

Studia Entomologica, vol. 1, fasc. 1-2, Janeiro 1958

Prof. Dr. K. Göswald

A 821

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**New Studies of the Ant Tribe Cephalotini
(Hym. Formicidae)**

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Editora Vozes Ltda., Petrópolis, R. J., Brasil

New Studies of the Ant Tribe Cephalotini (Hym. Formicidae)

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(With 28 text-figures and 8 plates)

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Foreword

«Revisionen bedeuten eine Erweiterung und Klärung unserer Tatsachenkenntnis: falsche taxonomische Begriffe (Synonyme) werden als Irrtümer erkannt, alte Begriffe werden näher präzisiert, neue Begriffe werden aufgestellt, und die systematischen Beziehungen der erkannten biologischen Einheiten (Taxa) werden erkannt. Systematik ist somit eine wachsende Wissenschaft».

(Borgmeier, 1955, p. 14).

It is now eight years ago since this writer started the study of the bizarre and queer-looking insects of the neotropical ant tribe Cephalotini. Already at the end of 1951, there appeared in print the first results of this research, in the form of a voluminous article, under the title of "A Taxonomic Study on the Ant Tribe Cephalotini" (Kempf, 1951, 244 pp.). Shortly afterwards, in May of 1952, followed the publication of another installment of the revisionary work in progress, containing "A Synopsis of the *pinellii*-group in the Genus *Paracryptocerus*"

(Kempf, 1952, 30 pp.). Both papers, taken together, deal with approximately two thirds of the hitherto recognized forms in the six genera of the tribe. A revision of the third and final portion of this group of ants is presented in this volume.

The species groups of *angustus* and *umbraculatus* of the subgenus *Harnedia* and the subgenus *Cyathomymex*, — both subgenera belonging to the genus *Paracryptocerus*, — constitute the subject matter of the following pages. For the sake of convenience the Argentine forms have been dealt with separately in Part I of the study, in which a general synopsis of all Argentine Cephalotini is also given. Part II takes up the taxonomic investigation of the subgenera *Harnedia* and *Cyathomymex*, by reviewing all the heretofore accepted forms, with the exception of the *pinellii*-group and the Argentine forms of the *angustus*-group, treated in previous sections. A general conspectus of the presently proposed classification of Cephalotini ants and an alphabetical index of all specific and infraspecific names (including synonyms) in the same tribe have been placed at the end of the volume. The bibliographical list confines itself to the literature concerning this last portion of the study.

Although the taxonomic review of the ant tribe Cephalotini has herewith come to a close, it must be confessed, that the outcome of the investigation does not, in all respects, attain the intended goal. There are two principal obstacles, which have been felt throughout the research, and which did not allow for an altogether satisfactory and final solution of all the existing problems. At the time when the work was begun, 166 forms had been proposed and recognized as valid in the Cephalotini tribe, i. e. 100 species, 34 subspecies and 32 varieties. Yet material of only 119 forms, or more precisely of 76 species, 23 subspecies, and 20 varieties could be secured for the investigation.

The second impediment consists in the relative inaccessibility of pertinent type material. This difficulty is of no significance in the case of the species described by the oldest authors, from Linné to Spinola, covering the first century of binomial taxonomy from 1758 to 1851. The 19 forms proposed during that period have long been cleared and recognized as 13 good species and 6 peremptory synonyms. The same does not hold good of the subsequent century, which coincides with the heydays of descriptive taxonomy. The profusion of newly discovered species and the terrific rate at which they were put out officially by

means of often very hasty descriptions, did not favor the necessary assimilation of systematic relationships. Not rarely authors lost even track of previously described species, both their own and those of others. Unfortunately this does not apply exclusively to the work of the famous master of taxonomic confusion, Frederick Smith, but also in part to the contribution of the great luminaries of ant taxonomy, especially Forel and even more so, Santschi. In order to clear up the dark spots, the puzzling situations, the pitfalls and ambushes of our ant classification, one must of necessity consult the types. The latter may be represented only by uniques or just a few individuals — this is what commonly happens — and thus may not be received on loan for study. Since most of the types are kept by European museums they are, for all practical purposes, inaccessible to non-European workers.

This writer was very lucky in getting hold of type specimens of 52 forms, among which were several crucial types of forms created by Santschi, Forel and Mayr. The fact of Emery's Cephalotini types not being available — they could not be located in the Museum of Genova, which has the custody of Emery's collection, — was of no very harmful consequence. Owing to Emery's conscientious work, which is much better than that of his contemporary colleagues, most of his forms in the ant tribe Cephalotini may be identified and recognized by using his descriptions and figures. The present revision leaves exactly 30 *species inquirendae*, of which F. Smith is the most prominent contributor, owning 16, i. e. slightly more than 50% of the total.

On account of the aforesaid circumstances it was impossible to accomplish a revisionary study of the exceptional kind, such as the one performed by Borgmeier (1955) with the ant tribe Ecitonini in his truly monumental monograph. Nevertheless, it is believed that at least a few sensible improvements have been introduced in the classification of the Cephalotini ants, and that this writer's treatment has rendered the group more manageable.

Despite the introduction of seven new species and two new subspecies, the total number of forms was lowered to 127, comprising 106 species and 21 subspecies. As far as the still retained subspecies are concerned, they are avowedly relics of classificatory practice of the past rather than clearly demonstrated geographical races. Inasmuch their dubious situation could not be cleared up, they were provisionally preserved as such. It did not seem expedient to change their status on mere theoretical

grounds. In the present and final installment of the revision the racial category has been completely set aside, because it was clearly perceived that the actual knowledge of the range of morphological variability and the distribution of each form does not provide a sufficiently secure foundation for adopting such refined a taxonomic procedure.

The customary acknowledgments are given in the introduction of each part. But at this place I cannot help expressing my deeply felt obligation to my confrère and colleague, Father Thomas Borgmeier, O. F. M., D.Sc., and to my fellow myrmecologists Drs. Wm. L. Brown, Jr., and M. R. Smith, whose generous help, interest and advice were greatly instrumental in the completion of the work.

PART I

The Cephalotini Ants of the Argentine Republic

(With 28 text-figures)

Introduction

The present article intends both to offer a comprehensive view of the Cephalotini ants, occurring within the territory of the Argentine Republic, and to continue the revision of this ant tribe, taken up several years ago. Nearly one-third of the hitherto recorded Argentine forms, comprising the genera *Procryptocerus*, *Cephalotes*, *Zacryptocerus*, and the groups of *spinosus*, *pavonii* and *pinelli* of the genus *Paracryptocerus*, have already been treated in previous papers (Kemp f, 1951, 1952). These forms will be dealt with here only briefly, by presenting keys, new locality records, and a reduced bibliographical list, selected from a distributional point of view. Descriptive details are given only in those cases, where the new material at hand permits me to extend or complete the preceding studies. A revision of the remaining two thirds of Argentine forms, with the exception of *Paracryptocerus angustus* (Mayr) and *P. pallens* (Klug), to be treated in a posterior section, is offered below. Following is a list of the species, subspecies and varieties, revised in the present section:

- * 1. *Paracryptocerus bivestitus* (Santschi)
- * 2. *P. bruchi* (Forel)
- * 3. *P. convexus* (Santschi), n. syn. of *quadratus* (Mayr)
- * 4. *P. fossithorax* (Santschi)
- * 5. *P. guttifer* (Santschi), n. syn. of *fiebrigi* (Forel)
- * 6. *P. guttatus* (sic!) var. *trivialis* (Santschi), n. syn. of *fiebrigi* (Forel), with doubt.
- 7. *P. jheringi* (Emery)
- * 8. *P. jheringi pampaensis* (Santschi), n. syn. of *bruchi* (Forel)
- * 9. *P. lanuginosus* (Santschi), n. syn. of *liogaster* (Santschi)
- * 10. *P. liogaster* (Santschi)
- * 11. *P. lobigaster* (Santschi), n. syn. of *liogaster* (Santschi)
- * 12. *P. lobigaster* var. *fides* (Santschi), n. syn. of *liogaster* (Sant.)
- 13. *P. peltatus* (Emery), n. syn. of *jheringi* (Emery)
- * 14. *P. peltatus ellenriederi* (Forel), n. syn. of *jheringi* (Emery)
- * 15. *P. peltatus ellenriederi* v. *gaudens* (Sant.), n. syn. of *jheringi* (Em.)
- 16. *P. peltatus ellenriederi* v. *jocans* (For.), n. syn. of *jheringi* (Em.)
- * 17. *P. peltatus ellenriederi* v. *tucumana* (For.), n. syn. of *bivestitus* (Santschi)
- * 18. *P. pilosus* (Emery)
- * 19. *P. pilosus fiebrigi* (Forel), n. comb.
- 20. *P. prodigiosus* (Santschi)
- * 21. *P. quadratus* (Mayr)
- * 22. *P. ridiculus* (Santschi), n. syn. of *bruchi* (Forel)

The asterisc (*) in front of the name indicates that authentic or type specimens have been examined. Type specimens, however, are taken here in the broader, not technical sense of the term, including all specimens belonging to the nest series, from which the types were selected, although they have not been seen by the author of the new form. It appears that, occasionally, Bruch divided each series of ants in two halves, one of which he retained. When Forel or Santschi made their half the basis for a new form, Bruch promptly attached the label "cotypus" (*syntype*) to his own half. Under the present nomenclatorial rules this procedure is untenable. Bruch's half did not form part of the material before the original author. Although there is no doubt concerning its authenticity, it cannot be ranked with type specimens in the strict sense. Yet, for all practical purposes, there persists the unsolvable difficulty of determining each case, where such a procedure was followed. At least in a few instances, there is evidence that the original material was returned to Bruch's collection, and consequently eligible for type designation.

Acknowledgments. — The ant material, on which this study is based, was received from the same sources, as mentioned in my previous studies (Kempf, 1951, 1952):

Collection of Father Borgmeier, O. F. M., Jacarepaguá, D. F., Brasil [WWK], received as a generous gift for this writer's collection; Instituto Miguel Lillo, Tucumán, Argentina [ML], received on loan through the courtesy of Dr. N. Kusnezov; Museum of Comparative Zoology at Harvard College, Cambridge, Mass., U.S.A. [MCZ], through the courtesy of Drs. J. Bequaert and Wm. L. Brown, Jr.; Muséum d'Histoire Naturelle, Genève, Switzerland [MHNG], through the courtesy of Dr. Ch. Ferrière; Naturhistorisches Museum, Wien, Austria [NHMW], through the courtesy of the late Dr. F. Maidl; U. S. National Museum, Washington, D. C., U.S.A. [USNM], through the courtesy of Dr. M. R. Smith.

In addition, through the kindness of Dr. R. N. Orfila, who made the arrangements for the loan, and Dr. T. Borgmeier, who personally transported the material from Argentina to Brazil, I recently received the entire Cephalotini collection of the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia", Buenos Aires, Argentina [MACN]. This collection is of particular importance, because it was gathered, to a large extent, through the efforts of the late Carlos Bruch, one of Argentina's outstanding myrmecologists in the past, and contains a conspicuous number of authentic specimens of forms described by Forel and Santschi.

To all persons and institutions mentioned above, I wish to express my sincere thanks for their generous cooperation.

At the final write-up of this paper, only the material received from Father Borgmeier, Instituto Miguel Lillo and Museo Argentino de Ciencias Naturales was at hand. All other had been returned to their proper collections several years ago.

Note on the taxonomic status of Argentine Cephalotini. — The knowledge of the Cephalotini fauna of Argentina is of recent date. Beg (1890) lists in his catalogue only four species, one of which — *Paracryptocerus quadratus* (Mayr) — had been originally taken in that country. Bruch's "Catálogo Sistemático" (1914, 1915) makes a substantial addition, by recording 13 more forms, bringing the number up to a total of 13 species, 2 subspecies and 2 varieties. Six of these forms were originally described from Argentine material by Emery, Forel and Santschi.

From 1916 to date, the number of Argentine Cephalotini was raised to 35 forms, i. e. 25 species, 3 subspecies and 7 varieties. This increase, due principally to Bruch's intensive collecting and Santschi's descriptions, does not represent a similar increase in the knowledge of these ants. It happens that precisely the Argentine representatives of the Cephalotini tribe show probably the most intricate systematic problems of the entire group.

Part of these difficulties are inherent to the species themselves. A few of the endemic forms are strikingly alike, lacking in one

or more castes good and tangible distinctive characters, which makes their identification a tough problem for any myrmecologist, not very familiar with the group. A more serious obstacle is found in the state of confusion, in which these forms were plunged by the taxonomists of the past. As shown in the preceding list, a great deal of new synonymy has to be introduced, the discovery of which was pending exclusively from a reexamination of the types.

The reasons for this synonymy are manifold. In the first place, the lack of sufficient representative material and too little allowance for individual variability contributed toward the recognition of mere individual variants as taxonomically diverse entities. The unnecessary and highly confusing multiplication of forms was favored by the inflationary practice on the infraspecific level, introduced with the adoption and careless use of the subspecies and variety concept. Furthermore, with the steadily increasing number of recognized forms, authors showed increasingly less mastering of the work previously done in the field. As systematic studies came to limit themselves more and more to the descriptions of new species, which daily arrived at the taxonomists in great quantities, authors were under great stress and turned out occasionally second-rate contributions due to hasty and rather slipshod research. The same pressure is likewise responsible for the lack of synthesis and inclusiveness as shown, for instance, in Forel's later work and, here and there, in that of Santschi.

In order to give a concrete picture of this regrettable situation, one may point out, that, *v. gr.* Santschi's contribution, which comprises 15 new forms, contains a minimum of 10 synonyms. At least some of them could have been prevented by a more careful consideration of the work previously done in the group.

The present study recognizes only 23 species of Argentine Cephalotini ants. Our present knowledge of infraspecific variation and its geographical distribution precludes the establishment of races. This writer does not have the presumption of having cleared up every dark area existing in this ant tribe, but his effort was concentrated upon the main purpose, *viz.* to render the present group into a workable condition again. If he succeeded at this, he considers himself well-paid for all the troubles encountered in this study.

Characteristics of the Argentine Cephalotini fauna. — The Cephalotini ants are typically denizens of the tropical and subtropical regions of the New World. Nevertheless, they are fairly well represented in the Northern half of the Argentine Republic. Only *Procryptocerus*, the most primitive genus of the tribe, makes an exception to this rule. A single species, the wide-spread *P. regularis*, has been recorded, so far, from the provinces of Misiones and Corrientes, and possibly also from Salta or Jujuy. This appears rather strange, as half a dozen species are known from neighboring Southern Brazil. One should expect to find one or several of these at least in the province of Misiones.

The widely distributed but small genera *Cephalotes* and *Zacryptocerus* have each a single representative in Northern Argentina, whereas the genera *Eucryptocerus*, confined to the Amazon basin, and *Hypocryptocerus*, known only from the Island of Haiti, are naturally absent.

The genus *Paracryptocerus*, on the other hand, occurs in quite a number of different forms. Some of the species belong to the common stock of generally dispersed South American Cephalotini, others constitute a highly characteristic complex of endemic species, which proves that the Argentine region played a significant part in the speciation of the genus. According to the present study, 20 valid species are recognized. The following five species, — *bruchi*, *bivestitus*, *fossithorax*, *liogaster* and *prodigosus*, — are strictly endemic, not being known from outside of Argentina. The Paraguay River basin fauna comprises seven Argentine representatives: *borgmeieri*, *eduarduli*, *incertus*, *pilosus*, *fiebrigi*, *jheringi* and *quadratus*. The last three species extend their range far South into Central Argentina. The next 6 species, *minutus*, *pusillus*, *depressus*, *grandinosus*, *maculatus* and *pallens* belong to the general fauna of the Guiana-Brasilia sub-region. The remaining two species, *angustus* and *pinelii*, are shared by Northeastern Argentina and Southern Brazil.

