

REVISION OF THE NEOTROPICAL
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THE SUBGENUS *CHOLUS* (*CHOLUS*)
(COLEOPTERA, CURCULIONIDAE)

PATRICIA VAURIE

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PATRICIA VAURIE
Research Associate
Department of Entomology
The American Museum of Natural History

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ABSTRACT

Cholus is considered tentatively to include two subgenera, *Cholus* Germar and *Aphyoramphus* Guérin-Méneville, but only *Cholus* is revised in the present paper. Keys are given to the 63 species of the subgenus *Cholus*, which are arranged in 10 species groups, to the genera of the Cholini and Cholomini, and to the three

tribes of Cholinae. *Dionychus* is placed in synonymy with *Cholus*. Fifteen new species are described from six countries of South America: *acuminatus*, *apicalis*, *cephale*, *cinereus*, *coloreus*, *grandis*, *hirsutus*, *indubitatus*, *leopardinus*, *longus*, *magnidens*, *planus*, *pubescens*, *sagittarius*, and *varians*.

INTRODUCTION

The Cholinae and their relatives, the Hylobiinae, comprise perhaps the most beautiful and varied Neotropical weevils although the short-nosed weevils (Otiorynchinae and Leptopinae) also are colorful. The species of Cholinae and Hylobiinae are medium to large (some attaining 40 mm.), with long beaks and toothed femora; their yellow, brown, white, or orange-red scales are arranged in diverse patterns of spots, angles, and bands and longitudinal or transverse lines or dashes; in some species the scales cover the entire body, in some they are interspersed among shining black tubercles; in others they are replaced by fine hairs, or they are lacking and the non-scaly surface is smooth and glossy; a few species are entirely black and dull-opaque. The relationship of the two subfamilies was discussed by me (Vaurie, 1973b).

I have examined all but two or three genera and almost all the 300 or more species of the Cholinae from South America, Central America, Mexico, and the Antilles. Of the 30 or more generic names listed in the catalogues of Klima (1936) and Blackwelder (1947), 11 have been synonymized, either by Kuschel (1955) or by Vaurie (1973b, 1974a, 1974b, and present paper). In addition to these changes, Kuschel (1955, pp. 269-272) transferred to the Cholinae four genera from the Baridinae, Erihinae, and Pissodinae (respectively: *Allostegotes* and *Saladorhynchus* of Hustache, *Peliobia* Pascoe, and *Tormeuphorus* Faust), these names not having appeared in the catalogues. Furthermore, I raised *Lobaspis* Chevrolat from synonymy to a valid genus (Vaurie, 1975).

There are no tribal divisions mentioned in the

catalogues for the Cholinae, but, as suggested by Kuschel (personal commun.), I have proposed three tribes: the Cholomini (two genera), the Rhinastini (19 or more genera, eight of which are monotypic), and the Cholini (nine genera, four of which are monotypic). A key is given below to the tribes, to the eight genera of Cholini and Cholomini, which I have revised or am now revising, and to three of the monotypic genera of the Cholini not yet revised (*Adionychus* and *Polydercicus* Heller, and *Odontocholus* Desbrochers des Loges).

The genus *Cholus* is by far the largest group of the Cholinae. Of the 120 or more valid species, about 20 are apparently restricted to Central America or Mexico, the others occurring in South America or the Antilles. A few species breed in sedges, bamboos, and cattails; others in orchids, palms, and grasses.

Germar (1824) described the genus for three new species (*sternicornis albicinctus*, and *geometricus*), but he did not give a type species. Schoenherr (1826), however, designated *albicinctus* as the type species of *Cholus* and at the same time transferred *sternicornis* to his new genus *Rhinastus*. From these small beginnings almost 200 names were added over the years, many of which are now in synonymy.

It would be convenient to have the genus *Cholus* divided into smaller units, but so far on a generic level this has not been possible. In the introduction to my paper on *Amerhinus* and *Lobaspis* (Vaurie, 1975), I said there were two large genera, *Cholus* Germar and *Aphyoramphus* Guérin-Méneville, each with about 60 species, but that this generic concept has had to be aban-

done because *Aphyoramphus*, as many other synonyms of *Cholus*, cannot in all cases be separated from *Cholus*. For the present, however, I am using *Cholus* and *Aphyoramphus* as sub-generic names and perhaps future workers will confirm or dissolve this combination.

In studying the species relegated to *Cholus*, I made a discovery that appeared at first to facilitate a natural division of the genus. It concerns two paired characters, which subsequently were found not to be invariably paired. Thus in about half the species of *Cholus* (including the type species) the femur is clavate and the comb (or outer apical fringe of setae) of the hind tibia is short, and in the other half, for which the name *Aphyoramphus* (type species, *A. rugosus* Guérin-Méneville) was available, at least the front femur is linear and much longer than the hind and middle femora, and the tibial comb also is long (generally about one-half the length of the tibia). Unfortunately, neither character can be singly relied on for separating *Cholus* and *Aphyoramphus*, as their definition is equivocal and many specimens are indeterminate. Thus, although tibial combs of one-half the length of the tibia are distinctly "long" and less than one-third the length are "short," combs one-third the length could be considered long or short. As for the femur, because the inner tooth of the front femur of some individuals tends to expand that part, such femora might be classed as subclavate or sublinear, thus belonging to either *Cholus* or *Aphyoramphus*.

The majority of remaining genera agree with the *Cholus* that have clavate femora and chiefly short tibial combs, but in *Homalinotus*, which is defined on different characters, all gradations exist between linear front femora to feebly clavate or strongly clavate femora, and between long and less long tibial combs. Thus some doubt exists as to the validity of these characters, even for subgenera. Perhaps more detailed examination of the genitalia of both sexes may clarify relationships in this complex subfamily.

I have examined approximately 2000 specimens of the 63 species of the subgenus *Cholus*, and the types of 56 of the forms concerned. Fifteen new species from South America are described, and the names of 14 species are added to the 16 names already in synonymy.

ACKNOWLEDGMENTS

The facilities accorded me by the American Museum of Natural History, New York; the Muséum National d'Histoire Naturelle, Paris; and the British Museum (Natural History), London; have made possible the continuation of my studies on the Cholinae. Types were sent me for comparison by the Naturhistoriska Riksmuseum, Stockholm (Dr. Tord Nyholm), the British Museum (Mr. R. T. Thompson), and the Entomology Division, DSIR, Auckland, New Zealand (Dr. G. Kuschel). I express again my gratitude for the many loans of specimens from those institutions and individuals already thanked in previous papers.

The illustrations of two of the new species (figs. 24, 33), which were kindly donated to me by Dr. Kuschel, are the work of Mrs. C. A. O'Brien, an artist at the British Museum. The photographs were taken by Mr. Arthur Singer of the Photographic Department of the American Museum of Natural History, and the line drawings were inked by the Graphic Arts Department of that museum.

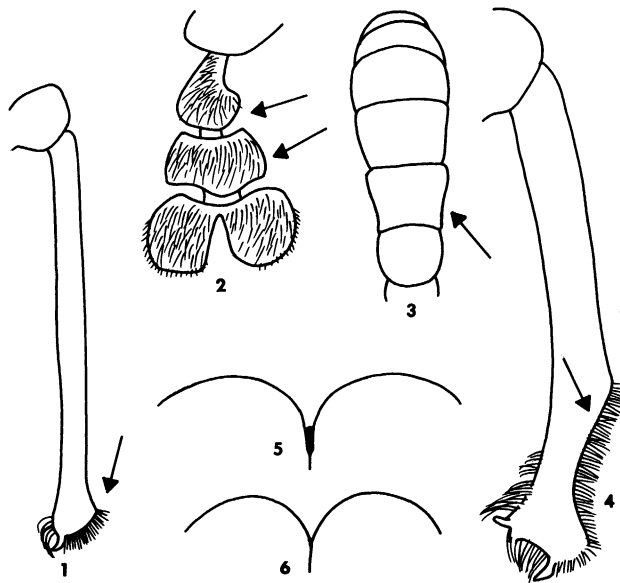
KEY TO TRIBES OF THE CHOLINAE AND TO THE GENERA OF CHOLINI AND CHOLOMINI

1. Middle and hind tibiae fringed with setae at apex only, not on outer (dorsal) side of tibiae (fig. 1); claws at base connate and as long as terminal antennal segment. Cholomini 2
- Middle and hind tibiae with fringe of setae ascending at least partially on outer (dorsal) side of tibiae; claws, if connate, short. Cholini, Rhinastini 3
2. Front coxae widely separated; femur with fine, sparse, semi-erect setae, and with or without small inner tooth; elytra smooth; 4 species . . . *Cholomus* Roelofs
- Front coxae contiguous; femur with dense, flat scales as on sides of elytra; femur not toothed; elytra tuberculate; 2 species. *Irenarchus* Pascoe
3. Tarsus widening from base to apex; segment 1 at apex not wider than segment 2 at apex (fig. 2); tibiae generally with both apical teeth (mucro and uncus) distinct Cholini 4
- Tarsus more or less same width throughout

- although segment 1 enlarged and at apex wider than segment 2; tibiae generally either with one apical tooth, or with two rudimentary or scarcely visible teeth. Rhinastini¹
4. Hind coxa so large that abdominal segment 1 behind coxa is reduced to narrow strip; abdominal segment 2 scarcely longer than segment 3; elytra with two rows of long spines; monotypic.
 *Ozopherus* Pascoe
- Hind coxa of normal size; abdominal segments 1 and 2 behind coxa of approximately same length; abdominal segment 2 twice as long as segment 3; elytra not spined. 5
5. Metasternum between middle and hind coxae very short (one-half diameter of coxa); large (23 to 28 mm.); probably wingless, entirely black, no scales; elytra with no humeral or subapical callus; monotypic. *Adionychus* Heller
- All characters not as stated above 6

6. Eye almost twice as long as wide, narrowed at lower end which extends well below level of base of beak; antennal funicle with terminal segment 7 adpressed closely to and seeming part of club (fig. 3); front coxae separated by at least one-third diameter of coxa; hind tibia with outer apical comb generally one-third length of tibia and generally slightly emarginate (fig. 4); 21 species . . .
 *Homalinotus* Sahlberg
- Eye, funicle, coxae, tibia not all as stated above 7
7. Glossy black with white scaly marks, no tubercles; antenna inserted in apical fourth of beak; beak with dorsal apex flattened, basal two-thirds with two embedded rows of white scales on each side of median carina; pronotum narrower than elytra; front coxae almost contiguous; monotypic.
 *Polydercicus* Heller
- All characters not as stated above 8
8. Tibia with outer (dorsal) edge bicarinate or feebly canaliculate; front coxae virtually contiguous; hind tibia with outer

¹The genera of the Rhinastini, except for *Rhinastus*, need revision.



FIGS. 1-6. Body parts of the Cholinae. 1. Tibial fringe of setae apical (Cholomini). 2. Tarsus with segment 1 narrower than segment 2 (Cholini). 3. Terminal segment 7 of funicle closely adpressed to club (*Homalinotus*). 4. Tibial fringe of setae one-third length of tibia and tibia emarginate at apex (*Homalinotus*). 5, 6. Bilobed base of elytra (*Lobaspis*). 5. Scutellum visible but tiny. 6. Scutellum not visible.

- fringe of setae only one-fourth or one-fifth length of tibia; 16 species.
 *Odontoderes* Sahlberg
 Tibia with outer (dorsal) edge rounded or compressed laterally; front coxae and length of tibial fringe not both as stated above 9
9. Pronotum subglobose; elytra oblong, cylindrical, scarcely narrower posteriorly; vestiture of acuminate, elongate, hair-like scales (some roundish scales may also be present): pygidium often exposed; scutellum either no larger than pronotal tubercle and enclosed almost entirely by rolled elytral-sutural margin, or scutellum normal but elevated apically; either elytra with four intervals near base elevated, or beak straight and shorter than pronotum; three species.
 *Amerhinus* Sahlberg
 Pronotum, elytra, vestiture, pygidium, scutellum, and beak not all as stated above 10
10. Elytra apically finely serrate and with two small angles at suture; pronotum short, about one-third length of elytra; surface covered with tubercles and yellow scales intermixed; monotypic.
 *Odontocholus* Desbrochers des Loges
 Elytra apically not serrate or angulate; pronotum generally longer than one-third of elytra; surface variable 11
11. Scutellum either not visible or visible as minute, elongate granule squeezed between basal lobes of elytra (figs. 5, 6); elytra with base broadly bilobed or bisinuate, overlapping base of pronotum; mesepimeron distally contiguous with pronotum instead of with elytra as in figure 10 of *tener* group but pronotum (in lateral view) with basal angle acuminate or subacuminate; dorsum not tuberculate; 12 species.
 *Lobaspis* Chevrolat
 Scutellum visible, but if minute, then base of elytra, shape of scutellum, position of mesepimeron, and pronotal basal angle not all as given above; tubercles present or not; 125+ species. *Cholus* Germar

SYSTEMATIC SECTION

CHOLUS

SUBGENUS *CHOLUS* GERMAR

Note: Complete synonymy of the genus is given. The subgenus *Aphyoramphus* and its synonyms are preceded by an asterisk (*).

Cholus Germar, 1824, p. 214 (type species: *Cholus albicinctus* Germar, by subsequent designation of Schoenherr, 1826).

Dionychus Germar, 1824, p. 214 (type species: *Dionychus parallelogrammus* Germar, by subsequent designation of Schoenherr, 1826). New synonymy.

**Aphyoramphus* Guérin-Méneville, 1844, p. 158 (type species, by monotypy, *A. rugosus* Guérin-Méneville, a synonym of *Cholus sparsus* Gyllenhal). Synonymized with *Cholus* by Heller, 1906.

Polydernes Schoenherr, 1844, p. 16 (type species: *Curculio zonatus* Swederus, by original designation). Synonymized by Champion, "1902-1906" [1903].

**Archarius* Lacordaire, 1866, p. 39 (type species not designated; 30 species included). Synonymized with *Cholus* by Champion, "1902-1906" [1903].

**Sternoxus* Chevrolat, 1879b, p. xvi (type species: *Curculio laticollis* Olivier, by original designation). Synonymized with *Archarius* by Faust, 1893.

Gymnonotus Chevrolat, 1879c, p. xxxix (type species, by monotypy, *Cholus geometricus* Germar). Synonymized by Heller, 1906.

**Lonchocerus* Chevrolat, 1879c, p. x1 (type species, by monotypy, *Cholus rhomboidalis* Fahraeus). Synonymized with *Cholus* by Heller, 1906.

Platypachys Chevrolat, 1879d, p. li (type species: *Amerhinus bohemani* Mannerheim, by original designation). Synonymized by Heller, 1906.

Diagnosis. *Cholus* differing from *Ozopherus* in having abdominal segments 1 and 2 behind coxa of same length, and elytra not spiny; from *Homalinotus* and *Odontoderes* in having round or oval, not elongated eye, and antennal club separate from funicular segment 7; from *Odontoderes* further in having edge of tibia round or compressed, not canaliculate; from *Amerhinus* and *Lobaspis* in combination of characters as stated in couplets 9 and 11 above. *Adionychus* differing

in having very short metasternum and no humeral or subapical callus on elytra; *Odontocholus* in having two small projecting angles at apex of elytra; and *Polydercicus* in having antenna in apical fourth of beak instead of farther back, and front coxae almost touching. Subgenus *Cholus* differing from subgenus *Aphyoramphus* in having shorter, clavate, not linear front femur (and other femora clavate also), and short, not long comb of setae on hind tibia (one-third or less of length of tibia, not one-third or one-half).

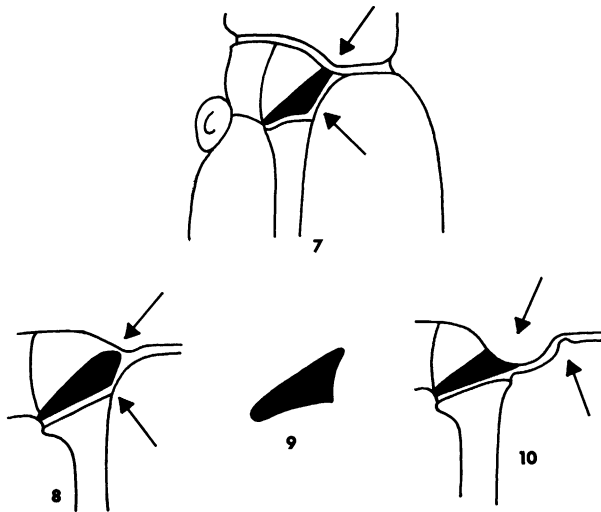
Description of Subgenus. Vestiture composed of variously colored round and blunt, or elongate and acute scales, or coarse or fine white or yellow hairs. Surface may be tuberculate or not. Length generally from 10 to 30 mm., but some are larger or smaller.

Eye round or feebly oval, flattish or convex; interocular space more or less equal to width of base of beak. Antenna inserted at or beyond middle of beak; funicle with segment 1 longer than segment 2; segment 2 slightly longer than each of following segments; terminal segment 7 separate from club (but somewhat adpressed to it in

longus). Beak as long as or longer than pronotum, generally arcuate, but in some species virtually straight. Pronotum wider than long, with or without postocular lobe, generally as wide as elytra. Elytra, scutellum, ventral parts variable, mesepimeron (figs. 7-10). Front coxae generally, but not in all cases well separated. Femora clavate, toothed on inner edge near apex (but tooth lacking on front femur of male of *longus*); hind femur not extending beyond apex of elytra. Tibia at apex mucronate and uncinata; hind tibia with outer fringe of setae (dorsal comb) one-third, generally less than one-third length of tibia.¹ Tarsal segment 1 narrower than segment 2; claws generally free, but connate in some species of *albicinctus* species group.

Sexual Dimorphism. The secondary sexual characters are feeble except for those of the *bohemani* and *parallelogrammus* species groups. In general, the abdomen of males is concave, whereas that of females is flat or convex (but concave in some females). Of the same order are

¹In an aberrant specimen of the common *C. pistor* and in *longus* the tibial comb is almost one-half the length of the tibia.



FIGS. 7-10. Body parts of *Cholus*. 7. Mesepimeron angulate medially and basal angle of pronotum obtuse or rounded. 8. Mesepimeron angulate distally and basal angle of pronotum obtuse or rounded (majority of species). 9. Mesepimeron angulate medially (*parallelogrammus* and *interruptefasciatus* species groups). 10. Mesepimeron contiguous with and covered by lobed basal angle of pronotum, showing also (*tener* species group) emargination and basal angle of elytra.

the relative length and curvature of the beak; if the beak differs sexually, that of males is generally longer and less arcuate, and the insertion of the antenna is generally situated farther front. In some species the beak of the female (when seen in dorsal view) is widened apically, but that of the male is of the same width throughout. Where a projection is present between the coxae, it tends to be longer, larger, or more acute in males.

Genitalia of Males. Parameres are present in almost all species except for those of the *albicinctus* group (no males were available for some species and some males were not dissected). A basal sclerite or copulating armature within the sac of the median lobe was found in *spinipes* (Fabricius) of the *zonatus* group, in *sulphuratus* Fahraeus, and in all but two species of the *parallelogrammus* group. Males of the *bohemani* group are unique in having two lateral horny "prongs" on each side of the median lobe (figs. 55-65).

Generic Synonymies. All but one (*Dionychus*) of the synonyms (above) are the same as those listed in the catalogues of Klima (1936) and Blackwelder (1947); they were proposed by Champion ("1902-1906" [1903]) or by Heller (1906). Champion synonymized *Archarias* and *Polyderces*, and Heller in his key to the genera of Cholinae synonymized *Gymnonotus*, *Platypachys*, *Lonchocherus*, *Polyderces*, *Lobaspis*, and *Aphyoramphus*. I agree with these synonymies, with the exception of *Lobaspis*, which I have revalidated as a genus (Vaurie, 1975), and I have temporarily restricted some of the names to the subgenus *Aphyoramphus*. (*Ectomastes* Desbrochers des Loges is removed from synonymy with *Cholus* as it belongs with the Rhinastini, species with large first tarsal segments.)

These various "genera," of which I have examined the type species, were described either on what appear to be species' characters or on characters present in other genera. Thus *Gymnonotus* was considered unique because it is mostly smooth, not tuberculate, and *Lonchocherus* because it has a very long antennal club; *Platypachys* was cited as having a strong postocular lobe and a transversely convex pronotum; *Polyderces* seems not to have special characters to separate it from *Cholus*. *Aphyoramphus* and *Sternoxus*, as well as some of the species classified by subsequent authors as *Archarias*, possess

a mesosternal projection that is feebly or strongly tumid in females and strongly prominent (acuminate, tuberculate, or shaped like a "capstan") in males; long, linear front femora are described also for these three "genera." These characters, however, are not sufficient, in my opinion, for the limiting of genera.

As for *Dionychus* (new synonymy), most of the species described therein are large, heavy species with long, abundant ventral pubescence, but additional species allied to them by strong external and internal characters of the male do not have this long pubescence, and differ further in having the dorsum almost glabrous instead of tuberculate and hairy, and in being less robust. Most of the species described in *Dionychus* are now in the *parallelogrammus* species group of *Cholus* (which see).

Species Groups. In the subgenus *Cholus*, 10 species groups can be defined (see checklist and key to the groups below). The neutral term "group" was chosen for these subdivisions to avoid the more rigid classification that genera or subgenera would entail. This freer grouping, it seems to me, will also facilitate any subsequent decisions as to the status of the species not yet relegated to a place in the subfamily. Two or three of the groups possibly could be considered as separate genera, but their significant characters are found in the males only, and although such "one-sex" characters are useful in denoting relationships among species or groups, they are not, I believe, constructive for genera.

I note here, as well as in the key below, that there are a few inconsistencies in the inclusion or exclusion of some species. Thus I have arbitrarily included all the species from the Antilles (*zonatus* group) even though four of the five species have the front femur scarcely clavate as in the subgenus *Aphyoramphus*, and in one species the tibial comb is as long as that of *Aphyoramphus*. The majority of species from Central America and Mexico are excluded because of difficulty in orienting them (they may comprise a separate genus); nonetheless, three or four species from that region are placed in groups to which they seem related; they are in the *tener*, *pantherinus*, *parallelogrammus*, and *forbesi* groups.

The sequence of the groups need not be con-

sidered final as they could be arranged in a different order. In my treatment of each group, the shared characters are given, followed by a discussion and by the distribution of the species and any biological notes available.

Biology. Notes on biology of some sort have been obtained for only about one-third of the 63 species, and in some cases it is not known whether the records refer to breeding or not. Species actually found breeding were in the following plant families: Bambuseae (*conci-*

tus, parallelogrammus); Bromeliaceae (*spinipes*); Cyperaceae (*annulatus*); Graminaceae (*pistor*); Marantaceae (*albicinctus*); Orchidaceae (*cattleyae, forbesi, nigromaculatus*); Palmaceae (*martiniquensis, pantherinus, zonatus*); Typhaceae (*annulatus*). Other species have been mentioned in association with rice (*flavofasciatus*), *Acacia* (*kunzei*), sugar cane (*annulatus, alboguttatus, aureus, nyblaei*), *Begonia* (*parallelogrammus*), and cotton (*annulatus, nyblaei*).

CHECKLIST OF SPECIES OF *CHOLUS* (SUBGENUS *CHOLUS*)

Species Group *albicinctus*

1. *albicinctus* Germar
2. *geometricus* Germar
3. *pistor* Boheman
 - transversalis* Chevrolat
 - pistor bahiensis* Marshall
4. *argentanicus* Heller
5. *annulatus* (Linnaeus)
 - gladiator* (Olivier), new synonymy
 - dealbatus* Boheman, new synonymy
 - faldermanni* Fahraeus, new synonymy
 - consors* Chevrolat, new synonymy
 - ornatus* Chevrolat, new synonymy
6. *cephale*, new species
7. *guerini* Boheman
8. *niveus* Chevrolat
9. *boisduvali* Boheman
 - championi* Desbrochers des Loges, new synonymy
10. *sagittarius*, new species
11. *coloreus*, new species
12. *nyblaei* Boheman
 - brasilianus* Chevrolat, new synonymy
13. *cinereus*, new species
14. *calcatus* Chevrolat

Species Group *flavofasciatus*

15. *flavofasciatus* Guérin-Méneville
 - flavofasciatus* Boheman

Species Group *bohemani*

16. *bohemani* (Mannerheim)
 - trifasciatus* Guérin-Méneville
17. *rubiginosus* (Kuschel)
 - trifasciatus* (Chevrolat)
18. *kunzei* Boheman
19. *variabilis* (Fahraeus)
 - marginicollis* (Chevrolat)

20. *margineguttatus* (Fahraeus)
margaritifer (Redtenbacher), new synonymy
albonotatus (Chevrolat), new synonymy
21. *alboguttatus* (Germar)
duodecimguttatus (Chevrolat)

Species Group *parallelogrammus*

22. *parallelogrammus* (Germar)
23. *conciliatus* (Pascoe)
parallelogrammus var. *alternans* (Desbrochers des Loges)
24. *jekelii* (Kirsch)
multicostatus (Chevrolat), new synonymy
25. *trifasciatus* (Hustache)
trizonatus Günther, new synonymy
26. *granifer* (Chevrolat)
27. *roelofsi* Chevrolat
28. *rojasi* (Chevrolat)
29. *frontalis* (Chevrolat)
carinatus (Chevrolat)
30. *hirsutus*, new species
31. *longus*, new species
32. *buckleyi* Pascoe
33. *magnidens*, new species
34. *nitidicollis* Pascoe
phaleratus Günther
35. *megaspilus* Pascoe
bonasus Günther
36. *geniculatus* Kirsch

Species Group *interruptefasciatus*

37. *grandis*, new species
38. *interruptefasciatus* Desbrochers des Loges
39. *planus*, new species
40. *pubescens*, new species
41. *indubitatus*, new species
42. *subcostatus* Desbrochers des Loges

Species Group *tener*

43. *tener* Kirsch
argentulus (Chevrolat), new synonymy
molitor (Chevrolat), new synonymy
44. *aureus* Champion
tenuis Champion, new synonymy

Species Group *sulphuratus*

45. *sulphuratus* Fahraeus

Species Group *pantherinus*

46. *pantherinus* (Olivier)
marmoratus (Fabricius)
marmoreus (Fabricius)
47. *leopardinus*, new species

- 48. *notabilis* Pascoe
- 49. *praetorius* Pascoe
- 50. *cretaceonotatus* Voss
- 51. *apicalis*, new species
- 52. *luctuosus* Pascoe
- 53. *varians*, new species

Species Group *zonatus*

- 54. *zonatus* (Swederus)
tricinctus (Fabricius)
- 55. *martiniquensis* Marshall
- 56. *adpersus* (Fahraeus)
- 57. *spinipes* (Fabricius)
wattsi Marshall
- 58. *biinterruptus* Desbrochers des Loges

Species Group *forbesi*

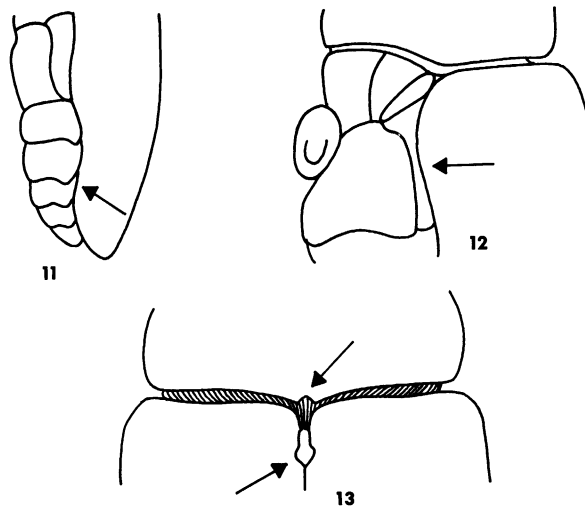
- 59. *forbesi* Pascoe
- 60. *nigronotatus* Champion
- 61. *nigromaculatus* Champion
- 62. *acuminatus*, new species
- 63. *cattleyae* Champion
cattleyarum Barber

KEY TO SPECIES GROUPS OF
THE SUBGENUS *CHOLUS*¹

- 1. Abdomen at extreme sides angulate at segment 2 (fig. 11); elytra with apex serrulate or dentate; aedeagus sinuous or twisted (figs. 34-53) . . . *albicinctus*, p. 14
Abdomen, elytra, and aedeagus not as stated above 2
- 2. Pronotum opposite scutellum with small, distinct, excised depression at base; scutellum receded or retracted from basal line of elytra (fig. 13); male with ventral side of pygidium (tergite 8), when extracted slightly, revealing median depression among hairs; aedeagus with two horny appendages ("prongs") emerging from each side (figs. 55-65) *bohemani*, p. 27
Pronotum with basal depression, if present, feeble, indistinct, shallow; scutellum retracted or not; male not as stated above 3

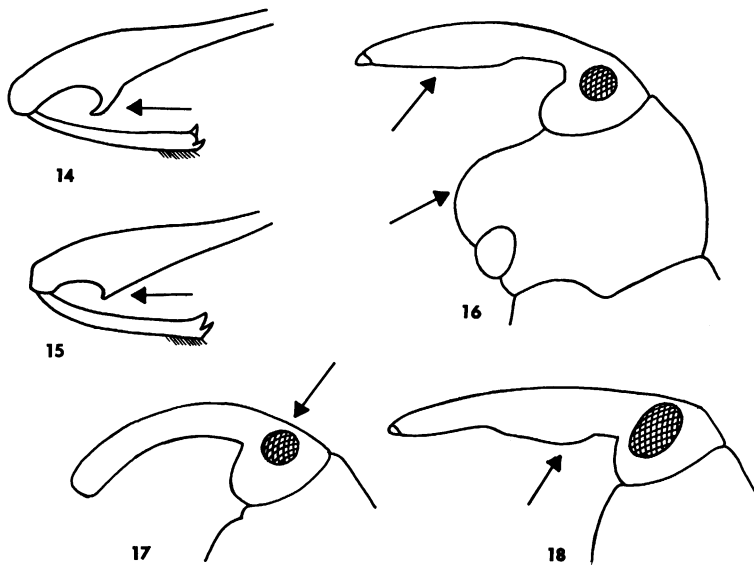
- 3. Compact, rough, black rhomboid species (10 to 12 mm.) with clusters of dense, white, imbricated scales; metepisternum very narrow (fig. 12), only a "line" almost hidden by epipleura; elytra not more than twice length of pronotum, either with strongly elevated patches of acuminate tubercles, or with strial foveae as large as scutellum; group includes some species from Mexico and Central America *forbesi*, p. 66
Species not agreeing with all characters given above 4
- 4. Species from Antilles (exclusive of Trinidad) *zonatus*, p. 59
Species from elsewhere than Antilles 5
- 5. Dorsum, in those intervening areas not covered by yellow or white, dense scaly spots or bands, furnished with dense black or dark bronze scales that produce "mat," velvety, or opaque effect; group includes one species from Panama *pantherinus*, p. 52
- 6. Pronotum and generally elytra tuberculate 7
Pronotum, at least, not tuberculate, but can be hairy, scaly, or punctate 8
- 7. Large (13 to 30 mm.), convex; male with

¹Species from Mexico or Central America are not in this key unless they agree with the first part of couplets 3, 5, 7, or 11. For the subgenus *Aphyoramphus*, see diagnosis of *Cholus* above.



FIGS. 11-13. Body parts of *Cholus*. 11. Angulate segment 2 of abdomen of *albicinctus* group (in lateral view). 12. Narrow metepisternum of *forbesi* group (in lateral view). 13. Median pronotal depression and retracted scutellum of *bohemani* group (in dorsal view).

- prosternum either medially strongly tuberculate or abruptly tumid (often obscured by long hairs), or male with beak in part ventrally thickened or hairy (figs. 16, 18); female with prosternum in front of each coxa flatly tuberculate and slightly tumid; group includes one species from Panama. *parallelogrammus* (part), p. 32
- Smaller (generally about 15 mm.); prosternum, both sexes, concave and not tuberculate under hairs. *interruptefasciatus* (part), p. 47
- 8(6). Black, glossy, rather rhomboid species, partially scaly; elytra with yellow scales limited to distinct spots or crossbands; pronotum feebly punctate or impunctate. 9
- Pubescent, oblong, parallel-sided species virtually entirely covered with scales or hairlike scales; pronotum punctate or not. 10
9. Elytra either with scaly spots or with three white scaly crossbands; male as described in couplet 7 *parallelogrammus* (part), p. 32
- Elytra with two yellow scaly crossbands alternating with black glossy bands, also apical yellow patch enclosing black spot on subapical callus. *flavofasciatus*, p. 27
10. Species with unique color pattern of three narrow red stripes on pronotum and elytra (that of center of pronotum wider or fusiform); red scutellum, and remainder covered with dense yellow scales; elytra with basal scales directed horizontally *sulphuratus*, p. 51
- Species with color and scaling not as stated above. 11
11. Dorsum with oval, rather blunt, not hairlike scales; pronotum with basal angles (in lateral view) subacute or distinctly and prominently lobed (fig. 10); 6 to 9 mm.; group includes one species from Central America *tener*, p. 50
- Dorsum, in whole or in part, with elongate, acuminate, hairlike scales that are 6 or 7 times longer than wide; pronotum with basal angles (in lateral view) obtuse or feebly lobed; 9 mm. or longer *interruptefasciatus* (part), p. 47
- Species Group *albicinctus*
- The species in this group in the order discussed are:



FIGS. 14-18. *Cholus parallelogrammus* group. 14, 15. Tooth of hind femur. 14. *C. magnidens*, new species. 15. *C. buckleyi* Pascoe. 16, 17. Pronotum and beak of *C. longus*, new species. 16. Male. 17. Female. 18. Beak of *C. jekelii* (Kirsch).

