; intervals finely punctate, straight at base; surface uneven; third and fourth striae and third interval at base depressed; striae punctures as large as those of pronotum, well separated, connected by impressed line and cutting into intervals; apices somewhat separately rounded. Scutellum U-shaped, slightly hollowed at center, placed slightly behind line of base of elytra. Pygidium narrowed to truncate apex, hairs at center and in two short tufts at apex.

Under side with same kind of large, dense

punctures as those of dorsum except for metepisternum which has fine, sparse punctures; distance between front coxae narrower than antennal club, about twice wider than segments of funicle, but less than one-half of width of coxa; between middle coxae distance less than diameter of coxa; prosternum between coxae flat, behind coxae rather prominent and truncate; mesosternal process tumid at center; front of metasternum virtually flat; mesepimeron with front border slightly arcuate, outer border truncate; last segment of abdomen not depressed, with fine, depressed hairs at middle. Tibiae straight, hind tibiae with sparse hairs within;

hind femur gradually widened, extending to apex of elytra, middle femur reaching about to base of metasternum; front tarsus with third segment as wide as club, hind tarsus with it slightly narrower, third segment of all tarsi widely dilated, hairy below except for glabrous spot at base, of middle and hind tarsi notably asymmetrical. Second segment of tarsus longer than wide; claw segment longer than first; tarsi dorsally shining. Eighth tergum bidentate at apex.

Color of dorsum and venter brownish, rather dark red when wet; femora red basally, black apically; beak and tibiae red, but with black tip.

APPENDIX: SPECIMENS EXAMINED

FOR CONVENIENCE, the species, as well as the countries under each species, are listed alphabetically, except for the polytypic species *M. fahraei* and *spinolae*, under which the countries are given from north to south. In the parentheses the name of the collector, if known, is followed by the letters indicating the institution or individual to which the specimens belong. These letter symbols are as follows:

A.M.N.H., the American Museum of Natural History
 A.U.C., Atlantic Union College, South Lancaster, Massachusetts
 B.M., British Museum (Natural History)
 C.A.C.S., Carlos A. Campos Seabra, Rio de Janeiro, private collection
 C.A.S., the California Academy of Sciences, San Francisco
 C.O'B., Charles O'Brien, University of California at Berkeley, private collection
 D.Z.S.P., Departamento de Zoologia, São Paulo, Brazil
 I.B.U.N., Instituto de Biologia, Universidad Nacional, Mexico City
 M.C.Z., Museum of Comparative Zoology, Cambridge, Massachusetts
 M.G.F., Museum G. Frey, Tutzing, Munich
 M.N.H.N., Muséum National d'Histoire Naturelle, Paris
 N.R., Naturhistoriska Riksmuseum, Stockholm
 S.E.M., Snow Entomological Museum, University of Kansas, Lawrence
 S.M.T., Staatliches Museum für Tierkunde, Dresden
 U.C., University of California at Berkeley
 U.C.D., University of California at Davis
 U.F., University of Florida, Gainesville
 U.I., University of Idaho, Moscow
 U.S.N.M., United States National Museum of the Smithsonian Institution, Washington, D. C.
 U.Z.M., Universitetets Zoologiske Museum, Copenhagen
 Z.I.A.N., Zoologicheskii Institut, Academia Nauk, Leningrad
 Z.M.B., Zoologisches Museum, Berlin
 Z.M.H., Zoologisches Museum, Hamburg
 Z.M.U.M., Zoological Museum, University of Moscow
 Z.S.M., Zoologische Staatssammlung, Munich

***Metamasius amoenus* (Günther)**

Ecuador: 1 ♂, 1 ♀ (Z.M.B.; Z.I.A.N.); Balzapamba, 1894, 9 ♂, 4 ♀ (de Mathan, M.N.H.N.);

Balzapamba, 1 ♀ (Haensch, Z.M.B.); Chimbo, 1891, 3 ♂, 2 ♀ (de Mathan, M.N.H.N.); Nanegal, 5000 ft., 1 ♂ (Dolby-Tyler, B.M.); San Carlos, July 5, 1936, 1 ♂ (type, S.M.T.); San Carlos, Oct. 23, 28, 1935, 2 ♂ (Schultze-Rhonhof, Z.M.B.); Santo Domingo, 1 ♂ (M.N.H.N.).

***Metamasius annulatus* (Champion)**

Costa Rica: Cariblanco, 2 ♂, 1 ♀ (Lankester, B.M.); Cartago, 1 ♂ (S.M.T.); Hamburg Farm, Reventazon, May 22, 1924, 1 ♂ (U.S.N.M.); Reventazon, Apr. 27, 1937, 1 ♂ (U.S.N.M.); San Carlos, 1 ♀ (S.M.T.); San Isidro, Cartago, Aug., 1963, 1 (Janzen, C.O'B.); Savanillas de Pirris, 1 ♂ (Underwood, B.M.); Tuis, 3 (M.N.H.N., B.M.). *Ecuador*: Balzapamba, 1 (Haensch, Z.M.B.); Balzapamba, 1893, 7 (de Mathan, M.N.H.N.); Chimbo, 1891, 7 (de Mathan, M.N.H.N.); La Chima, 1893, 1 (de Mathan, M.N.H.N.). *Panama*: Chiriqui, 1 (S.M.T.); "Costa Rica Chiriqui," 1 (S.M.T.); Volcan de Chiriqui, 4000–6000 ft., 1 ♂, 1 ♀ (lectotype, Champion, B.M.); Lino, 1 (S.M.T.).

***Metamasius aurocinctus* (Champion)**

Costa Rica: 2 ♂, 1 ♀ (S.M.T., U.S.N.M.). *Mexico*: 1 ♀ (B.M.). *Nicaragua*: Chontales, 1 ♂ (lectotype, Belt, B.M.). *Panama*: Las Cascadas, Canal Zone, 1 ♂ (type of *biocellatus*, Jackson, U.S.N.M.).

***Metamasius aurofasciatus* (Brême)**

Colombia: 4 ♂ (B.M., U.S.N.M., S.M.T.); Andagoya, Rio Condoto, Choco, 1 ♀ (B.M.); Cauca bei Cali, 1896, 2 ♂ (Bürger, Z.M.B.); Rio d'Agua, 5 (S.M.T., M.N.H.N.); Villaviciosa, 1919, 1 ♀ (M.N.H.N.). *Ecuador*: 1 ♀ (S.M.T.). *Mexico*: 1 ♂ (Richter, S.M.T.); 1 ♂ (Z.M.B.). *Venezuela*: 1 ♂ (S.M.T.).