Note on measurements. — In order to obtain a significant and objective value for the total length of the insects, the measurement is taken synthetically, by measuring separately the maximum length of head, thorax, petiole and postpetiole and gaster combined. The total length thus coincides with the sum of these particular measurements. Other quantitative characters will be explained in the text, when they occur.

Key to the Genera for Workers (from Kempf, 1951)

1. Frontal carinae very little expanded, not covering the cheeks, when seen from above, strongly diverging caudad; scape, when lodged in the scrobe, extending much beyond the posterior border of the eye...
I. *Procryptocerus* Emery
- Frontal carinae greatly expanded, covering the cheeks, when seen from above, subparallel or gently diverging caudad; scape, when lodged in the scrobe, not extending beyond the posterior border of the eye 2
2. Eyes situated beneath the antennal scrobe, which extends to the occipital corner II. *Cephalotes* Latreille
- Eyes situated, at least in part, behind or slightly above the antennal scrobe, which terminates in front of the eye, never reaching the occipital corner 3
3. Gaster completely surrounded by a translucent, membranaceous border; prothorax with a similar border, containing a solid, raised and recurved scapular spine; workers monomorphic. III. *Zacryptocerus* Wheeler
- Gaster not completely surrounded by a membranaceous border, or, if a border is present around the posterior half, the prothoracic border is horizontal and flat, not containing a solid scapular spine; workers dimorphic IV. *Paracryptocerus* Emery

I. Genus **PROCRYPTOCERUS** Emery1. *Procryptocerus regularis* Emery

- Procryptocerus convergens regularis* Emery, 1887, Bull. Soc. Ent. Ital. 19 : 361.
Procryptocerus striatus convergens var. *regularis* Emery, 1894, in: v. Ihering (1894),
 Berl. Ent. Zs. 39 : 384 (Corrientes).
Procryptocerus striatus convergens Bruch, 1914 (*nec* Mayr, 1887), Rev. Mus. La
 Plata 19 : 218.
Procryptocerus striatus convergens var. *loretensis* Santschi, 1933, An. Soc. Cient.
 Argent. 116 : 117 (Misiones: Loreto).
Procryptocerus regularis Kempf, 1951, Rev. de Ent. 22 : 74-79, figs. 3, 34, 51, 58.

General distribution: Island of Trinidad (B.W.I.), Southern Brazil, Northeastern Argentina.

The examination of a syntype (= lectotype) worker specimen of Santschi's variety *loretensis* confirms the synonymy proposed in my revision of the genus in 1951. So far this is the only species of the genus known to occur in Argentina, having been taken in the provinces of Misiones and Corrientes. According to Kusnezov (1953) it is said to occur also in the Northwestern region, i. e. in the provinces of Salta, Jujuy and Tucumán.

Specimens examined: 4 workers, as follows: Misiones, Estación Experimental Loreto, Dr. A. A. Oglobin: 1 worker (lectotype of var. *loretensis* Santschi), and three additional workers from the same locality [MACN].

II. Genus **CEPHALOTES** Latreille1. **Cephalotes atratus** (Linnaeus)

- Formica atrata* Linnaeus, 1758, Syst. Nat. ed. 10, 1 : 581.
Cephalotes atratus Latreille, 1802, Hist. Nat. Crust. Ins. 3 : 358. — Kempf, 1951, Rev. de Ent. 22 : 114-124, figs. 95, 96, 97, 100, 114 (Salta: Guemes).
Cryptocerus atratus Berg, 1890, An. Soc. Cient. Argent. 29 : 14 (Corrientes, Misiones, Chaco; Uruguay: Rio Negro). — Bruch, 1914, Rev. Mus. La Plata 29 : 218 (Misiones, Tucumán, Corrientes).
Cryptocerus atratus ab. *rufiventris* Emery, 1894, Boll. Mus. Zool. Anat. Comp. Torino 91 : 4 (Tucumán).
Cephalotes quadridens Santschi, 1919 (*nec* De Geer, 1773), An. Soc. Cient. Argent. 87 : 44-45 (Formosa: Laishi).
Cephalotes atratus crassispinus Santschi, 1920, Bull. Soc. Ent. France, p. 148 (Misiones, Formosa).

General distribution: South America, from Venezuela to Northern Argentina. No new Argentine records available.

III. Genus **ZACRYPTOCERUS** Wheeler1. **Zacryptocerus clypeatus** (Fabricius)

- Cryptocerus clypeatus* Fabricius, 1804, Syst. Piez. p. 420. — Berg, 1890, An. Soc. Cient. Argent. 29 : 14 (Corrientes). — Emery, 1905, Bull. Soc. Ent. Ital. 37 : 170 (Chaco, Formosa). — Bruch, 1914, Rev. Mus. La Plata 19 : 218 (Misiones).
Zacryptocerus clypeatus Wheeler, 1911, Ann. N. Y. Acad. Sc. 21 : 175. — Kempf, 1951, Rev. de Ent. 22 : 136-141, figs. 105, 109, 111 (Salta: Urundel).

Occurs throughout Cisandean South America, from Trinidad to Northern Argentina. No new Argentine records available.

IV. Genus **PARACRYPTOCERUS** Emery

Key to the Argentine species

A. Workers

(The worker of *prodigosus* is unknown)

1. Lateral border of head with a deep notch near the occipital corner for lodging the eye, which does not project beyond the maximum width of the head..... 19. *pallens* (Klug)
- Lateral border of head without a notch, or only slightly concave above eye, which visibly projects beyond the maximum width of head 2
2. Lateral border of pronotum and epinotum with a straight-edged, projecting, foliaceous crest 3
- Lateral border of pronotum and epinotum without a foliaceous crest, but beset with teeth or spines 6

- 3. Lateral border of mesonotum more or less rounded, without a projecting tooth; lateral crest of epinotum very narrow; extensor face of hind femora, in profile, indistinctly angulate at the middle. 6. *incertus* (Emery)
- Lateral border of mesonotum with a projecting tooth; lateral crest of epinotum broad; extensor face of hind femora, in profile, angulate near the middle, or bearing a longitudinal crest on the apical half. . . 4
- 4. Apical half of hind femora with a longitudinal crest above and below; thoracic crests rugose; integument uniformly ochraceous. 5. *grandinosus* (F. Smith)
- Apical half of hind femora not longitudinally crested above and below; thoracic crests punctate; integument ferruginous or darker. . . 5
- 5. Greatest diameter of eyes almost one third of maximum head length; head somewhat elongate; total length not exceeding 3 mm. 7. *maculatus* (F. Smith)
- Greatest diameter of eyes at most one fourth of maximum head length; head subquadrate; total length of smallest specimen exceeding 3.2 mm 8. *pinellii* (Guérin)
- 6. Petiole without a more or less perpendicular anterior face, distinct from the upper face, raised above the thoracic insertion; extensor face of hind femora, in profile, angulate near the middle; proximal tarsite of hind legs flattened and broadened at base. 7
- Petiole with a more or less perpendicular anterior face, distinct from the upper face, raised above the thoracic insertion; hind femora fusiform; proximal tarsite of hind legs prismatic, not flattened nor broadened at base 9
- 7. Frontal carinae of the same color as the rest of the head; lateral projecting lamellae of pronotum as broad as length of petiole; second epinotal tooth large, plate-like, arising from near the level of petiolar insertion. 2. *borgmeieri* Kempf
- Frontal carinae lighter in color than rest of the head, pale-testaceous or ferruginous-yellow; lateral lamellae of pronotum narrow at tip, narrower than length of petiole; posterior epinotal tooth either in the form of a slender and long spine, or short and small tooth, arising from the lateral border much in front of the level of the petiolar insertion 8
- 8. Anterior marginate border of gaster without a translucent crest; maximum width of petiole exceeding three times its length. 4. *eduarduli* (Forel)
- Anterior marginate border of gaster with a translucent crest; maximum width of petiole scarcely exceeding twice its length. 3. *depressus* (Klug)
- 9. Posterior corner of basal face of epinotum with a long spine, nearly as long as width of petiole, projecting obliquely caudad; declivous face of epinotum well differentiated from, almost perpendicular to, basal face 1. *pusillus* (Klug)
- Posterior corner of basal face of epinotum lacking a long spine, usually with a triangular tooth; declivous face of epinotum, in profile, continuous with the basal face, forming a gentle and rather even curvature 10
- 10. Antero-lateral border of gaster with a thin, translucent crest, which continues caudad as a distinct margination beyond the anterior half of the sides of the first gastric tergite. 9. *angustus* (Mayr)
- Antero-lateral corners of gaster protracted into conspicuous, more or less marginate, solid lobes; sides of first gastric tergite never distinctly marginate 11

11. Dorsum of head, thorax, peduncle and gaster, also the legs, with standing hair, or if hair, both appressed and standing, is nearly absent, then the first gastric tergite is completely smooth and highly shining 12
 — Dorsum of the body and the legs devoid of standing hair, except the posterior border of the gastric tergites; first gastric tergite never completely smooth and shining 14
12. Dorsum of head and thorax finely reticulate-punctate and sparsely foveolate; standing hair much shorter than the width of tibiae, always straight, never flexuous [Fig. 1] 12. *fiebrigi* (Forel)
 — Dorsum of head and thorax coarsely reticulate-rugose; standing hair long and flexuous 13
13. First gastric tergite opaque, sharply reticulate-punctate; lateral spines of peduncular segments gently recurved [Figs. 2, 19]
 10. *pilosus* (Emery)
 — First gastric tergite rather shiny, its sculpture superficial or fading; lateral spines of peduncular segments strongly recurved, those of postpetiole with the tips pointing directly caudad [Fig. 18]
 11. *liogaster* (Santschi)
14. Promesonotum strongly convex both in profile and transversely; anterior face of petiole separated from dorsal face by a sharp, bisinuate carina [Figs. 4, 22] 13. *quadratus* (Mayr)
 — Promesonotum gently convex or rather flat; anterior face of petiole not separated from dorsal face by a sharp transverse carina 15
15. Lateral borders of head strongly upturned, forming on the inside a longitudinal furrow, which begins in front of the eyes and extends to the occipital border; first gastric tergite superficially sculptured, quite shiny; peduncular spines with acute, strongly recurved tips [Fig. 3] 15. *bruchii* (Forel)
 — Lateral border of head scarcely upturned but horizontal, not forming on the inside a longitudinal furrow; first gastric tergite more strongly sculptured and opaque; tips of petiolar spines never strongly recurved 16
16. Head rectangular, always visibly longer than broad in front of the eyes; sides of head usually not emarginate in front of, and above, eyes; peduncular segments always subequal in width; sides of pronotum usually width more than three rather irregular teeth (for confirmatory diagnosis see features of soldier, without which this species offers serious difficulties in identification) [Fig. 7]
 14. *bivestitus* (Santschi)
 — Head subquadrate, usually scarcely longer than broad in front of the eyes, or, if somewhat elongate, the sides are distinctly emarginate above, and in front of, eyes, often with a small tooth projecting laterad at the anterior end of emargination; peduncular segments either subequal in width or petiole distinctly narrower than postpetiole; sides of pronotum either tridentate or with more than three teeth, which in the latter case are irregular and partly foliaceous 17
17. Sides of pronotum scarcely converging caudad, with three or more variable, always acute, partly foliaceous small teeth; peduncular segments always subequal in width [Fig. 6]
 18. *fossithorax* (Santschi)
 — Sides of pronotum more strongly converging caudad, their lateral borders sharply marginate and tridentate, only the anterior most tooth being acute, the following two teeth being rectangular or obtuse; peduncular segments either subequal in width, or petiole distinctly narrower than postpetiole [Fig. 5] 17. *jheringi* (Emery)

B. Soldiers

(The soldier of *incertus* is unknown, and that of *prodigosus* has been omitted from the key, because no specimen has been examined)

1. Head surmounted by a saucer-like disc, which is not excised in front, above the mandibles, and extends anteriorly well beyond the mandibles, when closed..... 19. *pallens* (Klug)
- Head always excised in front, above mandibles; the antero-lateral portions of head disc never extending anteriorly beyond the closed mandibles 2
2. Petiole always longer than deep, without a perpendicularly raised anterior face above the thoracic insertion 3
- Petiole always deeper than long, with a more or less perpendicular anterior face raised above the thoracic insertion..... 4
3. Occiput not conspicuously truncate, nor separated from vertex by a transverse median bidentate crest..... 3. *depressus* (Klug)
- Occiput distinctly truncate, separated from vertex by a transverse median bidentate crest [Fig. 25] (see text!).....
2. *borgmeieri* Kempf and 4. *eduarduli* (Forel)
4. Dorsum of head conspicuously convex, not surmounted by a marginate disc; posterior corner of basal face of epinotum with a long, stout spine 1. *pusillus* (Klug)
- Head surmounted by a completely marginate disc, or, if disc is little distinct, the upper face of head is flat or only gently convex; posterior corner of basal face of epinotum never with a long, stout spine 5
5. Extensor face of hind femora, in profile, angulate near the middle, or longitudinally crested on the apical half; proximal tarsite of hind legs compressed and slightly broadened at base; lateral processes of peduncular segments in the form of flattened, membranaceous lobes 6
- Hind femora fusiform, without a longitudinal crest on the apical half of the extensor face; proximal tarsite of hind legs prismatic, not compressed nor broadened at base; lateral processes of peduncular segments in the form of a solid tooth or spine..... 8
6. Sides of head separated from the truncate occiput by an elevated ridge extending from the tip of the occipital lobe to the rim of the cephalic disc; extensor face of hind femora with a longitudinal crest on the apical half..... 5. *grandinosus* (F. Smith)
- Sides of head not separated from the truncate occiput by a ridge; extensor face of hind femora without a longitudinal crest on the apical half 7
7. Cephalic disc subcircular, with at least a vestigial median groove, flanked by short, elevated ridges, touching the occipital border of head disc; lateral lobes of mesonotum more or less rounded or bluntly truncate 8. *pinelii* (Guérin)
- Cephalic disc elongate, subrectangular, without a trace of median groove and lateral ridges touching the occipital border; lateral lobes of mesonotum always angulate or even dentate
7. *maculatus* (F. Smith)
8. Dorsum of thorax, peduncle and gaster, and the legs with evenly scattered standing hair 9
- Standing hair confined to the rim of cephalic disc, posterior border of gastric tergites, and to the gastric sternites..... 11

9. Scalelike hair on head disc long, the free end strongly recurved, projecting beyond the rim of their foveolae; standing hair of thorax, gaster and legs short and straight [Fig. 11].... 12. *fiebrigi* (Forel)
- Scalelike hair on head disc inconspicuous, decumbent, the free end not projecting beyond the rim of the foveolae; standing hair of thorax, gaster and legs long and flexuous..... 10
10. First gastric tergite strongly sculptured, opaque; head disc and dorsum of thorax fuscous or black [Fig. 8].... 10. *pilosus* (Emery)
- First gastric superficially sculptured and shining; head disc and antero-lateral portions of thorax yellowish-brown [Fig. 21]..... 11. *liogaster* (Santschi)
11. Antero-lateral corners of gaster crested or sharply marginate; posterior epinotal teeth strongly upturned..... 9. *angustus* (Mayr)
- Antero-lateral corners of gaster lobate, neither crested nor sharply marginate; posterior epinotal tooth usually horizontal..... 12
12. Cephalic disc coarsely reticulate-rugose and foveolate; a thick, scalelike hair, with its free end strongly recurved, projecting beyond the rim of the foveolae; head disc either incompletely marginate laterally above eyes, or completely marginate, but incompletely excavated, the posterior portion being flat..... 13
- Cephalic disc foveolate only, or, if somewhat reticulate-rugose, then the disc is completely marginate along its borders and uniformly flat or excavated 14
13. Cephalic disc completely marginate laterally, the anterior four fifth of the disc forming a circular excavation, with a distinct subconical elevation in the center, on the vestigial frontal suture; posterior fifth of head disc flat [Fig. 13]..... 14. *bivestitus* (Santschi)
- Cephalic disc incompletely marginate laterally above eyes; head, in profile, strongly convex above, its sides not covering the dorsal face [Fig. 10] 13. *quadratus* (Mayr)
14. Head disc immarginate, or at most faintly marginate, postero-laterally, in front of the occipital lobes; integument shiny, finely punctate, sparsely foveolate, the foveolae being separated from each other by a distance which exceeds their greatest diameter; size well above 8.4 mm [Fig. 23]..... 15. *bruchii* (Forel)
- Head disc completely marginate along its sides and occiput; integument more or less opaque, finely reticulate-punctate, densely foveolate, or even partly coarsely reticulate-rugose, with the foveolae very close together; size less than 8.3 mm..... 15
15. Anterior portion of rim of cephalic disc and sides of head with very fine standing hair, which is pointed at tip [Fig. 9]..... 18. *fossithorax* (Santschi)
- Anterior portion of rim of head disc with thick, standing hair, which is obtuse at tip [Fig. 12]..... 17. *peltatus* (Emery)

1. *Paracryptocerus* (*Paracryptocerus*) *pusillus* (Klug)

- Cryptocerus pusillus* Klug, 1824, Ent. Ent. Monogr. p. 201. — Santschi, 1921, An. Soc. Cient. Argent. 92 : 127 (Corrientes: San Roque).
- Cryptocerus causticus* Berg, 1890, An. Soc. Cient. Argent. 29 : 14 (Corrientes, Misiones).
- Cryptocerus pusillus* var. *brevispinosa* Santschi, 1921, An. Soc. Cient. Argent. 92 : 127 (Misiones: S. Ignacio, Cerro Cora; Vila Lutecia; Córdoba).
- Cryptocerus pusillus* ab. *rufescens* Santschi, 1921, An. Soc. Cient. Argent. 92 : 128 (Chaco).