Cholus albicinctus Germar; *geometricus* Germar; *pistor* Boheman; *argentinus* Heller; *annulatus* (Linnaeus); *cephale*, new species; *guerini* Boheman; *niveus* Chevrolat; *boisduvali* Boheman; *sagittarius*, new species; *coloreus*, new species; *nyblaei* Boheman; *cinereus*, new species; *calcatus* Chevrolat.

Common characters of the 14 group members (not repeated in the descriptions) are: Eye round or feebly oval, rather flat. Pronotum as wide as elytra; convex; sides arcuate; postocular lobe feeble (but stronger in *argentinus* and *pistor*); basal angle round or obtuse, not prominent. Scutellum proportionally small. Elytra with sides subparallel, toward apex serrulate or dentate; apexes separated; epipleural margin sinuous. Prosternum at base not tumid. Mesosternum feebly tumid. Mesepimeron with lower edge not angulate medially, but slightly so distally (fig. 8). Metepisternum "normal," not wide. Abdomen angulate at sides of segment 2. Femur distinctly clavate, with inner tooth distinct; hind femur not reaching apex of elytra. Tibia with mucro and uncus distinct, mucro often larger; tibial comb short, one-fourth or one-fifth length of tibia.

Aedeagus sinuous or twisted, without basal sclerite or parameres; apodemes much shorter than aedeagus (figs. 34-53).

The important characters that distinguish the species of this group are the sinuous aedeagus, the angulate abdominal segment, and the serrate apexes of the elytra. The sexes are difficult to separate externally. In some specimens the eyes appear somewhat narrowed at the lower end, but this aspect is due to the presence of scales around the eye. Scales also make the interocular space seem wider or narrower than the base of the beak in some individuals although generally the space is about equal to the width of the beak.

The aedeagus of *albicinctus* and *geometricus* is more sinuous and twisted than that of other species. In all species the open area or dorsal orifice is very elongate, and in all but two species (*argentinus* and *cinereus*) the lateral view of the aedeagus is very sinuous. An angular, sclerotized flap on each side of the aedeagus, as shown for *boisduvali* (figs. 46, 47) is feebly present also in *albicinctus*, *geometricus*, *cephale*, *nyblaei*, and *annulatus*. Certainly in this group the similarity of genitalia reinforces the other characters.

The 14 species are arranged sequentially based on the structure of the pronotum, arrangement of scales on the elytra, and general shape. *Cholus albicinctus* and *geometricus* are most similar to each other differing from others in their more attenuate elytra with obtusely angled humerus, and in bold white, scaly lateral stripes. *Cholus pistior* resembles them in having tubercles or granules (on the entire upper surface in *pistior*; on the pronotum and its sides in the other two species), but in *pistior* the pale scales are distributed evenly among the tubercles, not in stripes. The remaining species have no tubercles, but have a scaly pattern, and the last seven species have on the pronotum scale-filled, elliptical or roundish depressions across the middle, these transverse depressions being distinct in *boisduvali*, *coloreus*, and *niveus*, distinct or rather feeble in *cinereus*, and *nyblaei*, and generally feeble or erratically evident in *calcatus* and *sagittarius*.

Elytral scales are in stripes in *albicinctus* and *geometricus*; in small spots in *argentinicus*; in bands alternating with bare areas in *annulatus*, *nyblaei*, *guerini*, *niveus*, and *cephale*; in *calcatus* and *cinereus* entirely scaly except where worn to irregular spots; and in *boisduvali*, *coloreus*, and *sagittarius* bare spots or irregular areas are surrounded by scales.

Connate tarsal claws are found in about half the species (*boisduvali*, *calcatus*, *cephale*, *guerini*, *niveus*, *pistior*, and *sagittarius*), and in addition, are of unequal length in *calcatus*, *cephale*, and *guerini*. It may be difficult to see whether the claws are connate, but the unequal claws are readily visible. In some parts of the subfamily an entire genus may have connate claws. In a number of species (*annulatus*, *argentinicus*, *boisduvali*, *cinereus*, *pistior*) the claw segment appears to be inserted closer to the middle of the bilobed terminal tarsal segment rather than at the base as is normal.

I place seven names in synonymy, in addition to the two synonymized previously by Kuschel (1955). The number of specimens examined is 677, half of which are of *albicinctus* and *annulatus*.

Biology. According to Araujo e Silva (1968) and to some few notations on specimens, the larvae of *albicinctus*, *annulatus*, and *pistior* bore

into the stems of plants of the monocotyledonous families, Cyperaceae, or sedges (*Rhynchospora*, *Fuirena*), Typhaceae (*Typha*), cattails, Gramineaceae or grasses (*Paspalum*), and Marantaceae or Arrowroot (*Calathea*). Species of some other genera of the Cholinae also utilize plants of these families. Specimens of *annulatus* and *nyblaei* were reported "on cotton" without further specification.

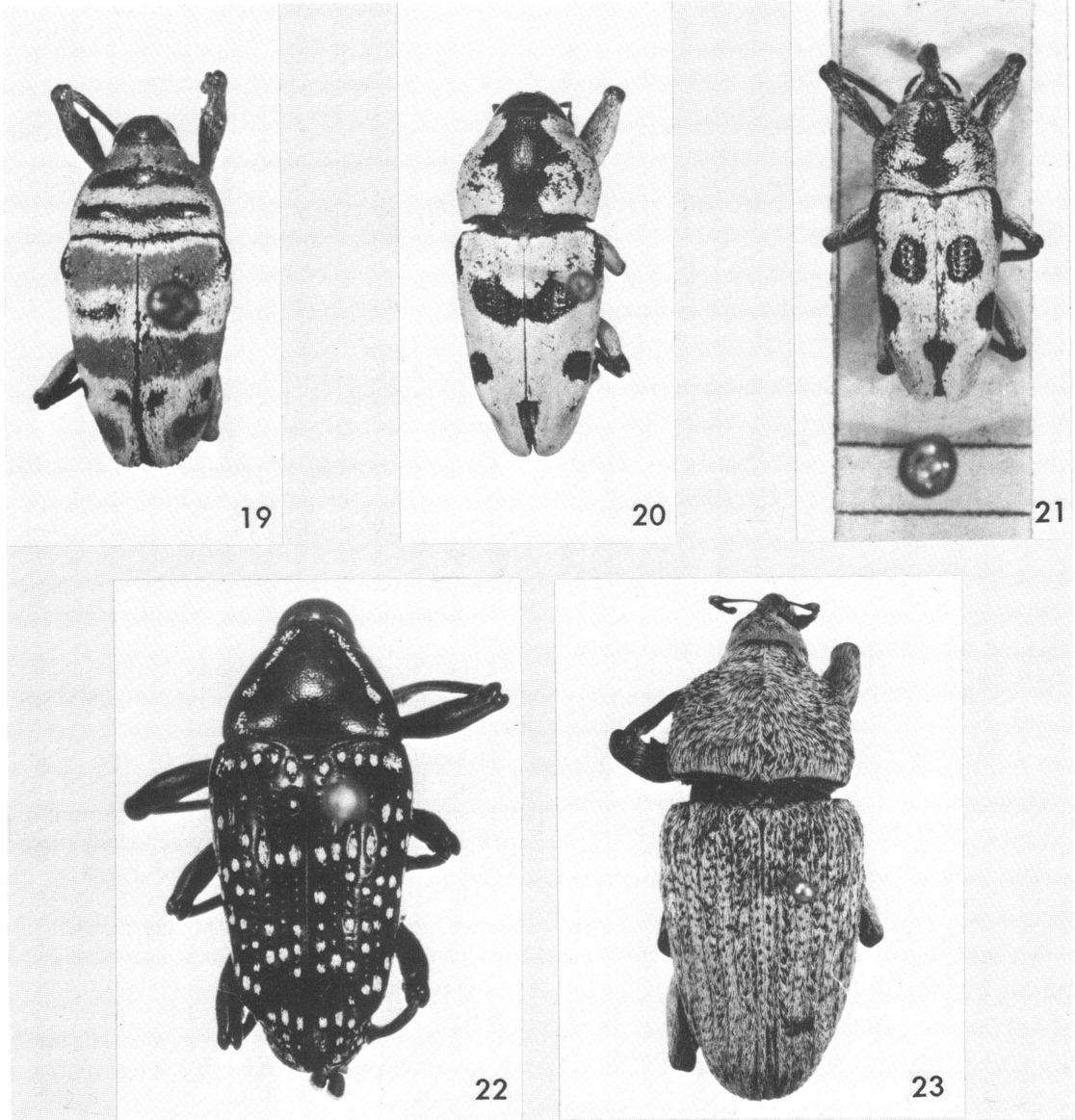
Distribution. The species of the group occur from the island of Trinidad south throughout most of South America to northern Argentina. All occur in Brazil but *cinereus*, and it is represented by two specimens only. There are only two records from Colombia (one specimen each of *boisduvali* and *nyblaei*) and no records from Ecuador or Chile; only *pistior* is recorded from as far north as Venezuela and Trinidad, and only *cinereus* exclusively from Peru (*nyblaei* and *pistior* occur also in Peru). Species with the widest geographical range are *annulatus*, *boisduvali*, *nyblaei*, and *pistior*. Six species (*cephale*, *coloreus*, *geometricus*, *guerini*, *niveus*, and *sagittarius*) have been seen from Brazil only where they occur chiefly in the east in the states of São Paulo and Parana, or inland in Minas Gerais, Goyaz, and Mato Grosso.

KEY TO SPECIES OF THE *ALBICINCTUS* GROUP

1. Pronotum with sides or disc tuberculate. 2
Pronotum punctate, not tuberculate . . . 4
2. Elytra with black tubercles among white
or gray scales; humerus forming right
angle; claws connate. . . *pistior* Boheman
Elytra without noticeable tubercles;
white scales confined to basal or
lateral stripes; humerus widened in ob-
tuse angle; claws divergent. 3
3. Elytra at base black and with lateral
white stripes continuing on to pronoto-
tum; pronotum uniformly densely
tuberculate. *albicinctus* Germar
Elytra at base with white crossband join-
ing lateral white stripes; pronotum
with sides tuberculate but disc punct-
ate or feebly granulate.
. *geometricus* Germar
- 4(2). Claws connate and of unequal length. . 5
Claws divergent or connate, but of equal
length 7

5. Prosternum deeply sulcate, sides of sulcus in front tumid or carinate; elytral scales generally worn to show two denuded V-shaped areas, one behind other. *guerini* Boheman
 Prosternum flat or feebly concave; elytral

pattern various 6
 6. Head deeply, broadly sulcate between eyes and on to base of beak; elytra with bold, distinct black and white pattern, edges of pattern clear cut (fig. 20). *cephale*, new species



FIGS. 19-23. *Cholus*, not to scale. 19. *C. coloreus*, 8.5-10 mm. 20. *C. cephalae*, 10 mm. 21. *C. sagittarius*, 7.5-8.5 mm. 22. *C. magnidens*, 13.5-15 mm. 23. *C. hirsutus*, 23 mm.

- Head with usual small fossa between eyes; elytra mostly with white scales and about eight faint dark bare spots, edges of pattern fuzzy, not clearly marked *calcatus* Chevrolat
- 7(4). Pronotum uniformly convex, without depressions 8
 Pronotum across middle with two shallow or deep, transverse, rather elliptical depressions, often merged together and generally bordered anteriorly and posteriorly by bare black areas . . . 10
8. Claws apparently connate at base; small (6 to 8 mm.); pronotum with disc longitudinally bare and black with edges of black angulate (fig. 21); base with pale scales lying horizontally *sagittarius*, new species (part)
 Claws distinctly divergent; larger (10 mm. or more); pronotum not as described above; base, at least at center, with scales vertical 9
9. Elytra with two black and three white (or yellow) bands that are reduced to spots in some specimens, or elytra almost entirely either black or white; pronotum with pale lateral scales, if present, merging broadly across apex *annulatus* (Linnaeus)
 Elytra covered with small white scaly spots (six to 10 on each stria); pronotum with pale lateral scales not meeting at apex *argentificus* Heller
- 10(7). Pronotum with basal pale scales at middle line either lacking or lying horizontally *sagittarius*, new species (part)
 Pronotum with basal pale scales at middle line vertical 11
11. Pronotum (apically and laterally) with bright vermilion scales; elytra (laterally and on disc in three crossbands) with bright vermilion scales contrasting with white scales and bare black areas (fig. 19) *coloreus*, new species
 Pronotum and elytra without vermilion scales 12
12. Elytra with eight or more distinct black spots devoid of scales; small (7 to 9 mm.); front intercoxal space as wide as or wider than beak at middle *boisduvali* Boheman
 Elytra with only two to four black spots devoid of scales, or with denuded black bands, or elytra entirely scaly; larger (9 to 15 mm.); front intercoxal space narrower than beak at middle . 13
13. Elytra with bare black bands or bands and scaly spots 14
 Elytra entirely scaly (may be abraded irregularly) 15
14. Elytra with subbasal black band horizontal (transverse); claws distinctly divergent; beak one and one-half times length of pronotum *nyblaei* Boheman (part)
 Elytra with subbasal black band oblique, V-shaped; claws apparently connate at base; beak scarcely longer than pronotum *niveus* Chevrolat
15. Elytral scales orange and yellow; Brazil *nyblaei* Boheman (part)
 Elytral scales white, ashy; Peru *cinereus*, new species

Cholus albicinctus Germar

Figures 34, 35, 54

Cholus albicinctus Germar, 1824, p. 214 (Brazil; type probably in University of Halle, Germany).

Diagnosis. Similar to *geometricus*, but white lateral stripes continuous from head to apex of elytra, and elytra lacking basal white band. Both species with elytra more attenuate, scutellum more transverse, and elytral humerus more widened angularly than those of other species of group.

Range. Brazil from São Paulo northward, and French Guiana (one specimen). (For 105 specimens examined, see Appendix.)

Description. Length 10.5 to 16 mm. Color pattern: black with continuous lateral white scaly stripes from head and front of pronotum to apex of elytra where joined by yellowish stripe of epipleura. Below white and yellow scales.

Beak longer than pronotum, arcuate, dorsally carinate, widened apically. Antenna inserted in front of middle of beak (male), almost at middle (female); funicle with segment 1 almost twice length of segment 2; segments 3 to 7 as wide as long; club as long as last 4 or 5 segments of funicle. Pronotum without depressions; disc densely tuberculate. Scutellum bare, wider than long. Elytra finely granulate in some specimens, in others intervals finely rugose, with tiny granules of size of stria punctures; base feebly bisinuate. Front intercoxal space almost as wide as beak at middle. Claws divergent; claw segment inserted

near base of terminal segment. Aedeagus (figs. 34, 35).

Remarks. *Cholus albicinctus* was designated the type of the genus by Schoenherr, 1826. The pattern of white lateral stripes is common in the Cholinae, there being 20 or more species in different groups or genera with this same general pattern.

Biology. Araujo e Silva (1968) reported *albicinctus* breeding in the "colmos florigenos" (flowering stalks) of *Calathea* in Bahia, Brazil. A specimen from Minas Gerais was taken also in this genus of Marantaceae (arrowroot family). An example without locality data was found in an unspecified Gramineae. Four specimens from Bahia are noted as "breeds in *Calathea* sp."

Cholus geometricus Germar

Figures 34, 35

Cholus geometricus Germar, 1824, p. 215 (Brazil; type probably in University of Halle, Germany).

Diagnosis. Similar to *albicinctus*, but pronotum smoother, being tuberculate on sides only, not on disc, and elytra also smoother, generally shiny, and with basal white band in addition to lateral white stripes.

Range. Brazil. (For 11 specimens examined, see Appendix.)

Description. Length 13 to 15 mm. Color pattern: black with white scales on head and in lateral stripes on pronotum and elytra, stripes of elytra arcuate from behind humerus to apex where joined by white stripe of epipleura; base of elytra banded in white; below white scales.

Beak slightly longer than pronotum, arcuate, dorsally carinate, feebly widened at apex, especially in female. Antenna inserted in front of middle of beak (male), at middle (female); funicle with segment 1 almost twice length of segment 2; segments 3 to 7 short; club at least as long as last 4 segments of funicle. Pronotum without depressions; disc either scarcely punctate, sparsely punctate, or feebly granulate. Scutellum bare, wider than long. Elytra smooth between stria punctures; base feebly bisinuate. Front intercoxal space wider than beak at middle. Claws divergent; claw segment inserted near base of terminal segment 3. Aedeagus (figs. 34, 35) as in *albicinctus*.

Remarks. *Cholus geometricus* is the type of the genus *Gymnonotus* Chevrolat (1879c) which was synonymized with *Cholus* by Heller (1906). Chevrolat mentioned the widening at the shoulders of the elytra; he wrote that this was the first species he had seen that was so smooth and polished dorsally. It is an uncommon species in most collections. The sexes are not readily distinguished although the antennae are inserted rather farther front in the male. The aedeagus is similar to that of *albicinctus*.

Cholus pistor Boheman

Figures 36, 37

Cholus pistor Boheman, 1836, p. 561 ("America meridionalis"; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Cholus transversalis Chevrolat, 1881d, p. 482 (Caracas, Venezuela; type in Naturhistoriska Riksmuseum, Stockholm, examined; synonymized by Kuschel, 1955).

Cholus pistor bahiensis Marshall, 1929, p. 394 (Brazil; type, male, in British Museum [Nat. Hist.]), London, examined; synonymized by Kuschel, 1955).

Diagnosis. Differing in being entirely tuberculate. Black tubercles interspersed with pale scales give salt and pepper effect, without any definite pattern.

Range. Island of Trinidad, Venezuela, French Guiana, Brazil, Bolivia, Paraguay, Peru. (For 58 specimens examined, see Appendix.)

Description. Length 12 to 19 mm. Color appearing to naked eye dark gray, pale gray, or whitish, depending on abundance of pale scales among tubercles.

Beak almost twice length of pronotum, arcuate, dorsally wider toward apex. Antenna inserted at or slightly in front of middle of beak; funicle with segment 1 a little more than twice length of segment 2; segments 3 to 7 almost as wide as long; club equal in length to last 3 or 4 funicular segments. Pronotum without depressions, tuberculate and densely scaly; tubercles in some specimens flattened and confluent. Scutellum scaly. Elytra with dense tubercles partially covered by dense scales (where scales worn off, tubercles are seen to be confluent); base straight. Front intercoxal space generally wider than beak at middle. Claws at base connate; claw segment inserted distinctly at middle

of terminal segment. Aedeagus (figs. 36, 37).

Remarks. The pepper and salt or speckled black and white pattern of *pistor* is found elsewhere in a number of species of *Erethistes*, as well as in *Cholus multiguttatus* Champion, a species differing in having round, not elongate scales, a much shorter beak, and different abdomen and metepisternum. In some examples of *pistor* an abundance of white scales causes a whiter appearance. Proportional to its overall size, *pistor* has minute connate tarsal claws.

In an unusually large female (17 mm.) from Sapucay, Peru, and in a dissected male (15 mm.) from São Paulo, Brazil, the middle and hind tibiae are much flattened and their outer apical fringe is longer (one-half the length of the tibia) than is normal for the species. This is disquieting as in general the tibial fringe or tibial comb and shape of the legs are good specific, if not generic, characters that should not vary. In these specimens, the aedeagus of the male seems not to differ from that of other specimens and no other differences were found. In a male from Bolivia the dorsal orifice of the aedeagus appears longer than shown in figure 37.

Biology. Gregorio Bondar, whose notebooks are deposited in the American Museum of Natural History, reported that he collected a number of adults and larvae of *pistor* in January and February, 1928, in grass, *Paspalum densum* (ditch millet), in Rio Vermelho, Brazil. Many of the plants had been bored into by the larvae, some of which he took home to rear under glass. He noticed that the adults made a kind of music by rubbing their abdomens against the elytra. Araujo e Silva (1968) found larvae boring in stalks of "capim d'Angola," as well as in *Paspalum densum*.

Cholus argentanicus Heller

Figures 38, 39

Cholus argentanicus Heller, 1906, p. 16 (Chaco, Argentina; type in Museum für Tierkunde, Dresden, examined).

Diagnosis. Only species having many distinct white scaly spots, creating mottled effect.

Range. Argentina, Paraguay, and Brazil. (For 30 specimens examined, see Appendix.)

Description. Length 13 to 16 mm. Color pat-

tern: black or dark red with yellow or white scales on pronotum laterally and basally, also in elongated mark at middle of base; on elytra seven to 12 small, elongated or round spots on each stria row, spots confluent within humerus, making large white patch, also medially on stria rows 2, 3, and 4 and apically behind callus; below white scales and irregular denuded spaces.

Beak 1-1/3 to 1-1/2 times longer than pronotum, arcuate, dorsally much widened apically. Antenna inserted at about middle of beak; funicle with segment 1 three times longer than segment 2; segments 3 to 7 about as wide as long; club as long as last 4 segments of funicle. Pronotum without depressions; disc densely punctate. Scutellum scaly. Elytra smooth between punctate striae; stria punctures mostly filled with scales; base virtually straight. Front intercoxal space about as wide as beak at middle. Claws divergent; claw segment inserted at middle of terminal segment. Aedeagus (figs. 38, 39) less sinuous than that of other species.

Remarks. The appearance of *argentanicus* is quite different when viewed in the microscope. When seen with the naked eye it is mottled, much as in *Cholus pantherinus* (Olivier); under the microscope the separate and distinct scaly spots are evident. In the majority of specimens the postocular lobe is distinct, as in *pistor*, not so feeble as in the other species. Although the beak of the female is proportionally longer, sex is generally difficult to determine. Four specimens (three with no locality data, one from Rio Grande do Sul) with the pronotum entirely and the elytra in great part denuded of scales seem to me to be this species although they bear an unpublished name of Heller's.

Cholus annulatus (Linnaeus)

Figures 40, 41

Curculio annulatus Linnaeus, 1764, p. 51 ("in Indiis"; type probably in Uppsala, Sweden).

Rhynchaenus gladiator Olivier, 1807, p. 174; 1808, pl. 28, fig. 422 ("Amérique méridionale," type not found; new synonymy).

Cholus dealbatus Boheman, 1836, p. 562 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Cholus faldermanni Fahraeus, 1844, p. 9 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Cholus consors Chevrolat, 1881e, p. 467 (Espírito Santo, Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Cholus ornatus Chevrolat, 1881c, p. 1xxiii (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Diagnosis. Color varying from almost entirely white or pale to almost entirely black, but generally elytra abraded to reveal white and black alternating crossbands that may be reduced to patches or spots. Shape and elytral pattern similar to those of *nyblaei*, but pronotum differing in pattern and lacking elliptic, scale-filled depressions.

Range. The Guianas, Brazil, Bolivia, Paraguay, Uruguay, and northern Argentina. Colombia (one specimen). (For 250 specimens examined, see Appendix.)

Description. Length 9 to 15 mm. Color pattern: pronotum with white, yellow, or tawny dense scales except for denuded, triangular black patch at center which may or may not attain sides of base and which is very large in dark specimens; elytra variable, entirely scaly except for black humerus or except for black humerus and antemedian band, or for antemedian and postmedian bands or spots; in dark specimens apical black band much smaller than in pale specimens; epipleura of elytra scaly in all specimens. Below covered with white scales but these sparser or lacking in dark specimens.

Beak slightly (male) or distinctly (female) longer than pronotum, arcuate, dorsally widened at apex. Antenna inserted at or slightly in front of middle of beak; funicle with segment 1 almost 3 times length of segment 2; segments 3 to 7 each shorter than segment 2 and about as wide as long; club as long as last 4 segments of funicle. Pronotum without depressions; disc densely punctate. Scutellum scaly. Elytra in denuded black areas punctate-striate; base virtually straight. Front intercoxal space at least as wide as beak at middle. Claws divergent; claw segment apparently inserted toward middle of terminal segment. Aedeagus (figs. 40, 41).

Remarks. Some of the names above were synonymized with each other but not with *annulatus* by Kuschel (1955), who placed *consors* and *ornatus* in synonymy with *dealbatus*, and *falder-*

manni with *gladiator*. Later Kuschel (personal commun.) considered all these conspecific.

Possibly *annulatus* varies geographically in its scaly color pattern, but the purely individual variation is so great and the loss of scales from abrasion so frequent that geographic differences, if present, are obscured. Generally speaking, there are perhaps more scaly individuals or individuals with only small or narrow black (denuded) bands on the elytra in the north, whereas farther south (southern Brazil, Paraguay, Uruguay, and Argentina) the majority of specimens seen are much blacker with heavy broad bands. On the other hand, five of 17 individuals from the Guianas, mostly from Cayenne, are black, being bereft of white scales dorsally, and five or six individuals from Gran Chaco and Misiones, Argentina, and from Uruguay are as white as many individuals from Brazil and French Guiana. In all examples the epipleurae of the elytra have white scales. The coloration of the pronotum varies also, from mostly black with a small amount of white apically and laterally to a large amount of white basically, apically, and laterally, to almost entirely white with only a median dark spot. The "denuded" dark areas are not entirely denuded as fine pale hairs or scales can generally be seen under high magnification. The allied species, *nyblaei*, has about the same geographical range as *annulatus*, but it is more constant in its color pattern.

Biology. Specimens from Uruguay were taken "on *Typha*," and "*Typha dominguensis*" (cattail), and on sheaths of *Totora* [= *Typha*]. Four examples from Bahia, Brazil, are labeled "larva bores stem of *Rhynchospora scaberrima*," a sedge, and Araujo e Silva (1968) stated that in Bahia *annulatus* breeds in sheaths or stalks of the same plant, and of *Fuirena umbellata*, a sedge. Thirty-eight of Bondar's specimens from Pituba, Bahia, were taken in the florescences of Cyperaceae and Graminaceae. From Surinam a specimen is marked "sugarcane" and "on cotton" without further explanation.

Cholus cephalae, new species

Figures 20, 42, 44

Type Material. Type, male, Maracaju, Mato Grosso, Brazil, February, 1937, in Museo de Zoologia, São Paulo, and female paratype, same

data, to be deposited in the American Museum of Natural History.

Diagnosis. Differing in having deep depression on head between eyes; male differing further in having beak (dorsal view) abruptly widened before apex.

Range. Known only from the type locality.

Description of Type. Male, length 10 mm. Color pattern: elongate white scales above and below except for denuded black areas at center, base, and apex of pronotum, and subbasally on elytra in upturned crescent (or half-moon); also on elytra two round bare spots in front of subapical callus and elongate black mark along suture at apex.

Beak slightly longer than pronotum, feebly arcuate, dorsally abruptly widened at apex, at base deeply sulcate. Antenna inserted at about middle of beak; funicle with segment 1 at least three times length of segment 2; segments 2 to 7 about as wide as long; club as long as last 4 or 5 segments of funicle. Pronotum without depressions, shallowly but densely punctate. Scutellum scaly. Elytra in denuded areas with punctures of striae 5 or 6 times larger than punctures of pronotum; base straight. Front intercoxal space about equal to width of beak at middle. Claws connate, of unequal length; claw segment inserted at base of terminal segment. Aedeagus (figs. 42, 44).

Variation from Type. In the female paratype the crescent shaped black band of the elytra is much smaller and does not reach the humeral black spot, and the beak is shorter, stouter, and widened at apex gradually, not abruptly; it is more finely punctate. The abdomen is flat, not concave and is strongly retracted into the elytra.

Etymology. The species name is from the Greek *cephale*, head.

Remarks. The elytral pattern of *cephale* is rather like that of *niveus* and *guerini*, but the pronotum lacks the transverse depressions of *niveus*, and the prosternum is not channeled as in *guerini*. The pronotum is rather similar to that of *sagittarius*. The claws are connate and of unequal length as in *guerini*. The subbasal black mark of the elytra is more crescent-like, not V-shaped as that of *niveus*. In both *niveus* and *cephale* the second tarsal segment of the male is distinctly longer than wide. The aedeagus in profile is the

same in *cephale*, *calcatus*, *niveus*, and *guerini* (fig. 44).

Cholus guerini Boheman

Figures 43, 44

Cholus guerini Boheman, 1836, p. 567 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Resembling *niveus* in elytral pattern of white scales interrupted by two sets of denuded, oblique V-shaped areas, but differing from it and other species in narrow, deep canal of prosternum bordered in male by tubercle on each side. Pronotal depressions virtually absent.

Range. Brazil. (For 26 specimens examined, see Appendix.)

Description. Length 12 to 13 mm. Color pattern: pronotum with white scales generally worn off in broad central area; elytra as given in diagnosis, but in some individuals V-shaped marks separated into spots (on humerus, in front of and behind middle, and on suture at apex). Below covered with white scales.

Beak scarcely, if at all, longer than pronotum straight to insertion of antenna where feebly arcuate, dorsally wider at apex than at middle. Antenna inserted in front of middle of beak; funicle with segment 1 about twice length of segment 2; segments 2 to 7 about as wide as long; club as long as last four segments of funicle. Pronotum with median depression, if present, scarcely defined; disc densely punctate. Scutellum scaly. Elytra in denuded areas punctate-striate; base straight. Front intercoxal space narrower than beak at middle. Claws connate, unequal in length; claw segment inserted near base of terminal segment. Aedeagus (figs. 43, 44).

Remarks. The prosternal canal between the coxae and the front margin of the prosternum is deep, but does not extend through to the base of the prosternum or to the mesosternum as is the case in most species of the Cryptorhynchinae and Zygopinae. The profile of the aedeagus is like that of *cephale*, *calcatus*, and *niveus*.

Cholus niveus Chevrolat

Figures 44, 45

Cholus niveus Chevrolat, 1881c, p. 1xxiii (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Pronotum similar to that of *boisduvali* in having deep, scaly transverse depressions, but elytra more like those of *guerini*, with bare, oblique, black bands abraded of white scales.

Range. Brazil. (For nine specimens examined, see Appendix.)

Description. Length 9 to 11 mm. Color pattern: black with white scales on pronotum laterally, also across base and apex, and at middle in two elliptical transverse bands; on elytra white scales except where denuded which is generally on humerus and on V-shaped or crescent shaped subbasal area, and on two subapical spots or two black "Vs," one behind other. Below white scales.

Beak slightly longer than pronotum, very feebly arcuate, dorsally wider at apex. Antenna inserted at about middle of beak; funicle with segment 1 about three times length of segment 2; segments 2 to 7 shorter; club as elongate as last four segments of funicle. Pronotum with two elliptical depressions filled with scales; disc shallowly punctate. Scutellum scaly. Elytra in denuded areas punctate-striate; base straight. Front intercoxal space narrower than beak at middle. Claws connate, of equal length; claw segment inserted near base of terminal segment. Aedeagus (figs. 44, 45).

Remarks. The antennal club is more robust, less elongate than that of other species, and is abruptly wider than the segments of the funicle. The front tarsus of a dissected male is distinctly longer than wide, whereas in the allied *boisduvali* and *guerini* it is about as wide as long. The aedeagus, viewed dorsally, is twisted to the left; it is not quite so exaggerated as that of *geometricus* and *albicinctus*, which twist to the right; when viewed laterally, it resembles the aedeagus of *calcatus*, *cephale*, and *guerini*.

Cholus boisduvali Boheman

Figures 46, 47

Cholus boisduvali Boheman, 1836, p. 568 ("America meridionalis"; type not found).

Cholus (Lobaspis?) championi Desbrochers des Loges, 1906, p. 363 (Bolivia; type in Muséum National d'Histoire Naturelle, Paris, examined; new synonymy).

Diagnosis. Pronotum with two transverse scaly depressions and longitudinal basal scales as in *nyblaei*, *cinereus*, and *coloreus*, but differing from them in having elytra mostly white with eight bare black spots, not unicolorous or banded with white.

Range. Argentina, Paraguay, Uruguay, Bolivia, Brazil, Colombia and French Guiana. (For 44 specimens examined, see Appendix.)

Description. Length 7.5 to 9 mm. Color pattern: black or red with white scales on pronotum laterally, also across base and apex, and at middle in two elliptical transverse depressions, leaving two bare black crossbands; on elytra white scales except on denuded spots as follows: two elongated marks on humerus, two longer round ones near suture in front of middle, two smaller round ones laterally behind middle, and two smaller ones near suture subapically, sutural spots in some specimens merged into one. Below white scales.

Beak slightly longer than pronotum, arcuate, dorsally feebly widened at apex. Antenna inserted at or behind middle of beak; funicle with segment 1 three times length of segment 2; segments 3 to 7 short; club as long as last 3 or 4 segments of funicle. Pronotum with two elongate, transverse scaly depressions (in some individuals merged into one); disc punctate. Scutellum scaly. Elytra in denuded areas punctate-striate; base straight. Front intercoxal space as wide as or wider than beak at middle. Claws at base connate, equal in length; claw segment inserted near middle of terminal segment. Aedeagus (figs. 46, 47).

Remarks. The type of *championi* (Bolivia) is a partly denuded specimen with rather more coarsely punctate pronotum than usual. Scales are present on the pronotum only in a narrow lateral line and the elliptical depressions are reduced by half, thus the pronotum is mostly black and bare. On the elytra also there is a large amount of abrasion of the white scales, but *championi* seems otherwise the same species as *boisduvali*.