***Metamasius biguttatus* Champion**

Guatemala: Quezaltenango: Cerro [= Volcan] Zunil, 4000 ft., 1 ♂ (type, Champion, B.M.). *Mexico*: 2 ♂ (M.N.H.N.); Veracruz: Toxpam [= Tuxpan], 1 ♀ (type of *bigeminatus*, B.M.); Coyame, Lake Catemaco, June, 1954, 1 ♂ (Kissinger, A.U.C.). *Without locality*: 1 ♂ (Z.M.B.).

***Metamasius bolivari* Vaurie, new species**

Ecuador: (See under the species in the text).

***Metamasius carinipyga* (Champion)**

Ecuador: Balzapamba, 1894, 1 (de Mathan, M.N.H.N.); San Carlos, Oct. 4, 1935, 1 (Schultze-Rhonhof, Z.M.B.). *Mexico*: Oaxaca: Palomares,

1 ♀ (B.M.). *Nicaragua*: Chontales, 1 ♀ (lectotype, Janson, B.M.), 1 ♀ (Richardson, B.M.). *Peru*: 1 ♀ (LeMoult, M.N.H.N.); Callanga "Bolivia," 1 (Garlepp, M.N.H.N.). *Peru-Brazil frontier*: Jan. 21, 1928, 1 ♂ (Bassler, A.M.N.H.).

***Metamasius circumdatus* (Champion)**

Colombia: Bogota, 1 ♀ (M.N.H.N.); Cananche, Cundinamarca, 1900, 1 ♂ (M.N.H.N.); "Carare San," May 7, 1939, 1 ♂ (Otoya, U.S.N.M.); Cauca Valley, 1 ♂ (A.M.N.H.). *Costa Rica*: 1 ♀ (S.M.T.); Hamburg Farm, Reventazon, May 22, 1922, Mar. 2, 1926, Oct. 15, 1932, 5 (U.S.N.M.); Infernillo, Rio Reventazon, 1000 meters, 1 ♂ (S.M.T.); Turrialba, May 21, 1951, 1 ♂ (Cartwright, U.S.N.M.); Turrialba, Apr., 1 (Z.M.B.); Zent, July, 1903, 1 ♂ (Pittier, B.M.). *Ecuador*: Balzapamba, 13 (M.N.H.N.); Chimbo, 1891, 5 (de Mathan, M.N.H.N.); Santo Domingo, 1 ♂ (M.N.H.N.). *Nicaragua*: 1 ♂ (S.M.T.); Chontales, 1 ♂ (lectotype, B.M.), 2 (Belt, B.M.), 2 ♀ (B.M., U.S.N.M.). *Panama*: Barro Colorado, May, 1929, 1 ♀ (Darlington, M.C.Z.); El Valle, Aug., 1946, 1 (Kraus, U.S.N.M.).

***Metamasius circumjectus* (Champion)**

Costa Rica: Cariblanco, 1 ♀ (Lankester, B.M.); San Carlos, 1 ♂, 1 ♀ (S.M.T.). *Ecuador*: Balzapamba, 1894, 1 ♀ (de Mathan, M.N.H.N.); Chimbo, 1891, 2 ♂ (de Mathan, M.N.H.N.); San Carlos, Dec. 22, 1935, 1 ♀ (Schultze-Rhonhof, Z.M.B.). *Panama*: Barro Colorado, Dec., 1928, 1 ♀ (Curran, A.M.N.H.), June, 1939, 1 ♀ (Zetek, U.S.N.M.); Bugaba, 1 ♀ (lectotype, Champion, B.M.); Chiriqui, 1 ♂ (S.M.T.); Volcan de Chiriqui, 2500-4000 ft., 1 ♂ (Champion, B.M.); Fort Davis, Canal Zone, June, 1957, 1 ♂ (Blanton, U.S.N.M.).

***Metamasius condylus* Vaurie, new species**

Costa Rica: (See under the species in the text).

***Metamasius duplocinctus* (Champion)**

Costa Rica: 1 (S.M.T.); Miravalles, 1 ♂ (lectotype, Underwood, B.M.); Infernillo, 1 ♂ (M.N.H.N.); Pico de Escazu, 1 (Assmann, U.S.N.M.); Ramal, Parismina, Santa Clara, July, 1926, 1 ♂ (U.S.N.M.); Monteverde de Purtaresas, 1959, 1 (Palmer, U.S.N.M.); Pejiville, June, 1924, 1 (B.M.). *Ecuador*: Bucay, July 17, 1905, 1 ♀ (Ohaus, S.M.T.). *Guatemala*: 1 (B.M.). *Mexico*: Veracruz: Santecomapan, 1 ♀ (B.M.). *Nicaragua*: 3 (S.M.T.; Belt, B.M.); Chontales, 1 ♂ (U.S.N.M.), 2 (Belt, B.M.). *Panama*: Chiriqui, 8 (S.M.T., M.N.H.N., B.M., Z.M.B.).

***Metamasius elegantulus* Hustache**

Brazil: 1 ♀ (type, Bruch, M.N.H.N.), 1 ♂ (M.N.H.N.); Amazonas: Tarapote, 1895, 2 ♂

(de Mathan, M.N.H.N.); Santa Catarina: Hansa Humboldt, 1 ♀ (Reitter, Z.S.M.); Distrito Federal: Guaratiba, Jan. 7, 1934, 1 ♂ (Silva, C.A.C.S.); Floresta da Tijuca, 1956, Dec., 1955, 1 ♂, 1 ♀ (C.A.C.S.). *Ecuador*: Chupientsa, Rio Upano, Feb. 10, 1939, 1 ♂ (F. M. Brown, A.M.N.H.).

Metamasius fahraei

***Metamasius fahraei fahraei* (Gyllenhal)**

Mexico: "Between Oaxaca and Acapulco," 1 ♀ (type, N.R.); Oaxaca: 50 (M.N.H.N., B.M., U.S.N.M., A.M.N.H., M.G.F., Z.M.B.); 13 miles west of Oaxaca, July, 1964, 1 ♂ (Raske, C.O.B.); Valle de Oaxaca, 2 ♂, 3 ♀ (I.B.U.N.); Capulalpam, 4 (S.M.T., B.M.); Totolapan, 1 (S.E.M.); Tlacolula, July, 1955, 1959, 2 (Vaurie, A.M.N.H.); Mitla, July, 1955, 10 (Vaurie, A.M.N.H.; C.O.B.); South of Ocotlan, 1 (C.A.S.). Guerrero: 2 (B.M., U.S.N.M.); Acapulco, June, 1 (S.E.M.); Mochitlan, 1 (B.M.). Colima: 1 (U.S.N.M.). Veracruz (no exact locality): 1905, 1 ♂, 2 ♀ (U.S.N.M.). *Brazil* (error?): 1 ♀ (S.M.T.). *Colombia* (error?): 2 (S.M.T.). *Cuba* (error?): 1 (Z.M.B.).