Paracryptocerus (P.) pusillus Kempf, 1951, Rev. de Ent. 22 : 176-182, figs. 118, 119 (Misiones: Eldorado, Esperanza, Iguazu, Loreto, Manoel Belgrano; Chaco: Roque Saenz Peña; Formosa: Las Lomitas, Puerto Pilcomayo; Salta: Aguas Blancas, Anta, Lumberas, Malan, Río Segundo, Yuto; Jujuy: Calilegua, Ledesma, San Pedro).

General distribution: Cisandean South America, from Venezuela to Northern Argentina. This is the most common species of the genus.

New locality record: Santiago del Estero, Girardet, n. 1740: 2 workers [MACN].

2. *Paracryptocerus (Paracryptocerus) borgmeieri* Kempf

Paracryptocerus (P.) borgmeieri Kempf, 1951, Rev. de Ent. 22 : 211-213, fig. 147 (Misiones: Iguazu).

General distribution: Upper Paraguay River basin, from Mato Grosso, Brazil, through Paraguay to Northeastern Argentina. No new records available. As regards the soldier caste, see under *P. eduarduli* on a following page.

3. *Paracryptocerus (Paracryptocerus) depressus* (Klug)

Cryptocerus depressus Klug, 1824, Ent. Monogr. pp. 204-206. — Bruch, 1914, Rev. Mus. La Plata 19 : 218 (Misiones).
Paracryptocerus (P.) depressus Kempf, 1951, Rev. de Ent. 22 : 218-220, figs. 141, 148 (Misiones: Loreto, Posadas; Formosa: Clorinda, Las Lomitas).

General distribution: From the Amazon River South to Northern Argentina.

New locality records: Corrientes: San Roque, C. Bruch: 5 workers [MACN]. — Chaco: Pontana: 5 workers [MACN]. Charata, Bosq: 1 worker [MACN].

4. *Paracryptocerus (Paracryptocerus) eduarduli* (Forel)

(Fig. 25)

Cryptocerus eduarduli Forel, 1920, Bull. Soc. Bot. Genève (2) 12 : 204-206.
Paracryptocerus (P.) eduarduli Kempf, 1951, Rev. de Ent. 22 : 221-222 (Formosa: Las Lomitas).

The present species was originally recorded from Paraguay. Dr. Kusnezov collected the first Argentine specimen in the province of Formosa (Kempf, 1951). The Argentine material received from Buenos Aires, contains several worker specimens of *eduarduli* and also a single soldier which I hesitantly associate with this form, for reasons that will be pointed out further below. As I had not seen this caste before, I want to give the following diagnosis:

Soldier [Fig. 25]. — Total length 7.8 mm. Maximum length of head 2.39 mm; of thorax 2.25 mm. Black; funiculus and apical four tarsites of all legs fuscous-brown.

Head wider than long (75:67). Mandibles finely punctate, opaque, their outer border distinctly angulate at the middle. Frontal carinae with scarcely crenulate border. Dorsum of head rather convex discad, sparsely foveolate, very finely punctate, shiny. Sides of head emarginate above the flattened eyes. Occipital angles obliquely truncate, marginate, the margination forming an obtuse tooth on each end. Vertex with a pair of projecting teeth in the middle, which are connected by a vestigial transverse carinule. Occiput perpendicular to vertex, its posterior border slightly convex. Gular face of head more coarsely reticulate-punctate, with rather oblong foveolae.

Thorax wider than long (73:63), subopaque, more coarsely punctate. Sides longitudinally rugose, the rugosities forming meshes on the mesopleura. Shoulders indistinct. Pronotum greatly expanded laterad, with an elevated, straight-edged, transverse crest, which is broadly interrupted mesally, and has laterally one or two shallow notches. Anterior corner of pronotal expansions with a pointed tooth. Behind the transverse crest, the sides of the pronotum are sinuous and converge strongly mesad. Promesonotal suture distinct. Sides of mesonotum with a large, rounded and projecting lobe. Mesoepinotal suture deeply impressed. Basal face of epinotum having on its posterior corner a stout lobe, which projects outward and upward, and bears on its apex two bluntly rounded teeth, the posteriormost tooth being largest and almost erect. Declivity not separated from the basal face by a carinule. Hind femora angulate and denticulate above, past the middle.

Peduncular segments thrice as broad as long. Sculpture as on thorax, the foveolae being somewhat elongate. Petiole broader than postpetiole, bearing on each side a strong, acute, spine, which curves obliquely caudad. Postpetiole with a similar spine on each side, the apex of which points directly caudad.

Gaster longer than broad (70:60). Anterior border shallowly emarginate in the middle. First tergite opaque, finely and densely punctured, with scattered, more conspicuous piligerous points. Sternites and apical border of tergites with standing hair.

This soldier specimen was taken by Bosq together with a worker of the same species and another worker of *depressus* at same locality. Each specimen is mounted on a different pin. Date and nest series are not indicated. Thus we lack a definite indication that the above

described soldier and the worker of *eduarduli* came from the same nest series and are conspecific. The doubts concerning this soldier's true identity grow even stronger for the following reasons:

First of all, the present soldier disagrees with Forel's description of the type in several rather significant features. 1. It is much longer than the type soldier, measuring 7.8 mm, instead of 5.5-6.2 mm. 2. The transverse bidentate crest of the vertex is only vestigial. 3. The shoulders are scarcely angulate. 4. The obliquely truncate plate of the posterior corner of the basal face of epinotum does not bear a pointed tooth within its lamella ("en dedans de sa lamelle"), nor does its base extend mesad, forming a transverse carina between the basal and declivous face. 5. The peduncular segments are much broader than long, whereas in the type, according to Forel, the width of the peduncular segments exceeds their length only one and a half times.

The first four differences could be attributed to individual variation and the larger size of the present soldier. Forel's specimens could have been intercastes, intermediates between the workers and the full-grown soldiers, which are rather common in the ants of this group. Thus I have not as yet come across a full-grown soldier of either *cristatus* or *borgmeieri*, whereas intermediates, especially in the former species, are not uncommon. The divergence in the proportions of the peduncular segments, however, does not find an equally plausible and satisfactory explanation, more so, as the shape of these segments constitutes a very important diagnostic character in the soldiers of the *pavonii*-group. The solution of this problem depends from a reexamination of Forel's types, or future collections of soldier specimens, definitely associated with *eduarduli* workers.

Another serious difficulty lies in the fact, that the present soldier runs out at *borgmeieri* instead of at *eduarduli* in my key of 1951. I stated at that time, that I did not have direct knowledge of this caste of *borgmeieri*, but had drawn my information from Emery's sketches (1890) of what he then erroneously considered to be *pavonii*. Looking over this figure again, I cannot detect any significant difference between the present soldier and that of *borgmeieri*. Either the soldiers of both species cannot be told apart, at least for the time being, or the soldier described above is indeed that of *borgmeieri*!

As regards the remaining species of the *pavonii*-group, the separation is readily accomplished. The present soldier specimen differs from *cristatus* by the smooth edge of the transverse pronotal crest; from *cristatus*, *pavonii* and *cordatus* by the more transverse head, by lacking the oblique lateral margination of the head disc, in front of the occipital lobes between the median bidentate crest of the vertex and the lateral border of head, by lacking distinctly angulate and protruding shoulders and by the sinuous sides of the posterior portion of the pronotum, as seen from above; from *depressus* by the pair of distinct teeth on vertex, the shape of the petiole and the deeply impressed mesoepinotal suture.

Specimens examined: 10; 9 workers, and 1 soldier, as follows: Misiones: loc. unknown, Jan. 2, 1922, A. Zotta: 6 workers [MACN]. — Chaco: Charata, Bosq: 2 workers, 1 soldier [MACN]. — Paraguay: loc. unknown, C. Bruch: 1 worker [MACN].

This species possesses a much greater area of dispersal than that was supposed originally. Besides these new Argentine records, I want to add that recently my confrère Father Reinaldo Mueller and myself collected in Agudos, State of S. Paulo, Brazil, several stray workers of *eduarduli*. My friend and colleague, Dr. Cincinato R. Gonçalves took the same species (only workers) near the town of Lapa, State of Bahia, Brazil. These are the first certain Brazilian records for this species.

5. *Paracryptocerus (Harnedia) grandinosus* (F. Smith)

Cryptocerus grandinosus F. Smith, 1860 (excl. var.), Journ. Ent. 1 : 76-77.
Cryptocerus (Cyathocephalus) grandinosus Santschi, 1919, An. Soc. Cient. Argent. 87 : 47 (Formosa: Laishi).
Paracryptocerus (H.) grandinosus Kempf, 1952, Stud. Ent. n. 1, pp. 11-15, figs. 3, 12, 13 (Formosa: Ing. Juarez).

The present species, which is never common throughout its range, is dispersed all over tropical and subtropical Cisandean South America. No new Argentine records are available.

6. *Paracryptocerus (Harnedia) incertus* (Emery)

Cryptocerus incertus Emery, 1905, Bull. Soc. Ent. Ital. 37 : 171-172 (Corrientes). — Bruch, 1914, Rev. Mus. La Plata 19 : 218.
Cryptocerus (Cyathocephalus) incertus Santschi, 1921, An. Soc. Cient. Argent. 92 : 125 (Corrientes: San Roque).
Paracryptocerus (H.) incertus Kempf, 1952, Stud. Ent. n. 1, pp. 15-18, figs. 1, 16 (Corrientes: Paso de la Patria; Santa Fé: Fives Lille).

Specimens examined: 20 workers, as follows: Corrientes: San Roque, C. Bruch: 6 workers [MACN]. — Santa Fé: Fives Lille, Weiser: 11 workers [MACN]. Same locality, Aug. 2, 1934, Daguerre: 1 worker [MACN]. — Entre Rios: Hernandarios, June 7, 1951, N. Kusnezov: 2 workers (communicated by Dr. Gonçalves).

This species, so far known only from the Argentine "Parque Mesopotámico", is now also recorded from Brazil. Dr. Gonçalves was able to collect 11 specimens (workers only) of this form, near Corumbá, State of Mato Grosso, Brazil, on October 18, 1953.

7. *Paracryptocerus (Harnedia) maculatus* (F. Smith)

Cryptocerus maculatus F. Smith, 1876, Trans. Ent. Soc. London, p. 607. — Forel, 1914, Bull. Soc. Vaud. Sci. Nat. 50 : 281 (Tucumán). — Bruch, 1915, Rev. Mus. La Plata 19 : 530.
Paracryptocerus (H.) maculatus Kempf, 1952, Stud. Ent. n. 1, pp. 18-22, figs. 5, 7, 11, 14 (Misiones: Loreto). — Kusnezov, 1953, Act. Zool. Lill. 13 : 338 (Tucumán).

General distribution: *Paracryptocerus maculatus* occurs rather commonly from Central American Honduras South to Northern Argentina. The Bruch collection contains 2 soldiers and 2 workers, from Misiones, belonging to the same series which I mentioned in my study of 1952.

8. *Paracryptocerus (Harnedia) pinelii* (Guérin)

Cryptocerus pinelii Guérin, 1845, in: Cuvier, Iconogr. Règn. Anim. 7 : 425-426. — Emery, 1905, Bull. Soc. Ent. Ital. 37 : 171 (Córdoba: La Carlota). — Bruch, 1914, Rev. Mus. La Plata 19 : 218.
Cryptocerus (Cyathocephalus) pinelii Santschi, 1916, Physis 2 : 383 (Entre Rios: Estación Sosa).
Paracryptocerus (H.) pinelii Kempf, 1952, Stud. Ent. n. 1, pp. 22-26, figs. 6, 10, 15.

General distribution: The range of *pinelii* covers Southern Brazil and includes the Argentine provinces of Entre Rios and Córdoba. The pertinent material of the Bruch collection comprises the specimens mentioned by Emery (1905) and by Santschi (1916). Although Emery already mentioned the slightly divergent features of the Córdoba series, a brief discussion of the outstanding features of these specimens will not be out of place here.

Soldier (Córdoba): Ferruginous with membranaceous parts pale testaceous. Posterior median groove, inside the head disc, vestigial, with flanking ridges likewise vestigial. Thorax slightly longer than broad. Lateral blunt, projecting lobes of mesonotum marginate and somewhat angular. Posterior corners of basal face of epinotum without upturned tubercular tooth. Anterior border of gaster deeply emarginate, with the antero-lateral lobes angulate at the inner corner.

Worker (Córdoba): Head disc blackish; thorax, peduncle, gaster, with the exception of the membranaceous crests, ferruginous. Median head length subequal to interocular width. Thorax slightly longer than broad. Sides of thorax not forming a distinct reentrant angle at mesonotum. Dorsum of thorax reticulate-rugose.

The worker specimen from Entre Rios, Est. Sosa, likewise possesses the slender habitus and the lack of the reentrant angle, formed by the lateral thoracic crests at mesonotum, although not quite as distinctly as in the two Córdoba workers mentioned before.

9. *Paracryptocerus* (*Harnedia*) *angustus* (Mayr)

Cryptocerus angustus Mayr, 1862, Verh. Zool.-bot. Ges. Wien 12 : 759-761. —
 ?Santschi, 1912, Rev. Suisse Zool. 20 : 529 (Santiago del Estero). — ?Bruch,
 1915, Rev. Mus. La Plata 19 : 530.

This species will be dealt with more thoroughly in a later study, treating of the Brazilian forms of the *angustus*-group in the subgenus *Harnedia* M. R. Smith. Its main diagnostic features are stated in the preceding keys.