Cholus sagittarius, new species

Figures 21, 48, 49

Type Material. Type, male, Sete Lagoas, Minas

Gerais, Brazil, in Kuschel collection, Department of Scientific and Industrial Research, Auckland. Twelve paratypes from Brazil: Aragaray, Minas Gerais, November, 1933, Spitz, collector, one, in Museu de Zoologia, São Paulo; Campos de Diamantina, Fazenda do Riacho Fundo, Minas Gerais, 1902, Gounelle, collector, one in Muséum National d'Histoire Naturelle, Paris, and two in Kuschel collection, Auckland; Jatahy, Goyaz, 1895-1896, Pujol, collector, three in Muséum National d'Histoire Naturelle and two in Kuschel collection, Auckland; Aragarças, Goyaz, November, 1953, Alvarenga, collector, one in Campos Seabra collection, Rio de Janeiro, and two to be deposited in the American Museum of Natural History.

Diagnosis. Similar to *boisduvali* in elytral pattern of six separate black spots and one subapical spot across suture (*boisduvali* has eight spots because sutural spot is broken into two), but pronotum differing in having bare black area longitudinal and angulate, like an arrowhead pointing basally, not transverse as in *boisduvali*.

Range. Minas Gerais and Goyaz, Brazil.

Description of Type. Male, 8.5 mm. Color pattern: black with white and yellow overlapping scales leaving bare areas on pronotum medially (as elongate, angulate area) and in spot on sides; on elytra elongate bare spot on humerus, two antemedian spots each side of suture, two laterally behind middle, and one subapically across suture.

Beak slightly longer than pronotum, strongly arcuate, dorsally feebly widened at apex. Antenna inserted at about middle of beak; funicle with segment 1 three times length of segment 2; segments 2 to 7 as wide as long; club as long as last 4 segments of funicle. Pronotum with ovoid median scaly depressions scarcely indicated; disc deeply punctate. Scutellum scaly. Elytra in bare spots with punctures of striae many times larger than those of pronotum; base straight. Front intercoxal space wider than beak at middle. Claws connate at base, of equal length; claw segment inserted at base of terminal segment. Aedeagus (figs. 48, 49).

Variation from Type. The size range is from 7.5 to 8.5 mm. In three paratypes the scales are worn off the elytra, exposing large, irregular bare areas. All scales on the three paratypes from

Campos de Diamantino (one specimen lacks its head) are white, and in the three other specimens from Goyaz they are yellow and white as in the type. In some paratypes the shallow, ovoid depressions at the middle of the pronotum are indicated by denser scales. The antennae of some individuals are inserted behind, not at the middle of the beak.

Etymology. The species name is from the Latin *sagittarius*, arrow, and describes the shape of the black pattern on the pronotum.

Remarks. At first glance *sagittarius* could be mistaken for *boisduvali*, but the bare black areas of the pronotum are quite different (see diagnosis). *Cholus sagittarius* appears twice in the key to the species (at couplets eight and 10) because some individuals show no scaly depressions on the pronotum and some do; the depressions, however, are very shallow in any case, and they are short and widely separated, not elongate as in *boisduvali*, *cinereus*, *coloreus*, *niveus*, and *nyblaei*.

Cholus coloreus, new species

Figures 19, 48, 49

Type Material. Type, female, Ruta 163, Mato Grosso, Brazil, 40 to 200 km. N of Campo Grande, January 20, 1972, Carbonell and Rondros, collectors, and a male paratype, Parana, Brazil, in the American Museum of Natural History; also male and female paratype from Bahia, Brazil, in Kuschel collection, Department of Scientific and Industrial Research, Auckland.

Diagnosis. Pronotum of same structure as *boisduvali*, *cinereus*, and *nyblaei* (with transverse scaly depressions and longitudinal basal scales), but differing from them and from other species in being more colorful, with bright vermilion and contrasting white and yellow scales, and in having longer, narrower beak.

Range. Brazil.

Description of Type. Female, 9 mm. Color pattern: pronotum with bright vermilion scales alternating with two bare black bands; elytra with vermilion scales on epipleura and dorsally in three transverse bands alternating with two white bands that enclose bare black areas; below, vermilion scales on sides of metasternum, yellow scales elsewhere.

Beak twice length of pronotum, arcuate, dorsally feebly widened at apex. Antenna inserted at middle of beak; funicle with segment 1 two and one-half times longer than segment 2; segment 2 elongate; segments 3 to 7 shorter; club as long as segments 3 to 7. Pronotum with two transverse elliptical depressions filled with scales; disc finely punctate. Scutellum scaly. Elytra in denuded areas punctate-striate; base straight. Front intercoxal space distinctly wider than beak at middle. Claws at base equal in length, apparently connate; claw segment inserted near base of terminal segment.

Variation from Type. In males the beak is shorter, about one and one-half times the length of the pronotum. The paratypes range in size from 8.5 to 10 mm. In a male from Bahia the median and subapical black bands of the elytra scarcely show as they are invaded by white scales. In two paratypes the scales of the transverse depressions of the pronotum meet medially and in the other paratype they even overlap.

Etymology. The species name is from the Latin *coloreus*, colored, variegated.

Remarks. In this beautiful polychromé species, the elytral bands are transverse as in *annulatus* and *nyblaei*, not crescent-shaped or V-shaped as in *cephale*, *niveus*, and *guerini*. The aedeagus is virtually the same as that of *sagittarius* (figs. 48, 49).

Cholus nyblaei Boheman

Figures 50, 51

Cholus nyblaei Boheman, 1836, p. 566 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Cholus brasiliensis Chevrolat, 1881c, p. lxxiii (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Diagnosis. Similar to *annulatus* in yellow- and black-banded elytra, but pronotum differing in having elliptical depressions across disc as in *cinereus* and other species.

Range. Argentina, Uruguay, Paraguay, Bolivia, Brazil, and French Guiana. (For 91 specimens examined, see Appendix.)

Description. Length 10 to 15 mm. Color pattern: black with dense white or yellow scales on

sides of pronotum obliquely to sides of apex or scales meeting at apex; scales also across base of pronotum and across middle in elliptical depressions that may merge; in some specimens dense orange scales except in front of and behind elliptical depressions; in some specimens nonscaly areas have fine, hairlike setae; elytra with dense scales at base, middle, and apex alternating with bare black crossbands which may be reduced to spots; humerus and subapical callus also denuded; in some specimens elytra entirely orange-scaled.

Beak generally feebly arcuate, but may be virtually straight, one and one-half times length of pronotum, dorsally slightly if at all widened at apex. Antenna inserted in some specimens in front of, in some behind, or near middle of beak; funicle with segment 1 about three times length of segment 2; segments 3 to 7 scarcely longer than wide; club as long as last four segments. Pronotum densely punctate, with elongate scaly depressions rather shallow. Scutellum scaly. Elytra in denuded areas punctate-striate; base straight. Front intercoxal space slightly narrower than or as wide as beak at middle. Claws divergent; claw segment inserted near base of terminal segment. Aedeagus (figs. 50, 51).

Remarks. The color pattern seems rather more constant than that of the equally widespread species *annulatus*. In some specimens, however, the black denuded bands are larger (or wider) than in others. I have not seen any completely pale specimens, but there are some orange-scaled individuals that have no denuded areas on the elytra. The *brasiliensis* type is one; others are from Bahia, from Lagoa Santa in Minas Gerais, and Rio Verde, Goyaz. I believe these specimens are all the same species. In "*brasiliensis*" specimens the basal and median elytral bands are orange instead of yellow or white, and the areas that are black and without scales in other *nyblaei* have yellow scales in "*brasiliensis*." In some but not all males the second tarsal segment is distinctly elongate. A few individuals that lack elytral bands resemble *cinereus*, but the aedeagus of these two species differs in shape.

Biology. A specimen from Machagay, Chaco, Argentina, is noted as having been captured "on cotton" as was also noted in *annulatus* from Surinam.

***Cholus cinereus*, new species**

Figures 52, 53

Type Material. Type, male, Middle River Ucayali, Peru, December 26, [1926?] and paratype, female, same locality, January 2, 1927, H. Bassler, collector, in the American Museum of Natural History.

Diagnosis. Pronotum similar to that of *nyblaei*, *niveus*, and others with transverse elliptical depressions, but elytra entirely scaly. Differing from *calcatus*, which also has scaly elytra, in aedeagus, and in having longer, stouter, less punctate, more uniformly strongly arcuate beak that is especially arcuate and convex at base.

Range. Northern Peru.

Description of Type. Male, length 12 mm. Color pattern: black with elongate white and yellow scales except in bare black area surrounding elliptical depressions of pronotum and on elytral humerus.

Beak one and one-half times length of pronotum, strongly arcuate, scarcely punctate. Antenna inserted at about middle of beak; funicle with segment 1 about three times length of segment 2; segments 3 to 7 shorter, as wide as long; club as long as last four segments of funicle. Pronotum punctate except on median line, with elliptical scaly depressions rather feeble. Scutellum scaly. Elytra in denuded spot on right elytron punctate-striate; base straight. Front intercoxal space narrower than beak at middle. Claws divergent; claw segment inserted near middle of terminal segment. Aedeagus (figs. 52, 53).

Variation from Type. In the female paratype (12.5 mm.) the pronotum is more denuded of scales, thus showing a larger black area; the beak is longer, almost twice the length of the pronotum, and the antenna appears to be inserted behind the middle of the beak. A second female from "Peru" is very much abraded and is not included as a paratype.

Etymology. The species name is from the Latin *cinereus*, referring to ashy color.

Remarks. The general appearance is much like that of some *calcatus* although in most *calcatus* the elytra are denuded in various spots, not uniformly scaly. In *cinereus* the claws are free and the claw segment emerges from about the middle of the terminal segment, whereas in *calcatus* the claws are connate and the claw segment is basally emergent. The aedeagus of *cinereus* differs from

that of all other species by being virtually straight not arcuate or sinuous when seen in profile.

***Cholus calcatus* Chevrolat**

Figures 43, 44

Cholus calcatus Chevrolat, 1881c, p. lxxiv (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Differing from other whitish or ashy species (*niveus*, *cinereus*) in lacking distinct elliptical depressions on pronotum, and by having antennae inserted farther front, and claws of unequal length. Similar to *guerini* in claws and occasionally in elytral pattern, but prosternum not canaliculate.

Range. Argentina, Paraguay, Brazil. (For 56 specimens examined, see Appendix.)

Description. Length 11 to 14 mm. Color pattern: entirely covered with whitish scales except for median bare line on pronotum, but majority of specimens abraded on humerus, on two or four bare spots at middle of elytra, and two in front of subapical callus; spots not concise but with blurred edges.

Beak scarcely, if at all, longer than pronotum straight to insertion of antenna where feebly arcuate, dorsally about same width throughout. Antenna inserted in front of middle of beak, funicle with segment 1 about twice length of segment 2; segments 2 to 7 about as wide as long, club as long as last three or four segments. Pronotum scaly; median depressions, if present, not elliptical or elongate; disc densely punctate. Scutellum scaly. Elytra in denuded areas punctate-striate; base virtually straight. Front intercoxal space narrower than beak at middle. Claws connate, unequal in length; claw segment inserted near base of terminal segment. Aedeagus (figs. 43, 44).

Remarks. Of 25 specimens, only two have the humerus bare of scales, one has the humerus and two elytral spots bare; two are entirely denuded and black; the remainder have eight or more areas of the elytra denuded. In some specimens the second tarsal segment is longer than wide as in males of *cephale*, *niveus*, and *nyblaei*. The antennal club is scarcely wider than the segments of the funicle. The aedeagus is essentially similar to that of *guerini*.

Species Group *flavofasciatus*

The single species does not seem to fit with any of the groups although it has no special distinguishing character except for its constant elytral pattern.

Cholus flavofasciatus Guérin-Ménéville

Cholus flavo-fasciatus Guérin-Ménéville, 1835, pl. 39, fig. 1 (Brazil; type not found).

Cholus flavofasciatus Boheman, 1836, p. 564 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined). Synonymized by Kuschel (1955).

Diagnosis. Resembling *kunzei* (*bohemani* species group) in glossy surface and yellow scaly bands of elytra, but differing in pattern of elytra, and lacking pronotal depression opposite scutellum as well as male characters of *kunzei*. Rather similar in pattern and shape to some variations of *annulatus* (*albicinctus* group), but without abdominal angle and serrate apex of elytra.

Range. Brazil; one specimen from French Guiana. (For 41 specimens examined, see Appendix.)

Description. Length 10 to 15 mm. Color pattern: pronotum with oblique lateral stripes of elongate yellow scales not meeting across apex; in some specimens there are scales along base; elytra with yellow crossbands at base (leaving humerus free), and at middle, and apical area also scaly yellow, but leaving black round spot on subapical callus; epipleura scaly from base to apex; venter entirely scaly.

Eyes round, separated above by less than width of beak at base. Beak slightly longer than pronotum, dorsally carinate, that of male virtually straight and of same width throughout; that of female more robust, widened at apex (dorsal view). Antenna inserted in front of middle of beak; funicle with segment 1 at least twice length of segment 2; club elongate. Pronotum without postocular lobe; basal angles (lateral view) rather prominently lobed. Scutellum about as wide as long, punctate. Elytra slightly longer than twice length of pronotum; sides tapering feebly to apex; striae uniformly punctate; intervals smooth, impunctate; base feebly bisinuate; apex rounded.

Prosternum slightly concave; base bituberculate. Mesosternum not tumid. Mesepimeron with lower edge angulate distally. Metepisternum normal in width. Front intercoxal space narrower than width of beak. Femora strongly clavate; front femur of male arcuate. Tibiae with apical teeth distinct; hind tibia with outer apical comb short, about one-fifth length of tibia. Aedeagus in profile strongly bent; dorsally rather spatulate in shape; parameres present but no basal sclerite.

Remarks. Boheman's type specimen of *flavofasciatus* agrees with the admirable illustration on Guérin-Ménéville's plate (1835) of *flavofasciatus*. In modern times an illustration serves as a description, but in the early nineteenth-century Boheman (1836, p. 564), who gave a reference to Guérin-Ménéville's illustration, evidently thought the species would be accredited to him because Guérin-Ménéville did not give any description. Actually he did mention *flavofasciatus* in the text (1844, p. 156); he described another species, *Cholus trifasciatus*, saying it was intermediate between *flavofasciatus* and *kunzei*. Guérin-Ménéville in 1835 also gave a reference to Schoenherr's [actually Boheman's] *flavofasciatus* of 1836. Kuschel (1955, p. 266) has explained that although some of the plates of the "Iconographie" began appearing in 1829, the plates of the Curculionidae are all by Guérin-Ménéville and are dated 1835. He said also that some of the species that Schoenherr, Boheman, and Chevrolat described later are shown on Guérin-Ménéville's plates.

Biology. According to Araujo e Silva (1968) *flavofasciatus* was taken in rice.

Species Group *bohemani*

The species included in this group are:

Cholus bohemani (Mannerheim), *rubiginosus* (Kuschel), *kunzei* Boheman, *variabilis* (Fahraeus), *margineguttatus* (Fahraeus), and *alboguttatus* (Germar).

Common characters of the six species are: Eye rather flat, round-oval, half covered by postocular lobe. Antenna inserted distinctly in front of middle of beak; funicle with segment 1 as long as next three segments; segments 3 to 6 more or less rounded; segment 7 wider than long; club elongate, equal to last four or five funicular segments. Pronotum as wide as elytra, convex; sides arcu-

ate; basal angle obtuse, not prominent; postocular lobe present; base at middle with small excised depression (difficult to see in *bohemani*). Scutellum receded from base of elytra. Elytra more or less parallel-sided; base straight; epipleural margin sinuous. Mesepimeron with lower edge distinctly angulate distally. Metepisternum width accommodating from five to seven rows of scales. Femur strongly clavate; inner tooth distinct; hind femur not reaching apex of elytra. Tibia with mucro and uncus distinct; tibial comb variable, but longer than one-fourth length of tibia. Adedeagus (figs. 55-65) with two horny, curved projections springing from dorsal base of median lobe; parameres present; basal sclerite not found. Dorsal apex of tergite 8 of male with elongate, transverse depression that may appear round because of enclosing, inward-turning hairs.

The species of this group differ from others by having an excision or distinct emargination (fig. 13) (as wide as but shorter than the scutellum) at the base of the pronotum opposite the retracted scutellum, by having a distinct postocular lobe, and the beak not longer than the pronotum. Unfortunately, the pronotal depression is not notable in all individuals and it is found, faintly, in some other groups.

The *bohemani* group differs, however, from all others in the pronged aedeagus and in the hairy depression of the eighth tergite of the male. I have examined the aedeagus of almost all species of the Cholini and have found none with the kind of aedeagus exemplified in the six species of this group. The two prongs are as strongly sclerotized as the median lobe and emerge from its dorsal side. In *bohemani*, *rubiginosus*, and *kunzei* they emerge from near the base of the lobe, in *alboguttatus* and *margineguttatus* from behind the middle, and in *variabilis* at about the middle. They are shorter in the first three species mentioned and longer in the other species. In *alboguttatus* the apexes of the prongs are greatly widened. The apical part of the median lobe is rather soft and ill-formed in *alboguttatus*, *kunzei*, and *margineguttatus*, but is stiffer and more sclerotized in *bohemani*, *rubiginosus*, and *variabilis*. The apodemes (not shown in the figures) are about the same length as the aedeagus. Curiously enough, the external aspect of these species is not so unusual as are the genitalia.

It should be noted that three species (*alboguttatus*, *margineguttatus*, and *variabilis*) were described in *Dionychus* Germar (which I now consider a synonym of *Cholus*) and two (*bohemani* and *rubiginosus*) were placed in *Platypachys* Chevrolat (which Heller, 1906, synonymized with *Cholus*). Kuschel (personal commun.) pointed out the affinity of all these species, as well as *Cholus kunzei*, through their unique genitalia.

Five species' names are synonymized, two by me, and three by Kuschel (1955). I have examined 242 specimens.

In the three smaller species (*bohemani*, *rubiginosus*, and *kunzei*) which are placed first, the elytra are punctate or foveate, but not tuberculate and have from two to four white scaly bands; in the larger, entirely tuberculate species (*alboguttatus*, *margineguttatus*, *variabilis*) the elytra are either immaculate or are furnished with white scaly spots or stripes.

Biology. No significant items are recorded; a specimen of *alboguttatus* was collected on sugar cane and three specimens of *kunzei* were found on the flowers of *Acacia*.

Distribution. The species inhabit eastern Brazil, one (*alboguttatus*) as far north as Pernambuco, and two (*rubiginosus*, *margineguttatus*) as far south as Santa Catarina. The other three species occur chiefly around Rio de Janeiro, São Paulo, Bahia, etc.

KEY TO SPECIES OF THE BOHEMANI GROUP

1. Dorsum smooth, not granulate, and pattern of white scaly spots and bands; 9 to 12 mm.
..... *kunzei* Boheman
- Dorsum, at least in part, granulate or tuberculate, with or without white scaly pattern . 2
2. Elytra foveate, not tuberculate, with two or three white transverse bands (one at base, one or two behind middle) 3
- Elytra tuberculate, not banded. 4
3. Black; dorsum (except for white scaly bands) without additional vestiture; elytral epipleura without spot
..... *bohemani* (Mannerheim)
- Reddish; dorsum (in addition to white scaly bands) with minute, elongate, white hair-like vestiture; elytral epipleura with white scaly spot. *rubiginosus* (Kuschel)

4. Elytra with tubercles, at least on disc, transversely confluent and elongate, forming wrinkles or reticulations; elytra either with 14 or more white spots or immaculate¹ *alboguttatus* (Germar)
Elytra with tubercles on disc round, distinctly separated even where contiguous; elytra with fewer than 14 white spots or immaculate¹ 5
5. Elytra immaculate 6
Elytra with a few white spots, bands, or stripes 7
6. Elytral striae with minute white scale within each puncture; elytral tubercles of same size as those of pronotum; hind femur generally reaching only to third abdominal segment; disc of elytra rather flat
. *margineguttatus* (Fahraeus) (part)
Elytral striae without scale within punctures; elytral tubercles generally larger than those of pronotum; hind femur reaching apex of fourth abdominal segment; disc of elytra arcuate, convex. *variabilis* (Fahraeus) (part)
7. Elytra with four basal spots and postmedian band that can be broken into spots; pronotum not striped. *variabilis* (Fahraeus) (part)
Elytra with lateral stripes that can be broken into spots; pronotum generally with lateral stripes. . . *margineguttatus* (Fahraeus) (part)

Cholus bohemani (Mannerheim)

Figures 55, 56

Amerhinus bohemani Mannerheim, 1836, p. 601 (Rio de Janeiro, Brazil; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined).

Cholus trifasciatus Guérin-Méneville, 1844, p. 156 (Brazil; type not found; synonymized by Kuschel, 1955).

Diagnosis. Size, shape, and general banded pattern of *rubiginosus*, but pronotum and surface between elytral bands without additional vestiture; pronotum tuberculate, elytra foveate.

Range. Eastern Brazil. (For 35 specimens examined, see Appendix.)

Description. Length 7 to 11 mm. Color pattern: black with band of white scales across apex

¹In some immaculate specimens of *margineguttatus* the elytral tubercles can also be rather transverse and confluent as in *alboguttatus*, but *alboguttatus* is distinctly shorter and wider, and the elytral disc is convex, not rather flat as in *margineguttatus*.

of pronotum and continuing onto prosternum and front coxae; elytra with basal band of white scales from humerus to humerus but interrupted at suture; postmedian and apical bands also not crossing suture but continuing to epipleural margin; epipleura with one white spot near base; legs reddish with black apexes on femora; underside scaly, but legs virtually scaleless.

Beak feebly arcuate, scarcely longer than pronotum, dorsally about same width throughout. Pronotum densely granulate-punctate. Scutellum elongate, not much wider than elytral fovea. Elytra, striae with rows of large foveae; intervals rather rugose. Prosternum granulate, shallowly concave. Front intercoxal space almost as wide as base of beak. Hind tibia with outer apical comb one-fourth or less length of tibia. Aedeagus with apex rounded-truncate, prolonged as a "finger"; lateral prongs in profile slightly arcuate, narrow, much shorter than median lobe, and cut out near base of aedeagus; ventrally, sides of aedeagus feebly carinate to near apex.

Remarks. *Amerhinus bohemani* was the type of Chevrolat's genus *Platypachys*. The nontuberculate elytra and shorter prongs of the aedeagus distinguish this species, as well as *rubiginosus* and *kunzei* from the others of the group. In *bohemani* the pronotal depression opposite the scutellum is not so readily visible as in the other species. A specimen from Espirito Santo and one from Carapa, Brazil, lack the apical white band of the elytra and the epipleural spot.

Cholus rubiginosus (Kuschel)

Figures 55, 56

Amerhinus rubiginosus Kuschel, 1955, p. 282 (new name for *trifasciatus* Chevrolat, not Guérin-Méneville).

Platypachys trifasciatus Chevrolat, 1879d, p. xlv (Santa Catarina, Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Similar to *bohemani* but reddish brown, not black, with legs scaly and differing further in having pronotum and elytra between scaly bands pubescent, not bare; pronotum tuberculate, elytra foveate.

Range. Eastern Brazil from São Paulo south to Santa Catarina. (For 25 specimens examined, see Appendix.)

Description. Length 7 to 10 mm. Color pattern: reddish brown with sparse white hairs in areas not covered with dense white scales; scales in band across apex of pronotum and continuing onto prosternum; on elytra scales in basal and postmedian bands; apical band more like spots; epipleura with spot near base; legs reddish with femoral apex black.

Beak, pronotum, scutellum, elytra, and intercoxal space as described for *bohemani* (but see color pattern above). Prosternum scaly, shallowly concave. Hind tibia with outer apical comb one-fourth length of tibia. Aedeagus as described for *bohemani*.

Remarks. The scales of the femora are like those of the elytra, not elongate and hairlike as in *kunzei*. Chevrolat's *Platypachys*, composed of *bohemani* and *trifasciatus* Chevrolat, was synonymized with *Cholus* by Heller (1906) and with *Amerhinus* by Klima (1936). The latter action brought *Platypachys trifasciatus* Chevrolat and *Cholus trifasciatus* Guérin-Méneville (synonym of *bohemani*) in the same genus, *Amerhinus*, and Kuschel (1955) therefore renamed Chevrolat's species. In the present paper there occurs also another *trifasciatus* of Hustache, formerly in the genus *Dionychus*.

Cholus kunzei Boheman

Figures 57, 58

Cholus kunzei Boheman, 1836, p. 565 (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Resembling *bohemani* and *rubiginosus* in punctate, not tuberculate elytra, but differing from them and other species of group in having pronotum punctate also and not tuberculate. Tibial comb very short.

Range. Eastern Brazil. (For 29 specimens examined, see Appendix.)

Description. Length 9 to 12 mm. Color pattern: black with white or yellow scales laterally on pronotum (leaving median third bare); elytra with basal band of white scales reaching from humerus to humerus but interrupted at suture, and some scaly spots (two subbasal and lateral, two antemedian, two postmedian, and two apical); scales of epipleura merging with lateral spots of elytra; some spots can be divided.

Beak as described for *bohemani* but slightly wider at apex. Pronotum densely or sparsely punctate. Scutellum elongate, but wider than elytral punctures. Elytral striae with punctures much larger than those of pronotum; intervals smooth and feebly punctate. Prosternum scaly, shallowly concave. Hind tibia with outer apical comb about one-sixth length of tibia. Aedeagus with apex more or less narrowly rounded; lateral prongs in profile virtually straight, short, narrow, rather far apart when viewed dorsally, cut out near base (in lateral view).

Remarks. The scales on the venter are similar to those on the elytra, but those of the femora are more elongate and hairlike. The median lobe of the aedeagus (in lateral view) is as short as that of *bohemani* and *rubiginosus*, but is thicker, and more tubelike.

The pronotum of a specimen labeled "Brazil" appears impunctate and shiny and lacks most of its scales, and the elytral spots are broken up into about 14 spots. In another specimen the subapical epipleural marks are run together.

Except for the aedeagus, the retracted scutellum, and the excision of the pronotum opposite it, this species could be readily confused with *flavofasciatus* Guérin-Méneville, which has virtually the same markings and shining surface.

Biology. Three specimens were reported as having been taken in the flowers of *Acacia* in Bahia, Brazil.

Cholus variabilis (Fahraeus)

Figures 59, 60

Dionychus variabilis Fahraeus, 1844, p. 20 (Brazil; type, labeled female, in Naturhistoriska Riksmuseum, Stockholm, examined).

Dionychus ? (*Ardoleucus*) *marginicollis* Chevrolat, 1881a, p. xx (Brazil; type in Naturhistoriska Riksmuseum, examined; synonymized by Kuschel, 1955).

Diagnosis. Differing from three preceding species and resembling *margineguttatus* in elongate elytra, densely scaly and tuberculate pronotum and elytra, longer metasternum, and longer prongs on aedeagus. Differing from *margineguttatus*, when scaly pattern lacking, by having tubercles of elytra much larger than those of pronotum, not of same size, and scutellum bare, not pubescent.

Range. Brazil, probably chiefly in east. (For 59 specimens examined, see Appendix.)

Description. Length 10 to 20 mm. Color pattern: pronotum appearing dark brown because of orange scales inserted among black tubercles; elytra variable, generally with four basal white scaly spots (on humerus and next to scutellum), and postmedian, feebly arcuate white band that can be broken into spots; in some specimens additional smaller white spots, in some no elytral marks whatsoever. Underside with orange scales except for white ones on mesepisternum; legs with hairlike pubescence.

Beak feebly arcuate, same length as pronotum, dorsally slightly wider at apex. Pronotum uniformly tuberculate, interstices filled with tiny orange scales. Scutellum round. Elytral intervals densely tuberculate, tubercles more than twice size of those of pronotum; striae with similar tubercles alternating with foveae. Prosternum scaly, slightly convex in front of coxae. Front intercoxal space as wide as beak at middle. Hind tibia with outer apical comb one-fourth length of tibia. Aedeagus with apex truncate; lateral prongs in profile slightly thicker toward apex, strongly arcuate, reaching almost to apex of aedeagus, cut out at middle; ventrally, sides of aedeagus at base feebly carinate.

Remarks. *Cholus variabilis* Fahraeus and *alboguttatus* Germar were described in *Dionychus*, as also *Cholus margineguttatus* Fahraeus, but these species lack the tuberculate or truly prominent prosternum of the males of other species described in *Dionychus*. In addition a postocular lobe is present, which is lacking in *Dionychus* (now considered the *parallelogrammus* group of *Cholus*.)

The name *Ardoleucus*, which Chevrolat placed in parentheses before his *marginicollis*, I have not found repeated in the literature. The type of *marginicollis* is small (10 mm.), lacks the apical pale spots of the elytra, and its basal white band is broken.

Cholus margineguttatus (Fahraeus)

Figures 61-63

Dionychus margineguttatus Fahraeus, 1844, p. 19 (Brazil; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined).

Dionychus margaritifera Redtenbacher, 1867, p.

164 (Rio de Janeiro, Brazil; syntype in Museum of Natural History, Vienna, examined; new synonymy).

Dionychus albonotatus Chevrolat, 1879a, p. v (Brazil; type, male, in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Diagnosis. On elytra within each striaal puncture is white scale that is larger than other scales; differing further from *variabilis* and *alboguttatus* in most specimens having lateral white stripes on pronotum and in elytra being proportionally longer, flatter, narrower, not convex.

Range. Eastern Brazil from Bahia south to Santa Catarina. (For 87 specimens examined, see Appendix.)

Description. Length 10 to 15 mm. Color pattern: black or brown with scaly yellow lateral stripes on pronotum as well as tiny brownish scales among black tubercles (but some specimens lacking stripes); elytra variable, in some individuals white lateral stripes of uneven width, in some stripes broken into three elongate or irregularly shaped spots each side of elytra, with or without additional small spots at center of base, spots generally bordered by black (but some specimens lacking all spots or stripes); ventrally white or yellow scales.

Beak dorsally slightly wider at apex, about equal in length to pronotum, that of male almost straight, of female arcuate. Pronotum densely tuberculate; interstices with minute brown scales. Scutellum round, scaly. Elytra as described for *variabilis* but tubercles smaller, of same size as those of pronotum. Prosternum scaly. Front intercoxal space not quite so wide as beak at middle. Hind tibia with outer apical comb about one-fourth length of tibia. Aedeagus with apex rounded; lateral prongs in profile of same width throughout, arcuate, long, reaching to apex of lobe, cut out from behind middle.

Remarks. The type of *margaritifera* was described as having lateral stripes on the elytra and the pronotum and they are present in the syntype I have examined. The type and paratypes of *albonotatus* have white basal spots, some sutural spots, and three lateral spots on the elytra; they lack the white lateral stripes on the pronotum. These two names are synonyms of *margineguttatus*, in the type of which there are

spots laterally on the elytra and smaller spots at the base near the scutellum and along the suture. Of the specimens examined, perhaps only 10 resemble *margaritifera*, being striped instead of spotted on the elytra; eight or 10 lack lateral stripes on the pronotum as in the type and paratypes of *albonotatus*. In addition, there are 13 specimens from Santa Catarina without any white marks and one from Cananea, São Paulo, that is almost immaculate. Such specimens might be confused with those *alboguttatus* (Germar) that also lack the usual white marks, but *margineguttatus* is a more slender, elongate species with flatter, narrow elytra, the tubercles of the elytra usually separate, not confluent, and the striae furnished with a tiny scale within the punctures. This puncture scale, however, is not visible on a few individuals. The hind femur of *margineguttatus* seems shorter than that of other species.

Cholus alboguttatus (Germar)

Figures 64, 65

Dionychus alboguttatus Germar, 1824, p. 314 (Brazil; type probably in University of Halle, Germany).

Dionychus duodecimguttatus Chevrolat, 1879a, p. v (Amazonas, Brazil; type in Naturhistoriska Riksmuseet, Stockholm, examined; synonymized by Kuschel, 1955).

Diagnosis. Readily recognizable by 14 well-spaced, round, impressed scaly white spots (some spots may be broken into two) on tubercular surface of elytra. Specimens lacking all spots differing from immaculate specimens of *variabilis* and *margineguttatus* in having confluent and flattish, not separate and convex elytral tubercles, and spoon-shaped prongs on aedeagus.

Range. Eastern Brazil from Pernambuco south to Espirito Santo. (For 54 specimens examined, see Appendix.)

Description. Length 10.5 to 17 mm. Color pattern: black with black tubercles and minute yellow scales on pronotum; elytra either of similar pattern, or with 14 large or small round scaly spots, generally three each side of suture (two basally, two medially, two postmedially), and four laterally on each margin (at humerus, antemedially, postmedially, subapically).

Beak feebly arcuate, slightly longer than pro-

notum, dorsally slightly wider at apex. Pronotum densely granulate, granules more or less confluent; interstices minutely scaly. Scutellum round or elongate, scaly. Elytra with dense flattened tubercles transversely confluent across intervals and striae; interstices filled with minute scales. Prosternum scaly, rather convex. Front intercoxal space as wide as beak at middle. Hind tibia with outer apical comb one-fourth or one-fifth length of tibia. Aedeagus with apex rounded; lateral prongs in profile strongly arcuate, widened in apical half to spoon-shaped lobe, prongs cut out from behind middle and reaching almost to apex of lobe.

Remarks. The elytral white spots are arranged across the elytra from base to apex in 4, 4, 4, and 2 lines although the middle ones are rather oblique, not in a horizontal line. In some individuals smaller spots are also present. These spots are depressed; they are margined by the black of the confluent tubercles surrounding them.

The 17 specimens examined from Minas Gerais lack spots, but they agree with other specimens in the aedeagus and other characters. Some immaculate specimens of *margineguttatus* are from much farther south (Santa Catarina).