***Metamasius fahraei striatoforatus* (Gyllenhal)**

Mexico: Veracruz: Orizaba, 1 (B.M.); Jalapa, 3 (B.M., A.M.N.H.); Almolonga, 1 ♂ (Z.M.B.). Distrito Federal: Mexico City, 1 (B.M.). Oaxaca: 21 miles south of Matias Romero, July, 1964, 1 ♀ (Johnson, C.O.B.); Temascal, June, 1964, 1 ♀ (Janzen, C.O.B.); 14 miles northwest of Tehuantepec, June, 1 ♀ (S.E.M.); Salina Cruz, July 19, 1951, 1 ♂ (U.C.D.). *Guatemala*: 1 ♀ (B.M.); El Rancho, 1 (U.S.N.M.); Zacapa, 4 (U.S.N.M.). *El Salvador*: La Union, 1 (U.S.N.M.); Izalco, 1 (U.S.N.M.). *Nicaragua*: 2 (Z.I.A.N.). *Costa Rica*: 9 (S.M.T., B.M.); Azahar de Cartago, 1 (B.M.); La Fuente, 1 (U.S.N.M.); Piedras Negras, 1 (U.S.N.M.); San Jose, 7 (B.M.). *Trinidad*: 1 ♂, 1 ♀ (B.M.). *Venezuela*: 2 (S.M.T.); Caracas, 3 (U.S.N.M., U.Z.M.); Maracaribo, 1 (U.S.N.M.); Maracay, May, 1935, 1 ♀ (Escalona, U.S.N.M.); Macuto, Sept., 1925, 1 ♀ (Wolcott, U.S.N.M.); Yacua (or Yagua?), 1937, 1 ♀ (Beatty, U.S.N.M.). *Colombia*: 1 ♂ (type of *striatoforatus*, N.R.), 6 (B.M., Z.M.B., Z.I.A.N.); Bogota, 2 (S.M.T.), 1 ♂, 1 ♀ (type and allotype of *perforatus*, N.R.). *Brazil*: 1 (Z.I.A.N.). *Guianas*: 1 (U.Z.M.).

***Metamasius graphipterus* (Champion)**

Colombia: 1 ♂, 1 ♀ (B.M., U.S.N.M.); Muzo, Oct., 1918, 1 (type of *fallaciosus*, M.N.H.N.). *Costa Rica*: Miravalles, 1 ♀ (lectotype of *graphipterus*, B.M.). *Guatemala*: Guatemala City, Mar. 8, 1948, 1 ♂ (C.A.S.). *Mexico*: 1 ♂ (B.M.); Tapachula, 1 (Z.M.B.). *Panama*: Canal Zone, Mar. 21, 1956, 1 (U.S.N.M.). *United States*: Summit, New

Jersey, Apr. 27, 1914, 1 ♀ (type of *weissi*, U.S.N.M.), July, 1917, 1918, 2 ♂, 4 ♀ (Nicolay, Weiss, A.M.N.H.); Washington, D. C., Oct., 1937, 1 (U.S.N.M.) *Venezuela*: 1 (S.M.T.).

***Metamasius imitator* Vaurie, new species**

Peru: (See under the species in the text).

***Metamasius incisus* Vaurie, new species**

Ecuador and Peru: (See under the species in the text).

***Metamasius lacordairei* (Chevrolat)**

Colombia: 1 ♀ (type, N.R.), 1 ♂, 1 ♀ (S.M.T., B.M.); San Antonio, 1908, 1 ♀ (Fassl, Z.M.B.).

***Metamasius laetus* (Erichson)**

Brazil: 1 ♂ (Bates, B.M.); São Paulo de Olivença, 1883, 2 (de Mathan, M.N.H.N.). *Ecuador*: 1 ♂ (B.M.); Baños to Canelos, 1894, 6 (de Mathan, M.N.H.N.); Loja, 1 (Abbé Gaujon, M.N.H.N.); [El] Napo, 1 ♂ (Haensch, Z.M.B.); Sabanilla, 1 ♀ (Ohaus, S.M.T.); Santa Inez, 6 ♂ (Haensch, Z.M.B.); Yunguilla, Rio Pastaza near Baños, Tungurahua, 1500 meters, Apr., 1937, 1 ♂ (Clark-MacIntyre, A.M.N.H.). *Peru*: "Peru mont.", 1 ♀ (type of *laetus*, Z.M.B.); Achinamiza, Dec., 1924, 1 ♂ (A.M.N.H.); Callanga, 1 ♂ (type of *luteus*, M.N.H.N.), 1 (Garlepp, M.N.H.N.); Contamana, Rio Ucayali, Apr., 1947, 1 ♂ (C.A.C.S.); Hera (Jera), Moyobamba, San Martin, 860 meters, June, 1947, 1 ♂ (Woytkowski, A.M.N.H.); Moyobamba, 1887, 5 (de Mathan, M.N.H.N.); Huanuco, 2 ♂ (S.M.T.); Marcapata, 2 ♂ (S.M.T.); Pachitea, 1 (N.R.); Tarapoto, 1886, 1 (de Mathan, M.N.H.N.).

***Metamasius limulus* Vaurie, new species**

Brazil: (See under the species in the text).

***Metamasius lojanus* (Heller)**

Bolivia: Cochabamba, El Limbo, 2000 meters, 1 ♀ (C.O.B.). *Brazil*: 1 ♀ (Z.M.B.). *Ecuador*: Loja, 1 ♂, 3 ♀ (U.S.N.M., N.R.), 1 ♂, 4 ♀ (Abbé Gaujon, M.N.H.N.), 1 ♂, 1 ♀ (type, Ohaus, S.M.T.); Sabanilla, 2 ♀ (Ohaus, S.M.T.); Ost-cordillera [East Cordillera], 3000 meters, Oct., 1905, 1 ♂ (Ohaus, N.R.). *Peru*: Huascary [Ridge], Sept. 21, 1911, 7000 ft., 1 ♀ (Townsend, U.S.N.M.).