General distribution: *P. angustus* is not uncommon in Southern Brazil, being known from the Federal District, the States of Rio de Janeiro, São Paulo, Paraná, Santa Catarina and Rio Grande do Sul. The only Argentine record, published by Santschi in 1912, referring to specimens ("varieté faisant passage à *pilosus* Em."!!) collected in the province of Santiago del Estero, is questionable. Yet the species is definitely known from the province of Misiones, according to two stray specimens examined by myself, as follows: Misiones, Estación Loreto, A. A. Oglobin: 1 worker [MACN]. Misiones, locality, collector and date unknown: 1 female [MACN].

10. *Paracryptocerus* (*Harnedia*) *pilosus* (Emery)

(Figs. 2, 8, 19, 20)

Cryptocerus pilosus Emery, 1896, Zool. Jahrb. Syst. 9 : 630-631, fig. B (soldier, worker; Paraguay: San Salvador). — ?Santschi, 1921, An. Soc. Cient. Argent. 92 : 127 (female; Argentina, Chaco de Santiago del Estero, Rio Dulce). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1) : 208.
Cryptocerus (*Cryptocerus*) *pilosus* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.

The present species is distinctive by the thin, long, flexuous, erect and evenly distributed hair on the dorsum of thorax, peduncle, gaster, and on the legs, and by the strongly sculptured, opaque first gastric tergite both in the worker and soldier caste.

Types. — Syntypes of soldiers and workers presumably in the Museo Civico di Storia Naturale, Genova (Coll. Emery). A unique syntype (lectotype by present designation) worker in the U. S. National Museum, Washington, D. C.

Worker [Figs. 2, 19]. — Total length 4.1-4.9 mm; maximum length of head 1.11-1.39 mm; of thorax 1.21-1.46 mm. Black; the following fuscous-ferruginous: tips of mandibles, scape, last funicular segment, femora, tibiae, the four distal tarsites; frontal carinae testaceous.

Head rather shining, subquadrate. Lateral borders scarcely sinuous, not raised above eyes, slightly diverging caudad. Dorsum of head moderately convex discally. Occipital lobes obliquely truncate, not transparent, their border irregularly crenate or notched. Occipital border broadly, but feebly, emarginate. Eyes hemispherical, bulging, their maximum diameter about one fourth of maximum head length. Frontal carinae semitransparent, in lateral view not considerably thickened just in front of eyes.

Thorax longer than broad. Scapular angle feebly dentate, distinct from the first, acute lateral pronotal tooth, which is very conspicuous and followed posteriorly by a sharp lateral crest, on which two more, rather obtuse, teeth are apparent. Promesonotal suture obsolete. Mesonotum projecting laterad as a rectangular tooth. Mesoepinotal suture often, not always, visible, especially laterad (practically absent in the lectotype). Anterior corner of basal face of epinotum in the form of a small, more or less obtuse tooth, followed by a much larger, acute lateral tooth. Lateral border of declivous face with a rather sharp, often somewhat denticulate edge. In profile, the thorax is moderately convex, forming an even curvature, scarcely interrupted by the transition of the basal into the declivous face of epinotum. Femora fusiform, tibiae more or less cylindrical.

Petiole [Fig. 19] narrower than mesonotum, having on each side a small spine, curving obliquely caudad. Postpetiole slightly broader, the lateral spines stouter, their tips more recurved. In profile, the postpetiole is strongly convex above.

Gaster elliptical, broadly excised antero-mesally, its antero-lateral lobes bluntly marginate.

Integument, with the exception of the gaster, rather shiny. Dorsum of head, thorax and pedicel reticulate-rugose and foveolate. Frontal carinae finely punctate. Mandibles finely rugose. Sides of fore coxae and laterotergite of pronotum horizontally striate. First gastric tergite finely but sharply punctate, opaque, with more or less longitudinal rugosities on the anterior half, and elongate, small shallowly impressed squamiferous pits scattered throughout. First gastric sternite shinier, superficially reticulate-punctate.

Canaliculate, long, appressed scalelike hair on head, thorax, and pedicel; similar hair, yet simple and small on first gastric tergite. Long, flexuous, standing hair scattered over the entire body and appendages, scarce on the sides of thorax, absent latero-ventrally on peduncle.

Soldier [Fig. 8]. — Total length 5.9-7.6 mm; maximum length of head 1.64-2.14 mm; of thorax 1.64-2.07 mm. Black; the following fuscous-ferruginous: antero-lateral portions of head disc, tips of mandibles, scapes, last funicular segment, the anterior corner of pronotum; fuscous testaceous: extensor face of tibiae. Gaster with a pair of small antero-lateral and another pair of slightly larger postero-lateral yellowish spots, which, however, are absent in smaller specimens.

Head slightly longer than broad (largest specimen 60:58, smallest 46:44). Head disc subquadrate, with strongly rounded corners, its bottom slightly convex discally, feebly excavate antero-laterally, its lateral border scarcely upturned, but strongly crenulate. Sides of disc almost straight, the occipital border strongly and rather evenly curved. Supramandibular excision broad and bidentate. Occipital lobes feebly obliquely truncate, with a small tooth on the inner end of the truncation. Eyes rather flat.

Thorax usually as broad as long. Pronotum laterally bidentate, with a distinct, crenulate, transverse crest, which is broadly interrupted mesally. Mesonotum with a bluntly rounded and submarginate lateral lobe. Mesoepinotal suture impressed. Basal face of epinotum with an obtusely angulate lobe on each side and on each posterior corner there is a strong, usually blunt, tooth, pointing upward and laterad. Lower half of slightly excavate declivity with a sharp lateral crest. Mesopleura with a blunt vestigial tooth near its antero-ventral corner. Legs as in worker, femora more incrassated, less distinctly fusiform.

Pediceal as in worker. Lateral spines of petiole and postpetiole stouter and more recurved. Gaster as in worker.

Integument less shining than in worker. Head disc, occiput and mandibles sharply reticulate-rugose with crowded, deeply impressed pits within the meshes of the anastomosing rugosities. Sculpture more superficial over the antennal scrobe. Sides of head and lower face coarsely foveolate with the intervals finely reticulate-punctate. Thorax and pedicel sculptured as head disc, the foveolae less crowded. On the laterotergite of pronotum there prevail longitudinal and somewhat curved rugosities. Gaster opaque, sculpture as in worker. Pilosity, in general as in worker. Each foveola of head disc bears a rather thin squamiform hair, which is more or less decumbent, and does not project beyond the rim of the pit. Scalelike hair of thorax and femora more conspicuous. Long, thin, flexuous standing hair around the rim

of head disc, present also on the sides of head, occipital lobes, dorsum of thorax, peduncle and gaster, as well as on legs.

Female. — The Bruch collection contains an isolated, dealate queen, taken at San Roque, province of Corrientes, which I tentatively place under the present species, rather than associating it with *liogaster*.

Total length 8.3 mm; maximum length of head 1.96 mm; of thorax 2.46 mm. Maximum width of head disc 1.68 mm; of thorax 1.71; of gaster 1.82 mm. Black; antero-lateral portions of head disc yellowish-brown to fuscous-ferruginous. Anterior corner of pronotum and each corner of gastric tergite with a small yellowish spot. Similar to the soldier, with the differences of the caste. Differs from *liogaster* by its color, the shape of the peduncle and the shallow anterior gastric emargination [Fig. 20], the sculpture of the first gastric tergite, which is subopaque, strongly sculptured with dense longitudinal rugosities extending over the anterior fourth of the segment.

Santschi (1929) mentions a single, isolated queen from the Chaco of Santiago del Estero, which is said to measure 9 mm in length, 1.8 mm across the thorax. The fore wings are 6 mm long, pale brown with darker veins.

The male caste is unknown.

Distribution. — The scarcely collected species is known from Paraguay and the interior of the State of São Paulo, Brazil. The Argentine records are questionable, because they are limited to isolated females, this caste not being known from other localities. However, it is quite probable that the typical *pilosus* does occur in that country, at least along the Paraguayan border.

Specimens examined: 40; 29 workers, 10 soldiers and 1 female, as follows: Argentina, Corrientes: San Roque, C. Bruch: 1 female [MACN]. — Paraguay: San Salvador, in woody thorns of *Acacia* (probably *cavenia*, according to Wheeler, 1942), J. Bohls: 1 worker (lectotype) [USNM]. Asunción, C. Bruch: 1 worker [MACN]. — Brazil, State of São Paulo: Agudos, in hollow dead twig, Oct. 3, 1954, W. W. Kempf: 24 workers, 10 soldiers [WWK]. Same locality, 3 stray workers taken during 1952 and 1954 by Father Reinaldo Mueller and myself [WWK].

Variation. — The present species is quite variable in structural detail. Workers of the same nest series may differ from one another as regards the proportions of head, gaster, development of thoracic denticles, and shape and direction of peduncular spines, and the outline of the

antero-lateral gastric lobes. The oldiers present even a greater variability, as according to their size, a greater or lesser number of worker characters are still retained. The preceding description and the figure are based upon a full-grown soldier from Agudos, and applies strictly only to this single specimen, whereas other individuals of the same nest diverge considerably in one or more details. Some soldiers, for instance, have the head disc more flattened and the antero-lateral portions strongly upturned. The drawing of the worker, made five years ago, is based upon the lectotype specimen in the U. S. National Museum. Only the pilosity of the rim of the head disc is shown. This specimen has the following characters: Total length 4.9 mm; maximum length of head 1.25 mm; of thorax 1.46 mm. The antero-lateral lobes of the gaster are more prominent, the promesonotal suture is vestigial, the mesoepinotal suture is obsolete. In the other worker from Paraguay, the dorsal convexity of the postpetiole is acuminate, the tooth thus formed pointing caudad.

11. *Paracryptocerus (Harnedia) liogaster* (Santschi)

(Figs. 16, 18, 21, 28)

Cryptocerus liogaster Santschi, 1916, Physis 2 : 381-382, fig. (worker; Entre Rios: Estación Sosa).
Cryptocerus lanuginosus Santschi, 1919, An. Soc. Cient. Argent. 87 : 46-47 (worker; Córdoba: Alta Gracia) [nov. syn.]
Cryptocerus lobigaster Santschi, 1919, An. Soc. Cient. Argent. 87 : 47, fig. 4 (worker; Córdoba: Cabana) [nov. syn.]
Cryptocerus lobigaster var. *fides* Santschi, 1925, Com. Mus. Hist. Nat. B. Aires 2 : 162-163 (worker, soldier, female; Santa Fé: Fives Lille) [nov. syn.]
Cryptocerus (Cryptocerus) liogaster Emery, 1922, Gen. Ins. Hym. fasc. 174 c, p. 310.

This highly variable species is an extremely close ally of *pilosus*, from which it differs in the following features:

Worker [Fig. 18]. — Length 4.4-5.2 mm. 1. Sculpture of first gastric tergite superficial to obsolete; integument always shining, often quite smooth. 2. Thoracic and peduncular teeth or spines usually more acute, peduncular spines more reflexed caudad, especially in shinier specimens [Fig. 18]. 3. Postpetiole middorsally often, not always, acuminate, as in *fiebrigi*. 4. First gastric tergite in general longer, with less convex sides and more pronounced antero-lateral lobes. 5. Standing hair slightly longer, less crowded; scalelike, appressed hair more delicate and shorter, masking to a lesser degree the integument.

Soldier [Fig. 21]. — Length 6.0-7.8 mm. 1. Head disc, shoulders, tips of posterior epinotal teeth, extensor face of tibiae yellowish-brown. Frequently, especially in larger, full-grown soldiers, the light color extends over the entire promesonotum and sometimes also the epinotum. In this case, the first gastric tergite is marked by four yellowish spots, variable in size, one at each corner. 2. Posterior epinotal teeth shorter [Fig. 21],

n. 1752: 8 workers, 1 soldier, 3 females [MACN, WWK]. —
"Argentina", exact locality unknown: 1 worker [WWK].

Note on the types, variation and synonymy. —
P. liogaster is evidently very intimately related to *pilosus*, with which it disagrees only in trivial, superficial characters. Santschi took great pains in differentiating his several species, which have been synonymized above, both from *pilosus* and from each other. This system, however, is untenable, unless one intends to give a distinct specific name to each more striking individual variant of a single nest series. Checking the types of aforesaid forms against the descriptions and a reasonably large series of *pilosus* will prove this point.

The Bruch collection contains four worker specimens of *liogaster* in the sense of Santschi, belonging to the series from which the type of this species was selected and retained by Santschi, who probably had seen only this single specimen. The former specimens, doubtless authentic, differ significantly from *pilosus* only in the following character: (worker only) 1. Spines of peduncular segments more strongly recurved. 2. Gaster longer and narrower (index of maximum length of first gastric tergite over maximum width in *liogaster* 1.33-1.38, in *pilosus* 1.25-1.32). 3. Sides of gaster less convex. 4. Antero-lateral gastric lobes slightly more pronounced. 5. Sculpture of first gastric tergite superficial to obsolete, integument shining. All the remaining characters mentioned by Santschi either do not hold for the entire series, or are not significant.

The second species separated by Santschi, — *lanuginosus*, — is not represented by labelled specimens in the Bruch collection. Yet, among specimens of the nidotype series of *guttifer* (= *fiebrigi*), a species taken at the same time and locality as *lanuginosus*, and described in the same paper, there is a single worker specimen, incorrectly labelled: *guttifer* "cotype", that really belongs to *lanuginosus*, being at least a topotype or more probably a nidotype mixed up with the wrong species. In the original diagnosis, *lanuginosus*, known only in the worker caste, is differentiated from *liogaster* by characters that place it somewhere inbetween *liogaster* and *pilosus*, yet being closest to *liogaster*. There is no doubt, that this form is a straight synonym of the latter, on account of the lightly sculptured gaster, the shining integument, the more recurved peduncular spines. The nidotype specimen, measuring 5.1 mm, is well above the types examined by Santschi (3.7-4.0 mm). This eliminates the last distinctive character of *lanuginosus*, the small size.

The holotype of *lobigaster* s. str., measures 4.6 mm. It appears in many ways an intergrade between *liogaster* and *pilosus* on account of the heavier, yet still superficial sculpture of the first gastric tergite, the rather short gaster and its more convex sides. The peduncular segments are in the fashion of *liogaster*. The most peculiar, though scarcely significant, feature of this specimen consists in the lack of distinctly angulate shoulders and the straight sides of the mesonotum, devoid of a projecting tooth. Against Santschi's statement in the original description, the examination of the type shows that the head sculpture does not disagree with that of *pilosus* and *liogaster*, nor does the peduncle exhibit greater affinities with *fiebrigi*, although the body of the petiole and postpetiole is really narrower and the lateral spines are slightly longer than usual. No doubt, this specimen is remarkable, but being only a stray individual, nothing definite can be said about its true affinities. In general, it is closer to *liogaster* than to *pilosus* and does not completely bridge the narrow gap existing between the two species. It certainly

strengthens this writer's suspicion, that eventually *liogaster* must be considered either as a subspecies or a straight synonym of *pilosus*.

Examining the types of *lobigaster* var. *fides*, one cannot help wondering, why this form has ever been associated with *lobigaster* s. str., if one should be agreeable to accept Santschi's subtle divisions. As a matter of fact, it is a straight synonym of *liogaster*. This is the only form, the type series of which includes both soldiers and females, already described by Santschi.

Perhaps the most remarkable series, belonging to the present species, is the one taken at La Cienaga, Catamarca province. One half of the worker specimens is characterized by the complete lack of pilosity and highly lustrous integument of the first gastric tergite, which is entirely smooth and polished. Specimens of the remaining half are scarcely distinct from the typical *liogaster*. The shiny and hairless specimens, all of the worker caste, have the peduncular spines drawn out into very acute and recurved tips. Soldiers and females of the same nest series are of the usual type, just a little bit more shining.