Chevrolat's *duodecimguttatus*, which is a synonym of *alboguttatus*, actually has 14, not 12 spots; perhaps he did not count the two subapical spots.

Biology. A specimen collected by Bondar in Bahia is marked as having been taken on sugar cane.

Species Group *parallelogrammus*

The 15 species in this group are:

Cholus parallelogrammus (Germar); *conciliatus* (Pascoe); *jekelii* (Kirsch); *trifasciatus* (Hustache); *granifer* (Chevrolat); *roelofsi* Chevrolat; *rojasi* (Chevrolat); *frontalis* (Chevrolat); *hirsutus*, new species; *longus*, new species; *buckleyi* Pascoe; *magnidens*, new species; *nitidicollis* Pascoe; *megaspilus* Pascoe; *geniculatus* Kirsch.

Common characters of the 15 species are: Eye convex. Pronotum with postocular lobe, if present, very feeble; basal angles rounded. Elytra convex, almost humped or swollen; proportionally short; base straight; epipleural margin sinuous. Scutellum normal, not small. Mesepimeron angulate medially (figs. 7, 9). Metepisternum

elongate. Femur robust, feebly or strongly clavate, inner tooth distinct (but lacking in male of one species on front femur). Tibia with apical teeth distinct; tibial comb usually one-third or less length of tibia (but one-half in *longus*). Aedeagus with basal sclerite and parameres present. Prosternum of male tuberculate at middle or feebly or massively tumid.

The species are distinguished from those of other groups by several characters present in the male which bring together some tuberculate and some smooth species. A grossly tumid or prominently tuberculate prosternum, which in about half the species is adorned with abundant, long yellow hairs, and a distinctive basal sclerite or inner armature in the aedeagus are typical of this group. In three species, however, the prosternum is rather flat or but feebly tuberculate (*granifer*, *hirsutus*, and *jekelii*), and in two species (*longus*, *nitidicollis*) the basal sclerite was not found. The beak of males of three species (*jekelii*, *longus*, *trifasciatus*) is ventrally thickened and granulate, and in some individuals also hairy. The male of *longus* lacks the usual tooth on the front femur, a condition that appears also in perhaps a dozen other species of *Cholus*. In *buckleyi* and *magnidens* the front coxae, viewed from behind, are virtually contiguous; nonetheless, when viewed from the front or the side they are divided by a distinct prosternal process.

The species are readily divisible in tuberculate and nontuberculate and could, if necessary, be considered as two groups. They are arranged more or less according to whether they have tubercles on the pronotum but not, or only faintly on the elytra (*parallelogrammus*, *conciliatus*, *jekelii*, *geniculatus*); whether both the pronotum and elytra are distinctly tuberculate (*granifer*, *roelofsi*, *rojasi*, *frontalis*, *hirsutus*, *longus*); and finally whether the surface is smooth, without tubercles (*buckleyi*, *magnidens*, *nitidicollis*, *megaspilus*, *trifasciatus*). I do not adhere entirely to this sequence, however, as I place the spotted *geniculatus* (tubercles on the pronotum) at the end along with the five white-spotted species without tubercles, and the nontuberculate *trifasciatus* between *jekelii* and *granifer*, both tuberculate. In the first eight species (see checklist, p. 11), the venter is densely hairy or has elongate, hairlike scales, but in *buckleyi*,

magnidens, *geniculatus*, and the male of *longus* the scales are stubby and short, sparse or dense, and in *nitidicollis* and *megaspilus* the venter is mostly glabrous.

Six species were in *Cholus*, but five (*conciliatus*, *jekelii*, *parallelogrammus*, *rojasi*, and *trifasciatus*) were formerly in *Dionychus*. Of other species listed under *Dionychus* in Blackwelder's catalogue (1947), three (*alboguttatus*, *marginiguttatus*, and *variabilis*) are now in the *bohemani* group of *Cholus* (see that group); *mutabilis* Fahræus was transferred to *Scelerosomus* by Kuschel (1955); *squamulosus* Gyllenhal was returned to *Homalinotus* by Costa Lima and Seabra (1955); and *aequatorialis* Kirsch (Ecuador) may represent a new monotypic genus; it is apparently wingless, with a very tiny scutellum, no humeral or subapical callus, the front coxae contiguous (no prosternal process visible); the prosternum transversely tumid, the mesepimeron rather malformed; the front femur linear but short, and the tibial comb long, almost one-half the length of the tibia.

In the *parallelogrammus* group the basal sclerite or inner armature of the aedeagus is almost cylindrical; large and thick in half the species, proportionally small and narrow in the nontuberculate, white-spotted species. It was not found in *longus* which had been dissected previously. The basal part of the aedeagus seems more strongly sclerotized dorsally in some males; the profile of the aedeagus is strongly arcuate in *jekelii*, *longus*, and *nitidicollis*, arcuate and very sinuous in *geniculatus*. In most species the aedeagus is narrowed to a truncate or blunt apex, but (figs. 66-89) it can be more acuminate, more rounded, slightly constricted before the apex, or somewhat emarginate.

Biology. The only species for which information is recorded are *parallelogrammus* and *conciliatus* which, according to Araujo e Silva (1968) breed in the internodes of bamboo in Brazil; *parallelogrammus* was found also in *Begonia* species and in some Gramineae.

Distribution. The group appears to be more northern in distribution than other groups, more than half the species occurring in Colombia, with four in Venezuela, one in Panama, and one in French Guiana. *Cholus buckleyi* and *parallelogrammus* are the most widespread species and the

most numerous in collections. I have examined more than 700 specimens of the group.

KEY TO SPECIES OF THE
PARALLELOGRAMMUS GROUP

- 1. Metasternum (seen in lateral view) as long as one and one-half times diameter of coxa; pronotum with scaly yellow or white lateral stripes among tubercles; male with front femur strongly arcuate, and lacking usual inner tooth, and prosternum massively tumid (fig. 24, female)

. *longus*, new species
Metasternum about equal in length to diameter of coxa; pronotum with lateral pale stripes, if present, on

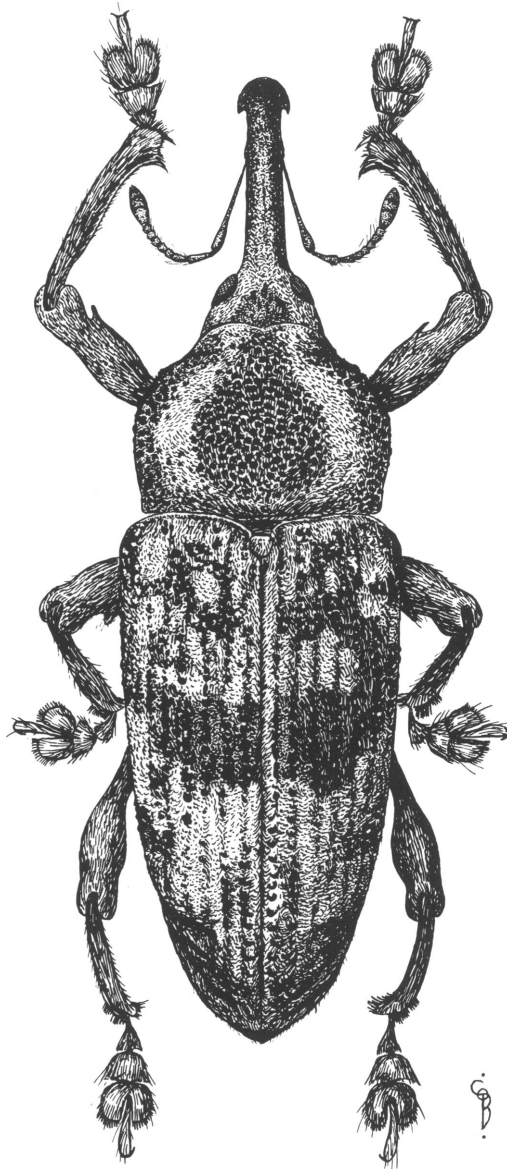


FIG. 24. *Cholus longus*, paratype, female, Sara Province, Bolivia, 25 mm.

- glabrous, not tuberculate surface; male with front femur toothed within, and prosternum tumid or not 2
2. Each stria of elytra with 18 to 20 impressed, distinct, white spots formed by clusters of scales in punctures *geniculatus* Kirsch
 Each stria of elytra with no more than 10 white spots, or elytra without any white spots. 3
3. Dorsum without tubercles or granules; black, generally shiny; elytra with white spots or white transverse bands 4
 Dorsum, at least pronotum, tuberculate or granulate; elytra either with white stripes alternating with black costae or entirely scaly-tuberculate 8
4. Ventral side with dense, elongate, white hairlike scales; elytra with three narrow white transverse bands *trifasciatus* (Hustache)
 Ventral side either virtually lacking vestiture or with short, sparse white scales of size and shape of those on elytra; elytra with white spots . . . 5
5. Entire elytra with only six large dorsal white spots. *megaspilus* Pascoe
 Entire elytra with more than six dorsal white spots. 6
6. Elytra across base with only four or fewer white spots, entire elytra with no more than 32 spots; venter without scales. *nitidicollis* Pascoe
 Elytra across base with from four to 10 white spots, entire elytra with 50 or more spots; venter covered with white scales 7
7. Hind femur strongly clavate and inner tooth much shorter than width of femur; front coxa spherical *buckleyi* Pascoe
 Hind femur feebly clavate and with inner tooth long, backward curving, as long as width of femur; front coxa (viewed from behind) pear-shaped (fig. 22). *magnidens*, new species
- 8(3). Elytra with bare black costae or ribs that are not, or scarcely tuberculate. 9
 Elytra without bare black costae, but entirely tuberculate among scales or hairs 12
9. Each elytron either with four long, bare dorsal costae (plus two on sides), or with four long costae and three narrower, shorter, or interrupted costae alternating with depressed stripes of pale scales *conciatus* (Pascoe)
 Each elytron with seven long, bare or scaly, dorsal costae (plus two or three on sides) alternating with depressed stripes of pale scales . . . 10
10. Scutellum with white scales. *jekelii* (Kirsch) (part)
 Scutellum bare of scales 11
11. Elytra boldly black and white with well-defined, broad black costae; striae filled with pale scales, no punctures visible . . . *parallelogrammus* (Germar)
 Elytra of pepper and salt aspect, with narrow, indistinct black costae generally invaded by pale scales of striae; striae with dense punctures generally visible under scales *jekelii* (Kirsch) (part)
- 12(8). Pronotum with "normal," feebly elongate, blunt scales only two or three times longer than wide 13
 Pronotum with hairlike, elongate, acuminate scales about six or seven times longer than wide 15
13. Elytral tubercles merging across intervals and striae, forming transverse pattern of scallops, "Ws," or wrinkles *rojasi* (Chevrolat)
 Elytral tubercles separated, or if merging somewhat, then merging within same interval, forming ribbed effect 14
14. Pronotum irregularly, more sparsely tuberculate, leaving several nontuberculate patches; tubercles generally larger than those of *roelofsi*; elytra more elongate; male with prosternal tubercles tumid, if at all, only in front of each coxa. *granifer* (Chevrolat)
 Pronotum uniformly, densely tuberculate; tubercles generally smaller than those of *granifer*; elytra broader, robust; male with prosternal tubercles tumid medially *roelofsi* Chevrolat
- 15(12). Dorsum with tubercles almost hidden by long, hairlike scales; elytra with scales as long as those of pronotum; pronotum not carinate; head with orange scales (fig. 23).

..... *hirsutus*, new species
 Dorsum with tubercles well evident
 among scales; elytra with scales
 shorter than those of pronotum; pro-
 notal disc in front of middle with
 short carina of fused granules; head
 with yellow scales
 *frontalis* (Chevrolat)

Cholus parallelogrammus (Germar)

Figures 66-68

Dionychus parallelogrammus Germar, 1824, p.
 314 (Brazil; type not found).

Diagnosis. In fresh condition readily identified by 20 elevated, shining bare black stripes of elytra alternating with rather depressed scaly white stripes; differs further from *concordatus* in having more and longer stripes and from it and *jekelii* in having stripes distinct, not partially covered by scales. Pronotum, but not elytra, tuberculate.

Range. Panama, Colombia, Peru, and eastern and southern Brazil. (For 264 specimens examined, see Appendix.)

Description. Length 14 to 30 mm. Color pattern: black or reddish; pronotum appearing yellowish due to yellow scales dispersed among tubercles; elytra with 20 or 22 long bare black stripes alternating with distinct rows of yellow scales; underside densely hairy.

Eye roundish, not larger than base of beak (in lateral view). Beak same length as pronotum, even slightly shorter in some females, virtually straight or slightly decurved apically, at base unincarnate in some specimens. Beak of male generally heavily scaled dorsally and of same width throughout; that of female generally slightly wider at apex (in dorsal view). Antenna inserted in apical third of beak in male, farther back in female; funicle with segment 1 about twice length of segment 2 and as long as club; segments 3 to 7 about as wide as long; club rather roundish, stout. Pronotum convex, about as wide as elytra with uniformly dense, flat, in some specimens confluent, tubercles and scarcely elongate scales. Scutellum bare. Elytra with intervals elevated, bare, in some specimens punctate, in some with slight irregularities; striae with three or four rows of dense yellow scales, no striae punctures visible unless scales worn off.

Prosternum of male tuberculate, with two very prominent median tubercles, with long, coarse, dense hairs covering most of tubercles; of female rather flat, vaguely granulate. Front coxae separated by somewhat less than width of beak. Middle and hind femora of male strongly clavate with rounded, backward pointing tooth; front femur of male arcuate; female with femur and tooth less strong. Hind femur not quite reaching apex of elytra. Venter of male with long, dense hairs. Aedeagus narrowed to truncate or slightly emarginate apex; apodemes shorter and narrower than those of *concordatus*.

Remarks. *Cholus parallelogrammus* was one of the six original species of Germar's *Dionychus*, 1824, and was subsequently designated the type of that genus by Schoenherr (1826). Over the years, many more species were attributed to this genus (there are 15 listed in Blackwelder, 1947), but the five other species originally in *Dionychus* have all been transferred to different genera. The only character in Germar's original description that might have distinguished *Dionychus* from allied genera, i.e., that the seventh funicular segment was dilated and adpressed to the antennal club, occurs in only one of the original species, *platynotus*. This species was later transferred correctly to the genus *Homalinotus* and Schoenherr omitted it from his redescription of *Dionychus* (1826).

On the sides of the elytra of *parallelogrammus* and *concordatus* three black stripes emanate from the black humeral patch; all three reach the apex or the subapical callus in *parallelogrammus*, but they generally become obscured by scales in *concordatus*. I have not seen any specimens of *parallelogrammus* with the scutellum hairy as is that of *jekelii*; one specimen of *concordatus* has a hairy scutellum. In some smaller males of *parallelogrammus* the beak appears proportionally longer than in larger males.

Biology. Araujo e Silva (1968) reported *parallelogrammus* breeding in bamboo in Brazil, and associated with *Begonia* species and some Gramineae.

Cholus concordatus (Pascoe)

Figures 67, 69

Dionychus concordatus Pascoe, 1881b, p. 303

(Brazil; type, male, in British Museum [Nat. Hist.], London, examined).

Dionychus parallelogrammus var. *alternans* Desbrochers des Loges, 1906, p. 371 (Santa Catarina, Brazil; type, male, in Muséum National d'Histoire Naturelle, Paris, examined; synonymized by Kuschel, 1955).

Diagnosis. Differing from quite similar *parallelogrammus* in having elevated bare black stripes of elytra not uniformly long; alternate stripes shorter, less elevated, or invaded by scales; and epipleura of elytra entirely scaly, not bare. Pronotum tuberculate, but not elytra.

Range. Santa Catarina in southeastern Brazil. (For 65 specimens examined, see Appendix.)

Description. Length 18 to 28 mm. Color pattern: black or reddish with pronotum appearing yellowish due to yellow scales dispersed among black tubercles; elytra with 12 long, bare black stripes (four visible dorsally on each elytron), alternating with much wider rows of yellow scales, some of which reveal medially a shorter, narrower, less distinct black stripe; below densely hairy.

Characters as given for *parallelogrammus* except for color pattern and for proportionally longer, wider apodemes of aedeagus and slightly different basal sclerite (fig. 69).

Remarks. Possibly this species is only a variety of *parallelogrammus* with half the elytral stripes covered by scales, not exposed and bare, but the partially exposed, shorter stripes of *conciliatus* are not so strongly elevated as those of *parallelogrammus* and they become obsolete toward the apex of the elytra. *Cholus conciliatus* might be considered a southern race except that *parallelogrammus* occurs also in Santa Catarina in nine or ten different localities.

Biology. This species, under the name of *Dionychus parallelogrammus* variety *alternans*, was recorded by Costa Lima (1917) as breeding in bamboo in Santa Catarina.

Cholus jekelii (Kirsch)

Figures 18, 70, 76

Dionychus jekelii Kirsch, 1875, p. 171 (Peru; type probably in Museum für Tierkunde, Dresden).

Archarias multicostratus Chevrolat, 1881e, p. 467 (Chiquitos, Bolivia; type, female, in Naturhis-

toriska Riksmuseum, Stockholm, examined; new synonymy).

Diagnosis. Similar to *parallelogrammus* and *conciliatus*, but differing in characters of male and in having bare black stripes of elytra less distinct, not strongly raised and delimited, and invaded on sides by feathery scales of striae. Pronotum tuberculate; epipleura of elytra scaly.

Range. Bolivia, Peru, Brazil. (For 75 specimens examined, see Appendix.)

Description. Length 15 to 28 mm. Color pattern: grayish, pepper and salt appearance when viewed with naked eye; pronotum with yellow scales among tubercles; scutellum with white scales; elytra with more white scales than exposed black stripes, especially toward apex; below densely hairy.

Eye slightly oval, not wider than base of beak (seen in lateral view). Beak not longer than pronotum, even slightly shorter in some females; beak of male straight to insertion of antenna where slightly decurved; underside canaliculate, tuberculate, and hairy; lower edge (fig. 18), viewed laterally, thickened behind antennal insertion; beak of female and antenna, funicle, and pronotum of both sexes as described for *parallelogrammus*, but antennal club perhaps shorter and rounder. Scutellum densely scaly. Elytra with intervals feebly elevated, not much wider than striae (in fresh specimens narrower than striae), invaded by scales; striae with punctures usually obscured by scales.

Prosternum of male feebly tuberculate but without median prominent tubercles, with long, dense, coarse hairs; of female rather flat, vaguely granulate. Front coxae narrowly separated by one-half width of beak. Femora and ventral vestiture of male as described for *parallelogrammus*. Aedeagus strongly arcuate, narrowed to rounded apex; apodemes shorter than aedeagus.

Remarks. Specimens with the dorsal scales worn can be confused with worn specimens of *parallelogrammus* although the costae of the elytra of *jekelii* are never so distinct or so elevated. Furthermore, the scutellum of *jekelii* is generally scaly (except in six worn specimens), not bare. The terminal segment of the antennal funicle is rather large, broad, and hairy in both species and the club also is quite stubby, not elongate. In some small specimens of *jekelii* the

characteristic thickening and hairiness of the beak is scarcely noticeable. Three males were dissected.

Cholus trifasciatus (Hustache)

Figures 71-73

Dionychus trifasciatus Hustache, 1939, p. 167 (Madre de Dios, Peru; type, male, in Muséum National d'Histoire Naturelle, Paris, examined).

Cholus trizonatus Günther, 1943, p. 82, fig. 18 (Rio Madre de Dios, Peru; type, female, in Museum für Tierkunde, Dresden, examined; new synonymy).

Diagnosis. Differing from other species in having white scales of elytra arranged in three transverse narrow bands; pronotum and elytra mostly glabrous as in *buckleyi*, *megaspilus*, *nitidicollis*, and *magnidens*, but beak of male rather thickened and hairy below as in male of *jekelii*. No tubercles.

Range. Bolivia, Peru, Brazil. (For 18 specimens examined, see Appendix.)

Description. Length 15 to 21 mm. Color pattern: black; pronotum on sides of front with few white scales (often worn off); elytra with three narrow transverse white scaly bands (at base, in front of middle and behind middle) and white apical patch of sparser scales; in some specimens bands broken irregularly into spots; epipleura scaly; below densely hairy.

Eye large, round, prominent. Beak of male slightly, but of female not, longer than pronotum, virtually straight with only slight decurve apically; beak of male with underside canaliculate, tuberculate, and hairy; lower edge in profile slightly thickened toward base; beak of female smooth. Antenna, funicle, and club as described for *parallelogrammus*. Pronotum rather elongate, very faintly punctate, almost as wide as elytra. Scutellum bare. Elytra deeply or shallowly punctate-striate, without tubercles.

Prosternum of male strongly tumid, with two prominent median tubercles and long coarse hairs; of female flat, sparsely hairy. Front coxae narrowly separated by about width of antennal funicle. Femur of male strongly, of female moderately clavate; front femur of male arcuate; hind femur not quite reaching apex of elytra. Aedeagus narrowed to truncate, slightly widened

apex; apodemes shorter than aedeagus; basal sclerite narrower than that of three preceding species.

Remarks. This well-marked species is slender and elongate, not so robust as those that precede. The pronotum is proportionally shorter than that of *concordatus*, *parallelogrammus*, and *jekelii*.

Because of lack of communication during World War II, Günther, when he described his well-illustrated *trizonatus* (1943) evidently did not know of Hustache's *trifasciatus* (1939). The types of both species are from the same locality, Madre de Dios.

Cholus granifer (Chevrolat)

Figure 76

Archarias granifer Chevrolat, 1881b, p. xxvii (Colombia; type, probably female, in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Similar to *roelofsi*, *rojasi*, and *frontalis*, differing from first two in having sparse, not dense tubercles on pronotum, and from *frontalis* in having shorter, not elongate or hairlike scales. Pronotum and elytra tuberculate; prosternum of male not especially tuberculate or tumid.

Range. Colombia and Venezuela. (For 127 specimens examined, see Appendix.)

Description. Length 17 to 25 mm. Color pattern: entirely yellowish brown with yellow scales among black tubercles; below hairy.

Eye, beak, antenna, pronotum as described for *parallelogrammus*, but tubercles of pronotum sparser, leaving scattered, nontuberculate areas, and club of antenna elongate. Scutellum scaly. Elytral intervals with one or two rows of dense tubercles, in some examples longitudinally confluent, intervals much wider than punctate-tuberculate striae which generally appear as black lines; all tubercles interspersed with tiny yellow scales.

Prosternum minutely tuberculate, only slightly more so in male than in female and covered with dense hairs. Front coxae narrowly separated by about one-half width of beak. Femur moderately clavate; inner tooth inconspicuous; front femur of male slightly arcuate; hind femur not reaching apex of elytra. Aedeagus narrowed to truncate apex; apodemes almost as long as aedeagus.

Remarks. Chevrolat described both *granifer* and *roelofsi* in *Archarias* although he had earlier described the scarcely distinguishable *rojasi* in *Dionychus*. These three very similar species occur in Colombia and Venezuela, with *rojasi* also in Brazil and *roelofsi* also in French Guiana. The prosternal tubercles in the male of *granifer* are inconspicuous and do not form a tumid mass as they do in males of *rojasi* and *roelofsi*. The striae lines of the elytra are generally evident, clearly separating the tubercular intervals. Four males were dissected.

Cholus roelofsi (Chevrolat)

Figure 76

Archarias roelofsi Chevrolat, 1881e, p. 467 (Cayenne, French Guiana; type, female, in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Differing from other brownish yellow species except *rojasi* in having denser tubercles on pronotum, which are proportionally also smaller than those of other species. Elytra more or less like those of *granifer* but tubercles smaller and denser.

Range. Colombia, Venezuela, French Guiana. (For 16 specimens examined, see Appendix.)

Description. Length 16 to 23 mm. Color pattern: entirely yellow-brown, with yellow scales among black tubercles; below hairy.

Eye, beak, antenna, and pronotum as described for *parallelogrammus*, but club of antenna elongate, not roundish. Scutellum scaly. Elytra as described for *granifer* but generally striae not so distinct. Prosternum of male tumid and tuberculate, with two more prominent median tubercles hidden in long coarse hairs; of female vaguely tumid and granulate. Front coxae narrowly separated by about width of antennal segment (wider in some specimens). Legs and aedeagus as described for *granifer*.

Remarks. This brownish yellow, robust species covered with black tubercles is very similar dorsally to *rojasi*, *granifer*, *hirsutus*, and *frontalis*, but differs slightly, on close inspection, in the vestiture or in the size and spacing of the tubercles (see key to the species). The aedeagus is similar also. The prosternum of the male is tumid and tuberculate as in *rojasi* and *frontalis*, whereas

that of males of *granifer* and *hirsutus* is either less tuberculate or almost flat.

Cholus rojasi (Chevrolat)

Figures 74-76

Dionychus rojasi Chevrolat, 1879a, p. v (Venezuela; type, male in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Differing from other yellow-brown species except *roelofsi* in having uniformly densely tuberculate pronotum and the male prominent prosternal tubercles; differing from *roelofsi* in having transversely confluent tubercles on elytra and much larger dorsal tubercles.

Range. Colombia, Venezuela, and Brazil. (For 34 specimens, see Appendix.)

Description. Length 16 to 24 mm. Color pattern: entirely yellow-brown with yellow scales among black tubercles; below hairy.

Eye, beak, antenna, pronotum as described for *parallelogrammus*. Scutellum scaly. Elytra densely tuberculate; intervals with one or two rows of large tubercles transversely confluent across striae, forming scallops or wrinkles; striae not visible; all tubercles interspersed with yellow scales. Prosternum of male forming strongly tumid mass of small tubercles, with long coarse hairs; of female tuberculate but not tumid. Front coxae, viewed from behind, separated by only width of antennal segment; femora moderately clavate with small inner tooth; front femur of male arcuate; hind femur not reaching apex of elytra. Aedeagus as described for *granifer*.

Remarks. The merging tubercles of the elytra form little "Vs" or "Ws" or vague scallops and present a quite different appearance from the distinctly separate, tiny tubercles of the closely allied *roelofsi*.

Cholus frontalis (Chevrolat)

Figure 76

Archarias frontalis Chevrolat, 1881e, p. 467 (new name for *carinatus* Chevrolat, not Guérin-Méneville).

Dionychus carinatus Chevrolat, 1879a, p. vi (Brazil; type in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Differing from *rojasi*, *roelofsi*, and *granifer* in having elongate, acuminate, hairlike

pronotal vestiture, not blunt, short scales; tubercles of pronotum at center or sides of center very sparse or lacking, as in *granifer*. Pronotum and elytra tuberculate.

Range. Colombia and Brazil. (For eight specimens examined, see Appendix.)

Description. Length 22 to 29 mm. Color pattern: entirely yellow-brown with yellow scales among black tubercles; below hairy.

Eye, beak, and antenna as described for *parallelogrammus*. Pronotum convex, as wide as elytra; tubercles rather dense medially basally, but lacking or sparse elsewhere; scales hairlike, six or seven times longer than wide. Scutellum scaly. Elytra densely tuberculate; intervals with one or two rows of large tubercles, some laterally confluent; striae scarcely visible; all tubercles interspersed with yellow scales. Prosternum, legs, and aedeagus as described for *granifer*, but prosternum somewhat more tuberculate.

Remarks. Chevrolat's name (*carinatus*) for this species probably referred to the abbreviated longitudinal carina of the pronotum which is, however, very vague and not invariably present. Chevrolat used *Dionychus* as the genus, but later (1881e) he referred his species to *Archarias* and gave it a new name (*frontalis*). This change may not have been necessary, but I believe at one time both *carinatus* were in *Cholus*, although the *carinatus* of Guérin-Méneville is now in *Odontoderes*.

Cholus hirsutus, new species

Figures 23, 76

Type, male, "Venezuela," Staudinger, collector, in Staatliches Museum für Tierkunde, Dresden.

Diagnosis. Differing from all species in group except *frontalis* in having long hairlike vestiture on both pronotum and elytra, vestiture even longer than that of *frontalis*, from which male differs further in flat, feebly tuberculate prosternum. Pronotum and elytra tuberculate.

Range. Known only from type locality.

Description of Type. Male, 23 mm. Color pattern: yellowish white with black tubercles; head, scutellum, and base of pronotum with orange vestiture; below scaly.

Eye roundish, not larger than base of beak (seen in lateral view). Beak same length as pro-

notum, straight to insertion of antenna where feebly decurved to apex, dorsally carinate and about same width throughout. Antenna inserted at apical third; funicle segments as described for *parallelogrammus*, but club rather elongate, not roundish, and slightly longer than funicle segment 1. Pronotum rather flat, as wide as elytra, with sparse, tiny tubercles partially covered by long, hairlike pubescence that is seven or more times longer than wide. Scutellum and elytra with same kind of pubescence; elytra with intervals and striae not very densely tuberculate, tubercles same size as those of pronotum, or slightly larger, on disc tubercles partially and in apical half almost entirely hidden by pubescence.

Prosternum somewhat tuberculate, but flat, not tumid, with long hairs. Front intercoxal space about one-half width of beak; femora clavate and toothed within; front femur arcuate; hind femur not reaching apex of elytra. Aedeagus as described for *granifer*.

Etymology. The species name is from the Latin *hirsutus*, hairy, referring to the hairy covering.

Remarks. The single male of *hirsutus* lacks the prominent prosternum characteristic of the majority of species of this group, but in this respect agrees with males of *granifer* and *jekelii*. The orange scales of the color pattern may be an individual, not a specific character. The pronotum is flattish, not convex as in *frontalis* from which *hirsutus* differs further in having less densely tuberculate elytra, and all tubercles less evident under their vestiture.

Cholus longus, new species

Figures 16, 17, 24, 81

Type Material. Type, male, Rio Coni, Chapare, Bolivia, 400 meters, R. Zischka, collector, in Kuschel collection, Auckland, and paratype, female, Province of Sara, Bolivia, 450 meters, J. Steinbach, collector, to be deposited in the American Museum of Natural History.

Diagnosis. Differing from all species of group in having scarcely clavate femora; pronotum with white scaly lateral stripes, not unicolorous; tibial corbel and metasternum longer; male with front femur extremely arcuate and lacking usual inner tooth, and prosternum globular. Pronotum and elytra tuberculate.

Range. Bolivia.

Description of Type. Male, about 25 mm., but prothorax bent strongly downward. Color pattern: pronotum with black tubercles and two yellow lateral scaly stripes; elytra rather mottled, with dark red tubercles among dense yellow scales; below scaly.

Eye round, strongly convex, smaller than base of beak (seen in lateral view). Beak slightly longer than pronotum, feebly arcuate on upper edge, but straight and slightly granulate on lower edge; dorsally unicarinate; in lateral view (fig. 16) apical two-thirds of beak wider than constricted and narrower base; antennal groove very deep. Antenna inserted in front of middle of beak; funicular segments missing (but see below for female). Pronotum convex, as wide as elytra, without apical constriction; densely tuberculate, some tubercles smaller than those of elytra; scales scarcely elongate. Scutellum scaly. Elytra with tubercles of intervals and striae rather sparse, so irregular that rows are confused; tubercles in area within humerus and backward along center of each elytron covered by dense stubby scales.

Prosternum with tiny tubercles in almost globular mass that is twice size of front coxa and fills space between coxae. Front intercoxal space (when viewed from behind) about as wide as base of beak; front femur strongly arcuate, without inner tooth; middle and hind femora scarcely clavate, inner tooth barely indicated; hind femur not reaching apex of elytra; middle and hind tibiae with outer apical comb or fringe almost one-half length of tibia. Aedeagus strongly arcuate; apex acuminate; apodemes slightly shorter than aedeagus; no basal sclerite found.

Variation from Type. The female paratype (23 mm.), in contrast to the type, is in almost perfect condition. The elytral pattern differs somewhat (fig. 24), being more regular and having a black band at the middle where in the type are pale scales. Possibly, however, these shiny black areas of the female are caused by the wearing off of the scales. The eye is as small as that of the male, but less convex; the beak (fig. 17) is uniformly strongly arcuate without any thickening toward the apex; dorsally the beak is slightly wider at the base and is not carinate. The antennal funicle appears quite short and the ter-

minal segment is adpressed to, and almost as wide as the narrow, short club. The tubercles of the elytra appear denser and many of them seem much larger than those of the male and than those of the pronotum, but these larger tubercles are free of encroaching scales that might make them appear smaller. The prosternum is scaly, not tumid; the femoral teeth are present, but small. The scales of the under side are finer and more elongate than those of the type.

Etymology. The species name is from the Latin *longus*, long, referring to the long metasternum and long tibial comb.

Remarks. The eye of this large species is proportionally quite small. The species differs from other tuberculate species in having the underside furnished with flat, compact scales instead of shaggy, hairy vestiture, and the apex of the aedeagus acuminate. In the male the front coxa is rather pear-shaped, not round, with the projection pointing inward. The thickening of the beak of the male is toward the apex, not, as in males of *jekelii* and *trifasciatus*, toward the base. In several species of *Cholus* the male, as in *longus*, lacks the tooth on the front femur or the tooth is lacking in both sexes, and males of two species of *Homalinotus* lack the tooth on the hind femur.

In the type the pronotum is bent forward from the elytra and the left elytron is somewhat askew.

Cholus buckleyi Pascoe

Figures 15, 77-80

Cholus buckleyi Pascoe, "1873" [1872], p. 469, pl. 11, fig. 3 (Canales [=Canelos?], Ecuador; type in British Museum [Nat. Hist.], London, examined).

Diagnosis. Resembling *nitidicollis*, *megaspilus*, and *magnidens* in white-spotted surface, tuberculate or tumid prosternum of male, short beak of female, almost contiguous front coxae, and absence of tubercles, but differing in having many more white spots than *nitidicollis* and *megaspilus* and much larger spots than *magnidens*.