***Metamasius mesomelas* (Champion)**

Colombia: Muzo, 1 ♀ (M.N.H.N.). *Costa Rica*: Boca de Limon, 1 ♀ (Pittier, B.M.); Chiriqui, 1 (Z.M.B.); Hamburg Farm, Reventazon, Mar. 20, 1924, 1 ♂ (U.S.N.M.). *Ecuador*: Pa . . belaz [spelling?], 1 ♀ (B.M.). *Mexico*: Veracruz: Santecomapan [=Sontecomapan], 1 ♂ (B.M.); Santa

Rosa, Aug., 1 ♀ (Schaus, U.S.N.M.). *Nicaragua*: 1 (U.S.N.M.); Chontales, 1 ♂ (B.M.). *Panama*: Bugaba, 1 ♂ (Champion, B.M.); Chiriqui, 1 ♂ (lectotype, B.M.), 1 ♀ (N.R.); Volcan de Chiriqui, 1 ♀ (Champion, B.M.).

***Metamasius miniatopunctatus* (Chevrolat)**

British Honduras: Belize, 4 ♂, 2 ♀ (Peck, M.C.Z.); Toledo District, Oct., 1906, 4 ♂ (Peck, M.C.Z.); Punta Gorda, Sept., 1906, 1 ♀ (Peck, M.C.Z.). *Costa Rica*: June, 1926, Sept., 1928, 2 ♂ (Nevermann, S.M.T.); Hamburg Farm, Reventazon, June, 1925, 1926, 2 ♂, 1 ♀ (Nevermann, U.S.N.M.). *Ecuador*: Balzapamba, Mar., Apr., 1894, 1 ♂, 1 ♀ (de Mathan, M.N.H.N.). *Guatemala*: El Rancho, 1 ♂ (Kellerman, M.C.Z.). *Verapaz*: Cubilguitz, 1 ♂ (Champion, B.M.); San Juan, 1 ♀ (Champion, B.M.). *Mexico*: 1 ♂ (type, N.R.), 1 ♀ (U.S.N.M.). *Veracruz*: San Andres, Feb., 1953, 1 ♀ (Kissinger, A.U.C.); Cordoba, 1 (U.S.N.M.). *Nicaragua*: Chontales, 1 ♂ (Janson, B.M.).

***Metamasius monilis* Vaurie, new species**

In addition to the type and paratype from Ecuador and Peru, the following specimen has been examined: "Origin, coll. at N. Y. Bot. Garden," May 27, 1944, 1 ♀ (U.S.N.M.).

***Metamasius ohausi* (Günther)**

Ecuador: 1 ♂, 1 ♀ (U.S.N.M.); Baños to Canelos, 1894, 9 ♂, 1 ♀ (de Mathan, M.N.H.N.); San Francisco, Rio Pastaza, 1 ♂ (Clark-MacIntyre, A.M.N.H.); Santa Inez, 3 ♂ (Haensch, S.M.T., including cotype of *ohausi*), 2 ♂, 2 ♀ (Z.M.B.). *Peru*: 1 ♀ (type of *decoratus*, S.M.T.), 1 ♀ (N.R.); Chanchamayo, 1 ♂ (Freymann, Z.M.B.); Huauruba [or Huanibo?], 1 ♂ (N.R.); Fundo Sinchono, Huanuco, Sept., 1947, 1 ♀ (C.A.C.S.); Marcapata, 2 ♀ (S.M.T.); Moyobamba, 1888, 1 ♂, 1 ♀ (de Mathan, M.N.H.N.); Mishqui-yacu, Moyobamba, San Martin, 1200 meters, Aug. 10, 1946, 1 ♂ (A.M.N.H.); Rio Santiago, Nov. 18, 1924, 1 ♂ (A.M.N.H.).

***Metamasius orizabaensis* (Chevrolat)**

Guatemala: Tamahu, Verapaz, 1 ♀ (Champion, B.M.). *Mexico*: 1 ♂ (Richter, S.M.T.), 1 ♀ (B.M.). *Veracruz*: Orizaba, 1 (type, N.R.), 1 ♂ (B.M.); San Andres, Feb., 1953, 2 ♀ (Kissinger, A.U.C.). *Without locality*: 2 (Z.M.B.).

***Metamasius ornatus* (Champion)**

Bolivia: Yungas de la Paz, 1 ♀ (Heyne, Z.M.B.). *Brazil*: Amazonas: Iquitos, 1 (de Mathan, M.N.H.N.); Pebas, 1880, 1 (de Mathan, M.N.H.N.); Tabatinga, Oct., 1956, 1 ♂, 1 ♀ (Oliveira, C.A.C.S.). *Colombia*: 1 ♂ (S.M.T.);

Muzo, 1 (Z.M.B.); Rio Guayuriba, Meta, Dec., 1946, 1 ♀ (Richter, A.M.N.H.); Umbria, Guines Fluss, 1 ♂ (M.N.H.N.). *Costa Rica*: Nov. 15, 1922, 1 ♂ (Nevermann, S.M.T.); Guapiles, Santa Clara, Nov. 21, 1934, 1 ♀ (U.S.N.M.); Hamburg Farm, Reventazon, July 22, 1922, 1 ♀ (U.S.N.M.); San Jose, 1 ♀ (Valerio, U.S.N.M.). *Ecuador*: Archidona, 1 ♂, 1 ♀ (B.M., Z.M.B.); Balzapamba, 1894, 2 (de Mathan, M.N.H.N.); Baños to Canelos, 1894, 1 ♂ (de Mathan, M.N.H.N.); Cachabe, Jan., 1897, 1 ♂ (Rosenberg, B.M.); Chimbo, 1891, 2 ♂, 1 ♀ (de Mathan, M.N.H.N.); Coca, 1 ♂ (Haensch, Z.M.B.); El Partidero, Nov. 17, 1935, 1 ♀ (A.M.N.H.); Jarugui, El Napo, Sept., 1931, 1 ♀ (type of *aurantiacus*, Benoist, M.N.H.N.); Quito, 1 ♂ (Vorbeck, U.Z.M.); Mangosisa R. [iver?], 2 ♀ (Gomez, B.M.); Santo Domingo, 450 meters, 1 ♂ (M.N.H.N.). *Nicaragua*: Chontales, 1 ♂ (lectotype of *ornatus*, Janson, B.M.), 3 ♀ (Belt, B.M.). *Panama*: Pirri Range, Apr., 1912, 1 ♂ (Goldman, U.S.N.M.). *Peru*: Huallaga Central, Huanuco, 750 meters, July, 1962, 1 ♂ (C.O.B.); middle Rio Ucayali, Nov. 1, 1923, 1 ♂ (A.M.N.H.); Mishuyacu, Mar., 1930, 1 ♀ (Klug, U.S.N.M.); Marcapata, 2 ♂ (S.M.T.); Rio Santiago, Nov., 1924, Oct., Aug., 1930, 2 ♂, 1 ♀ (Bassler, A.M.N.H.); Tarapoto, 1 ♀ (S.M.T.).