12. *Paracryptocerus* (*Harnedia*) *fiebrigi* (Forel), nov. stat.

(Figs. 1, 11, 17, 27)

- Cryptocerus pilosus fiebrigi* Forel, 1906, Ann. Soc. Ent. Belg. 50 : 235-236 (worker, soldier; Paraguay: San Bernardino).
 ?*Cryptocerus* (*Cryptocerus*) *pilosus* var. *fiebrigi* Mann, 1916, Bull. Mus. Comp. Zool. Harvard 60 : 451 (Brazil: Rio Grande do Norte, Natal).
Cryptocerus (*Cryptocerus*) *pilosus fiebrigi* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.
Cryptocerus (*Paracryptocerus*) *guttifer* Santschi, 1919, An. Soc. Cient. Argent. 87 : 45-46 (soldier, female; Argentina: Córdoba, Alta Gracia) [n. o. v. syn.].
Cryptocerus guttifer Santschi, 1922, An. Soc. Cient. Argent. 94 : 253-254 (worker, soldier, female, male; Córdoba: Alta Gracia).
 ?*Cryptocerus* (*Cryptocerus*) *guttatus* var. *trivialis* Santschi, 1929, An. Soc. Cient. Argent. 107 : 301 (worker; Catamarca: Valde) *lapsus*: *guttatus* instead of *guttifer*! [nov. syn.]

This species bears a superficial likeness to *pilosus* and *liogaster*, on account of the presence of erect pilosity on head, thorax, peduncle, legs and gaster, yet differs from these forms by the shape of the standing hair, which in *fiebrigi* is short, straight, never flexuous.

Types. — Type material of *fiebrigi* is in the Forel collection [MHNG], of *guttifer* in the Bruch collection [MACN], and probably in the Santschi collection.

The outstanding features of *fiebrigi*, by which it may be separated from *pilosus* and *liogaster*, are as follows:

Worker [Fig. 1]. — Total length 3.9-4.9 mm. Black; frontal carinae pale testaceous or pale ferruginous; articulations of legs, tarsi, tip of scape and basal segments of funiculus, more or less fuscous-ferruginous.

Head subopaque, subrectangular, distinctly longer than broad. Its upper face rather convex in the middle, the frontal carinae flat to excavated, the entire surface finely reticulate-punctate, sparsely and rather shallowly foveolate without conspicuous rugosities. Sides of head subparallel, often distinctly concave above eyes. Frontal carinae, in part, translucent, in lateral view considerably thickened just in front of eyes.

Thorax, in profile, — also transversely across the pronotum, — noticeably convex. Promesonotum less expanded laterad, its sides tridentate, the posterior tooth more or less rectangular. Mesonotum laterally tuberculate or subdentate. Sides of basal face of epinotum bidentate, the posterior tooth being largest. Declivous face sharply marginate at the sides. Sculpture of dorsum of thorax as on head, finely reticulate-punctate and sparsely foveolate. Sides of thorax finely reticulate-punctate with fine, more or less longitudinal rugosities on the laterotergite of the pronotum. Sides of fore coxae not transversely striate.

Peduncular segments with a triangular anterior face, separated from the dorsal face by a more or less marked edge, the vertex of the anterior face forming middorsally a projecting tooth, facing caudad. This tooth is rather feeble on the petiole, but strongly marked on the postpetiole. Lateral spines of petiole long, rather delicate, gently and evenly recurved, and acute at apex. Spines of postpetiole similar, but much more strongly recurved. Body of petiole comparatively narrower than in *pilosus*.

Gaster oval, similar to that of *pilosus*, slightly more shining, the first tergite being very finely and rather superficially reticulate-punctate. General pattern of pilosity as in *pilosus*, but the appressed scalelike hair is shorter and finer, and the standing hair is less abundant, more scattered, much shorter (shorter than the diameter of tibiae), straight, not visibly flexuous.

Soldier [Fig. 11]. — Total length 5.8-6.5 mm; maximum length of head 1.68-1.78 mm; of thorax 1.57-1.72 mm. Black; the following yellowish-ferruginous: antero-lateral portion of head disc, a triangular area on each shoulder, and usually four larger spots on the first gastric tergite, one close to each corner, the pair of the same side often being confluent; ferruginous: tip of scape, first funicular segment, knees, extensor face of tibiae, the four apical tarsites of each leg.

Head disc more elongate, its rim less distinctly crenulate, its sides distinctly converging caudad, with a feeble constriction at the level of the eyes. Antero-lateral portion of head disc more or

less excavated, the clypeal area marked off by a raised ridge. Sculpture of disc coarsely reticulate-rugose, as in *pilosus*, but the meshes are larger, and the foveolae more deeply impressed. About twelve foveolae may be counted in a transverse row, across the head, at the level of the eyes (fifteen or more in *pilosus* and *liogaster*).

Thorax dorsally mostly foveolate, scarcely reticulate-rugose. Transverse pronotal carina feeble, usually broadly interrupted in the middle, not forming a raised crest. Laterotergite of pronotum finely and more or less longitudinally rugose. Sides of thorax never with strong rugosities. Sides of fore coxae only reticulate-punctate.

Peduncular segments in general as in worker, broader than in *pilosus*, with strong lateral spines. Only the postpetiole possesses a sharply edged triangular anterior face, the vertex of which terminates middorsally in a tooth. Sides of gaster gently convex. The first tergite finely but superficially reticulate-punctate, with a few longitudinal rugosities on the antero-median portion.

Pilosity, in general, as in worker. In addition, the following highly distinctive feature: From each foveola of the head disc and the sides of head emerges a thick, curved scalelike hair, the free end of which projects well beyond the rim of the foveola. A somewhat similar condition holds occasionally for the foveolae of the thorax.

Female [Fig. 17, 27]. — Total length 7.5-7.9 mm; maximum length of head 1.67-1.71 mm; of thorax 2.14-2.25 mm. Color, sculpture and general features as in soldier. The head disc is still more elongate, indistinctly marginate postero-laterally behind the eyes. It differs from *pilosus* and *liogaster* by the shape of the peduncular segments, the nearly parallel-sided gaster, the short wings. The fore wing, measuring 5.1-5.2 mm, projects very little beyond the tip of the gaster, when folded over the back. The wings are infuscated, the venation of the fore wing is quite similar to that of *liogaster* [Fig. 27].

Male. — This caste has been described by Santschi (as of *guttifer!*). A discussion of it will be taken up in a later study, dealing with all the known males of the Cephalotini tribe.

Distribution. — The poorly collected species is known from Southern Paraguay and the Argentine provinces of Córdoba and Santiago del Estero. If Santschi's var. *trivialis* should definitively prove a synonym of *fiebrigi*, the range of the latter would also include the province of Catamarca. Mann (1916)

mentions the same species as having been taken in Northeastern Brazil, near Natal, State of Rio Grande do Norte. As this record appeared to me quite dubious, I searched in 1951 the collections of the Museum of Comparative Zoology at Harvard, the U. S. National Museum and the Mann Collection in Washington, D. C. for the respective specimens, but was unable to find them. Nor could I detect the *fiebrigi* specimen, which Mann states having been received from Forel, and against which his Brazilian material had been checked.

Specimens examined: 42; 10 workers, 11 soldiers, 16 females and 5 males, as follows: Paraguay: San Bernardino, M. K. Fiebrig: 1 worker (lectotype), [MHNG]. — Argentina, Córdoba: Alta Gracia, La Granja, C. Bruch, several series; a) n. 917, no date: 1 worker (labelled *guttifer* Typus), b) n. 917?, no date: 1 female, c) Z₁, February 1922: 5 workers, 5 soldiers, 8 females, 3 males (labelled: *guttifer* and incorrectly "Cotypus"), d) January 1924: 1 soldier, 2 females, 1 male, e) January 1925, n. 28163-28165: 4 workers, 4 soldiers, 4 females, f) February 1925: 1 soldier, 1 female, 1 male. — Santiago del Estero: Girardet, n. 1740: 1 worker. — All the Argentine specimens are in the Bruch collection [MACN], with a few duplicates in my own collection [WWK].

Ethology. — Very little is known of the biology of the present species. Fiebrig took the type series in crevices of dead wood, and the 1922 series of "*guttifer*" came from hollow twigs of *Fagara coco*, a native tree, named "Cocos".

Variation. — In contrast to the two preceding species, *fiebrigi* exhibits stabler features and more homogeneity. This, however, may be due to the fact, that it is known from relatively very few series and localities. Most of the Argentine workers differ from the type of *fiebrigi* from Paraguay, by having the third lateral tooth of the pronotum more salient and acute, the epinotal teeth being likewise more pointed. The development of the gastric maculae in the soldier is variable, although I did not observe a soldier in which the posterior maculae were lacking. The greatest amount of variation is found in the intermediates between soldiers and workers, which are not rare in the present species.

Synonymical note. — When describing his *fiebrigi* as a race of *pilosus*, Forel put the greater stress upon the worker, whereas the description of the soldier limits itself to very few and trivial characters, incapable of rendering a clear picture of this caste. In selecting the racial category for this form, Forel was deeply impressed by the presence of standing hair all over the body, indeed, a rather uncommon feature for an ant of the genus *Paracryptocerus*. Santschi, on the contrary, did not give much importance to this character. When he described his *guttifer*, he did not even mention *pilosus* or *fiebrigi* as possible close relatives. He assigned it to the vicinity of *quadratus*. There is no objection against

this placement, since structurally *guttifer* (= *fiebrigi*) resembles in many ways that species, especially the soldiers and females, as regards sculpture and pilosity of the head disc and the shape of the peduncular segments. Even later on, when making known the worker caste, Santschi did not come to suspect any close relationship between *guttifer* and Forel's *fiebrigi*. Probably he did not know through autopsy the latter species. As this form had been proposed as a race of *pilosus* one was obliged to imagine something very close to the latter. In this regard Forel's classification was not only misleading, but positively incorrect. *P. fiebrigi* is sympatric with *pilosus* and separated from it by a clear-cut morphological gap. On the other hand, a comparison between *fiebrigi* and *guttifer* workers shows that both forms are conspecific. I have not seen the typical *fiebrigi* soldier, but the meager description of it does not offer any difficulty except for one character, viz. the color of the gaster, which in *fiebrigi* is said to be reddish-brown. I believe, that Forel's soldier is a callow, and that this color character is by no means significant. Hence I have no doubt in placing *guttifer* in synonymy of *fiebrigi*.

As regards the variety *trivialis*, ranked under *guttifer* (by way of a clerical error Santschi writes: *guttatus*!) I doubtfully assign it to synonymy of the present species. First of all, it is quite possible that the relationship with *guttifer* may not be present. In the same paper, that contains the description of this variety, Santschi mentions a typical *guttifer* specimen from Catamarca, presently in my collection, having been received from Father Borgmeier some years ago. This individual is not *guttifer* at all, but *bivestitus*. Furthermore, the variety is said to differ from the typical form by the denticulate border of the sides of the declivous face of the epinotum, the narrower petiole, with stouter lateral spines, and the more recurved spines of the peduncular segments, the shallower sculpture of the gaster. Taking these features in the strict sense, they represent a condition not observed in the *fiebrigi-guttifer* material. At any rate, the problem cannot be solved without an examination of the types.

The drawing of the worker was made from the lectotype specimen in 1950. Only the standing hair around the head has been indicated. The remaining figures are based upon *guttifer* specimens from Argentina, received at a later date, when the type of *fiebrigi* was not at hand any more, having been returned to the Forel collection in 1951.

13. *Paracryptocerus* (*Harnedia*) *quadratus* (Mayr)

(Figs. 4, 10, 22, 26)

- Cryptocerus quadratus* Mayr, 1868, Ann. Soc. Nat. Modena 3 : 175-176 (soldier; Argentina, San Luis, Estancia Salvador, near S. Luis). — Berg, 1890, An. Soc. Cient. Argent. 29 : 15. — Emery, 1896, Zool. Jahrb. Syst. 9 : 634-635, fig. E (worker, soldier, female; Paraguay: San Salvador). — Bruch, 1916, Rev. Mus. La Plata 23 : 323.
- Cryptocerus* (*Cryptocerus*) *quadratus* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.
- Cryptocerus convexus* Santschi, 1916, Physis 2 : 382-383, fig. (worker; Argentina, Entre Rios: Estación Sosa) [n. o. v. s. y. n.]
- Cryptocerus* (*Cryptocerus*) *convexus* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 309.

This species resembles to some degree the preceding *fiebrigi* and the following *bivestitus*, especially as regards sculpture and

pilosity of the head disc in soldiers and females. These castes of *quadratus*, however, are distinctive by the shape of head, as seen in profile, and the worker is immediately recognized by the unusually convex promesonotum, the feeble sculpture of the body, and the transverse carina of the petiole.

Types. — Soldier (holotype) from Argentina, in the Bruch collection [NHMW]. Syntypes of *convexus* in the Bruch collection [MACN], and presumably in the Santschi collection.

Soldier (holotype) [Figs. 10, 26]. — Total length a 6.4 mm (not accurately measured when type was available). Maximum length of head 1.62 mm; of thorax 1.80 mm. Fuscous brown to black; antero-lateral portions of head disc and shoulders reddish-brown; antennae and legs rufo-testaceous. First gastral tergite quadrimaculate, the spots being yellow, rather small, posterior pair at some distance from the apical border. Integument slightly shining.

Head subquadrate but slightly longer than broad (67:59), surmounted by an incompletely marginate disc, i. e. anteriorly and antero-laterally the disc is sharply marginate, posteriorly the disc is sharply marginate forming a slightly raised crest, which is distinctly crenulate anteriorly and laterally. Postero-laterally, above eyes and the occipital lobe the border is obsolete and the upper face is continuous with the sides of the head. In profile, the head is strongly convex above [Fig. 26]. Transversely, the disc is concave in front, gently convex behind. Clypeal sutures vestigial. Eyes situated behind slightly above the antennal scrobes. Penultimate funicular segment nearly twice as long as the preceding segment. Occipital area subrectangular and slightly crested. Head disc, occiput and sides coarsely reticulate-rugose and foveolate, with suberect, slightly curved and spatulate hair arising from each pit.

Thorax longer than broad (74:59). Shoulders distinctly dentate. Promesonotum conspicuously convex, as seen in profile. Transverse pronotal carina distinct at the sides, obsolete in the middle. Lateral border of dorsal face of pronotum distinctly marginate in front of the transverse carina, immarginate and rounded behind. Promesonotal suture vestigial at the sides, absent in the middle. Lateral borders of mesonotum forming a rounded projecting lobe on each side. Mesoepinotal suture impressed rather deeply laterally, more superficially in the middle. Side basal face of epinotum immarginate, with a projecting tubercle and swelling. The posterior corner with an obtuse, stout, tuberculate tooth. Posterior border, between the teeth, gently emarginate.

not forming a marginate edge between the basal face and the declivity, which forms about a right angle with the former. Sculpture of dorsum of thorax almost as on head disc, but the pits are sparser, and the hairs arising from them are decumbent, silvery. Sides of thorax with still more scattered foveolae and the intervening spaces reticulate-rugose, the intervals between the rugosities being finely punctate. Declivous face very finely and densely punctate. Extensor face of tibiae rugulose. Femora fusiform, tibiae and tarsi subcylindrical.