Range. Bolivia, Brazil, Ecuador, Peru, and Colombia. (For 142 specimens examined, see Appendix.)

Description. Length 8 to 18 mm. Color pattern: head and beak in many specimens red; pronotum with white scales in three spots laterally

(or spots merge into one line); elytra with many large and small, white, scale-filled spots (50 or more), generally six across base (occasionally four or eight); femora and tibia red with apex of femora black and sparsely, if at all scaly; below entirely scaly.

Eye large, round, prominent. Beak scarcely longer than pronotum, decurved slightly toward apex in male, more arcuate in female; base with two short impressed lines, forming "fork." Antenna inserted in apical third of beak; funicle with segment 1 longer than segment 2 which is slightly longer than each of segments 3 to 7, latter about as wide as long; club as long as last three or four segments. Pronotum convex, shining, shallowly punctate or impunctate, slightly narrower than elytra. Scutellum bare. Elytra shallowly punctate-striate, in a few specimens deeply, and smooth except for impressed scaly spots of striae.

Prosternum of male with median tubercle of tiny granules (not evident in some small males); of female flat or feebly tumid. Front coxae, seen from behind, contiguous. Femur strongly clavate; front femur virtually straight; hind femur not quite reaching apex of elytra; tibia of some specimens slightly angulate within. Male with apex of abdomen at center noticeably hairy among white scales. Aedeagus with apex acuminate or somewhat blunt; apodemes slightly shorter than aedeagus; basal sclerite narrow.

Remarks. This species appears to be much more abundant in collections than its nearest relatives. The size and number of dorsal white spots vary considerably, but the overall pattern is fairly constant; in several examples from Colombia the elytral spots are so large that they touch each other, and some spots spread from the striae to the intervals. The three lateral pronotal spots are merged together in examples from throughout the geographic range of the species. The aedeagus can be acuminate and blunt in males from the same locality, as Tarapoto, Peru, and "Colombia." At least seven males were dissected.

***Cholus magnidens*, new species**

Figures 14, 22, 86

Type Material. Type and paratype, males, Caqueta, Colombia, Rio Orteguaza, tributary of

Rio Caqueta, south of Florencia, August 17, 1947, L. Richter, collector, in the American Museum of Natural History, and two male paratypes, Pebas, Amazonas, Peru, de Mathan, collector, in Muséum National d'Histoire Naturelle, and in Kuschel collection, Auckland.

Diagnosis. Distinguishable from other white-spotted species in having very large tooth on hind femur (slightly longer than width of hind tibia), but otherwise similar to *buckleyi*, with as many or more scaly spots on elytra (50 or more). Pronotum and elytra smooth, not tuberculate; below sparsely scaly.

Range. Colombia and Peru.

Description of Type. Length 15 mm. Color pattern: head, beak, and legs (except for black apex of femur) red; pronotum with oblique lateral line of white scales, evanescent basally, and small white spot on side margin; elytra with about 60 white scaly spots, mostly of same size, in strial punctures, those across base 10 in number; legs with fine scales at apex of femur only; below sparsely scaly but with long silky hairs on metasternum and abdominal segment 1.

Eye, beak, antenna as described for *buckleyi*. Pronotum convex, shiny, virtually impunctate, as wide as base of elytra. Scutellum bare. Elytra distinctly punctate-striate, smooth between impressed scaly spots. Prosternum with large median tubercle; strongly advanced and tumid, spoon-shaped prosternal tongue between front coxae almost as wide as beak, but coxae, seen from behind, contiguous, with pear-shaped projections turning inward. Femur slightly clavate; front femur arcuate; hind femur reaching to apex of elytra and with unusually long, backward curving inner tooth (fig. 14). Aedeagus with apex acuminate; apodemes slightly shorter than lobe; basal sclerite narrow as in *buckleyi* and *megaspilus*.

Variation from Type. The paratypes (all males) range in length from 13.5 to 14 mm. In one of the paratypes there are eight basal white spots on the elytra instead of 10. In two the white lines of scales on the sides of the pronotum are not interrupted and reach the base.

Etymology. The species name is from the Latin *magnus*, large, and *dens*, tooth, referring to tooth on the femur.

Remarks. *Cholus magnidens* could readily pass

for *buckleyi* if the femur were not examined. The white elytral spots, however, are generally not wider than the striae, whereas in *buckleyi* they are much larger, many spots extending across to adjacent striae. The front femur of *magnidens* is arcuate, that of *buckleyi* virtually straight. Additional differences are found in the male, that of *magnidens* having fine long hairs on the metasternum, which are lacking in *buckleyi*, and pear-shaped, not round front coxae. Although the middle and hind femora of *magnidens* possess a much longer tooth, the femora are less strongly clavate than those of *buckleyi*. I assume that the female, as in other species of the group, probably lacks a prosternal tumidity.

Shiny black species with white scaly spots on the elytra are not uncommon in *Cholus* and other genera of the subfamily. The elytra of an unidentified species from Rancho Grande, Venezuela, are almost exactly similar to those of *magnidens*, but the beak, antenna, and legs are quite different.

Cholus nitidicollis Pascoe

Figures 83, 84

Cholus nitidicollis Pascoe, "1873" [1872], p. 469 (Bogota, Colombia; type, male, in British Museum [Nat. Hist.] London, examined).

Cholus phaleratus Günther, 1943, p. 83, fig. 19 (Colombia; type, male, in Museum für Tierkunde, Dresden, examined; synonymized by Kuschel, 1955).

Diagnosis. Agreeing with *megaspilus* and differing from *buckleyi* and *magnidens* in lacking white scales on sides of pronotum; white scaly spots of elytra more numerous and much smaller than those of *megaspilus*. No tubercles.

Range. Colombia, Ecuador. (For 12 specimens examined, see Appendix.)

Description. Length 14 to 15 mm. Color pattern: black except for from 10 to 30 small white scaly spots on elytra, but generally only two spots across base of elytra; legs and venter mostly glabrous.

Eye, beak, antenna, pronotum, scutellum, and elytra as described for *buckleyi* except for color pattern and for beak of male being proportionally longer and more robust. Prosternum of male with median tubercle of small granules; of female slightly tumid. Front coxae separated by

about width of antennal segment. Femur slightly clavate; front femur straight; hind femur reaching apex of elytra. Aedeagus strongly arcuate in profile; apex acuminate; apodemes slightly longer than aedeagus; basal sclerite very small; parameres very short.

Remarks. The type of *phaleratus* Günther agrees perfectly with the type of Pascoe's *nitidicollis*. The long front legs and long beak of males are longer and narrower than those of the allied *megaspilus*, and the front femur is straight, not arcuate. The aedeagus is only half the size of that of a smaller male of *megaspilus* and is strongly arcuate and apically acuminate, not feebly arcuate and rounded as in *megaspilus*. The basal sclerite is so inconspicuous that three males had to be dissected before it was found. The prosternum of the male, although somewhat tuberculate, is not strongly tumid as in *megaspilus* and *magnidens*. In *nitidicollis* there are from 10 to 30 white spots on the elytra, in *megaspilus* only six, in *buckleyi* and *magnidens* from 50 to 60, and in *geniculatus* from 80 to 200.

Cholus megaspilus Pascoe

Figures 85, 86

Cholus megaspilus Pascoe, 1886, p. 420 (Sarayacu, Peru; type, female, in British Museum [Nat. Hist.], London, examined).

Cholus bonasus Günther, 1943, p. 85, fig. 20 (Macas, Ecuador; type, male, in Museum für Tierkunde, Dresden, examined; synonymized by Kuschel, 1955).

Diagnosis. Of five white-spotted smooth species, *megaspilus* has fewest and largest spots and most convex (humped) elytra. No tubercles.

Range. Ecuador and northern Peru. (For seven specimens examined, see Appendix.)

Description. Length 14 to 17 mm. Color pattern: black except for six large dorsal white spots on elytra and two on epipleura; below devoid of scales but venter of male with long silky hairs.

Eye, beak, antenna, and scutellum as described for *buckleyi*. Pronotum convex, densely, shallowly punctate, slightly narrower than elytra. Elytra extremely convex just in front of middle, shallowly punctate-striate, smooth except for impressed scaly spots that can be as wide as two striae and intervals. Prosternum of male with

median tubercle and strongly advanced and tumid prosternal tongue between coxae; of female flat. Front coxae seen from behind not quite contiguous. Femur slightly clavate; front femur slightly arcuate; hind femur reaching apex of elytra. Male with mesosternum, metasternum, and first two abdominal segments hairy. Aedeagus with apex rounded; apodemes slightly shorter than aedeagus; basal sclerite narrow.

Remarks. This species and the allied *nitidicollis* are apparently not common in collections as I have seen fewer than 10 specimens of each species. Both species, and also *geniculatus*, lack the white scales on the pronotum that are present in the other species with white spots on the elytra. The front femora are arcuate as in *buckleyi* and *magnidens*. The male agrees with the male of *magnidens* in having long fine hairs on the under surface.

Cholus geniculatus Kirsch

Figures 87-89

Cholus geniculatus Kirsch, 1869, p. 187 (Bogota, Colombia; type probably in Museum in Dresden).

Diagnosis. Differing from all species of group in having every puncture (or fovea) of elytral striae filled with white scales; differing from four preceding white-spotted species and agreeing with *parallelogrammus*, *conciliatus*, and *jekelii* in having pronotum densely tuberculate, not smooth.

Range. Colombia, Ecuador, and Peru. (For 21 specimens examined, see Appendix.)

Description. Length 13 to 16 mm. Color pattern: legs red with black apex to femur, remainder black but with white scales in deep foveae of elytral striae; in some examples pronotum dark red; below scaly.

Eye, beak, antenna, and scutellum as described for *buckleyi*. Pronotum narrower than elytra, convex, covered with small, dense, round, rather flat tubercles interspersed with minute setae. Elytra deeply striate-foveate, foveae separated by about their diameters and filled with white scales; intervals smooth, not punctate. Prosternum of male with either two small tubercles or one large tubercle composed of granules; of female slightly tumid in front of coxae. Front coxae well separated by somewhat less than

width of beak. Femur strongly clavate; front femur virtually straight; hind femur not quite reaching apex of elytra; tibia of some specimens slightly sinuate within. Male with metasternum and abdominal segments 1 and 2 with long fine hairs. Aedeagus with apex acuminate; in profile strongly sinuate; basal sclerite distinct.

Remarks. Although there are many species, some not yet described, that are black with white scaly spots on the elytra, no other species I know in South America has the scales in every stria puncture as in *geniculatus*, in which also many of the spots are well contained within the depression of the puncture or fovea, not spreading around the puncture. This trait, along with the densely tuberculate, generally reddish pronotum makes *geniculatus* a distinctive species. The beak, legs, and the characters of the male ally it with the four preceding species.

Species Group *interruptefasciatus*

The six species in this group are:

Cholus grandis, new species; *interruptefasciatus* Desbrochers des Loges; *planus*, new species; *pubescens*, new species; *indubitatus*, new species; *subcostatus* Desbrochers des Loges.

The following characters are shared by all members of the group: Eyes rather flat, oval, separated above by about width of base of beak. Antenna inserted in front of middle of beak; club elongate. Pronotum with postocular lobe feeble; basal angles obtusely rounded. Elytra with sides subparallel, only feebly narrowed to apex; epipleural margin sinuous. Mesosternum flat or feebly tumid. Mesepimeron (figs. 7, 9) angulate near middle of lower edge. Metepisternum "normal," elongate. Prosternum feebly concave. Femur clavate, toothed within (tooth lacking in male of one species). Tibia with apical teeth distinct. Legs with elongate, acute, hairlike scales. Aedeagus with parameres, but no basal sclerite.

In these species the pronotum and generally the elytra are hairy, not scaly in appearance, the vestiture being fine, elongate, acutely tipped, and hairlike, although a few coarse scales can also be present. The oblong shape recalls that of most members of the *albicinctus* and of the *tener* groups, but neither of these has elongate, hairlike scales. The species differ further from those of the *parallelogrammus* group in having the pro-

sternum concave and smooth, not tuberculate, or tumid. The first two species are dorsally smooth under the hairlike scales, the remainder are tuberculate. The sexes are difficult to distinguish, but males have more arcuate front femora.

Very few specimens have been examined except for *interruptefasciatus* (36 specimens), and *planus* (11).

Biology. A male of *interruptefasciatus* from Baños, Ecuador, was collected on *Baccharis polyantha*, a composite.

Distribution. Only one species (*indubitatus*) has been found in Brazil; one (*grandis*) occurs in Colombia only; one (*subcostatus*) in Colombia and Venezuela; one (*pubescens*) in Ecuador; one (*interruptefasciatus*) in Colombia and Ecuador; and *planus* in Peru, Ecuador, and Bolivia. More extensive material probably would enlarge the ranges.

KEY TO SPECIES OF THE
INTERRUPTEFASCIATUS GROUP

1. Pronotum with three stripes of dense yellow scales as well as scattered, fine, hairlike vestiture in intervening areas.
 . . . *subcostatus* Desbrochers des Loges
Pronotum not striped but covered (unless worn) with fine hairlike vestiture 2
2. Elytra with distinctly elevated, rugose intervals alternating with depressed scale-filled striae (fig. 28); antennal funicle with segment 2 about same length as following segments; femora with usual inner tooth lacking; bases of pronotum and elytra slightly sinuous. *indubitatus*, new species
Elytra with intervals not distinctly elevated; striae scarcely, if at all depressed; antennal funicle with segment 2 distinctly longer than following segments; femoral tooth present; bases of pronotum and elytra straight 3
3. Pronotum with dense flattish tubercles among punctures, in some specimens best visible in lateral view 4
Pronotum with uniformly fine dense punctures under hairlike scales, not tuberculate 5
4. Elytra black with transverse whitish scaly marks with or without intervening pubescence (figs. 26, 27); strial punctures generally large and well visible
 *planus*, new species

- Elytra covered with whitish scales arranged in longitudinal rows through which tubercles generally protrude; strial punctures generally obscured by tubercles and scales. *pubescens*, new species
- 5(3). Smaller (10 to 16 mm.); beak and legs dark red; elytra either entirely scaly, or mostly black with narrow whitish marks (as in *planus* above). *interruptefasciatus* Desbrochers des Loges
- Larger (18 to 19 mm.); beak and legs black; elytra with six denuded black areas or spots (subbasally, medially, subapically) (fig. 25). *grandis*, new species

Cholus grandis, new species
Figures 25, 95

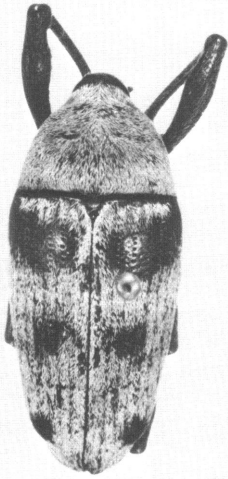
Type Material. Type, male, Cali, [Valle], Colombia, in Kuschel collection, DSIR, Auckland, and paratype, male, Medellin [Antioquia], Colombia, to be deposited in the American Museum of Natural History.

Diagnosis. Largest of the group (18 to 19 mm.), with six large denuded black spots on elytra. Differing from others except *interruptefasciatus* in having smooth, not tuberculate pronotum under its fine hairlike vestiture, and from *interruptefasciatus* in somewhat longer comb of hind tibia and more rounded apex of aedeagus.

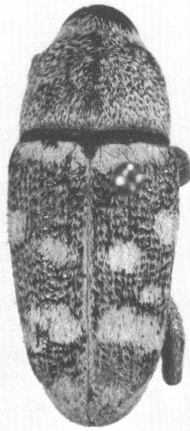
Range. Colombia.

Description of Type. Length 19 mm. Color pattern: black with yellow vestiture on pronotum and elytra; elytra with six bare black areas (two at base, two at middle, two near apex); ventral vestiture orange.

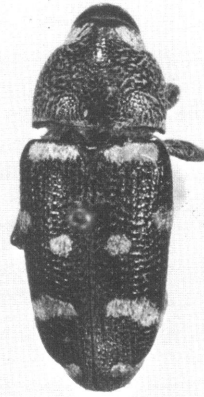
Beak slightly longer than pronotum, straight to insertion of antenna where bent feebly downward, dorsally carinate in basal two-thirds, about same width throughout. Antennal funicle with segment 1 almost three times length of segment 2, following segments becoming shorter and wider. Pronotum convex, as wide as elytra, finely, densely punctate under covering of dense, elongate fine scales. Scutellum bare, punctate. Elytra with rather shorter wider scales than those of pronotum; intervals, where denuded, smooth; striae densely punctate; base straight. Front intercoxal space as wide as beak. Front femur strongly arcuate; hind femur reaching almost to apex of elytra. Front tibia incurved; hind tibia with comb about one-third length of tibia.



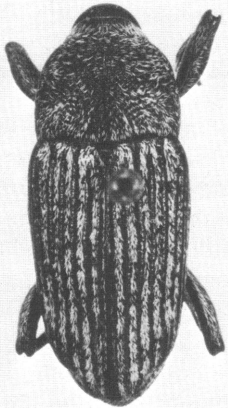
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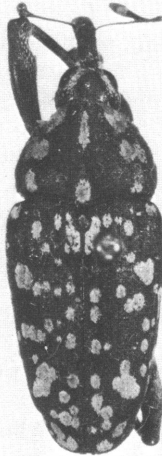
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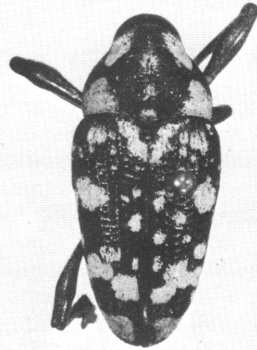
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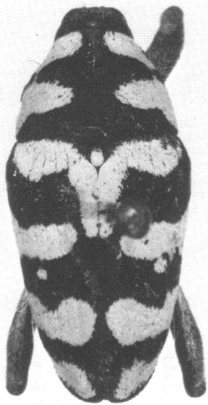
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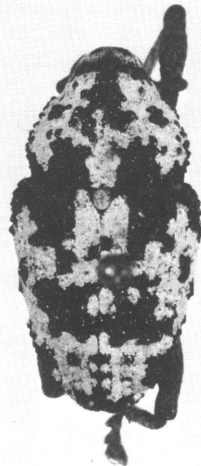
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31



32

Aedeagus with apex rounded (fig. 95); apodemes same length as aedeagus.

Variation from Type. The male paratype (18 mm.) differs in having six much larger, better defined bare black areas on the elytra and the vestiture ventrally yellow, not orange.

Etymology. The species name is from the Latin *grandis*, referring to the large size.

Remarks. Possibly this species in perfect condition would be entirely covered with scales; in any case, the type specimen is more pubescent than the paratype and therefore has smaller denuded areas. In another species of the group (*interruptefasciatus*), for example, the rather worn type specimen has well-defined bare areas on the elytra whereas in other specimens these areas are covered at least partially by scales. Both specimens were dissected.

Cholus interruptefasciatus

Desbrochers des Loges

Figures 96-98

Cholus interruptefasciatus Desbrochers des Loges, 1906, p. 364 (type, male, "Colombia," in Muséum d'Histoire Naturelle, Paris, examined).

Diagnosis. Similar to *planus* with virtually same elytral pattern in some specimens, but differing in having smoothly punctate, not tuberculate pronotum.

Range. Colombia and Ecuador. (For 36 specimens examined, see Appendix.)

Description. Length 10 to 16.5 mm. Color pattern: in fresh condition covered with pale, elongate, fine, hairlike scales under which are visible on elytra some denser, overlapping scales that show (when viewed with naked eye) as three paler bands and pale apical patch; in type and other worn specimens, most of pronotum bare as well as bare denuded spaces between elytral bands.

Beak scarcely, if at all, longer than pronotum, that of male virtually straight, that of female more arcuate; dorsally about same width

throughout, carinate in all or in part. Antennal funicle with segment 1 twice length of segment 2, following segments shorter and wider. Pronotum and scutellum as described for *grandis*, but in two specimens scutellum has scales. Elytra as described above, not tuberculate although in some individuals intervals are rather rugose; striae, where denuded of scales, densely punctate; base straight. Front intercoxal space as wide as beak. Front femur of male arcuate; hind femur not reaching apex of elytra. Front tibia incurved; hind tibia with outer comb one-fourth or one-fifth length of tibia. Aedeagus narrowing to truncate-rounded apex; apodemes same length as aedeagus.

Remarks. Of 13 specimens before me (when viewed with the naked eye), two are pale gray, three yellowish, one is buffy, and the remainder, in which the vestiture is worn off, appear mostly black. Of 20 other specimens, 13 males are yellowish or grayish depending on the extent of wear, and all show the faint elytral bands described above; seven females are mostly black and denuded with only small vestiges of elytral bands. The type differs from all the specimens in being larger (16.5 mm.) and having the pale bands of the elytra broken into large spots without intervening vestiture present. The type and a partially denuded female (12 mm.) from Colombia differ somewhat from the other specimens in having a more convex pronotum, which is virtually impunctate in the female, and black apexes on the femora. The size, shape, and convexity of the pronotum, however, varies considerably in the species. Eight specimens, including the type, were dissected. The sides of the aedeagus, in dorsal view, are in some specimens slightly sinuous or constricted in the apical third.

Cholus planus, new species

Figures 26, 27, 99, 100

Type Material. Type, male, Suapi [La Paz], Bolivia, in Kuschel collection, DSIR, Auckland; three female paratypes, one, Yungas de la Paz,

FIGS. 25-32. *Cholus*, not to scale. 25. *C. grandis*, 18-19 mm. 26. *C. planus*, 9-14 mm., with hairy covering. 27. *C. planus* partially denuded. 28. *C. indubitatus*, 15 mm., characteristic also of *C. pubescens*. 29. *C. leopardinus*, 14-15 mm. 30. *C. pantherinus*, 12-15 mm. 31. *C. varians*, 11-14 mm. 32. *C. acuminatus*, 11-12 mm.

Bolivia, to be deposited in the American Museum of Natural History, one, "Peru," and one, Chanchamayo, Peru, in Kuschel collection; one female, Chanchamayo, B. Schwarzer, collector, in Senckenberg Museum, Frankfurt; one female, Chanchamayo, M. Freymann G., collector, in Zoological Museum, Berlin; one female, Coroico [La Paz], Bolivia, in Dresden Museum; three females, Ambato [Tungurahua], Ecuador, in Museum d'Histoire Naturelle, Paris; one male, no locality, in the American Museum of Natural History.

Diagnosis. Resembling *interruptefasciatus* in having densely scaly white spots and crossbands on elytra as well as (in fresh specimens) scaly intervening areas, but differing from it in having flat tubercles as well as punctures in rougher surfaced, not smooth pronotum.

Range. Bolivia, Ecuador, Peru.

Description of Type. Length 9 mm. Color pattern: pronotum reddish, covered with sparse, yellow, hairlike scales; elytra with dense yellow, less elongate scales concentrated in crossbands at base and behind middle, in two spots on disc in front of middle, and two spots at apex; also two spots on epipleura; below with yellow elongate scales.

Beak as described for *grandis*, but not carinate. Antennal funicle as described for *grandis* but segment 1 about twice length of segment 2. Pronotum convex, as wide as elytra, punctate among flattish tubercles. Scutellum bare, punctate. Elytra with short, thick, dense scales in bands and spots (see above), and intervening elongate, fine scales as on pronotum; intervals and striae with ill-defined, flattish tubercles somewhat transversely confluent; base straight. Front intercoxal space narrower than width of beak. Front femur feebly arcuate; hind femur not reaching apex of elytra. Front tibia incurved; hind tibia with apical comb about one-fifth length of tibia. Aedeagus with apex truncate or truncate with slight median emargination; apodemes shorter than aedeagus.

Variation from Type. Length ranges from 9 to 14 mm. In three paratypes the intervening fine scales between the elytral scaly markings are virtually all worn off so that the bands and spots stand out clearly; in two specimens the intervening scales are abundant and form a yellowish or

whitish film on the elytra. All but two of the paratypes have a carina on the beak. The elytra and pronotum are reddish or black. In females the beak is shorter, about equal in length to the pronotum and uniformly feebly arcuate. There is quite a bit of variation in the size of the elytral marks.

Etymology. The species name is from the Latin *planus*, flat, referring to the flat tubercles of the pronotum.

Remarks. *Cholus planus* differs from the other species in its broadly truncate, not rounded or acuminate aedeagus. It is, however, externally exceedingly similar to *interruptefasciatus* and could readily be confused with it when viewed with the naked eye, but the pronotum of *planus* is not so smooth and the elytra are somewhat tuberculate. Only two of the 12 specimens examined are males, both of which were dissected.

***Cholus pubescens*, new species**

Figures 101, 102

Type Material. Type, male, Rio Blanco, Pastaza watershed, Ecuador, 1900 meters, December, 1937, Clark and MacIntyre, collectors, in the American Museum of Natural History, and two male paratypes, one, "Ecuador," 1880, Buckley, collector, in Muséum d'Histoire Naturelle, Paris, and one, Macas [Santiago-Zamora], Ecuador, in Kuschel collection, DSIR, Auckland.

Diagnosis. Differing from *grandis* in having pronotum dark red, not black; dorsal surface tuberculate, not smooth, and elytra striped with "feathery," pale hairlike scales, not marked with denuded black spots.

Range. Ecuador.

Description of Type. Length 14 mm. Color pattern: pronotum dark red with yellow, elongate, fine vestiture on sides, base, and apex but worn elsewhere; elytra with black, flattish tubercles under "feathery," whitish vestiture arranged in rows; below, yellow scales.

Beak, antenna (partly broken), and pronotum as described for *grandis*, but pronotum with convergent flattish tubercles among punctures. Scutellum partly scaly. Elytra with intervals subcostate, flatly tuberculate; striae with hairlike scales spreading onto intervals, all scales denser at base and in apical area; base straight. Front intercoxal

space narrower than width of beak. Front femur strongly arcuate; hind femur not quite reaching apex of elytra. Front tibia incurved; hind tibia with outer comb worn. Aedeagus with apex narrowly rounded to subacute; apodemes same length as aedeagus.

Variation from Type. The paratypes are 16 and 17 mm. in length. In the paratype from Macas the scales of the elytra are yellow, not white, the scutellum is bare, and the tubercles of the elytra seem to be in more distinct rows, probably because the covering scales of the striae are worn off. In the other paratype the scales are worn only in one place on one side of the elytra.

Etymology. The species name is from the Latin *pubescens*, referring to the hairlike vestiture.

Remarks. The elytra are distinctly tuberculate and lack the concentrated crossbands and scaly spots found in *planus*; instead there are feathery scales in all the striae and on most of the intervals. In *indubitatus* the elytra are strongly costate, but less tuberculate.

***Cholus indubitatus*, new species**

Figure 28

Type, male, Jatahy [Goyaz], Brazil, in Muséum d'Histoire Naturelle, Paris.

Diagnosis. Similar dorsally to *pubescens*, but elytra with distinctly elevated costae and scale-filled striae; differing from all species in having obtuse, not rounded, outer apex of front tibia, shorter second segment of antennal funicle, and no inner tooth on femora.

Range. Known only from type.

Description of Type. Length 15 mm. Color pattern: entirely dark red with whitish, hairlike pubescence on pronotum and coarser, whitish pubescence in alternate rows on elytra; below elongate scales.

Beak same length as pronotum, virtually straight, but upper edge feebly curved at apex, dorsally carinate in basal two-thirds, about same width throughout. Antennal funicle with segment 1 about twice length of segment 2; segment 2 not longer than following segments. Pronotum convex, as wide as elytra, with dense, mostly confluent, flattish tubercles and short, impunctate median carina. Scutellum bare, punc-

tate. Elytra with wider, thicker scales than those of pronotum; intervals elevated, punctate, somewhat rugose; striae filled with scales; base feebly sinuous. Front intercoxal space narrower than beak. Front femur scarcely arcuate; all femora lacking inner tooth; hind femur not reaching apex of elytra. Front tibia straight; hind tibia with outer comb about one-fourth length of tibia. Aedeagus with apex somewhat narrowly rounded; apodemes same length as aedeagus.

Etymology. The species name is from the Latin *indubitatus*, indubitable, as there is no doubt as to its uniqueness.

Remarks. Although this species might be thought a variation of *pubescens* with more distinctly costate elytra, the other characters separate it indubitably from it and the other species. The type was labeled by Heller as a new species of *Dionychnus*. In the type there is a little tuft of scales where the femoral tooth should be, but in dislodging these scales, I found no actual tooth. Additional specimens, however, may be found to have a tooth. Seven or eight species of *Cholus* lack the tooth on the front femur only, and one (*mimus* Vaurie) has the tooth quite inconspicuous on all femora.

***Cholus subcostatus* Desbrochers des Loges**

Figure 103

Cholus subcostatus Desbrochers des Loges, 1906, p. 364 (type, sex not ascertained, "Colombia," in Muséum d'Histoire Naturelle, Paris, examined).

Diagnosis. Distinct from other species in scaly pattern of four broad yellow longitudinal stripes on elytra and three on pronotum; base of elytra sinuous as in *indubitatus*, not straight as in other species.

Range. Colombia and Venezuela at high altitudes. (For seven specimens examined, see Appendix.)

Description. Length 11 to 12 mm. Color pattern: black with white or yellow, hairlike, acute scales arranged on pronotum in two broad, dense lateral stripes and one narrow median stripe, as well as scales across base and sparse hairs among black tubercles; elytra with four long yellow stripes (six in some specimens) and two short basal stripes; below elongate scales.

Beak distinctly longer than pronotum, strongly arcuate, dorsally carinate in basal part, same width throughout. Antennal funicle with segment 1 two and one-half times length of segment 2; remaining segments short, beadlike. Pronotum rather flat, not quite so wide as elytral humeri, with flattish, in some specimens confluent tubercles (but pronotum merely densely punctate in specimen from Venezuela which also lacks median stripe). Scutellum scaly. Elytra, where denuded, with large, dense punctures filled with fine, elongate scales, with long scaly stripes each side of suture and on outer intervals, and short basal stripe with wider scales; base feebly sinuous. Front intercoxal space narrower than beak. Front femur straight; hind femur not reaching apex of elytra. Front tibia slightly incurved; hind tibia with outer comb one-fourth length of tibia. Aedeagus (fig. 103) with apex bluntly acuminate; apodemes slightly shorter than aedeagus.

Remarks. This species differs further from other species in having the pronotum shorter, with more oblique, less parallel sides, and the elytra less oblong, more attenuated. Some individuals are darker, rather blackish (the scales probably worn); the specimen from Fusagasuga is almost entirely covered with dense yellow scales, leaving exposed only short black stripes from the humerus and on each side of suture.

Species Group *tener*

The species of this group are *Cholus aureus* Champion and *C. tener* Kirsch. Probably, as indicated in my notes on the type and its genitalia, *C. flavescens* Fahraeus, 1844, from Minas Gerais, Brazil, also belongs in the group, but the type is not now available for direct comparison with the other species.

These species are characterized by having strongly lobed, prominent basal angles on the pronotum that fit into a shallow emargination at the base of the epipleura of the elytra; the emargination ends at the humerus in an obtuse or right angle that projects over the base of the pronotum when the specimen is properly in repose. The species are of the same oblong shape as those of the *interruptefasciatus* group, but they are covered with pale scales, not fine hairy pubescence, and have no color pattern. They lack true

tubercles and a postocular lobe, although the edge of the pronotum behind the eye can appear feebly lobed due to the concentration of dense scales, and the pronotum can be feebly granular. The aedeagus is distinctive; it is provided at its apex with a sharp little drooping point or tooth (in lateral view), and within the orifice dorsally with two sclerotized, somewhat elongated triangular pieces that appear to be part of the border (figs. 104-107). No basal sclerite was found.

Both species share the following characters: Eyes large, round, separated by slightly more than width of beak at base. Antennae inserted at or slightly in front of middle of beak; funicle with segment 1 at least three times length of segment 2; segment 2 scarcely longer than segments 3 to 7; segment 7 slightly wider and distinctly setose; club at middle twice diameter of segment 7. Beak arcuate, slightly longer than pronotum, that of male dorsally same width throughout, of female feebly wider apically; finely, densely punctate and in some specimens faintly unicate toward base. Pronotum convex, as wide as elytra. Scutellum as wide as long. Elytra a little more than twice length of pronotum; apex rounded; subapical callus prominent; denuded areas punctate-striate. Mesepimeron with lower edge angulate, if at all, distally; upper edge covered distally by lobe of basal angle of pronotum. Metasternum longer than diameter of coxa. Front intercoxal space almost as wide as beak at middle. Prosternum with basisternal pieces rather prominent and angular. Hind tibia with outer apical fringe about one-fourth length of tibia.

Biology. Specimens of *aureus* from Costa Rica were recorded by the collector, Nevermann, on sugar cane and various other grasses, and on a leaf of a plant of the Menthaceae family.

Distribution. The species occur from southern Central America to northern South America, *tener* being known from Colombia only, but *aureus* from Costa Rica, Panama, and Colombia.

KEY TO SPECIES OF THE *TENER* GROUP

- Aedeagus (in dorsal view) distinctly narrowing from base to apex (fig. 104); scleritic pieces within orifice much smaller than those of *aureus* and not invariably evident; Colombia. *tener* Kirsch

- Aedeagus (in dorsal view) widening from base to apex or about same width (fig. 106) throughout; scleritic pieces within orifice about one-third length of entire aedeagus, very prominent; mostly Costa Rica and Panama, but some from Colombia (12 of 34 specimens). *aureus* Champion

Cholus tener Kirsch

Figures 104, 105

Cholus tener Kirsch, 1869, p. 188 (Bogota, Colombia; type, male, in Dresden Museum, examined).