***Metamasius pallisteri* Vaurie, new species**

Guyana, Ecuador, Peru, and Bolivia: (See under the species in the text).

***Metamasius personatus* Vaurie, new species**

Costa Rica and Panama: (See under the species in the text).

***Metamasius pruinus* (Champion)**

Colombia: Bogota, 1 ♂, 1 ♀ (S.M.T., Z.I.A.N.); Cananche, Cundinamarca, 1900, 5 (de Mathan, M.N.H.N.); Muzo, Oct., 1918, 1 ♂ (type of *appollinairei*, M.N.H.N.); Santa Fe de Bogota, 1 ♂ (M.N.H.N.). *Panama*: Chiriqui, 2 ♂ (S.M.T., N.R.); Volcan de Chiriqui, 1 ♂ (lectotype of *pruinus*, Champion, B.M.), 1 ♀ (Champion, B.M.).

***Metamasius pulcherrimus* (Chevrolat)**

Costa Rica: Hamburg Farm, Reventazon, Nov. 15, 1923, 1 ♂ (Nevermann, U.S.N.M.); Turrialba, 1 (Z.M.B.). *Mexico*: 1 (type, N.R.), 2 ♂, 1 ♀ (B.M., U.S.N.M.).

***Metamasius rectistriatus* (Champion)**

Costa Rica: 1 ♀ (B.M.); Cariblanco, July, 1903, 1 ♀ (Lancker, B.M.). *Ecuador*: 1 ♂ (S.M.T.). *Nicaragua*: Chontales, 1 ♂ (lectotype, Janson, B.M.). 1 ♂ (Belt, B.M.). *Panama*: Chiriqui, 1 ♀ (B.M.).

***Metamasius rubricatus* (Hustache)**

Brazil: 2 ♀ (Bates, B.M.), 1 ♀ (A.M.N.H.); Bahia, 1 ♂ (Z.M.B.); Ega, 1 ♀ (B.M.); Espirito Santo, 1906, 1 ♂, 1 ♀ (Garbe, D.Z.S.P.); Amazonas: 1 ♀ (Bates, B.M.), Uypizanga, Rio Negro, 14 km. from Manaus, Oct.-Nov., 1941, 1 ♂ (Rabaut, A.M.N.H.). *Ecuador*: Baños to Canelos, 1894, 1 ♂ (de Mathan, M.N.H.N.). *French Guiana*: St. Laurent du Maroni, 1 ♀ (type, M.N.H.N.). *Without locality*: 1 ♀ (B.M.).

***Metamasius rubrovariegatus* (Bowie)**

Brazil: 1 ♂ (type of *rubrovariegatus*, U.S.N.M.). *Costa Rica*: 1 ♀ (Nevermann, S.M.T.), 1 ♂ (Heyne, S.M.T.); Cariblanco, 1902, 1 ♂ (B.M.), 1 ♂, 1 ♀ (Lancker, B.M.); La Palma, 1100 meters, June, 1926, 1 ♀ (U.S.N.M.); Pico de Escazu, 1 ♂ (Assman, U.S.N.M.); Tuis, 2400 ft., 1 ♂ (co-type of *quadrinotatus*, Lancker, U.S.N.M.); Turrialba, 1 (Z.M.B.). *Panama*: Chiriqui, 1 ♂ (lectotype of *quadrinotatus*, B.M.).

***Metamasius rudeli* (Voss)**

Colombia: 2 ♀ (U.S.N.M., N.R.); Rio Aguacatal, 2000 meters, 1 ♂ (type, Fassl, Z.M.H.); Rio Aguacatal, 2000 meters, 1 ♂ (S.M.T.). *Ecuador*: 1 ♀ (U.S.N.M.), 1918, 1 ♂ (Felsche, S.M.T.); Baños to Canelos, 1894, 2 ♂ (de Mathan, M.N.H.N.); Rio Blanco, Pastaza watershed, Oriente, 1600 meters, May, 1937, 1 ♂ (Clark-MacIntyre, A.M.N.H.); Santa Inez, 1 ♂ (Haensch, Z.M.B.).

***Metamasius sanguinolentus* (Olivier)**

British Honduras: Punta Gorda, Aug., 1934, 1 ♂ (White, A.M.N.H.). *Colombia*: 1 (B.M.); Cananche, Cundinamarca, 1900, 4 (de Mathan, M.N.H.N.); Muzo, 1921, 2 ♂ (M.N.H.N.); Puerto Wilches, Dec. 7, 1920, 1 ♂ (Schultze, Z.M.B.). *Costa Rica*: Caño Blanco, at sea level, July, 1931, 1 ♂ (Valerio, U.S.N.M.); Guapiles, Limon, Aug. 9, 1963, 1 ♀ (Janzen, C.O.B.); Hamburg Farm, Reventazon, July 5, 1929, 1 ♀ (U.S.N.M.); Las Mercedes, Santa Clara, Sept., 1926, 1 ♂ (U.S.N.M.); San Carlos, 1 ♂ (U.S.N.M.); Toro Amarillo, Santa Clara, Oct., 1925, 1 ♂ (U.S.N.M.); Plain of Limon, July, 1928, 1 ♂ (U.S.N.M.). *Guatemala*: 1 (B.M.); Cubilguitz, 1 ♂ (Champion, B.M.); Panzos, Verapaz, 1 ♂ (M.N.H.N.), 1 ♀ (Conrad, B.M.); Secanquin, Apr., 1905, 1 ♂ (Pittier, U.S.N.M.). *Mexico*: 4 (B.M.); Presidio, Veracruz, Oct., 1942, 1 ♀ (Islas, I.B.U.N.). *Nicaragua*: 8 (B.M., M.N.H.N., S.M.T., U.S.N.M.); Chontales, 14 (Belt, Richardson, Janson, B.M.). *Panama*: Chiriqui, 1 ♀ (B.M.).