Petiole, in dorsal view, with evenly curved anterior border, which continues laterally as the anterior border of the recurved spines. In the middle, the body of the petiole has a gently impressed longitudinal furrow, flanked on each side by a vestigial swelling. From spine to spine, across the body of the segment extends a bluntly edged, sinuate, transverse carina. Postpetiole slightly broader than petiole, its lateral spines in the form of a pigeon wing, pointing obliquely cephalad at base, strongly recurved caudad. Transverse, blunt carina present, forming a feeble tooth middorsally. Both peduncular segments irregularly rugose, with longer, appressed scalelike hair.

Gaster deeply excised anteriorly, between the projecting, more or less rounded, antero-lateral lobes, the border of which is neither crested nor lamellate. Gaster elongate, almost twice as long as broad, its sides subparallel. First tergite finely and densely punctate, with long, appressed, scalelike hair at base, the rest being subglabrous. The apical end of the following tergites and the sternites bear short, sparse, suberect hairs.

Worker [Figs. 4, 22]. — Total length 3.4-5.0 mm; maximum length of head 0.97-1.30 mm; of thorax 1.00-1.40 mm. General body color varying between black, fuscous-brown and ferruginous (most specimens were more or less ferruginous). Frontal carinae light brown, the first gastric tergite always somewhat infuscated.

Head a little longer than broad, its sides parallel, slightly concave above eyes. Dorsum of head moderately convex, the frontal carinae flat to slightly excavated, strongly curved downward anteriorly, their lateral borders somewhat upturned above eyes and scarcely crenulate. Occipital border shallowly emarginate between the small, subdentate occipital lobes. Frontal furrow usually visibly extending to the center of head disc. Sculpture of dorsal face of head variable, according to size; larger workers have it finely reticulate-rugose and shallowly foveolate,

each foveola with a small decumbent hair; smaller workers have the integument almost smooth, only superficially reticulate-punctate and not foveolate, the decumbent hair being inconspicuous. Sides of head with a few minute projecting setae, especially on the anterior curvature of frontal carinae and on the outer border of the occipital lobes and above eyes.

Thorax, in profile, rather strongly convex dorsally [Fig. 22], especially the promesonotum, which is also unusually convex transversely. Shoulders angulate, the angle not incorporated in the lateral prothoracic crest, the latter being sharply edged, having an anterior acute tooth, followed by broad lobes, on which appear occasionally one or two teeth of small size. Mesonotum with a projecting rectangular or subdentate lobe on each side. Mesoepinotal suture obsolete in small specimens, distinct and somewhat impressed in larger specimens. Basal face of epinotum with a larger triangular tooth on each side, at some distance behind the more or less denticulate anterior corner. Declivity sharply marginate at the sides. Sculpture of dorsum of thorax variable according to size, in the same fashion as stated for the sculpture of head disc. In larger specimens the laterotergites of pronotum present a few fine, more or less horizontal striations. Pilosity appressed, widely spaced.

Peduncular segments of nearly equal width, the postpetiole sometimes slightly broader; both with long, slender, acute, lateral recurved spines, connected by a transverse, sharply edged, bisinuate carina, which forms middorsally an acute, reclined tooth. Sulphure feeble and fading.

Gaster ovate, with strong, more or less rounded antero-lateral lobes. First tergite finely reticulate-rugose, with somewhat longer, quite conspicuous, glittering and decumbent hair. Standing hair, as usual, confined to the exposed portions of the terminal tergites and all the sternites.

Female. — Total length 8.0 mm (Santiago del Estero specimen only!). Maximum length of head 1.71-1.78 mm; of thorax 2.25-2.32 mm. General body color black or fuscous-brown; antero-lateral portions of head disc fuscous-ferruginous. Shoulders with an elongate, narrow yellowish spot. First tergite of gaster with the customary yellowish spots, one at each corner.

Resembling the soldier, with the usual divergences proper to the caste. Head slightly longer, but in profile equally convex above. Ocelli small. Head disc lacking a distinct margination above eyes. Shoulders dentate. Transverse pronotal carina present,

but not raised in the form of a crest. Mesopleural tooth either small or completely absent. Sides of epinotum with a triangular lobe near the anterior corner, then converging caudad, ending in a larger posterior tooth, the tip of which is recurved laterad. Peduncular segments compact, globose, lacking the distinctive transverse carinae of the worker and soldier; the lateral spines very short, toothlike. Gaster elongate, nearly twice as long as broad. The first tergite finely but sharply punctate. Wings are unknown.

The Santiago del Estero specimen, the only intact female examined, is lighter in color, the head disc being entirely ferruginous and scapular spots large and yellow in color.

Male. — Unknown.

Distribution. — The range of the poorly known species extends from Southern Paraguay to Central Argentina.

Specimens examined: 11; 7 workers, 2 soldiers, 2 females, as follows: Paraguay: San Salvador, J. Bohls: 1 worker, 1 soldier (specimens mentioned by Emery, 1896) [USNM]. — Argentina, Formosa: Las Lomitas, N. Kusnezov: 1 female [ML]. — Jujuy, Calilegua, Rd. 84, km. 155, Dec. 1, 1948, N. Kusnezov: 1 worker [ML]. — Entre Rios: Estación Sosa, Mac Donagh: 5 workers (2 syntypes of *convexus* Santschi) [MACN]. — Santiago del Estero: loc. unknown, R. Wagner: 1 female [MACN]. — San Luis: Estancia Salvador, near San Luis, P. de Strobel: 1 soldier (holotype) [NHMW].

Synonymical note and variation. — Only once soldiers and workers have been caught definitely associated with one another. This happened with the series taken by Bohls and studied by Emery, who gave the first description of the worker. In this diagnosis, Emery omitted to mention the unusual convexity of head and thorax, the most striking character of this caste, which induced Santschi to describe the workers from Estación Sosa, Entre Rios, as a new species, under the name of *convexus*. I have examined the holotype of *quadratus*, the specimens seen by Emery, and the types of *convexus*, reaching the conclusion that the latter is a straight synonym of the former.

The Paraguay specimens taken by Bohls differ from the Argentine material in a few details, that deserve mentioning. The workers are darkest in color, with usually two distinct lateral epinotal teeth. The soldiers are distinct by somewhat smaller size (5.5 mm), longer head, less expanded pronotum, which is scarcely broader than mesonotum, the more pronounced light spots on shoulders and the first gastric tergite. The female is said to have a completely marginate head disc, a feature not observed on the two Argentine specimens examined by myself.

The specimens collected in Paraguay by Bohls were found nesting in woody thorns of *Acacia* (probably *cavenia*, according to Wheeler, 1942). In that country the species is said to be very common.

14. *Paracryptocerus* (*Harnedia*) *bivestitus* (Santschi)

(Figs. 7, 13, 15)

Cryptocerus bivestitus Santschi, 1922, An. Soc. Cient. Argent. 94 : 254-255 (soldier, worker, female; Catamarca: Hualfin).
Cryptocerus peltatus ellenriederi Forel, 1914 (*nec* Forel, 1911), Bull. Soc. Vaud. Sci. Nat. 50 : 281 (San Luis: Alto Pencoso, — Bruch, 1916, Rev. Mus. La Plata 23 : 321-322 (in part, as regards Alto Pencoso specimens).
Cryptocerus peltatus ellenriederi var. *tucumana* Forel, 1914, Bull. Soc. Vaud. Sci. Nat. 50 : 281 (worker; Tucumán). [n. o. v. syn.]
Cryptocerus (*Cryptocerus*) *guttatus* Santschi, 1929 (*nec* *guttifer* Santschi, 1922), An. Soc. Cient. Argent. 107 : 301 (worker; Catamarca: Nacimientos).

Soldiers and females of this species are immediately recognized by the distinctive shape of the head disc. The worker, however, is extremely similar to *peltatus* and *fossithorax*, with which it is easily confused. The distinctly elongate head, the sides of which are scarcely or not emarginated above eyes and the shape of the lateral pronotal crest are its main diagnostic features.

Types. — Specimens of the original nest series (nidotypes or syntypes) are in the Bruch collection and in my own collection [MACN, WWK]. Syntypes probably in the Santschi collection. The lectotype of *peltatus ellenriederi* var. *tucumana* Forel is likewise in the Bruch collection [MACN].

Worker [Fig. 7]. — Total length 4.5-4.9 mm; maximum length of head 1.25-1.39 mm; of thorax 1.25-1.39 mm. Black; frontal carinae testaceous. Tips of mandibles, scapes, extensor face of tibiae, apical tarsites ferruginous or fuscous-ferruginous.

Head subopaque, rectangular, visibly longer than broad. Cephalic index (maximum width as measured in front of the eyes over maximum length as measured from the anteriormost point of frontal carinae to posteriormost point of occipital lobes) 0.82-0.86. Mandibles finely rugulose. Frontal carinae semitransparent, without a distinctly crenulate border, straight, not conspicuously emarginate in front of, nor upturned above eyes, very gently diverging caudad. Occipital corners obliquely truncate; occipital border shallowly emarginate. Eyes small, their greatest diameter less than one fourth of maximum head length. Upper face of head gently and evenly convex, finely reticulate-punctate, more sparsely covered with shallow, squamiferous foveolae, which occur somewhat more densely and larger towards occiput. Between the foveolae most specimens show more or less longitudinal yet rather fine rugosities. Vertex without a pair of small denticules. Lower face of head reticulate-rugose, the rugae forming elongate meshes.

Thorax subopaque. Anterior border moderately arcuate. Scapular angle subdentate, not well visible from above, lying beneath the anterior corner of the pronotal crest. This crest bears anteriorly an acute, strong tooth, followed by two or three blunt, crenate or denticulate lobes. Occasionally the first lobe may have the form of a tooth, yet a distinctly tridentate condition of the lateral crest is rare. Promesonotal suture effaced. Sides of mesonotum angulate or even feebly dentate. Promesonotum moderately convex both in profile and transversely. Mesoepinotal suture absent. Anterior corner of basal face of epinotum forming a rectangular tooth, followed by another larger triangular tooth on the sides. Sides of declivity sharply marginate, the edge bearing one or several minute teeth. Basal face and declivity, as seen from the side, form an even but gentle curvature. Dorsum of thorax sculptured as head, finely reticulate-punctate, rather densely covered with squamiferous foveolae. The slightly raised intervals between the foveolae form a network of anastomosing rugosities, which are more conspicuous on thorax than on dorsum of head. Lowermost portion of declivous face finely reticulate-punctate. Laterotergite of pronotum with a few horizontal striae. Thoracic pleura finely reticulate-punctate and more coarsely rugose.

Peduncular segments subequal in width. Petiole dorsally without a transverse carina, but bearing on each side a strong pointed tooth, pointing obliquely caudad. Postpetiole with a dorsally submarginate, inclined anterior face, and with lateral spines, the tip of which is strongly recurved, acute, pointing directly caudad.

Gaster subopaque, oval. Strongly emarginate antero-mesally, the antero-lateral lobes almost semicircular, solid, without a distinctly marginate border. First tergite extremely finely reticulate-punctate. A few longitudinal but short rugosities extending from the postpetiolar insertion caudad. Squamiferous foveolae very shallow and sparse.

Dorsum of head, thorax, and peduncular segments bearing in the foveolae appressed, silvery, canaliculate, scalelike hair. Similar hair, but simple, on the first gastric tergite. Standing hair, as usual, confined to the posterior end and ventral face of gaster.

Soldier [Fig. 13]. — Total length 7.3-8.0 mm; maximum length of head 2.10-2.25 mm; of thorax 1.89-2.03 mm. Black; the following ferruginous: head disc, (excepting the black clypeal

and frontal region), sides of head, legs (usually more or less infuscated); yellowish-brown: triangular area on each shoulder, lateral borders of mesonotum, extensor face of tibiae. The four spots of the first gastric tergite pale-testaceous.

Head somewhat shining; longer than broad, surmounted by an elongate, completely marginate disc, which is much broader in front than behind, its sides converging caudad, with a feeble constriction near the level of the eyes, its posterior border evenly rounded. The anterior four fifths of the cephalic disc form a circular, pronouncedly excavate area, with strongly raised, scarcely crenulate lateral borders. The center of the excavation, coinciding with the vestigially limited clypeal and frontal area, slightly raised and convex. The posterior fifth of the head disc, which is sickle-shaped, is flat, with narrowly crested lateral and posterior border. Mandibles strongly reticulate-rugose. Eyes feebly convex, scarcely visible from above, being partly covered by the head disc. In side view, the dorsal face of head disc invisible, being concealed by the sides of the disc. Lower border of cheeks carinate. Occipital lobes bluntly angulate, with rounded, carinate borders. Floor of head disc and sides of head coarsely reticulate-rugose, with deeply impressed, circular, large foveolae, the bottom of which is shining. About 18 foveolae may be counted along a line drawn transversely across the head disc, at the level of the eyes. Lower face of head more shining, with coarser rugosities and more spaced foveolae.

Thorax slightly shining, compact. Anterior corner of pronotum dentate, its sides subparallel until reaching the weakly crested, mesally interrupted transverse carina. From this point the sides gently converge caudad toward the mesonotum. Promesonotal suture distinct. Mesonotum having on each side a projecting, bluntly rounded, posteriorly marginate, lobe. Mesoepinotal suture scarcely impressed mesally. Basal face of epinotum about three times as broad, as long along the midbody line, having a short, bluntly rounded tooth on each side, and another more pronounced tooth on each posterior corner. Declivous face less than twice as long as basal face, feebly marginate at the sides. Sculpture of thoracic dorsum as on head disc, yet the rugosities are broader, the foveolae smaller, less deeply impressed and often somewhat elongate, especially on mesoepinotum. Laterotergites of pronotum with oblique striation. Remaining parts of the sides of the thorax reticulate-rugose, with horizontally elongate, shallow foveolae. Declivous face finely reticulate-punctate.

Gaster subopaque, elliptical, elongate, with subparallel sides, strongly emarginate antero-mesally, the projecting antero-lateral lobes with immarginate border. First gastric tergite reticulate-punctate, with sparse, shallowly impressed squamiferous punctures. A few more or less longitudinal and widely spaced rugosities on the anterior portion of the first tergite.

Foveolae of head disc and sides of head with a central, scalelike, curved, thick hair, the tip of which projects beyond the rim of the pit, as in *fiebrigi*. Rim of head disc with projecting clavate setae. Scalelike hair of thorax and gaster appressed, smaller, silvery, smallest on gaster. Standing hair, as usual, only on the tip and venter of gaster.

Female [Fig. 15]. — Total length 8.2-8.8 mm; maximum length of head 1.85-2.03 mm; of thorax 2.36-2.50 mm. Diagnostic features as in soldier. The lightly colored parts (head disc, sides of head, shoulders, extensor face of tibiae) are orange instead of ferruginous, but the center of head disc is much more extensively infuscated. Portions overlying the antennal scrobe transparent in part. Head disc with an anterior circular excavation, which is much shallower than in soldier, with the lateral borders less strongly raised, but more conspicuously crenulated. The posterior fifth of head disc transversely convex, in lateral view distinctly sloping downward toward occiput, forming a very obtuse, yet visible angle with the anterior portion. Occipital border nearly straight and sharply marginate. Ocelli minute, the antero-median ocellus being located in the excavate portion of head disc, the two postero-lateral ocelli in the posterior portion, facing obliquely caudad and laterad. Thorax less elongate than in *fiebrigi*, the sides of the pronotum slightly diverging caudad. Scutum broader than long. Mesopleural tooth obtuse, yet distinguishable. Peduncular segments similar to those of *fiebrigi*. Gaster more deeply emarginate antero-mesally, the antero-lateral lobes rounded. Sides of gaster subparallel. Wings subhyaline, only slightly infuscated, the venation as in *fiebrigi*. Fore wings, when folded over the back, distinctly project beyond the posterior tip of the gaster.

Male. — Unknown.