Lobaspis argentulus Chevrolat, 1881e, p. 467 (on bank of river Magdalena, Colombia; type in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Lobaspis molitor Chevrolat, 1881e, p. 468 (“Brazil,” but type, male, from “Colombia,” in Naturhistoriska Riksmuseum, Stockholm, examined; new synonymy).

Diagnosis. Differing from *aureus* only in size and shape of aedeagus of male. Fresh specimens covered with yellow or golden or whitish, somewhat elongate, overlapping scales; apexes of femora generally black, remainder of body, underneath scales, black, or dark red.

Range. Bogota, east of Bogota, and Santander Province, Colombia. (For 10 specimens examined, see Appendix.)

Description. Length 8 to 9 mm. Remainder as described for group. Aedeagus as described in key above.

Remarks. *Cholus tener* is somewhat more elongate and narrower than *aureus*, but the golden vestiture, when fresh, is the same. The aedeagus is wider at the base than that of *aureus* and the sclerotized flaps in the orifice are smaller, less prominent. Although *molitor* and *argentulus* were described by Chevrolat in *Lobaspis*, they do not have the invisible scutellum characteristic of that genus. Four males and one female were dissected.

Cholus aureus Champion

Figures 106, 107

Cholus aureus Champion, “1902-1906” [1903], p. 308, pl. 16, figs. 16a-c (Bugaba, Panama; “Colombia,” but type, male, Bugaba, in British Museum [Nat. Hist.], London, examined).

Cholus tenuis Champion, “1902-1906” [1903], p. 307, pl. 16, figs. 14, 14a (Peña Blanca and Bugaba, Panama; type, male, Peña Blanca, Panama, in British Museum [Nat. Hist.], London, examined; new synonymy).

Diagnosis. Differing from *tener* only in size and shape of aedeagus of male.

Range. Costa Rica from 600 to 1100 meters, Panama, and Colombia. (For 33 specimens examined, see Appendix.)

Description. Length 6 to 10 mm. Remainder as described for group. Aedeagus as described in key above.

Remarks. Although Champion mentioned differences between his *tenuis* and *aureus* and although they do appear of different shape in his illustrations (*tenuis* somewhat narrower and more cylindrical), I have been unable to separate specimens as one or the other “species.” Champion found that *tenuis* had more whitish, less golden, and less dense and coarse vestiture, that the beak was shorter, and the elytral intervals more punctate and transversely rugose. His four specimens of *tenuis* were rather abraded; in 10 specimens of *aureus* from Costa Rica there is quite strong variation in color of the scales, shape of the body, and punctuation. Therefore I synonymize *tenuis* with *aureus*. The aedeagus appears similar and the aedeagus is the only character I can find to separate *aureus* from *tener*. Eleven males and one female were dissected.

Species Group *sulphuratus*

The single species of this group has little else but its invariable color pattern to distinguish it from species of other groups. It resembles species of the *tener* group in its oblong shape, small size, and dense yellow vestiture of rather blunt scales, but differs as stated below.

Cholus sulphuratus Fahraeus

Figures 108, 109

Cholus sulphuratus Fahraeus, 1844, p. 12 (Brazil; type not found).

Diagnosis. Differing from *tener* and *aureus* in having basal angles of pronotum feebly, not prominently lobed; pattern of stripes, not solid covering of scales; first segment of antenna shorter, and second segment longer; apex of

elytra with feeble "roll" or feeble carinae, not smooth; no sharp tooth at apex of aedeagus and basal sclerite present.

Range. Eastern and southern Brazil and Paraguay. (For 75 specimens examined, see Appendix.)

Description. Length 8 to 10 mm. Color pattern: dark red, with three narrow red stripes on pronotum and elytra; scutellum red; otherwise covered with overlapping yellow scales.

Characters as described for *tener* group except for: antenna of male inserted in front of middle of beak, that of female at about middle; funicle with segment 1 not more than twice length of segment 2; segment 2 distinctly longer than segments 3 to 7. Hind tibia with outer apical fringe about one-fifth length of tibia. Aedeagus strongly bent in profile, dorsally narrowed to rounded apex; apodemes much shorter than lobe; basal sclerite present, but minute.

Remarks. The sexes are distinguished by the abdomen, which is concave in the male and flat or feebly tumid in the female, and by the antennae, which are inserted farther front in the male. The "roll" at the apex of the elytra is composed of feebly elevated outer elytral intervals converging; they are not invariably visible. Two males and one female were dissected.

Species Group *pantherinus*

The species included in this group are:

Cholus pantherinus (Olivier); *leopardinus*, new species; *notabilis* Pascoe; *praetorius* Pascoe; *cretaceonotatus* Voss; *apicalis*, new species; *luctuosus* Pascoe; *varians*, new species.

Characters shared by the eight species are: Eyes large, round or feebly oval, set high on head. Antennal funicle with segment 1 about one and one-half times length of segment 2; segments 3 to 7 shorter than segment 2; club elongate. Mesepimeron (fig. 8) with lower edge angulate distally, but can be obscured by scales. Metasternum about as long as one and one-third diameter of coxa. Femur toothed within.

The sexes are scarcely distinguishable although in males the first abdominal segment is generally feebly concave, not flat or tumid. I have seen only females of *apicalis*, *cretaceonotatus*, *luctuosus*, and *praetorius*.

The species of this group are boldly marked

black or brown with yellow or white dense scales arranged in large stripes or bands or in mottled spots. They are not entirely homogeneous, but all possess a large round eye set high on the head. In addition they are rather "mat," velvety, or opaque due to imbricated black or dark bronzy scales in all areas that are not covered with yellow or white scales (in *notabilis* this dark squamosity is not invariably distinct). The only other species of the Cholinae I know of with this kind of nigrosquamosity are *Cholus nigromaculatus* Champion, a small weevil of the *forbesi* species group with very narrow metepisternum, and *Amerhinus dufresnei* Kirby, which has an exaggeratedly globose pronotum and very short straight beak. (Formerly *pantherinus* was considered to be in *Amerhinus*.)

The group can be divided into three subgroups. The first four species (*pantherinus*, *leopardinus*, *notabilis*, and *praetorius*) are very similar; they have a thick, short beak, less convex, more widely spaced eyes, strongly convex pronotum, retracted scutellum, strongly clavate femora, widely separated front coxae, tuberculate prosternal process, and large basisternal pieces. The next two species (*cretaceonotatus* and *apicalis*) agree with the preceding in having large basisternal pieces and widely spaced coxae, but differ in having a longer, narrower beak, more convex eyes set closer together, a conical pronotum, nonretracted scutellum, and less clavate, almost linear femora, but very short tibial outer comb. *Cholus luctuosus* and *varians* differ from both subgroups in having very narrowly separated front coxae, small basisternal pieces, and no postocular lobe on the pronotum.

Biology. Lamb (1974) reported *pantherinus* as a borer of palm leaf stalks.

Distribution. One species (*pantherinus*) occurs in French Guiana and Surinam as well as in Amazonian Brazil. Another species (*notabilis*) and one specimen of *apicalis* are recorded also from French Guiana although *notabilis* is more numerous in Brazil, Colombia, and Peru, and *apicalis* in Colombia. *Cholus leopardinus* is known from Peru only; *varians* and *cretaceonotatus* occur along the Amazon River in Peru and Brazil; *luctuosus* in Peru, Brazil, and Ecuador. *Cholus praetorius* is the only species of the group from Central America (Panama).

I have seen only four or fewer specimens of five of these species, but 13 of *varians* and 42 and 52 of *notabilis* and *pantherinus* respectively.

KEY TO SPECIES OF THE
PANTHERINUS GROUP

1. Front intercoxal space narrower than beak; prosternum with basal pieces between coxae scarcely longer than basal strip behind coxae 2
 - Front intercoxal space at least as wide as beak or as wide as one-half coxa diameter; prosternum with basal pieces between coxae at their longest two or three times length of basal strip behind coxae 3
2. Elytra with basal and subapical white bands; epipleura with large white spot; pronotum with white scaly band apically, no white scales on disc
 - *luctuosus* Pascoe
 - Elytra with basal, postmedian, subapical, and apical white bands; epipleura with white marks generally advancing onto disc; pronotum with apical white band broken at middle and white scales reaching from sides onto disc (fig. 31)
 - *varians*, new species
3. Elytra and pronotum spotted with yellow scales; pronotum with short median stripe of scales; prosternal process tumid or tuberculate 4
 - Elytra boldly marked with large black and yellow transverse scaly bands or with dark rectangular areas; pronotum with lateral scaly stripes (not dorsally visible in all species); prosternal process rather flat 5
4. Pronotum laterally with three yellow-orange spots (fig. 29); each elytron with about 40 dorsally visible spots; Peru
 - *leopardinus*, new species
 - Pronotum laterally with two large, often almost contiguous, yellow-orange spots (fig. 30); each elytron with 15 or fewer dorsally visible spots; Guianas, Brazil.
 - *pantherinus* (Olivier)
- 5(3). Pronotum with yellow lateral stripes dorsally visible; scutellum retracted behind margin of elytra; beak robust, scarcely longer than pronotum; front femur clavate (at level of inner tooth twice width at base) 6
 - Pronotum either with yellow lateral stripes barely visible, or no stripes present; scutellum not retracted; beak narrow, about one and one-half times length of pronotum; front femur sublinear (at level of inner tooth scarcely wider than width at base) 7
6. Pronotum narrower than elytra; legs black; elytra with large discal spot and humerus black; Central America
 - *praetorius* Pascoe
 - Pronotum as wide as elytra; legs red; elytra with humerus and suture furnished with yellow scales; South America
 - *notabilis* Pascoe
7. Prothorax laterally with large yellow spot generally not visible on pronotum; elytra, in addition to yellow basal band, with large oval spot on each side and no apical patch; mesepimeron with black scales; pronotum not tuberculate
 - *cretaceonotatus* Voss
 - Prothorax laterally with broad yellow stripe from base to apex and continuing onto pronotum; elytra, in addition to yellow basal band, with postmedian band and apical patch (fig. 33); mesepimeron with yellow scales; pronotum tuberculate. *apicalis*, new species

Cholus pantherinus (Olivier)

Figures 30, 110, 111

Curculio pantherinus Olivier, 1790, p. 506; 1808, pl. 13, fig. 153 (Cayenne, French Guiana; type not found).

Curculio marmoratus Fabricius, 1792, p. 425 (Cayenne, French Guiana; type not found; synonymized by Olivier, 1807).

Rhynchaenus marmoreus Fabricius, 1801, p. 462 (Cayenne, French Guiana; correction for *marmoratus* Fabricius; synonymized by Olivier, 1807).

Diagnosis. Dorsum mottled as in *leopardinus*, both species agreeing also in having same kind of scaly, yellow, basal scutellar patch on elytra, various scaly spots on dorsum, and strongly convex pronotum; differing from *leopardinus* in shape of aedeagus and in having two, not three yellow spots laterally on pronotum, and fewer but larger spots on elytra.

Range. French Guiana, Surinam, and Amazonian Brazil. (For 53 specimens examined, see Appendix.)

Description. Length 12 to 15 mm. Color pattern: Brownish or bronzy scales in all nonyellow areas; dense yellowish orange scales as follows: on pronotum in median line that widens in front of middle; laterally in round or acuminate basal spot and oval apical spot; spots narrowly separated, in some specimens contiguous; on elytra scales in V-shaped scutellar patch, in two large, antemedian lateral spots and in subapical sinuous band and apical spots; also spots of various sizes here and there (15 or fewer spots on each elytron); below covered with dense yellowish scales; sides of prothorax with C-shaped broad yellow mark advancing onto pronotum. In some specimens, legs and beak reddish with fine sparse white scales.

Eyes moderately convex, separated above by slightly more than width of base of beak; no margined rim above eyes. Beak scarcely arcuate, almost straight, scarcely longer than pronotum, especially that of female; about same width throughout, dorsally either smooth or faintly uncarinate, finely, densely punctate. Antenna of male inserted in apical third of beak, of female slightly in front of middle. Pronotum convex, about as wide as elytra; sides strongly arcuate to apex, with bronzy scales among tiny, concentric tubercles and overlapping yellow scales; postocular lobe feebly rounded. Scutellum oblong, retracted behind margin of elytra. Elytra slightly more than twice length of pronotum with tiny brownish scales between yellow areas, among dense flattish tubercles of intervals and striae; base somewhat sinuous.

Prosternal process with apex tuberculate, densely scaly, projecting forward; basisternal pieces large. Mesosternum with scaly tubercle projecting beyond coxae. Front intercoxal space at least as wide as beak. Front femur strongly clavate, arcuate; front tibia slightly incurved; hind tibia with outer apical fringe one-fourth length of tibia. Aedeagus in profile very strongly bent at middle, dorsally narrowed to rounded apex; apodemes longer than aedeagus; parameres present; no basal sclerite found.

Remarks. Although both *pantherinus* and *leopardinus* have mottled patterns they are closely related to the nonmottled *notabilis* and *praetorius*, having the same kind of convex, tuberculate pronotum, retracted scutellum, and robust,

short beak. They differ from those species chiefly in their color pattern (the elytra spotted, not banded).

The median scaly line of the pronotum can be interrupted and it is not invariably widened toward the front. In only five of 39 examples are the lateral pronotal spots touching one another; in one specimen the spots form a continuous stripe.

***Cholus leopardinus*, new species**

Figures 29, 112

Type Material. Type, male, Iquitos, [Loreto], Peru, in Kuschel collection, DSIR, Auckland, and paratype, female, Mishujacu, Iquitos, September 14, 1929, in Senckenberg Museum, Frankfurt.

Diagnosis. Very similar to *pantherinus*, differing in having aedeagus asymmetrical, color pattern of scaly yellow spots including three, not two, spots on each side of pronotum, and smaller, more numerous spots on elytra.

Range. Loreto region of Peru.

Description of Type. Male, length 15 mm. Color pattern: brownish with pale bronzy scales in nonyellow parts, and with dense yellowish orange scales as follows: on pronotum in median line broken at middle and not extending to apex, and in three large spots laterally; on elytra in U-shaped scutellar patch, in spot on humerus, and in about 30 spots on each elytron, two of which are almost as large as pronotal spots, others smaller by half or more; below entirely densely scaly; legs and beak reddish.

Eyes, beak as described for *pantherinus*, with beak feebly arcuate and carinate, at apex virtually impunctate. Antenna, pronotum, and scutellum as described for *pantherinus* except for color pattern (see above), but flattish tubercles of pronotum scarcely visible. Prosternum, mesosternum, coxae, and legs as described for *pantherinus*. Aedeagus asymmetrical; basal half bulbous; apex rounded; large parameres present; no basal sclerite found.

Variation from Type. The female paratype measures 14 mm. in length and is marked almost exactly like the type although the yellow scaly spots in front of the subapical callus are not quite so large and a few smaller spots are added or absent on each elytron. In the female the first

segment of the abdomen is flat, not feebly concave.

Etymology. The species name is from the Latin *leopardinus*, referring to the spotted leopard-like appearance.

Remarks. As can be seen from the short description above, there is little difference between this species and *pantherinus*. They occur, however, far from one another, *leopardinus* in Peru, and *pantherinus* in the Guianas and Amazonian Brazil.

Cholus notabilis Pascoe
Figures 110, 111

Cholus notabilis Pascoe, "1873" [1872], p. 470, pl. 11, fig. 1 ("Amazonas"; type, Para, Amazonas, Brazil, in British Museum [Nat. Hist.], London, examined).

Diagnosis. Readily recognizable by pattern of elongate, oblong dark patch in basal two-thirds of each elytron that is surrounded by yellow scales.

Range. Colombia, French Guiana, and Amazonian Brazil, also southern Brazil. (For 42 specimens examined, see Appendix.)

Description. Length 9 to 16 mm. Color pattern: brownish with bronzy scales in nonyellow parts and dense yellowish orange scales as follows: on pronotum in lateral oblique stripe from center of apex to sides of base enclosing round, dark, lateral spot partially visible from above; on elytra on basal, lateral, and apical margins, narrowly on suture and on subapical band that is either straight or sinuous; below all dense yellow scales except on dark spot behind eye and near base of epipleura of elytra; legs and beak reddish, finely, sparsely scaly.

Eyes, beak, antenna, pronotum, scutellum, and elytra as described for *pantherinus* except for color pattern. Prosternal process with apex flat, densely scaly; basisternal pieces large. Mesosternum, intercoxal space, legs, and aedeagus as described for *pantherinus*.

Remarks. This species, described at the same time as *praetorius*, but inhabiting South America, not Panama, reads almost the same in Pascoe's two descriptions, but his illustrations (pl. 11, figs. 1, 2) show well the differences. The pronotum of *notabilis* is as wide as, not narrower than

the elytra and the elytra have two oblong dark areas separated by sutural scales instead of a large oval central patch going across the suture. In *notabilis*, in addition, the humerus has yellow, not black scales and there is a black spot on the epipleura. The yellow stripes of the pronotum come close together in almost all specimens examined, even touching in a few cases.

Cholus praetorius Pascoe

Cholus praetorius Pascoe, "1873" [1872], p. 470, pl. 11, fig. 2 ("Panama" [Central America]; type in British Museum [Nat. Hist.], London, examined).

Diagnosis. Similar to *notabilis*, but differing in having black, not red legs and disc of elytra with large oval dark patch instead of oblong patches divided by yellow scales at suture; humerus dark, not yellow and pronotum narrower than elytra.

Range. Panama. (For three specimens examined, see Appendix.)

Description. Length 17 mm. Color pattern: black with black scales in nonyellow areas, and dense yellow scales as follows: on pronotum in lateral oblique stripe from sides of apex to sides of base, surrounding round, dark lateral spot partially visible in dorsal view; on elytra surrounding both median oval black spot, and black spot on subapical callus; in front leaving humeral area black; below entirely yellow scales; beak and legs black.

Eyes, beak, antenna as described for *pantherinus*. Pronotum, scutellum, and elytra as described for *pantherinus* except color pattern (see above), and for pronotum being narrower than elytra and elytra with no tubercles showing. Prosternal process with apex flat, densely scaly; basisternal pieces large. Mesosternum, intercoxal space as described for *pantherinus*. Front femur strongly clavate, straight (at least in female). Front tibia straight in female; hind tibia with outer apical fringe about one-fifth length of tibia.

Remarks. *Cholus praetorius* is the only one of the group from Central America and is apparently rare in collections. Champion ("1902-1906" [1903]) had seen only the type and I have seen only two additional specimens, one of which is a dissected female.

Cholus cretaceonotatus Voss

Cholus cretaceonotatus Voss, 1954, p. 271, fig. 11 (Satipo, Jauja Province, Peru; type not found in Zoologisches Museum, Hamburg, probably destroyed).

Diagnosis. Black and yellow banded species differing from *apicalis* in having no tubercles on pronotum; black, not yellow scales on mesepimeron; no yellow on apex of elytra; subapical yellow oval marks not reaching suture; and epipleura scaled behind middle.

Range. Peru and Amazon basin, Brazil. (For four specimens examined, see Appendix).

Description. Length 15 to 18 mm. Color pattern: dorsum with black scales in nonyellow areas; pronotum black; elytra black with large scaly yellow basal crossband not quite reaching humerus, and subapical transverse-oval marks not reaching suture; large yellow spot on sides of prothorax, on center of prosternum, and sides of metasternum; mesepimeron with black scales; remainder of venter and legs with dense or sparse whitish scales.

Eyes strongly convex, separated above by less than width of beak at base, margined rim raised slightly above forehead. Beak feebly arcuate, one and one-half times length of pronotum, about same width throughout, dorsally unicarinate, finely and in some densely punctate. Antenna inserted slightly in front of middle of beak. Pronotum rather conical, convex on disc, narrower than elytra, nigrosquamose, no tubercles visible; sides oblique to apex; postocular lobe rather angulate. Scutellum elongate, shield-shaped. Elytra two and one-half times length of pronotum, nigrosquamose between yellow scaly areas; striae, where black scales worn off, densely punctate; intervals with single row of tiny sparse tubercles; base almost straight.

Prosternal process at apex broadly rounded or feebly acuminate; basisternal pieces four or five times longer than basal strip behind coxae. Mesosternum with scaly pointed apex projecting beyond coxae (seen in lateral view). Front intercoxal space as wide as beak. Front femur scarcely clavate. Tibiae straight, but front tibia at base within can be sinuous; hind tibia with outer apical fringe one-fifth or one-sixth length of tibia.

Remarks. The "matt schwarz tomentiert" covering (Voss, 1954) gives this species a velvety look. In two of the four specimens examined (all apparently females) the large yellow lateral spot of the pronotum is partially visible from above. *Cholus cretaceonotatus* differs from the rather similarly patterned and velvety *luctuosus* Pascoe in larger size, wider spaced front coxae, tuberculate mesosternum, and absence of a median yellow spot on the epipleura of the elytra. It differs from the four foregoing species (*pantherinus*, *leopardinus*, *notabilis*, and *praetorius*) in having the scutellum not retracted, the legs and beak longer, and the front femur virtually linear.

The majority, if not all of Voss's types of Curculionidae were destroyed by fire at the museum in Hamburg. His illustration of this species, however, is unmistakable.

Cholus apicalis, new species

Figure 33

Type Material. Type, female, Cananche, Cundinamarca, Colombia; and paratype, sex not ascertained, Puerto Berrio [Santander], Colombia, in Kuschel collection, DSIR, Auckland; and paratype, female, Cayenne, French Guiana, in Muséum d'Histoire Naturelle, Paris.

Diagnosis. Very similar to *cretaceonotatus* but with different color pattern (elytra with three, not two yellow bands, and epipleura scaly except at extreme base); differing further in having pronotum tuberculate as well as nigrosquamose, and lateral yellow stripe of pronotum visible in dorsal view.

Range. Colombia.

Description of Type. Female, length 15.5 mm. Color pattern: dorsum with black scales in nonyellow areas; pronotum black with oblique yellow scaly stripe laterally; elytra with three yellow bands (basal band not extending to humerus, postmedian extending to suture, apical oblique); epipleura broadly scaled with yellow except in humeral area; sides of prothorax with broad oblique yellow stripe; prosternum and venter with yellowish scales.

Eyes, beak, antenna as described for *cretaceonotatus*, but beak feebly widened at apex and coarsely punctate at base only. Pronotum and scutellum as described for *cretaceonotatus*, but

pronotum with small, dense tubercles. Elytra (except for color pattern) as described for *cretaceonotatus*. Prosternal process at apex broadly rounded; basisternal pieces four or five times

longer than basal strip behind coxae. Mesosternum, intercoxal space, and legs as described for *cretaceonotatus*, but outer apical fringe of hind tibia one-sixth length of tibia.

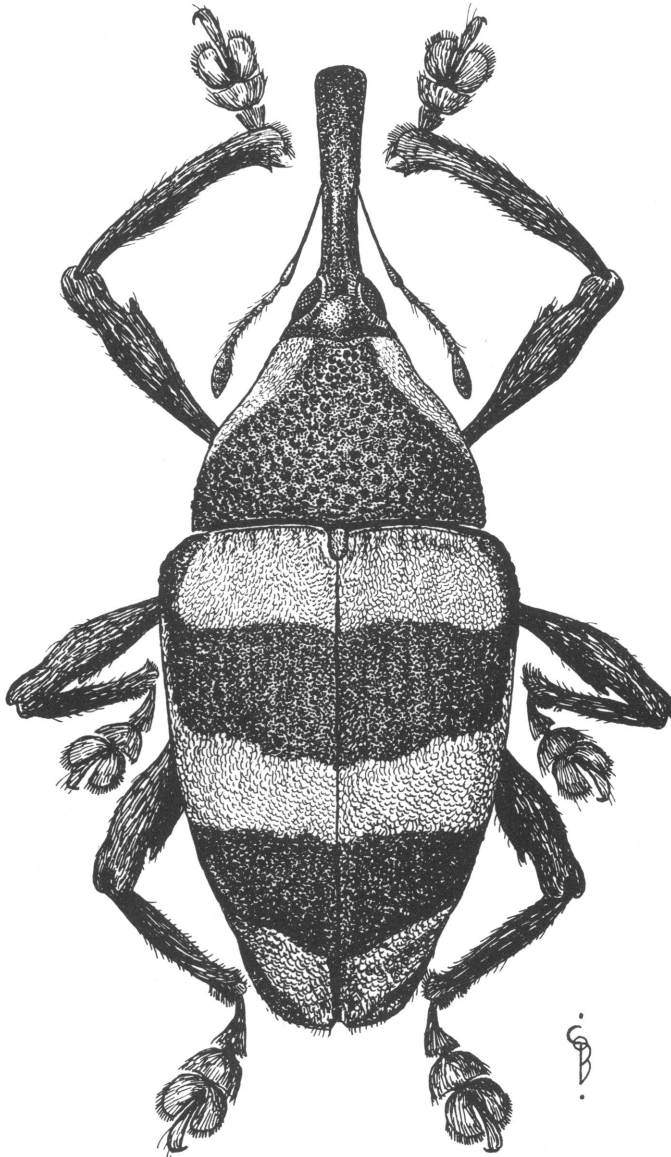


FIG. 33. *Cholus apicalis*, type, female, Cananche, Cundinamarca, Colombia, 15.5 mm.

Variation from Type. The paratype from Cayenne has had the head reglued and has lost most of its antennae. It is 15 mm. long and differs from the type only in having the postmedian scaly yellow band larger, and not interrupted at the suture. The paratype from Puerto Berrio has no head and differs in having on the elytra two large black spots interrupted at the suture instead of a continuous black band.

Etymology. The species name is from the Latin *apicalis*, referring to the apical patch of scales.

Remarks. *Cholus apicalis* and *notabilis* are the only species of the group known so far from Colombia, although both occur elsewhere. The pattern of the elytra is reminiscent of that of *luctuosus* and *varians*, but there are other, structural differences, *apicalis* having widely, not narrowly separated front coxae, large, not small basisternal pieces on the prosternum, and a postocular lobe on the pronotum.

Technically, *C. apicalis*, as well as *C. cretaceonotatus* probably belong in the subgenus *Aphyoramphus* because the front femora are sublinear. The tibial comb, however, is even shorter than those of most members of *Cholus*, *sensu stricto*, and I believe these two species belong in the subgenus *Cholus*.

Cholus luctuosus Pascoe

Cholus luctuosus Pascoe, 1881a, p. 41 (Sarayacu, Loreto, Peru; type in British Museum [Nat. Hist.], London, examined).

Diagnosis. Pattern, velvety aspect, and absence of tubercles agree with *cretaceonotatus* and *apicalis*, but *luctuosus* differs in its much smaller size, in having front coxae narrowly, not widely separated, basisternal pieces of prosternum very small, and no postocular lobe on front of pronotum.

Range. Ecuador, northern Peru, and Amazonian Brazil. (For four specimens examined, see Appendix.)

Description. Length 11 to 12 mm. Color pattern: dorsum covered with black scales except in yellow scaly parts as follows: on pronotum narrowly across apex, continuing laterally to base; on scutellum; on elytra in basal crossband (not covering humerus), and subapical band broken at middle; in round lateral spot on epipleura between basal and subapical bands; below except

on sides of prothorax where black scaly tongue intrudes between yellow scales; legs with sparser, longer white scales.

Eyes, beak, antenna as described for *cretaceonotatus*, but beak only slightly longer than pronotum and in dorsal view beak widened at apex. Pronotum, scutellum, and elytra as described for *cretaceonotatus* except for color pattern and for nonconical pronotum with sides arcuate, not oblique, and postocular lobe absent, and elytra only slightly more than twice length of pronotum. Prosternal process rather acuminate; basisternal pieces small, not longer than basal strip of prosternum behind coxae. Mesosternum tumid, not tuberculate. Front intercoxal space much narrower than beak. Legs as described for *cretaceonotatus* but outer comb of hind tibia one-sixth length of tibia, and front femur more clavate.

Remarks. The only specimens examined of *luctuosus* are four females. This species and *varians* could be conspecific as they are almost identical except for their yellow scaly pattern which in any case apparently varies in *varians* in the way of three different patterns. In *luctuosus* the round spot of the epipleura is scarcely visible on the dorsum but in *varians* it advances onto the elytra.

Cholus varians, new species

Figures 31, 113

Type Material. Type, female, and paratype, female, Teffe, Amazonas, Brazil, October, 1924, and December, respectively, H. Bassler, collector, in the American Museum of Natural History; four paratypes, same locality, one, December, 1956, in Seabra collection, Rio de Janeiro, one, 1879, de Mathan, collector, and one male and one female, no date or collector, in Kuschel collection, DSIR, Auckland; one female, Rio Autaz, Amazonas, Brazil, in Kuschel collection; one, Amazonas, Brazil, in Muséum National d'Histoire Naturelle, Paris; one, "Brazil," in British Museum. Four paratypes, Peru: Mishujacu, Iquitos, Loreto, November, 1929, in Senckenberg Museum, Frankfurt; "Amazonas, Iquitos," Hahnel, collector, in Paris Museum and November, 1879, de Mathan, collector, in Kuschel collection; San Roque, Iquitos, Loreto, in Kuschel collection.

Diagnosis. Structurally similar to *luctuosus*,

but color pattern differing either in having more yellow scaly marks or in having apex of elytra with yellow scaly spots, not black.

Range. Amazonian region of Peru and Brazil.

Description of Type. Male, length 13.5 mm. Color pattern: black areas covered with dense bronze scales; yellow scaly areas arranged as follows: on pronotum in interrupted bands at apex and middle that do not cross disc; on scutellum; on elytra in elongate scutellar patch on each side of suture that connects with transverse basal marks; two median transverse marks not reaching suture; in two subapical marks approaching suture; in two apical spots; on epipleura in four yellow marks joining marks on elytral disc; below dense yellow scales throughout.

Eyes, beak, antenna, pronotum, scutellum, elytra, and other characters as described for *luctuosus* except for color pattern (see above). Aedeagus narrowing feebly to apex where sharply triangular.

Variation from Type. The length of the paratypes is from 11 to 14 mm. The paratype from Rio Autaz is almost entirely covered with yellow scales that are sparser than those of the normal yellow bands that are visible beneath; also the pronotum has scales across the apex. In six paratypes the elytral pattern is similar to that of the type (with the scaly scutellar patch) and the median yellow marks of the pronotum are visible on the disc; in the remaining five paratypes the yellow from the sides of the prothorax does not reach the disc and the scutellar patch of the elytra is lacking (or worn off). In all specimens, however, a yellow patch, which is lacking in *luctuosus*, is present on the apex of the elytra.

Etymology. The species name is from the Latin *variatus*, denoting the variability of the color pattern.

Remarks. The fact that the Rio Autaz specimen (mentioned above) is entirely scaly may mean that all other specimens are variously worn. Somewhat the same condition occurs in *interruptefasciatus* of that group. In all examples of *variatus* except the Rio Autaz specimen the scales do not cross the apex of the pronotum as they do in the very similar *luctuosus*, and they generally encroach from the sides onto the disc, whereas in *luctuosus* there are no scales on the disc. Possibly this is the same species as *luctuosus*; additional specimens of the last-named,

including males, may resolve the question.

Species Group *zonatus* Antillean Species

The species included in this group are:

Cholus zonatus (Swederus); *martiniquensis* Marshall; *adpersus* (Fahraeus); *spinipes* (Fabricius); *biinterruptus* Desbrochers des Loges.

I have united these species in one group because they are the only ones that occur in the Antilles. In the entire subfamily Cholinae there are only seven species recorded from the Caribbean area—these five and *Homalinotus lherminieri* Chevrolat and *H. umbilicatus* Desbrochers des Loges. Of the five species that follow, two (*biinterruptus* and *spinipes*) are quite different from the others and from one another, but I keep them in this group until their affinities can be established.

The first three species listed above share a number of characters as follows: widely spaced coxae, glabrous, virtually impunctate beak and legs, large basisternal pieces abutting on a tumid mesosternum, long metasternum, and short pronotum. These three species appear to be closely related; two (*adpersus* and *zonatus*) were for a long period in the genus *Polyderces* Schoenherr, 1844, but Heller (1906) synonymized that name with *Cholus* and Marshall (1922, 1926) followed Heller when he described *martiniquensis* and *wattsii*.

With the exception of *zonatus* (59 specimens) I have seen only 13 specimens of *martiniquensis*, 12 of *adpersus*, 16 of *spinipes*, and one of *biinterruptus*.

Biology. Two species (*zonatus* and *martiniquensis*) are found on or breeding in palms, and *spinipes* breeds in pineapples.

Distribution. The three closely related species are found in the Lesser Antilles from north to south: *zonatus* on Guadeloupe and Dominica (although a single specimen is labeled Grenada, much farther south); *martiniquensis* on Martinique and St. Lucia; *adpersus* still farther south on St. Vincent island; and *spinipes* on Grenada.