***Metamasius sinuatus* (Champion)**

Costa Rica: Pozo Azul, Rio Grande de Pirris, Dec. 28, 1923, 1 ♂ (U.S.N.M.). *Panama*: Chiriqui,

3 ♂, 4 ♀ (B.M., N.R., M.N.H.N., S.M.T.); Volcan de Chiriqui, 2 ♂ (including lectotype, Champion, B.M.).

***Metamasius spinolae*¹**

***Metamasius spinolae spinolae* (Gyllenhal)**

Mexico: More than 50 (B.M., S.M.T., M.N.H.N., Z.M.B., and type of *spinolae*, N.R.). Aguascalientes: About 12 (U.S.N.M., U.C.). Chihuahua: Santa Barbara, 1 (A.M.N.H.). Colima: 5 (U.S.N.M., I.B.U.N.). Distrito Federal: More than 25 (I.B.U.N., U.S.N.M., B.M., A.M.N.H., D.Z.S.P., C.A.S.). Durango: More than 50 (U.S.N.M., B.M., A.M.N.H., U.C., Z.M.B.). Guanajuato: About 12 (U.S.N.M., B.M., A.M.N.H., C.O'B., S.M.T.). Guerrero: 13 (B.M., M.G.F., S.E.M., C.A.S., Z.M.B.). Hidalgo: 13 (U.S.N.M., C.O'B., S.E.M.). Jalisco: More than 50 (U.S.N.M., B.M., A.M.N.H., M.N.H.N., C.A.S., U.C., C.O'B., S.E.M., Z.M.B.). Mexico: More than 50 (U.S.N.M., I.B.U.N., A.M.N.H., C.A.S.). Michoacan: More than 15 (U.S.N.M., B.M., I.B.U.N., S.E.M., C.O'B.). Morelos: More than 50 (U.S.N.M., B.M., A.M.N.H., I.B.U.N., C.A.S., S.E.M., D.Z.S.P., Z.M.B.). Nayarit: Santa Maria del Oro, 16 (C. O'B.); 7 miles south of Jalisco, 1 (A.M.N.H.); Ixtlan del Rio, 1 (A.M.N.H.); Ahuacatlan, 1 (U.C.); La Mesa de Nayarit, 1 (U.C.); Jesus Maria, 1 (U.C.), Chacala, 1 (Z.M.B.). Nuevo Leon: Southwest of China, 1 (S.E.M.). Oaxaca: Huajuapán de Leon, 1 (I.B.U.N.); Nochistlan, 1 (C.O'B.); Sierra Mixteca [Sierra de las Mixtecas], 8 (Z.M.B.); Tamazulapan, 4 (C.O'B.). Puebla: 1 ♀ (type of *obliquefasciatus*, N.R.), 9 (B.M., S.M.T.); Acatlan, 1 (S.E.M.); Atlisco, 1 (B.M.); Calcaloapan, 22 (C.O'B.); Tecamachalco, 1 (C.O'B.); Tepeaca, 3 (C.O'B.); Tehuiztingo, 1 (S.E.M.). Tehuacan, 18 (including type and paratypes of var. *rubronigrum*, U.S.N.M.); Tlacotepec, 2 (U.F.). Queretaro: 7 (C.O'B., S.E.M.). San Luis Potosi: 3 (B.M.). Sinaloa: Escuinapa, 2 (A.M.N.H.). Zacatecas: 18 (A.M.N.H., C.A.S., U.C., A.U.C.). Doubtful records: *Costa Rica*: 1 ♀ (U.S.N.M.). *Colombia*: 1 (Westermann, U.Z.M.). *Brazil*: 1 (S.M.T.). *Without locality*: 18 (Z.M.B.).

***Metamasius spinolae validus* (LeConte)**

United States: California: About 50 (U.S.N.M., A.M.N.H., C.O'B., C.A.S., U.C., S.E.M., including cotype of *procerus* in Z.M.U.M.). Arizona: 1 ♂ (type of *subnitens*, U.S.N.M.), and about 50 (U.S.N.M., A.M.N.H., C.O'B., C.A.S., S.E.M.). *Mexico*: Sonora: 8 (A.M.N.H., B.M., C.A.S., C.O'B.). Sinaloa: Alamosa [not located], 1 (C.A.S.); Mazatlan, 16 (U.S.N.M., A.M.N.H.,

Z.M.B.); Venedio (=El Venadillo), 1 (C.A.S.); Villa Union, 1 (C.O'B.); Presidio, 2 (Z.I.A.N.). *Baja California* (all C.A.S. unless otherwise stated): Carmen Is., 1; Ildefonso Is., 1; Isla Partida, 1; Espirito Santo Is., 1; Monserrate Is., 1; Las Animas, Sierra Laguna, 1; Mesquital, 1 (U.C.); Palmarita, 1 (U.S.N.M.); Rosarito Beach, 1; between San Jose del Cabo and Triunfo, 1 (A.M.N.H.).

***Metamasius spurius* Vaurie, new species**

Ecuador: (See under the species in the text).

***Metamasius strigosus* (Erichson)**

Brazil: 1 ♂ (Bates, B.M.); Benjamin Constant, Amazonas, June, 1942, 1 ♀ (Parko, C.A.C.S.); São Paulo de Olivença, 1883, 4 ♂ (de Mathan, M.N.H.N.). *French Guiana*: 1 ♀ (U.S.N.M.); Cayenne, 1 ♂ (B.M.); St. Laurent du Maroni, 1 ♀ (M.N.H.N.). *Peru*: "Peru mont.," 1 ♀ (type, Z.M.B.); middle Rio Ucayali, Dec., 1923, 2 ♂, 1 ♀ (Bassler, A.M.N.H.); Rio Santiago, Aug., 1930, Nov., 1924, 1 ♂, 2 ♀ (Bassler, A.M.N.H.); Calanga, "Bolivia," 1 (Garlepp, M.N.H.N.).