Distribution. — The present species appears to be generally distributed in the Western half of Northern and Central Argentina, from Tucumán to San Luis. A single worker was taken in La Pampa, and a stray female comes from Misiones. Quite a few records are based upon isolated workers, about

the identity of which one can never be absolutely sure, it is advisable to point out that definite records for the species (based on soldiers and females) are restricted to the provinces of Misiones, Catamarca, and La Rioja.

Specimens examined: 34; 21 workers, 6 soldiers, 7 females, as follows: Misiones: loc. unknown: 1 female [WWK]. — Tucumán: Tucumán, Shipton: 2 workers (lectotype and topotype of *peltatus ellenriederi* var. *tucumana* Forel) [MACN]. — Catamarca: Amando, Jan. 17, 1923: 2 workers [WWK]. Hualfin, Weiser: 9 workers, 5 soldiers, 5 females (lectotype and paratypes) [MACN, WWK]. La Cienaga, Belén, Weiser & Wolters: 1 soldier [WWK]. Nacimientos, Dec. 20, 1922, Weiser: 1 worker (= *guttatus* Santschi, 1929) [WWK]. — La Rioja: loc. unknown: 1 female [WWK]. S. Rovareto: 1 worker [MACN]. — Córdoba: Alta Gracia, La Granja, Jan. 1922; Bruch: 1 worker [MACN]. — San Luis: Alto Pencoso, Represa del Carmen, Bruch: 4 workers (= *peltatus ellenriederi* Forel, 1914, Bruch 1916) [MACN]. — La Pampa: Cuchillo có: 1 worker [MACN].

Variation. — According to the presently available material of this still poorly known species, individual variability is not very pronounced. Variation in soldiers limits itself almost exclusively to color. In smaller specimens the median black area of the excavated portion of head disc is larger, in larger specimens very small or almost absent, in which case the entire cephalic disc is orange-colored. Size and shape of the gastric spots are quite variable, yet not a single specimen showed confluence of the pair of spots on the same side of the tergite, mentioned for the specimen seen by Santschi. Neither did any specimen exhibit the pruinose condition (originating from a secretion of the integument) which struck Santschi and inspired the choice of the name. In the worker caste, the main source of variability is provided by the size, shape, and arrangement of the lateral teeth of the thorax.

Synonymical note. — Although the present species is noticeably distinctive in the soldier and female castes, workers have been confused with those of *peltatus* (= *jheringi*). Indeed, the similarity is exasperatingly close. No clear-cut, tangible distinctive characters have been found so far, although separation of the two species can be made, almost intuitively, after one becomes familiar with them. I have synonymized Forel's *peltatus ellenriederi* var. *tucumana* (based on worker specimens alone!) with the present species, although it is a mixed form, founded upon several stray specimens, two cotypes presenting *bivestitus* features, the third definitely belonging to *peltatus*, with characters of what has been termed var. *gaudens* by Santschi. As Forel's description fits better the *bivestitus* specimens, and in order to get rid of this untenable and cumbersome variety, I select the lectotype, as follows: *P. (H.) peltatus ellenriederi* var. *tucumana* (Forel) [= *P. (H.) bivestitus* (Santschi).]

Santschi's "*guttatus*" (lapsus for *guttifer*!) of 1929 likewise belongs to *bivestitus*, according to the specimen received from Father Borgmeier, who had obtained it from Santschi.

15. *Paracryptocerus* (*Harnedia*) *bruchi* (Forel)

(Figs. 3, 23, 24)

Cryptocerus bruchi Forel, 1912, Mém. Soc. Ent. Belg. 19 : 202-203 (worker; Catamarca: Huasan). — Bruch, 1914, Rev. Mus. La Plata 19 : 218.
Cryptocerus (*Cryptocerus*) *bruchi* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 309.
Cryptocerus ridiculus Santschi, 1915, Bull. Soc. Ent. France, pp. 207-208, fig. (soldier; Santiago del Estero: Chaco). — Bruch, 1915, Rev. Mus. La Plata, 19 : 530. — Bruch, 1917, Physis 3 : 269-270, figs. (soldier, female; Santiago del Estero). — Santschi, 1921, An. Soc. Cient. Argent. 92 : 128 (Santiago del Estero: Añatuya, Tintina, Icaño). [n. v. syn.]
Cryptocerus (*Cryptocerus*) *ridiculus* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.
Cryptocerus (*Cryptocerus*) *jheringi pampaensis* Santschi, 1931, An. Soc. Cient. Argent. 112 : 277-278 (soldier, worker; La Pampa: Monte Nievas). [n. v. syn.]
Paracryptocerus bruchi Kusnezov, 1953, Act. Zool. Lill. 13 : 238 (Tucumán).

Several unique characters render the present species remarkably distinctive. Workers resemble to a certain extent *peltatus*, as regards the outline of the thorax, but may easily be separated from the latter species by the larger size, the strongly upturned lateral borders of the head and the shape of the peduncular segments. Soldiers and females have no real close relative, being quite peculiar as regards the shape and sculpture of head, and the outline of the thorax. Also the larger size removes them effectively from the remaining species, excepting only *prodigosus*, which, however, disagrees completely in the shape and the sculpture of the head disc.

Types. — The lectotype of *bruchi*, a single worker in the Bruch collection, taken by Bruch himself in Huasan, province of Catamarca, in a dead twig in a bird's nest, at an altitude of 1300 m. [MACN]. A paratype of the same species is in the Forel collection [MHNG], but was not examined. Type material of *ridiculus*, taken by E. R. Wagner in the Chaco of Santiago del Estero, is presumably in the Santschi collection or in the Museum of Paris. Specimens of the same species, taken at the same place by the same collector are in the Bruch collection [MACN], and may possibly belong to the type series. A large type series (syntypes or nidotypes) of *jheringi pampaensis* is deposited in the Bruch collection [MACN].

Worker [Fig. 3]. — Total length 5.1-6.0 mm; maximum length of head 1.35-1.61 mm; of thorax 1.61-1.82 mm (lectotype measurements: 5.9, 1.53, 1.82). Measurements of a single worker-soldier intermediate: 6.8, 1.75, 2.02 mm. Black; frontal carinae pale testaceous; tip of scape, and apical tarsites fuscous-ferruginous.

Head subopaque, subquadrate, its maximum length usually scarcely shorter, sometimes longer, than the interocular width. Mandibles rugulose. Frontal carinae semitransparent, their lateral

border scarcely crenulate, nearly straight-edged, and conspicuously diverging caudad. Sides of head strongly upturned into a perpendicular position, forming on the inside a longitudinal furrow starting at some distance in front of the eyes and reaching back to the occipital lobes, which are obliquely truncate, with the edge sometimes slightly notched and bearing on the inner corner a strong, opaque, flat, triangular tooth. Eyes bulging, considerably convex, their greatest diameter less than one fourth of maximum head length. Occipital border concave. Upper face of head gently and evenly convex discad, finely reticulate-punctate, more sparsely covered with squamiferous foveolae. Lower face of head reticulate-rugose discally.

Thorax subopaque. Anterior border gently arcuate. Shoulders subdentate. Sides of pronotum with a tridentate, sharply marginate border, converging caudad. The anteriormost tooth of this border acute and large, the second tooth obtuse, the third subrectangular. Promesonotal suture obsolete. Mesonotum with a blunt, tuberculate tooth on each side. Mesoepinotal suture usually, not always, distinct and slightly impressed. Epinotum sharply marginate on each side, the anterior corner of basal face forming an obtuse tooth followed by a larger, triangular platelike tooth. Declivous face continuous with the basal face, both forming, in profile, an almost even curvature. Dorsum of thorax finely reticulate-punctate, rather densely covered with somewhat elongate squamiferous foveolae. A few very short longitudinal costulae on the anterior border of epinotum in specimens that show a distinct mesoepinotal suture. The lower half of the laterotergite of pronotum longitudinally striate. The greater part of the thoracic pleura more or less longitudinally reticulate-rugose.

Peduncular segments subopaque, the dorso-lateral sculpture as on thorax. Petiole scarcely narrower than postpetiole, its anterior face obliquely truncate, finely reticulate-punctate and slightly shining, lacking all kind of macrosculpture and pilosity. Anterior corners of petiole rounded, continued laterally by a stout, strongly recurved, sharply pointed lateral spine. Postpetiole with slightly concave anterior border, bearing on each side an even more strongly recurved and pointed spine, resembling a pigeon wing. Upper face of postpetiole convex, often vestigially acuminate discally.

Gaster short, oval, rather shining, its median length usually scarcely exceeding the maximum width, deeply excised anteromesally, between the submarginate, strongly projecting antero-

lateral gastric lobes. First tergite finely reticulate-punctate, with sparse piligerous punctures.

Standing hair confined to the apex and venter of gaster. Scalelike hair of head and thorax and peduncle canaliculate and appressed; of gaster simple, thin, but appressed.

Soldier [Fig. 23]. — Total length 8.4-10.6 mm; maximum length of head 2.39-3.10 mm; of thorax 2.50-2.96 mm. Black; antero-lateral corners of head to a variable extent fuscous yellowish-red; tip of scape, apical funicular segments, extensor face of tibiae and apical tarsites fuscous-ferruginous.

Head shining, subquadrate, little or scarcely broader than long, without a distinct, completely marginate disc above. Antero-lateral borders vestigially crenulate, posterior border sharply marginate above the truncate occiput, postero-lateral border of upper face immarginate, i. e. the disc surface is continuous with the occipital lobes. Dorsum of head scarcely convex, almost flat, slightly excavated antero-laterally above the antennal scrobe. Clypeal sutures and midfrontal suture well marked, the latter extending beyond the middle of head. Occipital lobes terminating in a stout, solid tooth. Eyes little convex. Lower border of cheeks carinate. Upper face of head and sides finely punctate, with sparse squamiferous, rounded foveolae, separated from each other by a distance which exceeds their own diameter. Lower face of head foveolate. Cheeks and mandibles reticulate-rugose and foveolate.

Thorax less shining than head. Pronotum nearly as broad as head, its anterior angle with a stout tooth, which is blunt at apex. Sides of pronotum gently sinuous, gently converging caudad, the posterior corner rounded. Transverse pronotal carina bisinuate, bluntly edged, interrupted in the middle. Promesonotal suture vestigial. Lateral lobes of mesonotum obliquely truncate, immarginate. Mesoepinotal suture distinct and impressed. Basal face of epinotum with a little projecting, broad, rounded lobe on each side, and a stronger, apically rounded tooth on the posterior corner, projecting upward and obliquely laterad. Declivous face about twice as long as basal face, slightly excavated discally, immarginate at the sides. Sculpture of dorsum of thorax as on upper face of head, the microsculpture being a bit stronger, and the foveolae more crowded. Sides of thorax with more elongate foveolae, and a reticulate-rugose area on the posterior half. Middle and hind metatarsi slightly broadened and flattened at base.

Peduncular segments subopaque, the dorso-lateral sculpture as on dorsum of thorax. Postpetiole distinctly broader than petiole. Lateral spines of both segments equally recurved, their apices not very acute.

Gaster rather short, oval, subopaque, its greatest width at the middle of its length. Shallowly emarginate antero-mesally, the antero-lateral lobes much less projecting than in worker. First tergite finely, but sharply and densely punctate, with sparse, piligerous punctures.

Scalelike hair in the foveolae, as a rule, short and inconspicuous, especially on head, more visible and longer on pronotum and sides of thorax. Very small and simple on first gastric tergite. Standing hair, as usual, in this caste, confined to the tip and venter of gaster.

Female [Fig. 24]. — Dealate. Total length 11.0 mm; maximum length of head 2.5 mm; of thorax 3.25 mm. For the rest as in Bruch's (1917: 269-270) original diagnosis, who describes this caste quite adequately, as follows:

"Largo, 11 milímetros. De igual coloración que el soldado, es decir negra, la región anterior de la cabeza, las antenas y patas de un moreno rojizo. Bastante lustrosa: el abdomen es más opaco, debido a su superficie de una puntuación reticulada, más pronunciada que sobre la cabeza y el tórax. Éstos están cubiertos de gruesos puntos impresos o fosetas, algo mayores sobre la cabeza y que son asimismo más grandes que en el soldado, pero más pequeños y menos profundos en el abdomen. Cada fosea lleva un pelo plateado, corto y adyacente, mucho más fino en el abdomen, que tiene también algunas setas en su extremidad. La cabeza es cuadrada; como en el soldado, algo más pequeña (2,5×2,5 mm); sus costados son también paralelos, los ángulos posteriores rectos, los bordos ligeramente sinuosos y no crenulados; existe también la débil arista en el tercio inferior del bordo posterior. Los ocelos, despuestos en triángulo regular, son apenas mayores que el tamaño de las fosetas. El tórax es como la mitad más largo que ancho (3,1×2,2 mm.); todo mas estrecho que el del soldado. Los dientes laterales del epinoto son más angostos. Los dos nudos del pedúnculo son bastante más largos, el primero es apenas dentado lateralmente; el segundo, o postpetiolo, como en el soldado. El abdomen es dos veces más largo que ancho, cilíndrico y también fuertemente escotado a la base. Ancho del pronoto 2,2 mm., del epinoto 1,2 mm., del abdomen 2,2 mm.; largo del tórax 3,2 mm., del abdomen 5 mm."

Male. — Unknown.

Distribution. — The present species, which is apparently endemic to the Argentine territory, has been recorded from the following provinces: Formosa, Tucumán, Santiago del Estero, Catamarca and La Pampa.

Specimens examined: 31; 18 workers, 12 soldiers, 1 female, as follows: Formosa: Las Lomitas, N. Kusnezov: 1 worker [ML]. — Tucumán: Tapia, N. Kusnezov: 3 workers [ML, WWK]. — Santiago del Estero: loc. and date unknown, Wagner: 2 workers, 3 soldiers, 1 female (probably not belonging to the same nest series; some of them possibly nidotypes of *ridiculus*) [MACN, WWK]. Girardet, date unknown: 1 worker [WWK]. — Catamarca: Huasán, Febr. 3, 1912, C. Bruch: 1 worker (lectotype of *bruchi*) [MACN]. loc. and date unknown, Bruch: 1 worker [MACN]. Andalgalá, C. Bruch: 1 worker [MACN]. loc. and date unknown, Gomez: 1 worker [WWK]. — La Pampa: Monte Nievas, J. Belsak: 8 workers, 9 soldiers (syntypes or nidotypes of *iheringii pampaensis*) [MACN].

Variation and synonymical notes. — in his original description (1915, p. 208), Santschi presents the *ridiculus* soldier as a close relative of *bruchi*, then known only in the worker caste. The relationship between both forms is not only that of extreme similarity, but also that of specific identity, as proved by a small nest series of "*ridiculus*" soldiers and "*bruchi*" workers in the Bruch collection. There is not the slightest doubt concerning the presently proposed synonymy.

The mere fact of Santschi proposing *pampaensis* as a subspecies pertaining to *iheringi* demonstrates conclusively that this author did not possess a clear concept of the latter species. As will be shown below, *iheringi* is the senior synonym of *peltatus*, widely distributed over the northern half of Argentina, and conspicuously different from *pampaensis*, as follows: a) Worker. 1. Sides of head subparallel, not strongly upturned above eyes, the latter not conspicuously convex; 2. declivous face submarginate laterally, not crested; 3. peduncular segments with much shorter spines, which are scarcely recurved at apex; 4. shape of gaster. b) Soldier. 1. Much smaller in size, largest specimen not reaching 8 mm in total length; 2. cephalic disc subopaque with larger, nearly contiguous foveolae, the intervals between the pits narrower than the diameter of the pits; 3. cephalic disc usually completely marginate, especially in larger full-grown soldiers; 4. thorax subopaque, strongly sculptured; 5. peduncular segments and gaster of different shape.