KEY TO SPECIES OF THE *ZONATUS* GROUP

1. Pronotum with distinct postocular lobe; red-

- dish (7 to 8 mm.); elytra with four areas of dense yellow scales and three intermediate areas of sparse scales
- *biinterruptus* Desbrochers des Loges
- Pronotum with no trace of postocular lobe; black (12 to 22 mm.); elytra either with three crossbands of dense yellow scales or with small scaly spots. 2
2. Prosternum between coxae with median tubercle; front intercoxal space not wider than width of beak; elytra with narrow, rather sinuous lines forming three bands; 17 to 20 mm.; Grenada.
- *spinipes* (Fabricius)
- Prosternum between coxae smooth; front intercoxal space wider than beak; elytra with white scaly spots or broad bands; 11 to 16 mm. 3
3. Elytra and pronotum covered with clusters of white scales within punctures, no scaly bands; St. Vincent. . . *adspersus* (Fahraeus)
- Elytra with broad transverse bands of dense whitish scales; pronotum with broad lateral scaly stripes 4
4. Elytra with black areas between scaly bands smooth, glabrous, not scaly; Guadeloupe, Dominica. *zonatus* (Swederus)
- Elytra with spaces between scaly bands mottled with clusters of white scales; Martinique, St. Lucia. . *martiniquensis* Marshall

Cholus zonatus (Swederus)

Figure 90

Curculio zonatus Swederus, 1787, p. 194 (Guadeloupe; type not found).

Curculio tricinctus Fabricius, 1792, p. 430 (Guadeloupe; type, probably male, in Muséum d'Histoire Naturelle, Paris, examined; synonymized by Schoenherr, 1836).

Diagnosis. Differing from similarly colored *martiniquensis* in absence of scales between scaly bands of elytra and in slight difference in shape of aedeagus.

Range. Islands of Guadeloupe and Dominica, Lesser Antilles (one specimen from "Grenada" and two, probably in error, from "Brazil"). (For 58 specimens examined, see Appendix.)

Description. Length 11 to 16 mm. Color pattern: black with dense yellow scales in stripe on outer third of pronotum and in three broad transverse bands on elytra (subbasally, post-medially, and subapically); scales also on sides of

prothorax, on prosternum, sides of metasternum, and on second segment of abdomen; legs entirely black, virtually scaleless.

Eyes round, separated above by width of base of beak. Beak arcuate, about twice length of pronotum, same width throughout, very feebly punctate. Antenna inserted slightly in front of middle of beak; funicle with segment 1 somewhat longer than segments 2 and 3 combined; club elongate, equal to last three or four funicular segments. Pronotum as wide as elytra, at median third shiny, flatly tuberculate, partly punctate or almost smooth; sides arcuate; basal angles obtusely rounded; postocular lobe absent. Scutellum shield-shaped. Elytra two and one-half to three times length of pronotum; striae uniformly distinctly punctate; punctures separated by about twice their diameter; spaces between punctures and also intervals flat and impunctate.

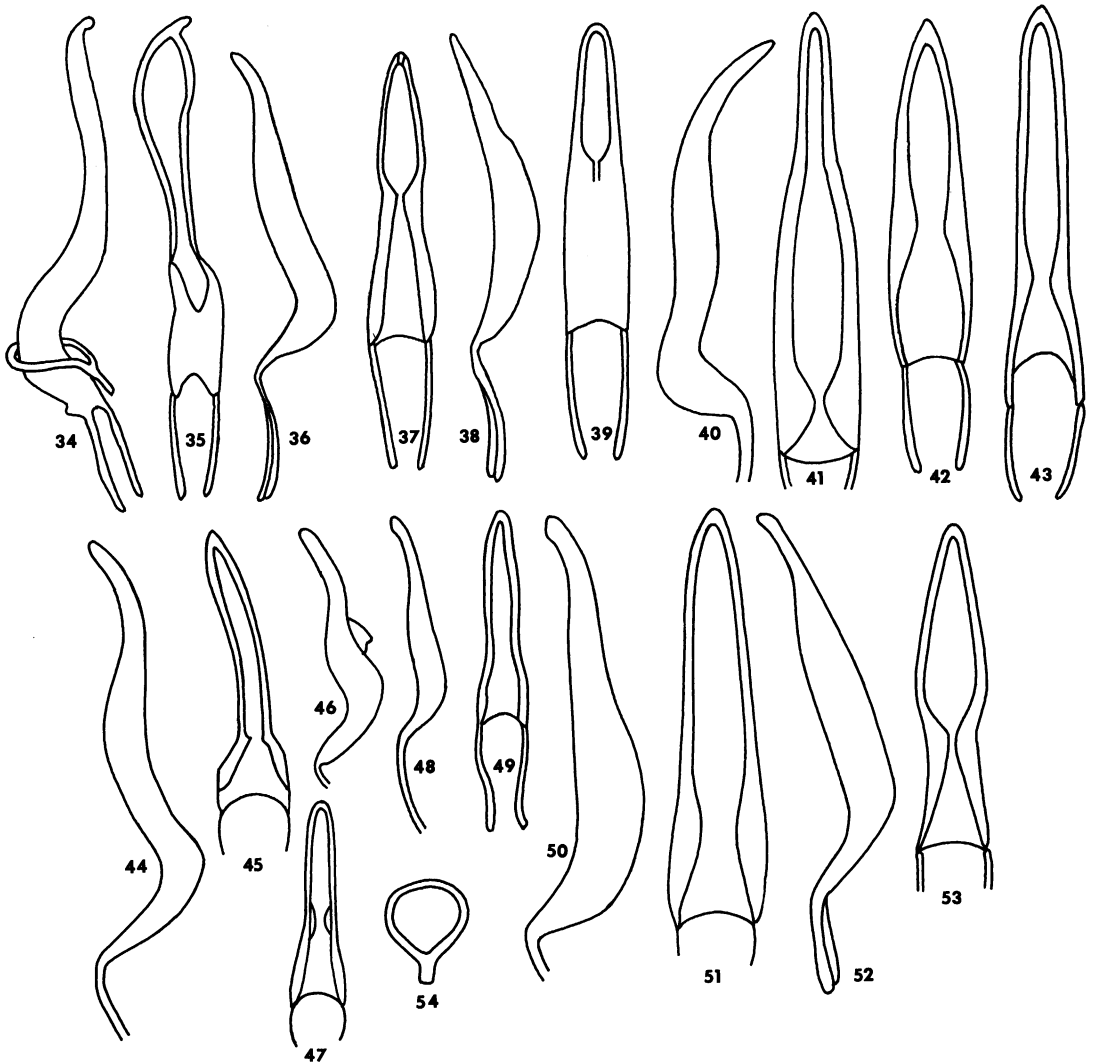
Prosternum flat or slightly concave; basisternal pieces very large, as long as front coxae. Metasternum is twice diameter of coxae in length. Front coxae widely separated by diameter of coxa. Legs virtually impunctate. Front femur feebly clavate. Front tibia at apex incurved, in some specimens with angle or sinuosity near base within; hind tibia with outer fringe about one-fifth length of tibia. Aedeagus with apex bluntly triangular, narrower than widest part of tube; parameres minute, almost obsolete; basal sclerite not found.

Remarks. This species is readily identifiable and is constant in pattern. The sexes are quite similar, but in the male the abdomen is feebly depressed, not flat, and the front legs are rather longer than those of the female.

In 1836 Schoenherr listed *tricinctus* Fabricius as a synonym of *Litomerus zonatus*, and in 1844 he proposed *zonatus* as the type of his new genus *Polyderces*, along with *adspersus* Fahraeus, *Polyderces* being in turn synonymized with *Cholus* by Heller (1906). Marshall (1926) also considered *zonatus* in *Cholus*, but Hustache (1930) reverted to the name *Polyderces*.

The type of *tricinctus* in Paris bears a second label "C. 3-cinctus," evidently written by Fabricius.

Biology. A specimen at Morne Trois Pitons, Dominica, was collected by Henry Hesperheide, July, 1964, "at *Euterpe globosa*," a palm, and at Pont Casse "at *Cyrilla racemiflora*" (Cyrillaceae).



FIGS. 34-54. Genitalia of *albicinctus* group of *Cholus*. 34, 35. *C. albicinctus*; characteristic also of *C. geometricus*. 34. Lateral view, showing tegmen *in situ*. 35. Dorsal view. 36, 37. *C. pistor*. 36. Lateral view. 37. Dorsal view. 38, 39. *C. argentinicus*. 38. Lateral view. 39. Dorsal view. 40, 41. *C. annulatus*. 40. Lateral view. 41. Dorsal view. 42. *C. cephalae*, dorsal view. 43, 44. *C. guerini*. 43. Dorsal view; characteristic also of *C. calcatus*. 44. Lateral view; characteristic also of *C. calcatus*, *cephalae*, and *niveus*. 45. *C. niveus*, dorsal view. 46, 47. *C. boisduvali*. 46. Lateral view. 47. Dorsal view. 48, 49. *C. sagittarius*; characteristic also of *C. coloreus*. 48. Lateral view. 49. Dorsal view. 50, 51. *C. nyblaei*. 50. Lateral view. 51. Dorsal view. 52, 53. *C. cinereus*. 52. Lateral view. 53. Dorsal view. 54. Tegmen of *C. albicinctus*.

The collector, Dufau, wrote on the label of a specimen from near Trois Rivières, Guadeloupe, that *zonatus*, always isolated, was found from the shore to the summit of the Soufrière volcano.

Cholus martiniquensis Marshall

Figure 91

Cholus martiniquensis Marshall, 1926, p. 540

(Martinique, Lesser Antilles; type, male, in British Museum [Nat. Hist.], London, examined).

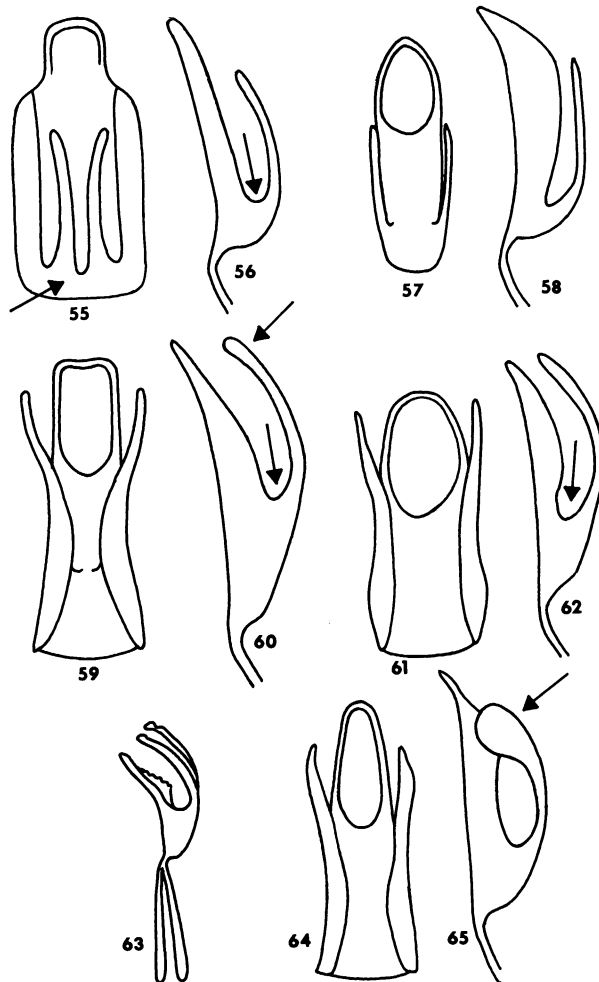
Diagnosis. Differing from very similar *zonatus* in having whitish scales instead of glabrous surface between scaly bands of elytra.

Range. Islands of Martinique and St. Lucia. (For 13 specimens examined, see Appendix.)

Description. Length 11 to 14 mm. Color pat-

tern as described for *zonatus* with addition of white scales between elytral scaly bands and clusters of scales at center of pronotum.

Eyes, beak, antenna, scutellum, venter, and legs as described for *zonatus*. Pronotum and elytra as described for *zonatus*, but median punctures of pronotum larger and furnished with some scales, and spaces between elytral cross-bands mottled with scattered white scales. Aede-



FIGS. 55-65. Aedeagus of *bohemani* group of *Cholus*. 55. *C. bohemani*; characteristic also of *C. rubiginosus*. 55. Dorsal view. 56. Lateral view. 57, 58. *C. kunzei*. 57. Dorsal view. 58. Lateral view. 59, 60. *C. variabilis*. 59. Dorsal view. 60. Lateral view. 61-63. *C. margineguttatus*. 61. Dorsal view. 62. Lateral view. 63. Three-quarter view, smaller scale. 64, 65. *C. alboguttatus*. 64. Dorsal view. 65. Lateral view.

agus with apical portion concave; apex acuminate and wider than tube itself; basal sclerite not found.

Remarks. This form may prove to be a subspecies of *zonatus* although it is, however, consistently distinguished from *zonatus* by the additional vestiture and the more apically widened aedeagus. The type specimen was previously dissected. *Cholus martiniquensis* is apparently more southern in distribution, but one specimen of *zonatus* is recorded from even farther south (Grenada). As is true of *zonatus*, the sexes of *martiniquensis* are much alike, the male having only a slight ventral depression and perhaps longer front legs.

Biology. Some specimens from St. Lucia were found "tunnelling in the petioles of coconut palms" and a "larva in petioles of *Cocos nucifera*"; four other specimens are labeled "coconut." Two specimens from Morne Gimie, St. Lucia, were taken by H. Box "at large flowering spike of palm (?*Euterpe*, sp.) in virgin mountain forest at 2500 feet." Another specimen from St. Lucia was collected by Fennah "on *Piper* sp. in high forest" (Piperaceae, or true peppers).

Cholus adspersus (Fahraeus)

Polydectes adspersus Fahraeus, 1844, p. 16 (St. Vincent Island, Lesser Antilles; type, sex not ascertained, in Naturhistoriska Riksmuseum, Stockholm, examined).

Diagnosis. Size, shape, and structure of *zonatus* and *martiniquensis*, differing from them in having clusters of white scales in all punctures and no scaly bands on elytra.

Range. Island of St. Vincent. (For 12 specimens examined, see Appendix.)

Description. Length 13 to 15 mm. Color pattern: black with white spots of dense scales in almost every puncture of pronotum, elytra, and venter, some spots larger than others.

Eyes, beak, antenna, scutellum as described for *zonatus*. Pronotum (except for scales in punctures) as described for *zonatus*, but pronotum with larger punctures and sides of pronotum distinctly tuberculate. Elytra as described for *zonatus*, but rather rough, not smooth between large foveae that are much more densely arranged than those of *zonatus*. Prosternum shallowly con-

cave; basisternal pieces, metasternum, front coxal space and legs as described for *zonatus*, but front tibia straight, not incurved at apex. Aedeagus not examined.

Remarks. The characters given by Schoenherr (1844) for his genus *Polydectes* do not seem to me to differentiate it from *Cholus*. The shiny, almost impunctate legs of *adspersus* and the large basisternal pieces of the prosternum are in other species of *Cholus* as well.

Unfortunately I have no information on the biology, but *adspersus* will probably be found breeding in palms, as is true for the preceding two species.

Cholus spinipes (Fabricius)

Figures 92, 93

Curculio spinipes Fabricius, 1781, p. 174 ("Americae meridionalis insulis" [=Antilles]; type not found).¹

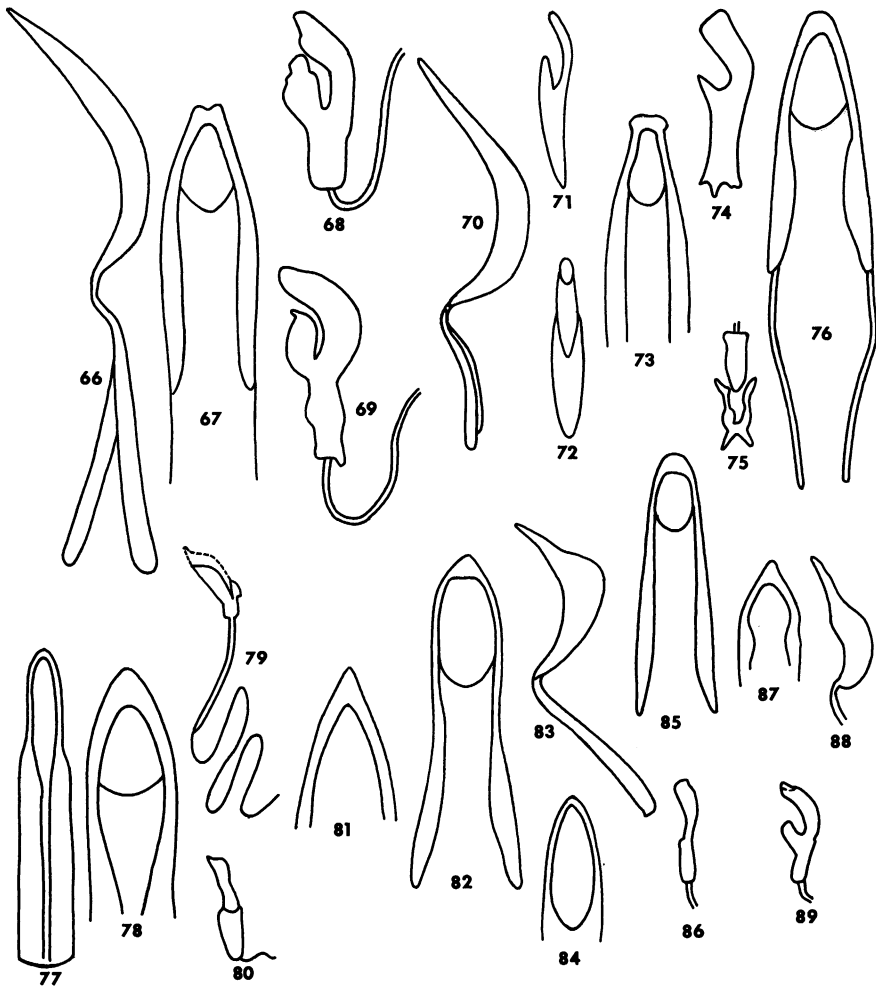
Cholus Wattsi Marshall, 1922, p. 62, pl. 1, fig. 5, pl. 2 (Grenada, Lesser Antilles; type, male, in British Museum [Nat. Hist.], London, examined; synonymized by Klima, 1936).

Diagnosis. Differing from three foregoing species in larger size (22 mm.); strongly tuberculate elytra with pattern of three narrow, rather sinuous white scaly lines; sharp tubercle between front coxae; short basisternal pieces of prosternum; shorter metasternum; less widely separated front coxae, and secondary sexual characters of male.

Range. Grenada. (For 17 specimens examined, see Appendix.)

Description. Length 16.5 to 22 mm. Color pattern: black with dense white, not very elongate scales on pronotum in two wavy lateral stripes joined at middle of each by horizontal band from prosternum; scales on elytra in three rather sinuous bands (subbasal, antemedian, and postmedian); scutellum with scaly border; epipleura with dense scaly patch between ends of two elytral bands; below black with sparse white elongate scales. All dark areas actually furnished with minute, fine, yellowish scales that are sparser than all other scales.

¹In Zimsen's book on Fabricius's types (1964), three specimens are mentioned, two in Glasgow and one in Kiel.



FIGS. 66-89. Genitalia of *parallelogrammus* group of *Cholus*. 66-68. *C. parallelogrammus*. 66. Aedeagus, lateral view, and 67, dorsal apex; characteristic also of *C. conciliatus*. 68. Basal sclerite, larger scale. 69. *C. conciliatus*, basal sclerite. 70. *C. jekelii*, aedeagus, lateral view. 71-73. *C. trifasciatus*. 71. Basal sclerite, lateral view, and 72, dorsal view. 73. Aedeagus, dorsal view, smaller scale. 74-76. *C. rojasi*. 74. Basal sclerite, lateral view, and 75, dorsal view, smaller scale. 76. Aedeagus, dorsal view; characteristic also of *frontalis*, *granifer*, *hirsutus*, *jekelii*, and *roelofsi*. 77-80. *C. buckleyi*. 77, 78. Aedeagus, dorsal view. 77. Tarapoto, Peru. 78. Tarapoto, Peru, and Colombia, larger scale. 79, 80. Basal sclerite, two views. 81. *C. longus*, aedeagus, dorsal apex. 82. *C. magnidens*, aedeagus, dorsal view. 83, 84. *C. nitidicollis*, aedeagus. 83. Lateral view. 84. Dorsal apex. 85, 86. *C. megaspilus*. 85. Aedeagus, dorsal view. 86. Basal sclerite, lateral view, larger scale; characteristic also of *C. magnidens*. 87-89. *C. geniculatus*. 87. Aedeagus, dorsal apex. 88. Aedeagus, lateral view. 89. Basal sclerite, lateral view, larger scale.

Eyes as described for *zonatus*. Beak arcuate, one and one-half times length of pronotum, same width throughout (seen in lateral view) except

for male which has apex ventrally angulate, almost toothed. Antenna inserted slightly in front of middle of beak; funicle with segment 1

slightly longer than segment 2; club as long as last three funicular segments. Pronotum at widest part as wide as elytra in male, but not quite so wide in female, rather flat, with flat, concentrically confluent tubercles; sides strongly arcuate; postocular lobe absent. Scutellum shield-shaped. Elytra almost two and one-half times length of pronotum; striae and intervals uniformly tuberculate, tubercles separated longitudinally by almost their diameter; striae punctures generally obscured by tiny dark scales.

Prosternum somewhat concave in front of sharp tubercle between coxae; basisternal pieces one-half length of front coxae. Metasternum one and one-half times length of coxae. Front intercoxal space narrower than beak, less than one-half diameter of coxa, but middle intercoxal space as wide as coxae. Legs somewhat tuberculate or confluent punctate. Front femur feebly clavate. Front tibia straight, with inner edge in male medially angulate or toothed; hind tibia with outer fringe almost one-half length of tibia. Aedeagus (fig. 92) with apex narrowing to sharp triangular point; parameres present; basal sclerite (fig. 93).

Remarks. In its large size and general pattern *spinipes* resembles *Cholus* (*Aphyoramphus*) *undulatus* Gyllenhal, but differs from *undulatus* in having a prosternal tubercle, toothed, more clavate front femur, and different male characters (an angle under the apex of the beak and within the front tibia). It is also superficially similar to *Homalinotus hystrix* and *fasciatus*, species in which the front tibiae are toothed in both sexes, a postocular lobe is present, and the eyes are distinctly elongate, not round. As shown in the Diagnosis, *spinipes* differs markedly from *zonatus*, *martiniquensis*, and *adpersus*, differing further in having a longer outer fringe on the hind tibia and the legs scaly, rather tuberculate, not smooth and shining. The aedeagus of *spinipes* is acuminate as in *zonatus*, but is very small; the aedeagus of a *spinipes* 19 mm. long is shorter than that of a specimen of *zonatus* of 12 mm.

Biology. The habits of this large, handsome weevil are given by Marshall (1922) for *wattsi* (a synonym of *spinipes*). The type series of *wattsi* was taken attacking the crown of a pineapple (Bromeliaceae). It was discovered on Grenada in May, 1920, in a bushy, weedy patch of fruits

which had been neglected for several years. According to H. A. Ballou, the collector of the series, the eggs are laid in the flower stalk of the pineapple and the larva travels up or down, feeding on the fruit stalk. The adult feeds on the developing fruit, fruit suckers, and crown; it damages and in some cases completely spoils the pineapple. The larva and the injury inflicted on the fruit are illustrated by Marshall.

Cholus biinterruptus Desbrochers des Loges
Figure 94

Cholus biinterruptus Desbrochers des Loges, 1906, p. 362 ("Antilles"; type, male, in Muséum d'Histoire Naturelle, Paris, examined).

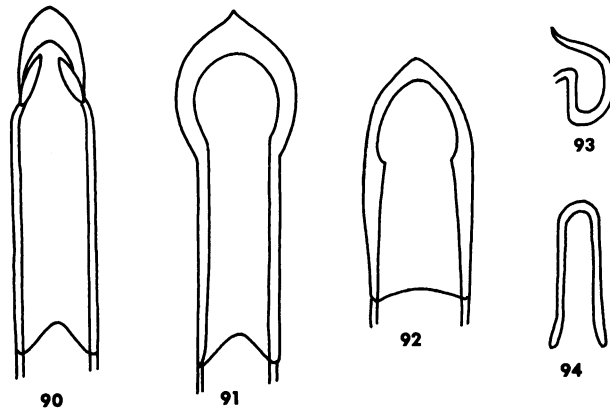
Diagnosis. Differing notably from other species of Antilles in very small size, elongate, oblong shape, presence of postocular lobe, and entirely hairy covering.

Range. Known only from type.

Description. Length 8 mm. Color pattern: reddish, almost entirely clothed (except apical half of beak) with fine, elongate, hairlike yellow scales, with denser patches in two oblique lateral stripes on pronotum; denser scales on elytra forming V-shaped area at base, three round spots in front of middle, also subapical band and apical patch; epipleura and venter and legs scaly.

Eyes round, separated above by slightly more than width of beak. Beak robust, strongly arcuate, of same width throughout, one and one-half times length of pronotum, apparently impunctate. Antenna as described for *zonatus* but funicle with segment 1 almost as long as segments 2 to 4 combined, and club almost as long as last five segments of funicle. Pronotum as wide as elytra, rather flat, finely granulated under vestiture; sides arcuate; postocular lobe prominent. Elytra two and one-half times length of pronotum, feebly tuberculate under scales; intervals and striae indistinct.

Prosternum flat; basisternal pieces shorter than diameter of coxa. Metasternum long. Front coxae narrowly separated by less than one-half diameter of coxa. Front femur slightly arcuate, strongly clavate. Front tibia straight; hind tibia missing. Aedeagus strongly arcuate, with apex rounded, spatulate; basal parts missing.



FIGS. 90-94. Aedeagus of *zonatus* group of *Cholus*. 90. *C. zonatus*. 91. *C. martiniquensis*. 92. *C. spinipes*. 93. Basal sclerite, *C. spinipes*, larger scale. 94. *C. biinterruptus*.

Remarks. Aside from its provenance from the Antilles, this species is not allied to the other Antillean species. Rather it resembles *sulphuratus* Fahraeus (Brazil), which I have not been able to classify with any species group. However, *biinterruptus* differs from *sulphuratus* in having a postocular lobe, more arcuate beak, the elytra feebly tuberculate, not punctate under the vestiture, and the hairlike scales finer, more elongate, and not of the same density throughout. The color pattern of *sulphuratus* is unique—entirely yellow except for three narrow red stripes running medially and laterally on pronotum and elytra.

Species Group *forbesi*

The species placed in this group are:

Cholus forbesi Pascoe; *nigronotatus* Champion; *nigromaculatus* Champion; *acuminatus*, new species; *cattleyae* Champion.

The characters common to the five species are: Eyes rather flat, feebly narrowed at lower end but generally half hidden by postocular lobe; separated above by width of beak. Beak rather compressed laterally. Antenna inserted at about middle of beak; funicle with segment 1 twice length of segment 2; remaining segments shorter than segment 2; club elongate. Pronotum convex; sides arcuate; basal angles not prominent; postocular lobe strong. Scutellum oval, scaly. Elytra narrowed to apex, only twice length of pronotum; epipleural margin sinuous. Prosternum

feebly concave, but slightly tumid in front of each coxa. Mesepimeron with lower edge angulate distally, but angle can be obscured by dense scales. Mesosternum feebly tumid. Metepisternum very narrow, at narrowest part (fig. 12) almost covered by epipleura. Femur clavate, toothed within. Tibia with uncus and mucro visible; outer apical fringe one-fourth or one-fifth length of tibia.

The distinguishing characters of this group are the very narrow width (a mere line) of the metepisternum, the short elytra, the strong postocular lobe of the pronotum; the dense white scales and generally uneven, irregular, tuberculate surface; and the fact that they breed in orchids. At first glance the species are confusingly similar, especially when some of their scales are worn off, yet they differ distinctly in details of the scaling and in the degree of tuberculation. They might well be considered a separate genus, but in the present nomenclatural uncertainty of the subfamily, it seems unwise to add yet another generic name to the roster.

In the discussions of previous authors I believe too much attention has been given to the arrangement of the white scales of the elytra, whereas more concrete characters seem to be the arrangement and shape of the tubercles on the pronotum, the presence or absence of black squamosity, the length of the beak, and the shape of the base of the elytra. There is not much external difference between the sexes

although the first two segments of the abdomen are feebly depressed in males and rather tumid in females.

The species are apparently not common in collections although I have seen 18 specimens of *forbesi*.

Biology. Probably all the species are associated with orchids. Three of the species have been found in orchid or greenhouses in the United States on plants imported from South America. The orchids mentioned by Champion (1916) and Barber ("1916" [1917], "1917" [1918]) include *Cattleya gigas* and *mossiae*, *Cattleya* sp., *Oncidium splendidum*, and *Laelia* sp.

Distribution. Possibly all the species are found wherever there are orchids, in Venezuela (*cattleyae*), Peru and Ecuador, (*acuminatus*), Mexico and Central America (*nigromaculatus*), Central America (*nigronotatus*), and Mexico, Panama, and Ecuador (*forbesi*).

KEY TO SPECIES OF THE *FORBESI* GROUP

- 1. Pronotum black, generally without scales; discal tubercles tiny, rather acute, oblique or concentric, and uniformly sparsely separated; tibiae and tarsi covered with shaggy, elongate, hairlike white pubescence obscuring surface. . . . *cattleyae* Champion
 Pronotum with dense white scales among tubercles; discal tubercles round, convex, irregularly sparse, or dense; tibiae and tarsi either with black pubescence or white sparse pubescence through which surface visible 2
- 2. Elytra punctate-striate, with distinct rows of alternating large and small tubercles; pronotal disc with two sharply defined, flat, nigrosquamose spots as well as tubercles and white scales; scales narrow, longer than wide *nigromaculatus* Champion
 Elytra tuberculate-foveate with irregular rows of large tubercles and foveae; pronotal disc with three or more irregular patches containing black, convex tubercles among white scales; scales oval to round, strongly overlapping 3
- 3. Each elytron subbasally with cluster of strongly elevated tubercles that are acuminate (seen in lateral view)
 *acuminatus*, new species
 Each elytron subbasally with tubercles, if

- elevated, merely convex, not acuminate (seen in lateral view) 4
- 4. Elytra with base virtually straight; pronotum with three equal sized patches of tubercles (one V-shaped at apex, one each side of middle at base), and two tiny ones on sides *nigronotatus* Champion
 Elytra with base advanced angularly onto pronotum; pronotum with six or seven visible patches of tubercles (three in apical half, three or four in basal half). . *forbesi* Pascoe

Cholus forbesi Pascoe
 Figure 115

Cholus forbesi Pascoe, 1876, p. xxx ("taken alive amongst some orchids at Highgate, London, supposed to have been imported from Ecuador"; type in British Museum [Nat. Hist], London, examined).

Diagnosis. Differing from *nigronotatus* in presence of scales at apex of pronotum and in having bare tuberculate spots of dorsum arranged in different pattern. General shape about like that of *nigronotatus* and *nigromaculatus*, not so rhomboidal as that of *cattleyae* and *acuminatus*.

Range. Ecuador, Mexico, and Panama, or probably tropical America where there are orchids. (For 18 specimens examined, see Appendix.)

Description. Length 9 to 12 mm. Color pattern: on pronotum dense, white, scarcely elongate scales surrounding six or seven clusters or patches of black tubercles (see key above), also several single tubercles; on elytra dense, white scales except on black bare areas as follows: on basal lobes or angles each side of scutellum; on humerus; at center across suture; in four large black spots laterally (two in front of and two behind middle); and a few exposed tubercles on alternate intervals 3, 5, 7, and 9; below white scales in patches.

Beak one and one-half times length of pronotum, feebly arcuate, densely, confluent punctate, dorsally unicarinate, widened toward apex. Pronotum slightly narrower than elytra, with seven (or six if basal patches run together) patches of round, convex tubercles among blunt, broadly oval, whitish overlapping scales. Elytra with large foveae among scales, in some specimens foveae about twice diameter of pronotal

tubercles; edges of some foveae rather tuberculate; base sinuous or biangulate, covering base of pronotum; apexes finely serrulate. Front intercoxal space about equal in width to beak at middle. Hind femur reaching to apex of elytra. Femora and tibiae densely punctate-rugose, sparsely scaly; tibiae on inner side with short black hairs. Aedeagus narrowing slightly to rounded apex.

Biology. The type was bred in London from an orchid said to come from Ecuador. Specimens from Hudson and Bergen counties, New Jersey, were found "in orchid houses," "on *Oncidium splendidum*" (an orchid), were "taken in greenhouse," and a specimen from Oaxaca, Mexico, was labeled simply "in garden."

Remarks. In some specimens the bare areas are smoother and less tuberculate than in others. In fresh specimens the bare areas are smaller as there are more scales surrounding them; in partially denuded specimens the elytral scales that remain show a pattern of narrow, sinuous lines.

Cholus nigronotatus Champion

Cholus nigronotatus Champion, "1902-1906" [1903], p. 306, pl. 16, figs. 12, 12a (Chontales, Nicaragua, and Bugaba, Panama; type, male, Chontales, in British Museum [Nat. Hist.], London, examined).

Diagnosis. Most similar to *forbesi*, but differing from it in having base of elytra virtually straight, not advanced onto pronotum, and large patch of black tubercles at apex and each side of base.

Range. Central America. (For three specimens examined, see Appendix.)

Description. Length 9 to 12 mm. Color pattern: dense, white, virtually round scales leaving bare black tuberculate patches as follows: on pronotum V-shaped patch at center apically, and patch of same size basally each side of center, and tiny patch each side of front, also many single sparse tubercles; on elytra basal margin, on humerus, in large antemedian area each side of suture, on round spot each side subapically; also exposed sharp tubercles in all intervals; below scales in patches.

Beak as described for *forbesi*, but dorsal carina lacking. Pronotum and elytra as described

for *forbesi* except for pattern (see above) and for base of elytra which is virtually straight. Venter and legs as described for *forbesi*. Aedeagus not examined.