***Metamasius transatlanticus* (Kirsch)**

Colombia: 1 ♂ (B.M.); Villavicencia, 1919, 1 ♀ (M.N.H.N.). *Costa Rica*: Estrella, 2000 m., Sept., 1 ♂ (Picado, U.S.N.M.); Tablazo, May 12, 1936, 1 ♂ (U.S.N.M.). *Ecuador*: 1 ♂ (M.N.H.N.), 1 ♂ (type, S.M.T.); Baños to Canelos, 1884, 1 ♂ (de Mathan, M.N.H.N.); El Partidero, Nov. 26, 1935, 1 ♂ (MacIntyre, A.M.N.H.); Macas, 1 ♂ (Z.M.B.); Loja, 2 ♂ (Abbé Gaujon, M.N.H.N.); Sabanilla, 1 ♂ (type of variety *maculicollis*, S.M.T.). *Venezuela*: 1 ♀ (Staudinger, N.R.).

***Metamasius validirostris* (Gyllenhal)**

Colombia: 1 ♀ (U.S.N.M.). *Ecuador*: Balzapamba, 1894, 1 ♂ (de Mathan, M.N.H.N.). *Guatemala*: Cerro Zunil, 1 ♂, 1 ♀ (B.M.); Pancina, 2 ♂ (B.M.); Pantaleon, 1 ♂ (B.M.); Panzos, 2 ♂, 2 ♀ (M.N.H.N.); Purula [=Purulha], 1 ♀ (B.M.). *Mexico*: 2 ♂ (types of *validirostris* and *bifasciatus*, N.R.), 6 ♂, 4 ♀ (B.M., M.G.F.); Tabasco, 1 (Z.M.B.); Tepansacualco [=Tepamacoalco], Oaxaca, 3 ♀ (B.M.); Veracruz: Catemaco, Coscuapa [spelling?], June, 1954, 1 ♀ (Kissinger, A.U.C.); Coatepec, Aug., 1952, 1 ♂ (Selander, A.U.C.); Cordoba, Aug., 1928, 1 ♂, 2 ♀ (C.O'B., U.S.N.M.); Fortin de las Flores, July, 1963, 1 ♂, 1 ♀ (Foster, C.O'B.), Aug., 1959, 1 ♂, 1 ♀ (U.S.N.M.); Huatusco, July, 1901, 1 ♀ (I.B.U.N.); Jalapa, 27 (A.M.N.H., B.M.); Misantla, 1 ♂, 1 ♀ (B.M.); Motzorongo, 2 ♀ (Z.M.B.); Rio Metlac, near Fortin, Dec., 1948, 1 ♀ (Leech, C.A.S.); Zongolica, May, 1963, 2 ♂, 2 ♀ (I.B.U.N.).

¹ Only the states are given in many instances.

Panama: Volcan de Chiriqui, 3 ♂, 1 ♀ (B.M., M.N.H.N.).

***Metamasius venezolensis* (Günther)**

Venezuela: 1 ♂ (U.S.N.M.); 1 ♀ (cotype, S.M.T.).

***Metamasius viduus* (Hustache)**

Colombia: Ibagué, 1 ♂ (type of *viduus*, Fr. Claver, M.N.H.N.). *Costa Rica*: Paqueta, Aug. 13, 1936, 1 ♀ (U.S.N.M.). *Ecuador*: Archidona, 1 ♀

(B.M.); Loja, 1 (Abbé Gaujon, M.N.H.N.). *Nicaragua*: Rama, Aug. 16, 1943, 1 ♂ (Woke, U.S.N.M.). *Panama*: 1 ♀ (A.M.N.H.); Canal Zone, Dec. 2, 1954, 1 ♀ (U.S.N.M.). *Peru*: Huanuco, 1 ♂ (type of *peruanus*, S.M.T.). *Surinam*: 1 ♂, 1 ♀ (Z.M.B.). "America," 1 (M.N.H.N.).

***Metamasius xanthozona* (Champion)**

Guatemala: Senahu, Alta Verapaz, 1 ♂ (type, Champion, B.M.).

BIBLIOGRAPHY

- ANDERSON, W. H.
1948. Larvae of some genera of Calendrinae (= Rhynchophorinae) and Stromboscerinae (Coleoptera: Curculionidae). *Ann. Ent. Soc. America*, vol. 41, pp. 313-437, pls. 1-2.
- BARBER, H. S.
1917. Notes and descriptions of some orchid weevils. *Proc. Ent. Soc. Washington*, vol. 19, pp. 12-22, pl. 4.
- BLACKWELDER, R. E.
1947. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. Part 5. Curculionidae. *Bull. U. S. Natl. Mus.*, no. 185, pp. 791-921.
- BOVIE, A.
1907. Notes sur les curculionides. *Ann. Soc. Ent. Belgique*, vol. 51, pp. 326-328.
- BRÈME, F. DE
1844. Insectes coléoptères nouveaux ou peu connus. Première et deuxième décades. *Ann. Soc. Ent. France*, ser. 2, vol. 2, pp. 287-313, pls. 7-9.
- BROWN, F. M.
1941. A gazetteer of entomological stations in Ecuador. *Ann. Ent. Soc. Amer.*, vol. 34, pp. 809-851, figs. 1-10.
- CASEY, T. L.
1892. Coleopterological notices. IV. *Ann. New York Acad. Sci.*, vol. 6, pp. 359-712.
- CHAMPION, G. C.
1910. Calandrinae. In Godman, Frederick D., and Osbert Salvin, *Biologia Centrali-Americana*. London, Coleoptera, vol. 4, pt. 7, pp. 79-177, pls. 5, 9.
- CHEVROLAT, L. A. A.
1882. Calandrides. Nouveaux genres et nouvelles espèces, observations, synonymies, doubles emplois de noms de genres et d'espèces. 1re partie. *Ann. Soc. Ent. France*, ser. 6, vol. 2, pp. 555-582.
1885. Calandrides. Nouveaux genres et nouvelles espèces, observations synonymiques, doubles emplois de noms de genres et d'espèces. 3e partie. *Ibid.*, ser. 6, vol. 5, pp. 275-292.
- COTTON, R. T.
1924. A contribution toward the classification of the weevil larvae of the subfamily Calendrinae, occurring in North America. *Proc. U. S. Natl. Mus.*, vol. 66, art. 5, pp. 1-11, pls. 1-10.
- CSIKI, E.
1936. Curculionidae: Rhynchophorinae, Cossoninae. In Junk, W., *Coleopterorum catalogus*. Berlin, vol. 30, pt. 149, pp. 3-212.
- DUGÉS, D. E.
1881. Descripciones de coleópteros indígenas. *La Naturaleza*, vol. 5, pp. 103-125, pls. 3-4.
1886. Métamorphoses de quelques coléoptères mexicains. *Ann. Soc. Ent. Belgique*, vol. 30, pp. 27-45, pls. 1-3.
- ERICHSON, W. F.
1847. Conspectus insectorum coleopterorum quae in Republica Peruana sunt. *Arch. Naturgesch.*, yr. 13, vol. 1, pp. 67-185.
- FAHRÆUS, O. I.
1845. [New species.] In Schoenherr, C. J., *Genera et species curculionidum*. Paris, vol. 8, pt. 2.
- FAUST, J.
1894. Viaggio di Leonardo Fea in Birmania e regioni vicine. Curculionidae. *Ann. Mus. Civ. Genova*, ser. 2, vol. 14, pp. 153-170.
1899. Neue Curculioniden Madagaskars. *Abhandl. Ber. Mus. Dresden Festschr.*, vol. 8, no. 2, pp. 1-26.
- FISHER, W. S.
"1926" [1927]. New cactus beetles. *Proc. Ent. Soc. Washington*, vol. 28, pp. 214-217.
- GÜNTHER, K.
1941. Ergänzungen und Berichtigungen zu *Coleopterorum Catalogus*, pars 149: Rhynchophorinae (Curcul.), mit einigen Neubeschreibungen. *Deutsche Ent. Zeitschr.*, vol. 4, pp. 24-53, figs. 1-15.
1943. Vermischte Studien über Rüsselkäfer hauptsächlich aus der Sammlung Hartmann, Dresden. *Deutsche Ent. Zeitschr.*, Iris, Ergänzungsbd., pp. 10-96, illus.
- GYLLENHAL, L.
1838. [New species.] In Schoenherr, C. J., *Genera et species curculionidum*. Paris, vol. 4, pt. 2.
- HELLER, K. M.
1912. Sudamerikanische *Metamasiopsis* Arten (Col.). *Deutsche Ent. Zeitschr.*, pp. 390-393.
1926. Bestimmungsschlüssel aussereuropäischer Käfer: Calandrini spurii (*Laogenia* etc.) und Verwandte. *Ent. Blätter*, vol. 22, pp. 180-187, figs. 1-14.
- HORN, G. H.
1873. Contributions to a knowledge of the

- Curculionidae of the United States. Proc. Amer. Phil. Soc., vol. 13, pp. 407-447.
- HUSTACHE, A.
 1936. Nouveaux sphénophorides sudaméricains (Curculionidae). Bull. Ann. Soc. Ent. Belgique, vol. 76, pp. 87-114.
 1938. Espèces nouvelles de Curculionidae de l'Amérique tropicale. Ent. Blätter, vol. 34, pp. 231-243.
- KIRSCH, T.
 1869. Beiträge zur Käferfauna von Bogotá. Berliner Ent. Zeitschr., vol. 13, pp. 187-224.
 1875. Beiträge zur Kenntnis der Peruanischen Käferfauna auf Dr. Abendroth's Sammlungen basirt. Deutsche Ent. Zeitschr., vol. 19, pp. 241-304.
 1889. Coleopteren gesammelt in den Jahren 1868-1877 auf einer Reise durch Süd Amerika von Alphons Stübel. Abhandl. Ber. Zool. Mus. Dresden, no. 4, pp. 1-58, pls. 1-4.
- KISSINGER, D. G.
 1964. Curculionidae of America north of Mexico. A key to the genera. Taxonomic Publ., South Lancaster, Massachusetts, pp. 1-143, figs. 1-59.
- KUSCHEL, G.
 1950. Nuevas sinonimias revalidaciones y combinaciones. Agr. Téc. Santiago de Chile, vol. 10, pp. 10-21.
 1955. Nuevas sinonimias y anotaciones sobre Curculionoidea (1). Rev. Chilena Ent., vol. 4, pp. 261-312.
- LACORDAIRE, T.
 1866. Histoire naturelle des insectes. Paris, vol. 7, pp. 1-620, pls. 61-80.
- LECONTE, J. L.
 1858. Description of new species of Coleoptera, chiefly collected by the United States and Mexican Boundary Commission, under Major W. H. Emory, U.S.A. Proc. Acad. Nat. Sci. Philadelphia, vol. 10, pp. 59-89.
 1876. Family VIII. Calandridae. In LeConte, J. L., and G. H. Horn, The Rhynchophora of America north of Mexico. Proc. Amer. Phil. Soc., vol. 15, pp. 328-333.
- OLIVIER, G. A.
 1790. Histoire naturelle. Insectes. In Encyclopédie méthodique. Paris, vol. 5, pp. 1-793.
 1808. Entomologie ou histoire naturelle des insectes. Coléoptères. Planches, genres 66 à 100. Paris, vol. 8, no. 83, pls. 1-35.
- PETTEY, F. W.
 1953. The boring beetles of prickly pear in South Africa and their importance in control of *Opuntia megacantha*. Sci. Bull. Dept. Agr. South Africa, no. 340, pp. 1-26, figs. 1-10.
- SCHOENHERR, C. J.
 1826. Curculionidum dispositio methodica. Leipzig pt. 4, pp. 3-338.
 1838. Genera et species curculionidum. Paris, vol. 4, pt. 2, pp. 601-1121.
- STURM, J.
 1843. Catalog der Kaefer-Sammlung von Jacob Sturm. Nuremberg, pp. 1-386, pls. 1-6.
- VAURIE, P.
 1951. Revision of the genus *Calendra* (formerly *Sphenophorus*) in the United States and Mexico (Coleoptera, Curculionidae). Bull. Amer. Mus. Nat. Hist., vol. 98, pp. 29-186, figs. 1-116.
 1966. A revision of the neotropical genus *Metamasius* (Coleoptera, Curculionidae, Rhynchophorinae). Species groups I and II. *Ibid.*, vol. 131, pp. 213-337, figs. 1-119.
- Voss, E.
 1953. Neue und bemerkenswerte Curculioniden aus Columbien und Bolivien (Col. Curc.). Ent. Mitteil., pp. 55-84, figs. 1-4.
 1954. Curculionidae (Col.) Beitrag zur Kenntnis der Curculioniden. Beitr. Fauna Perus (Titschack, editor), vol. 4, pp. 193-376, figs. 1-22.
- WEISS, H. B.
 "1916" [1917a]. Miscellaneous notes. Jour. New York Ent. Soc., vol. 24, pp. 90-94.
 1917b. Some unusual orchid insects (Hem., Lep., Dip., Col.). Ent. News, vol. 28, pp. 24-29, pls. 4, 5.

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