Remarks. The three black areas of the pronotum, one of which touches the apex, serve, if constant, to distinguish this species from the other species of the group. In *nigromaculatus* the black tubercular area also reaches the apex, but in the form of a vague stripe, and *nigronotatus* apparently lacks the minute dark scales of the dark areas that are present in *nigromaculatus* and *forbesi*.

Cholus nigromaculatus Champion

Figure 114

Cholus nigromaculatus Champion, "1902-1906" [1903], p. 306, pl. 16, figs. 13, 13a (Volcan de Chiriqui, Panama; type, male, in British Museum [Nat. Hist.], London, examined).

Diagnosis. Differing from other species in having flat, nigrosquamose round spots on pronotum, and from all but *nigronotatus* in virtually straight, not biangulate base of elytra.

Range. Mexico, Nicaragua, and Panama. (For six specimens examined, see Appendix.)

Description. Length 10.5 to 12 mm. Color pattern: dense, almost round, white scales leaving bare patches of tubercles as follows: on pronotum in fusiform median vitta, two large lateral spots, two tiny spots on sides of front, also some single sparse tubercles; on elytra in six large spots (two basally, two postmedially, two smaller, apically), also on humerus and large medial spot on epipleura; on alternating rows, large and small tubercles; below mostly scaly.

Beak as described for *forbesi* but only one and one-third length of pronotum and smooth (except at base), finely, sparsely punctate. Pronotum and elytra as described for *forbesi* except for pattern (see above), for presence of black or bronzy scales in exposed black parts, and for feebly bisinuate, or virtually straight base of elytra. Venter and legs as described for *forbesi*, but hind femur a little shorter. Aedeagus feebly narrowing to slightly pointed apex.

Biology. A specimen in the National Museum of Natural History, Smithsonian Institution, from Mexico that evidently came into port in

San Francisco, California, was taken "on *Laelia*," a large genus of Central and South American orchids.

Remarks. The black strial lines of tiny, scarcely visible punctures and the narrow sparse white scales separate *nigromaculatus* from the other species in which the punctures are deep foveae and the scales are broadly oval and overlapping. The median vitta of the pronotum is faint and vague in the two specimens from Mexico.

***Cholus acuminatus*, new species**

Figure 32

Type Material. Type, apparently female, Santa Isabel, Rio Cosnipata, Cuzco, Peru, "8-11-51," 1700 meters, Woytkowski, collector, in Kuschel collection, DSIR, Auckland, and paratype, female [Rio] La Chima [Bolivar], Ecuador, 1893, de Mathan, collector, in Paris Museum.

Diagnosis. Most similar to *cattleyae*, but elytra more uneven than there, with clusters of elevated and sharp, not rounded tubercles that show acuminate tips when viewed in profile; pattern of pronotal bare areas less distinct than that of other species.

Range. Ecuador, Peru.

Description of Type. Length 12 mm. Color pattern: dense, almost round white scales expose patches of black tubercles as follows: on pronotum in apical half at center in irregular patch, on each side in small round spot of only five or six tubercles, in basal third in large squarish patch each side of center, and laterally in small patch at base and line of single tubercles going forward; on elytra in black basal margin, on humerus, and in seven areas (two each side basally, two post-medially, two on subapical calluses, and one apically at center); below white scales.

Beak, pronotum, and elytra as described for *forbesi* (except pattern), but elytra much rougher and more uneven, with strongly elevated tubercles that, viewed laterally, are acuminate and asperate; also apexes of elytra not serrulate. Front intercoxal space wider than beak at middle. Legs as described for *forbesi*, but femora tuberculate rather than punctate, tibiae lacking inner hairs.

Variation from Type. The female paratype is

only 11 mm. long; it resembles the type but the scales on the ventral side and the legs are somewhat worn, and the pattern of the pronotum shows less distinct tuberculate areas. On the elytra the humerus is scaly and the apexes are serrulate.

Etymology. The species name is from the Latin *acuminatus*, acuminate, referring to the pointed tubercles of the elytra.

Remarks. The examination of additional specimens may show more variation in the scaly pattern which already differs somewhat in the two examples seen. The lack of a male is not too important in this group as the aedeagus is not very different among the other species.

***Cholus cattleyae* Champion**

Figures 115, 116

Cholus cattleyae Champion, 1916, p. 201 ("Tropical America"; type, probably female, Bergen County, New Jersey greenhouse, in British Museum [Nat. Hist.], London, examined).

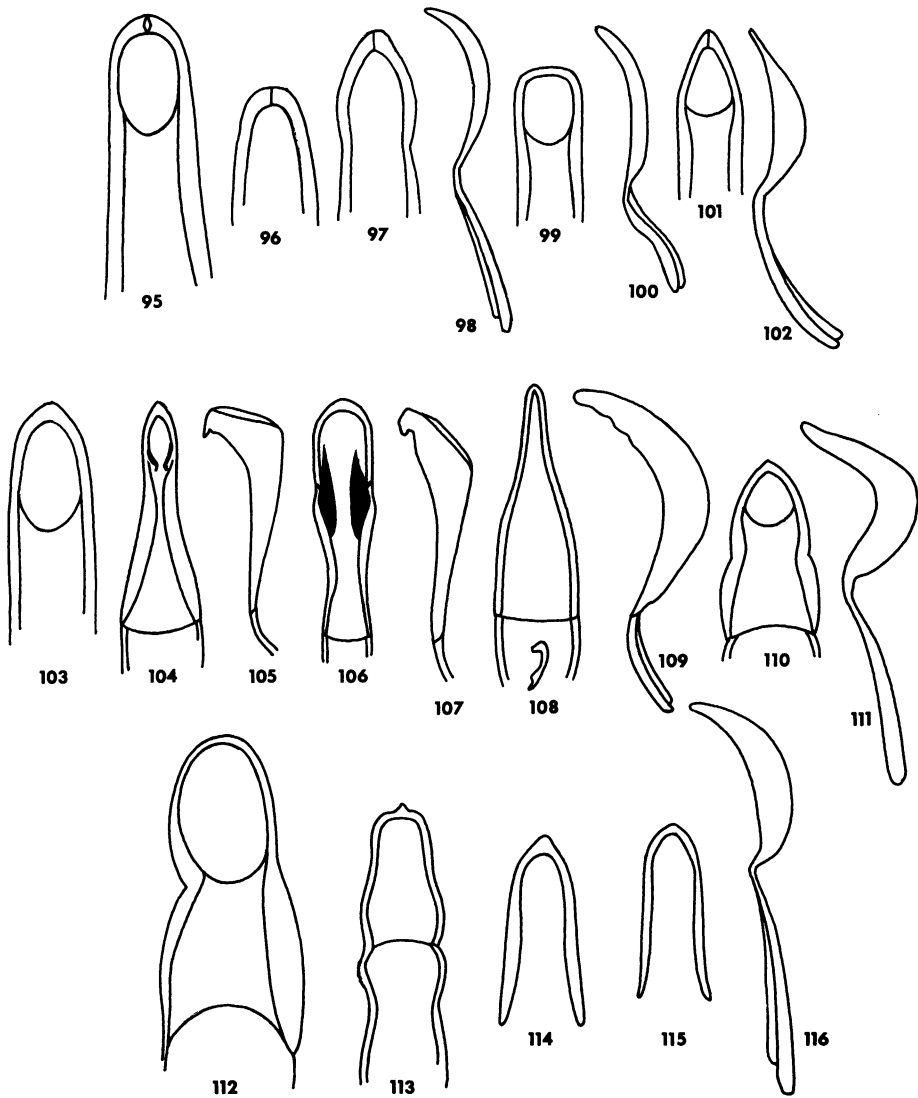
Cholus cattleyarum Barber, "1916" [1917], p. 178, pl. 13 (type, reared from *Cattleyae* species, "Colombia or Venezuela or northern Brazil"; in National Museum of Natural History, Smithsonian Institution, synonymized by Barber, "1917" [1918]).

Diagnosis. Differing from other species of group in having tubercles of pronotum smaller and rather oblique, not round, and uniformly sparsely spaced, not in dense clusters surrounded by scales. Only species with pronotum generally scaleless (scales present in some specimens), and with tibiae and tarsi covered with dense white, shaggy hairs.

Range. Tropical America where there are orchids. (For 12 specimens examined, see Appendix.)

Description. Length 11.5 to 12 mm. Color pattern: pronotum either entirely black or black with lines of dense, roundish, white scales laterally or in small oval patch at center of base; elytra black except for dense white scales on scutellum and in interrupted longitudinal stripes on first sutural interval and on intervals 2, 6, 7, and 8; below scales chiefly on sides.

Beak as described for *forbesi*, but that of



FIGS. 95-116. Aedeagus of various groups of *Cholus*. 95-103. *C. interruptefasciatus* group. 95. *C. grandis*. 96-98. *C. interruptefasciatus*. 96. Type, Colombia. 97. Baños, Ecuador; also characteristic of *C. indubitatus*. 98. Lateral view. 99, 100. *C. planus*. 99. Dorsal view. 100. Lateral view. 101, 102. *C. pubescens*. 101. Dorsal view. 102. Lateral view. 103. *C. subcostatus*, dorsal view. 104-107. *C. tener* group. 104, 105. *C. tener*. 104. Dorsal view. 105. Lateral view. 106, 107. *C. aureus*. 106. Dorsal view. 107. Lateral view. 108, 109. *C. sulphuratus*. 108. Dorsal view with basal sclerite *in situ*. 109. Lateral view. 110-113. *C. pantherinus* group. 110, 111. *C. pantherinus*; characteristic also of *notabilis*. 110. Dorsal view. 111. Lateral view. 112. *C. leopardinus*, dorsal view. 113. *C. varians*, dorsal view. 114-116. *C. forbesi* group. 114. *C. nigromaculatus*, dorsal view. 115, 116. *C. cattleyae*. 115. Dorsal view; characteristic also of *C. forbesi*. 116. Lateral view.

female finely, sparsely punctate. Pronotum distinctly narrower than elytra; tubercles tiny, sparse, oblique. Elytra uneven, with foveae as large as scutellum; intervals, especially near base, strongly elevated, some transversely, confluent tuberculate; base biangulate and elevated, covering base of pronotum; apexes not serrulate. Front intercoxal space distinctly wider than beak at middle. Hind femur as described for *forbesi*. Femur and tibia rather rugose; tibia and tarsus with dense, long, white pubescence that more or less obscures surface beneath; tibiae with short hairs on inner edge. Aedeagus with apex narrowly rounded.

Biology. This species breeds in *Cattleya* orchids and perhaps in other orchids. Champion's description was made from a specimen sent him by Mr. H. B. Weiss of New Brunswick, New Jersey, who found it and other specimens breeding in *Cattleya gigas* bulbs in orchid houses in Bergen County, New Jersey. Another example (a paratype of *cattleyarum*) was taken in a plant of *C. mossiae*, probably from Venezuela (Barber, "1916" [1917]). The type of Barber's *cattleyarum* was reared by him in the swollen leaf stem of *Cattleya* sp. in Washington, D.C., from a plant received from a greenhouse in Milwaukee, Wis-

consin. Many additional specimens were found in the Milwaukee greenhouses where the larvae were damaging the orchids. Barber ("1917" [1918]) reviewed the history of these specimens and where they resided; he presented photographs of the adults of *cattleyarum* and of *forbesi* (pl. 4, figs. 1, 1a, 2). In his earlier paper he had illustrated the adult, pupa, and full-grown larva. All other specimens from New Jersey were collected in greenhouses or orchid houses.

Remarks. In the type of *cattleyae* there is a small spot of dense, overlapping white scales on the pronotum at the center of the base, and in another specimen there is not only this spot, but are also some wavy lines of white scales laterally that join similar lines on the prosternum. In these and in the majority of specimens with scaleless pronotum, the tubercles of the pronotum are small, pointed, and oblique, thus differing from the convex tubercles of *forbesi* and the other species. Of the 14 specimens reported by Barber ("1917" [1918]), eight had some white marks on the pronotum and six had no marks.

Champion's description of *cattleyae* (September) came to the notice of Barber too late for him to withdraw his own description (November) of the same species (*cattleyarum*).

APPENDIX

SPECIMENS EXAMINED

For convenience, the species and the countries under each species are listed alphabetically.

GENUS *CHOLUS* GERMAR

Cholus acuminatus, new species

PERU: (see under the species in the text).

Cholus adpersus (Fahraeus)

LESSER ANTILLES: *St. Vincent*: 10 (including type); Soufrière, 2.

Cholus albicinctus Germar

BRAZIL: 8; *Bahia*: 43; Cachimbo, 1. *Espirito Santo*: 5; Parque Sooretama, Linhares, 3; Timbuhy, 1. *Minas Gerais*: 12. *Rio de Janeiro*: Santo Antonio dos Brotos, 7. *São Paulo*: Rio Mucury, 3.

FRENCH GUIANA: Cayenne, 1.

NO LOCALITY: 21.

Cholus alboguttatus Germar

BRAZIL: 14; *Amazonas*: 1 (type of *duodecimguttatus*). *Bahia*: 5; Una, 1. *Espirito Santo*: 1; Corrego do Ita, 1. *Minas Gerais*: 1; Macachalis, 16. *Pernambuco* (Pery Pery); 4.

NO LOCALITY: 10.

Cholus annulatus (Linnaeus)

ARGENTINA: Gran Chaco de Santa Fe, 2; Gran Chaco, Rio Tapenago, 2; Gran Guardia, Formosa, 2; Patagonia, 3; San Jose, 1; Tucuman, 2. Eldorado, 3; Iguazu, 1; Puerto Libertad, 1; San Xavier or Javier, 4.

BOLIVIA: Guarayos, 1; Lagunillas, 1.

BRAZIL: 38 (including types of *dealbatus*, *faldermanni*, *ornatus*). *Bahia*: 12; Pituba, 62; Salvador City, 4. *Espirito Santo*: 1 (type *consors*); Corrego do Ita, 4; Linhares, Parque Sooretama, 1.

Goyaz: 1; Magalhães, 1. *Mato Grosso*: Guaicurus, 2. *Minas Gerais*: 1; Macachalis, 1; Serra dos Aymores, 1; Viçosa, 2. *Rio Grande do Sul*: Porto Alegre, 2. *Rio de Janeiro*: Mendes, 14; Montagnes des Orgues, 1. *Santa Catarina*: 1. *São Paulo*: 1; Barueri, 4; Lussanvira, 1; São Paulo, 1. *State?*: Santos, 1.

COLOMBIA: Savanilla, 1.

FRENCH GUIANA: Cayenne, 12; St. Laurent du Maroni, 1.

GUYANA: Bartica District, 2.

PARAGUAY: Hohenau, 1; Sapucay, 2.

SURINAM: 2.

URUGUAY: Canelones, Playa Carrasco, 1; Colonia, Playa Santa Ana, 2; El Placer, Maldonado, 3; Las Delicias, Maldonado, 15; Montevideo, 6; Rio Negro, Playa Ubici, 2.

NO LOCALITY: 19.

Cholus apicalis, new species

COLOMBIA, FRENCH GUIANA: (see under the species in the text).

Cholus argentiniticus Heller

ARGENTINA: 1; Buenos Aires, 1; Chaco, 1 (type); Gran Chaco, Colonia Florencia, 1; Gran Chaco, Rio Tapenago, 2; Gran Guardia, Formosa, 6; La Hersilia, 2; Rio de las Garzas, Chaco de Santa Fe, 1; Rosario, Sante Fe, 1.

BRAZIL: 2. *Mato Grosso*: 1. *Rio Grande do Sul*: 1.

PARAGUAY: 7.

NO LOCALITY: 3.

Cholus aureus Champion

COLOMBIA: 8; Bogota, 1; Ibague, 1; San Antonio, 2.

COSTA RICA: 1; Guapiles, Santa Clara, 5; Hamburg Farm, Reventazon, 3; Las Mercedes, Santa Clara, 3; Santiago, 1; Turrialba, 2; Zent, 1.

PANAMA: 1; Bugaba, 2 (including type of *aureus*); Ciricito, Canal Zone, 1; Peña Blanca, 1 (type of *tenuis*).

Cholus biinterruptus Desbrochers des Loges

ANTILLES: 1 (type).

Cholus bohemani (Mannerheim)

BRAZIL: 11 (including type of *bohemani*). *Espirito Santo*: 1. *Minas Gerais*: Caraça, 1. *Rio de Janeiro*: 14; Floresta da Tijuca, 2. *São Paulo*: 1. *State?*: S. Leopoldo, 1; St. Hilaire, 1.

NO LOCALITY: 3.

Cholus boisduvali Boheman

ARGENTINA: Cordoba, 1; Guemps, 1; Salta, 5. Loreto, 5.

BOLIVIA: 1 (type of *championi*); Santa Cruz, 1.

BRAZIL: 3. *Guapore*: Porto Velho, 1. *Minas Gerais*: Rio Aguaray, 1. *São Paulo*: 3; Brooklin Paulista, 1; Ypiranga, 11. *State?*: Villa Guilhermina, 1.

COLOMBIA: 1.

FRENCH GUIANA: Roches de Kourou, 1.

PARAGUAY: 2; Sapucay, 2.

URUGUAY: *Rivera*: Sierra de la Aurora, 1.

NO LOCALITY: 2.

Cholus buckleyi Pascoe

BOLIVIA: Chapare, 2; Cochabamba, 5; El Palmar (Yungas), 1.

BRAZIL: *Amazonas*: São Paulo d'Oliveira, 31; Tabatinga, 1.

COLOMBIA: 8; Cano Grande near Villavicencio, 1; Esmeralda, 2; Medina, 1; Mocoa on Putomayo, 1; Muzo, 2; Rio Guayuriba, 1; "Umbria Guines Fluss", 1; Upper Putomayo, 1; Villavicencio, 2.

ECUADOR: 4; Archidono, 1; Canelos, 1 (type); Eastern Andes, 4; El Partidero, 1; Loja, 1; Macas, 6; Napo, 1; Normandia, 1; Pastazza, 1; Puyo, 3; Sarayacu, 2; Valle Santiago, 1; Zatzayacu, 2.

PERU: Achinamiza, 2; Chanchamayo, 2; Cuzco, 1; Iquitos, 2; Middle Rio Ucayali, 1; Mishujacu, Iquitos, 1; Moyobamba, 13; Pacazu, 3; Sarayacu, 2; Tarapota, 22; Upper Rio Hualaga, 4.

NO LOCALITY: 3.

Cholus calcatius Chevrolat

ARGENTINA: Buenos Aires, 2; Chaco, 2; Chaco de Santa Fe, Las Garzas, 11; Chaco de Santiago del Estero, Rio Dulce, 1; Formosa, 4; "Forueora", 3; Gran Guardia, Formosa, 13; Gran Chaco, Rio Tapenago, 3; Iguazu, Misiones, 1; Pindapoy, Misiones, 2; Salta province, 1.

BRAZIL: 1 (type); *São Paulo*: 1.

PARAGUAY: 3; "Apabergland", 2; Hohenau, 4; Villarrica, 1.

NO LOCALITY: 1.

Cholus cattleyae Champion

UNITED STATES: *New Jersey*: Bergen County: 3 (including type of *cattleyae*); Rutherford, 2. *Hudson County*: Secaucus, 3. *Somerset*

County: Bound Brook, 2.

VENEZUELA: 1 (paratype, *cattleyarum*).

***Cholus cephalae*, new species**

BRAZIL: (see under the species in the text).

***Cholus cinereus*, new species**

PERU: (see under the species in the text).

***Cholus coloreus*, new species**

BRAZIL: (see under the species in the text).

***Cholus conciliatus* (Pascoe)**

BRAZIL: 4 (including types of *conciliatus* and var. *alternans*); *Rio Grande do Sul*: San Leopoldo, 1. *Santa Catarina*: 6; Blumenau, 1; Corupa (Hansa Humbolt), 50; Hammonia, 1; Rio Natal, 1.

NO LOCALITY: 1.

***Cholus cretaceonotatus* Voss**

BRAZIL: *Amazonas*: Tabatinga, 1.

PERU: *Jauja*: Satipo, 1. *Loreto*: Iquitos, 2.

***Cholus flavofasciatus* Guérin-Ménéville**

BRAZIL: 14 (including type of *flavofasciatus* Boheman). *Bahia*: 1. *Espirito Santo*: 2. *Rio de Janeiro*: 13; Tijuca, 3.

FRENCH GUIANA: Cayenne, 1.

NO LOCALITY: 1.

***Cholus forbesi* Pascoe**

ECUADOR: 2 (including type).

MEXICO: 4; *Oaxaca*: La Concordia, Pochutla, 2. *Tepic*: El Cora, 2.

PANAMA: Cerro Campana, 8°40'N, 79°56'W, 2.

UNITED STATES: New Jersey: Bergen County: 4. Hudson County: Secaucus, 2.

***Cholus frontalis* (Chevrolat)**

BRAZIL: 1 (type of *carinatus*).

COLOMBIA: 3; Bogota, 2; El Dintel, 1; Pacho, 1.

***Cholus geniculatus* (Kirsch)**

COLOMBIA: 5; Bogota, 5; Bolivar, Santander, 1; Cananche, Cundinamarca, 5; Muzo, 1; San Carare, 1.

ECUADOR: Quito, 1.

PERU: 1.

NO LOCALITY: 1.

***Cholus geometricus* Germar**

BRAZIL: 6; *São Paulo*: 1; Mucury, 1.

NO LOCALITY: 3.

***Cholus grandis*, new species**

COLOMBIA: (see under the species in the text).

***Cholus granifer* (Chevrolat)**

COLOMBIA: 25 (including type); Amazonas, 1; Bogota, 1; Cauca, 28; Fusagasuga, 1; Manizales, 53; Medellin, 1.

VENEZUELA: 6.

NO LOCALITY: 11.

***Cholus guerini* Boheman**

BRAZIL: 11 (including type). *Parana*: 1. *São Paulo*: 6; Campinas, 1; Ypiranga, 2. *State?*: Campos Geraes, 1.

NO LOCALITY: 4.

***Cholus hirsutus*, new species**

VENEZUELA: (see under the species in the text).

***Cholus indubitatus*, new species**

BRAZIL: (see under the species in the text).

***Cholus interruptefasciatus* Desbrochers des Loges**

COLOMBIA: 2 (including type).

ECUADOR: 3; Ambato, 18; Baños, 6; Hacienda La Merced, Baños, 1; Macas, 1; Mapato, Rio Pastazza, 2; El Napo, 2; Pastazza, 1.

***Cholus jekelii* (Kirsch)**

BOLIVIA: 5; Buenavista, Ichilo, Santa Cruz, 1; Chapare, 2; Chiquitos, 2 (including type of *multicostatus*); Cochabamba, 4; El Palmar, 1; El Palmar, Chapare-Cochabamba, 3; Guarayos, 3; Isiamas, 1; Mapiro, 1; Santa Cruz, 2; Sara, 3; Tumupasa, 1; Yungas, 3.

BRAZIL: *Acre*: Porto Walter, 2. *Amazonas*: 2. *Goyaz*: Rio Verde, 1. *Mato Grosso*: 2; Corumba, 2; Rio Verde, 2; Rosario, 1.

ECUADOR: Zatzayacu, 1.

PERU: 12; Callanga, 2; Chanchamayo, 2; Cuzco, 1; Huallaga, Huanuco, 1; Rio Toro, 2; Rio Urubamba, 1; Satipo, *Jauja*, 2; Shapajilla, Huanuco, 1; Sinchona, 1; Tarapote, Amazonas, 2;

Tingo Maria (Rio Huallaga), 2.
NO LOCALITY: 1.

Cholus kunzei Boheman

BRAZIL: 8 (including type). *Bahia*: 8. *Espírito Santo*: 4. *Rio de Janeiro*: 2.
COLOMBIA: 1.
COUNTRY?: Santa Cruz, 1.
NO LOCALITY: 5.

Cholus leopardinus, new species

PERU: (see under the species in the text).

Cholus longus, new species

BOLIVIA: (see under the species in the text).

Cholus luctuosus Pascoe

BRAZIL: *Amazonas*: Tabatinga, 1.
ECUADOR: Pastazza, 1.
PERU: *Loreto*: Sarayacu, 2 (including type).

Cholus magnidens, new species

COLOMBIA, PERU: (see under the species in the text).

Cholus margineguttatus (Fahraeus)

ARGENTINA: *Lujan*: 2.

BRAZIL: 21 (including type and paratype of *albonotatus* and type of *margineguttatus*). *Bahia*: 1. *Espírito Santo*: 4. *Rio de Janeiro*: 17; Floresta da Tijuca, 5; Mendes, 3; Orgues Mountains, 1; Tijuca, 1. *Santa Catarina*: 1; Corupa (Hansa Humbolt), 3; Rio Natal, 4; Rio Vermelho, 4. *São Paulo*: 4; Cananea, 1; Alto da Serra, 2; Pilar, 1; Salesopolis (Boraceia), 2.
NO LOCALITY: 10.

Cholus martiniquensis Marshall

AMERICA MERIDIONALE, 1.
MARTINIQUE: 2 (including type).
ST. LUCIA: 7; Morne Gimie, 3.

Cholus megaspilus Pascoe

ECUADOR: 2; Ambato, 1; Canelos, 1; Macas, 2 (including type of *bonasus*); Sarayacu, 1 (type of *megaspilus*).

Cholus nigromaculatus Champion

MEXICO: 2.
NICARAGUA: 1.

PANAMA: Volcan de Chiriqui, 2 (including type).
NO LOCALITY: 1.

Cholus nigronotatus Champion

NICARAGUA: Chontales, 1 (type); Las Con-cavas, 1.
PANAMA: Bugaba, 1.

Cholus nitidicollis Pascoe

COLOMBIA: 4 (including type of *phaleratus*); Bogota, 4 (including type of *nitidicollis*); Cananche, Cundinamarca, 1; Muzo, 1; Santa Ines, 1.
ECUADOR: 1.

Cholus niveus Chevrolat

BRAZIL: 3 (including type). *Mato Grosso*: Gustavo Duera Cuiaba, 2. *Minas Gerais*: Campos de Diamantina, Fazenda do Riacho Fundo, 2.
NO LOCALITY: 2.

Cholus notabilis Pascoe

BRAZIL: 2. *Amazonas*: 16; Manicore, 2; Manaus, 1; Massenary, 3; Taperinha to Santarem, 3; Santarem, 1. *Guapore*: São Carlos, Porto Velho, 1. *Para*: 2 (including type). *Santa Catarina*: Nova Teutonia, 2.
COLOMBIA: 1.
FRENCH GUIANA: Cayenne, 1.
PERU: Pozuelo, 1.
NO LOCALITY: 6.

Cholus nyblaei Boheman

ARGENTINA: Chaco, Resistencia, 1; Chaco de Santa Fe, Las Garzas, 12; Formosa, 2; Gran Chaco, Rio Tapenago, 5.

BOLIVIA: 1; Chiquitos, 1. *Santa Cruz*: Buenavista, 1.

BRAZIL: 13 (including types of *nyblaei* and *brasilianus*). *Bahia*: 5. *Goyaz*: Rio Verde, 2. *Mato Grosso*: Riacho do Herval, Rio Parana, 1. *Minas Gerais*: Lagoa Santa, 1. *Rio de Janeiro*: 2; Mendes, 4; São Bento, Duque de Caxias, 3. *São Paulo*: 1; Avahandava, 5; Barueri, 1.

FRENCH GUIANA: Cayenne, 2.

PARAGUAY: Asuncion, 1; Honenau, 1; Paso Yobai, 1; San Bernardino, 1.

URUGUAY: Rivera: Ruta 27, 8; Ruta, Aerodromo, 3; Carretera à Cerro Chato, 1.

NO LOCALITY: 12.

Cholus pantherinus (Olivier)

BRAZIL: 1. *Para*: Colonia, Rio Branco, 1; Obidos, 1.

FRENCH GUIANA: 6; Cayenne, 23; La Mana, 1; Maroni River, 1; Nouveau Chantier, 1; Pariacabo, Rivière de Kourou, 1; Passoura, 1; Roches de Kourou, 2; St. Laurent du Maroni, 9.

SURINAM: 1.

NO LOCALITY: 3.

Cholus parallelogrammus (Germar)

BOLIVIA: 3; Coroico, 2; Rio Chistalmayo, 1; Rio Songo, 8; Yungas de la Paz, 1.

BRAZIL: 55. *Bahia*: 1. *Espirito Santo*: 3; Rio Lamago, 2; Tijuco Preto, 1. *Minas Gerais*: Caraça, 1. *Parana*: Caviuna, 2; Ponta Grossa, 6. *Rio Grande do Sul*: Cruz Alta, 7; Porto Alegre, 1. *Rio de Janeiro*: 15; Floresta da Tijuca, 29; Friburgo, 2; Independencia, Petropolis, 1; Mendes, 7; Montagne des Orgues, 4; Petropolis, 1; Santo Antonio dos Brotos, 2; Serra da Carioca, 1; Teresopolis, 1; Tijuca, 1. *Santa Catarina*: 2; Cauna, 1; Corupa (Hansa Humbolt), 10; Joinville, 1; Mafra, 13; Nova Friburgo, 2; Nova Teutonia, 1; Pinhal, 17; Rio Vermelho, 4; San Bento, 5; San Leopoldo, 1. *São Paulo*: 5; Barueri, 1; Campos da Serra, 1; Pindorama, 1.

COLOMBIA: 1; Bogota, 1; Muzo, 1; Rio Guayuriba, Meta, 1.

PANAMA: Chiriqui, 1.

PARAGUAY: Hohenau, 3.

PERU: Chanchamayo, 1; Songo, 1.

NO LOCALITY: 33.

Cholus pistior Boheman

BOLIVIA: 1; Buenavista, Santa Cruz, 2; Guarayos, 1; Santa Cruz de la Sierra, 3; Sara, 2.

BRAZIL: 10. *Bahia*: 10 (including type of *bahiensis*). *Mato Grosso*: Corumba, Alto Paraguay, 1. *Pernambuco*: 7; Escada, 2. *São Paulo*: 2; Barueri, 2.

FRENCH GUIANA: 1.

PARAGUAY: Sapucay, 1.

PERU: 3.

TRINIDAD: 3; Caroni, 1; Port of Spain, 1.

VENEZUELA: 1; Caracas, 1 (type of *transversalis*).

NO LOCALITY: 2.

"Amer. Merid.," 1 (type of *pistor*).

Cholus planus, new species

BOLIVIA, ECUADOR, PERU: (see under the species in the text).

Cholus praetorius Pascoe

PANAMA: 1 (type); Cerro Campana, 1. *Canal Zone*: Barro Colorado, 1.

Cholus pubescens, new species

ECUADOR: (see under the species in the text).

Cholus roelofsi (Chevrolat)

COLOMBIA: 6; Bogota, 3; Choachi, 2. *Cundinamarca*: Tunijaque, 2850 miles southeast of La Calera, 3.

FRENCH GUIANA: Cayenne, 1 (type)

VENEZUELA: Merida, 1.

Cholus rojasi (Chevrolat)

BRAZIL: 1. *Rio de Janeiro*, 1.

COLOMBIA: 6; Bogota, 6.

VENEZUELA: 12 (including type).

NO LOCALITY: 7.

COUNTRY?: Saint-Domingue, 1.

Cholus rubiginosus (Kuschel)

BRAZIL: *Santa Catarina*: 1 (type of *trifasciata*); Corupa (Hansa Humbolt), 5; Jaragua do Sul, 1. *São Paulo*: Alto da Serra, 1; Cantareira, 2; Jabaquara, 6; Parque do Estado, 2; Repreza, 1; Repreza Rio Grande, San Bernardo, 1; São Paulo, 1. *State?*: São Bento, 1.

Cholus sagittarius, new species

BRAZIL: (see under the species in the text).

Cholus spinipes (Fabricius)

LESSER ANTILLES: *Grenada*: 15 (including type of *wattsi*).

NO LOCALITY: 2.

Cholus subcostatus Desbrochers des Loges

COLOMBIA: 1 (type); Arcabuco, northwest of Tunja, Boyaca, 1; Barbosa-Paramos, 1; Bogota, 1; Fusagasuga, 1; Tunja, 1.

VENEZUELA: 1.

Cholus tener Kirsch

COLOMBIA: 3 (including type of *molitor*); Bogota, 1 (type of *tener*); Cananche, Cundinamarca, 1; La Esperanza, 1; Magdalena, 1 (type of *argentulus*); Rio Guayuriba, Meta, 2; Rio Opon, 1.

Cholus trifasciatus (Hustache)

BOLIVIA: 2; Buena Vista, Ichilo, 1; Chapare, 1; Cochabamba, 2; Rio Ichilo, 1.

BRAZIL: Acre: Porto Walther, 2; Rio Branco, 1.

PERU: Loreto: Madre de Dios, 7 (including types of *trifasciatus* and *trizonatus*); Pucallpa, 1.

Cholus variabilis (Fahraeus)

BRAZIL: 32 (including types of *variabilis* and *marginicollis*). Espirito Santo: 2; Rio de Janeiro: 14. State?: Petropolis, 1.

NO LOCALITY: 10.

Cholus varians, new species

BRAZIL, PERU: (see under the species in the text).

Cholus zonatus (Swederus)

BRAZIL: 2 (error?).

AMERICA MERIDIONALE: 1.

ANTILLES: 2.

DOMINICA: 7; Laiou, 5; Morne Trois Pitons (summit), 1; Pont Cassé, 1; Roseau, 2.

GRENADA: 1.

GUADELOUPE: 22; Domaine Duclos, 2; Trois Rivières, 3.

NO LOCALITY: 9 (including type of *trincinctus*).

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