On the other hand, the only differences between *pampaensis* and *ridiculus* soldiers consist, both according to Santschi's own admission and the examination of the specimens by myself, in a slight divergence in size, color, and shape of the posterior epinotal teeth. The contrast in size is not very impressive, if one compares the respective ranges in total length: "*ridiculus*" 9.7-10.6 mm; "*pampaensis*" 8.4-10.0 mm. The darker color of *pampaensis* is likewise not decisive, since the lightly colored *ridiculus* type is certainly a callow. Incidentally, Santschi himself (1921) makes mention of a *ridiculus* soldier from Icaño, Santiago del Estero, distinctive by smaller size (8.5 mm) and darker color. Even the third character, difference in shape of the epinotal tooth, breaks down, if one examines the original nest series of *pampaensis*. First of all, the development of this tooth is variable from individual to

individual, and secondly, specimens with rather short and little projecting tooth, are also otherwise modified, bearing on the sides of the mesonotum rudimentary wings stubs, or showing pits from which wings would arise. These individuals are not soldiers in the strict sense, but dinergatogynes, intermediates between the soldier and female caste. In conclusion, *pampaensis* is not only related to *ridiculus* (= *bruchii*), but cannot even be accorded racial status, on account of the lack of decisive characters.

Concerning the workers of the *pampaensis* series, all of them agree by having the sides of head more divergent caudad, the head itself being more elongate. These features, however, may be found sporadically in workers of *bruchii* from other localities. In general, workers show little constancy in the following characters: absence or presence of mesoepinotal suture, proportions of gaster, middorsal tooth on peduncular segments, distinctness of foveolae on head disc, degree of divergence of sides of head.

16. *Paracryptocerus* (*Harnedia*) *prodigiosus* (Santschi)

Cryptocerus (*Cyathocephalus*) *prodigiosus* Santschi, 1921, An. Soc. Cient. Argent. 192 : 124-125 (soldier, female; Santiago del Estero: Rio Salado, near Icaño, Rio Dulce).

This species is known only from the type specimens, two soldiers and two females, which were not available for the present review. To judge from the description alone, it seems that *prodigiosus* represents an independent species, characterized by the ensemble of the following characters: Soldier. — Large size (9 mm); black; head disc, pronotum, lateral lobes of mesonotum, knees, tibiae and tarsi light red. Head and thorax coarsely costate, reticulate-rugose and foveolate. Head surmounted by a saucerlike, excavated, oval disc, the lateral borders of which are strongly upturned, and the center of which is slightly convex. First peduncular segment narrower than second. — Female. — Length 12 mm; color and head disc as in soldier. Mesonotum reddish. Head disc more elongate, the sides almost straight.

Type s. — Soldiers and females from Santiago del Estero: Rio Salado near Icaño, E. R. Wagner leg., deposited in the Museum of Paris. Rio Dulce, in the Collection Le Moult (Museum of Paris?).

For the sake of recognition I wish to transcribe Santschi's description:

Soldier. — "Long. 9 mm. (tête fléchée 7,8 mm.). Noir. Tête, pronotum angles du mésonotum, genoux, tibias et tarses d'un rouge assez clair, plus brunâtre sur les membres, plus jaunâtres sur le devant de la tête. Mat. Tête et thorax grossièrement ridé, réticulé, rugueux, dont

les mailles circonscrivent de grosses fossettes confluentes, plus irrégulières vers le bord de la tête, manquant sur la face déclive de l'épino-tum; plus petites et irrégulières sur le pédoncule. Gastre densément et finement ponctuée avec des fossettes très peu imprimées sauf vers la base. Une pilosité couchée, épaisse, claviforme, occupe les fossettes de la tête et du thorax et les membres, la pilosité du gastre est beaucoup plus fine. Quelques longs poils dressés sous et vers l'extrémité de l'abdomen.

Dessus de la tête cupuliforme, ovale; un cinquième plus longue que large. Ses bords sont assez fortement relevés sur les côtés et devant, plus faiblement derrière, échancrés dans le tiers médian du bord antérieur, faiblement et irrégulièrement crénelés. Le centre de la cupule est légèrement convexe. Les angles postérieurs de la tête se prolongent un peu en un lobe triangulaire et mousse que débordent le disque. La fente antennaire atteint l'œil. Le pronotum a une crête transversale interrompue qui aboutit latéralement aux épaules unidentées en formant comme un petit feston. Mésonotum la double plus large que long, ses côtés saillants et mousses. La face basale bidentée vers l'angle postérieur, trois fois plus large que longue au milieu. La face déclive transversalement concave et subbordée. Les deux noeuds du pédoncule disposés comme chez *Iheringii* Em. soldat; le premier noeud plus étroit que le deuxième, avec une petite dent latérale dirigée en arrière. Le gastre ovale, très allongé. Cuisses épaisses, mais non brusquement renflées".

Female. — "Long. 12 mm. Couleur comme chez le soldat, mais, en plus, le mésonotum est taché de rouge. Le disque céphalique est moins ovale, les côtés plus droits et le tout plus allongé; le bord postérieur moins saillant. Une dent, à l'épaule pronotale, non suivie de lobe. Une dent épino-tale précédée d'une saillie à peine indiquée. Les noeuds plus étroits que chez le soldat. Le gastre très allongé, à côtés parallèles".

17. *Paracryptocerus* (*Harnedia*) *jheringi* (Emery)

(Figs. 5, 12, 14; Pl. 2 Fig. 2; Pl. 3 Fig. 6)

- Cryptocerus jheringi* Emery, 1894, Bull. Soc. Ent. Ital. 26 : 205-206, pl. 3, figs. 13, 14 (soldier, worker; Brazil: Rio Grande do Sul; Paraguay); 1894, in v. *Jhering*, Berl. Ent. Zs. 39 : 384 nota, fig. (worker, soldier; Brazil: Rio Grande do Sul). — Bruch, 1915, Rev. Mus. La Plata 19 : 530 (Tucumán).
- Cryptocerus* (*Cryptocerus*) *jheringi*, Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio de Janeiro 29 : 118.
- Paracryptocerus jheringi*, Kusnezov, 1953, Act. Zool. Lill. 13 : 238 (Tucumán).
- Cryptocerus peltatus* Emery, 1896, Zool. Jahrb. Syst. 9 : 633-634, fig. D (soldier, female; Paraguay: San Salvador). [n. o. v. syn.]
- Cryptocerus* (*Cryptocerus*) *peltatus* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.
- Cryptocerus peltatus ellenriederi* Forel, 1911, Sitz.-Ber. Bayer. Akad. Wiss. pp. 258-259 (soldier, female, worker; Argentina, Santa Fé: Rosario). — Forel, 1912, Mém. Soc. Ent. Belg. 19 : 202 (Buenos Aires). — Forel, 1913, Bull. Soc. Vaud. Sci. Nat. 49 : 235 (Santa Fé: Rosario). — Bruch, 1914, Rev. Mus. La Plata 19 : 218. — Bruch, 1916, Rev. Mus. La Plata 23 : 321-322, fig. 13 (in part, excepting the specimens from San Luis, Represa del Carmen). [n. o. v. syn.]
- Cryptocerus* (*Cryptocerus*) *peltatus ellenriederi* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.
- Cryptocerus peltatus ellenriederi* var. *jocans* Forel, 1913, Bull. Soc. Vaud. Sci. Nat. 49 : 235 (soldier; Catamarca). — Bruch, 1914, Rev. Mus. La Plata 19 : 218. [n. o. v. syn.]
- Cryptocerus* (*Cryptocerus*) *ellenriederi* var. *jocans* Emery, 1922, Gen. Insect. Hym. fasc. 174c, p. 310.

Cryptocerus peltatus ellenriederi var. *gaudens* Santschi, 1922, An. Soc. Cient. Argent. 94 : 255-256 (soldier, worker, female; Córdoba: Alta Gracia).
[n. o. v. s. y. n.]
Paracryptocerus peltatus ellenriederi Kusnezov, 1953, Act. Zool. Lill. 13 : 238 (Tucumán).

The present species, which is perhaps the most common Argentine form of the genus, offers serious taxonomic problems, on account of its perplexing variability in all castes, and its striking similarity to *bivestitus* and *fossithorax* in the worker caste. From these two species soldiers and females of *jheringi* may immediately be separated by the shape of the head disc (*bivestitus*) and by the form of the setae, projecting from the rim of the cephalic disc (*fossithorax*).

Types. — The type series (one soldier and several workers) of *jheringi* was captured by Prof. H. von Jhering in the State of Rio Grande do Sul, Brazil, probably either at Taquara or at S. Lourenço, although neither Emery nor von Jhering indicated the exact locality. In the original description Emery also mentions a worker specimen from Paraguay, which despite its significantly smaller size is associated with the same species. This specimen, however, may not be taken as a type. The syntypes of both *jheringi* and *peltatus* s. str. are supposed to be in the Emery collection, presently in the custody of the Museo Civico di Storia Naturale, Genova, Italy. Yet Dr. Delfa Guiglia, curator of Hymenoptera of the aforesaid institution, wrote to me in 1949, that the specimens cannot be found in that collection. Syntypes of *ellenriederi* are in the Forel collection [MHNG] (2 workers examined in 1950) and in the Bruch collection [MACN] (1 soldier examined). The holotype of the var. *jocans*, a unique, is also in the Forel collection, but was not seen. Syntypes of the var. *gaudens* are presumably deposited in the Santschi collection (not seen) and a good series of syntypes or nidotypes, including forms of all castes of the same variety, is in the Bruch collection [MACN] and my own (one soldier, received from Father Borgmeier) [WWK].

Worker [Fig. 5]. — Total length 3.9-5.6 mm. Maximum length of head 1.10-1.53 mm; of thorax 1.10-1.57 mm. Maximum width of head, as measured in front of the eyes, 1.0-1.39 mm. Black; frontal carinae testaceous, occasionally somewhat infuscated; tip of mandibles and scape, the first funicular segment, extensor face of tibiae, and apical tarsites ferruginous, often quite infuscated.

This caste defies all attempts of characterization due to its great variability and close likeness to *bivestitus* and *fossithorax*. I have been unable to detect one single feature that would allow for a clear-cut separation. Hence an identification of this caste, without accompanying soldiers or females from the same nest, is liable to mistakes. Instead of giving a lengthy and meaningless description I want to state a few characters which, in my opinion, will serve as a probable criterion for determination of isolated workers.

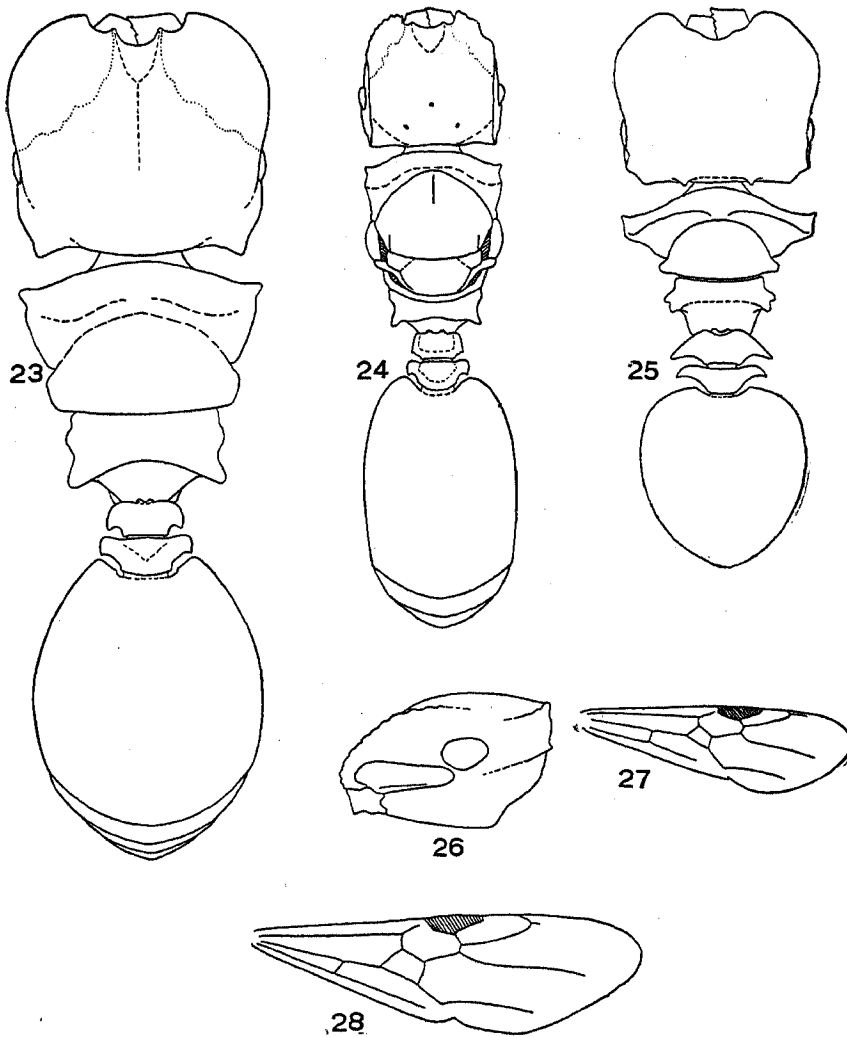
1. Head subquadrate. Cephalic index (maximum width of head, as measured in front of the eyes, over maximum length, as measured from the anteriormost extension of frontal carinae to posteriormost tip of occipital lobes): 0.86-0.95 (*bivestitus*: 0.82-0.86; *fossithorax*: 0.88-0.90). Sides of head usually somewhat emarginate in front of eyes, with a blunt projecting angle or tooth at the anterior end of the emargination (rarely so in *bivestitus*!). This feature is more pronounced in workers with a more elongate head.

2. Lateral border of pronotum with a sharp, not foliaceous nor crenulate crest, which, as a rule, is distinctly tridentate; the anteriormost tooth triangular and acute, the second very obtuse, the third (posterior corner of pronotum) subrectangular.

3. Border of antero-lateral gastric lobes submarginate to marginate. As a rule more strongly compressed dorso-ventrally, i. e. more platelike, than in *bivestitus* and *fossithorax*, where the border does not form a distinctly marginate edge, and the lobes are thick and solid. Specimens of *peltatus* from Tucumán and Córdoba have the antero-lateral lobes partly in the form of a thin plate, with their border forming a thin edge, the lobe being often partly semidiaphanous. This character is even more pronounced in the Brazilian specimens.

4. Peduncular segments sometimes (especially in Western and Southwestern specimens!) unequal in width, the petiole being conspicuously narrower than postpetiole.

Soldier [Fig. 12]. — Total length 5.5-7.9 mm (specimens under 6.0 mm are generally intermediates between this and the worker caste); maximum length of head disc 1.61-2.25 mm; of thorax 1.61-2.14 mm. Maximum width of head disc 1.50-2.07 mm. Black; yellowish-brown to testaceous: antero-lateral portions of head disc, or nearly the entire head disc, both dorsally and the sides (in this case, there is usually a median black spot on the center of the disc, near the vertex of the clypeal triangle), antero-lateral portions of pronotum, extensor face of tibiae; ferruginous: tip of mandibles and scapes, first funicular segment, the four apical tarsites. In darker specimens the yellow color may be substituted by ferruginous, and the ferruginous color by fuscous-ferruginous. A single soldier from Tafi Viejo, Tucumán, of an otherwise completely black series, has a quadrimaculate gaster.



Genus *Paracryptocerus*. Fig. 23. *P. bruchi*, soldier in dorsal view (Santiago del Estero). — Fig. 24. *P. bruchi*, female in dorsal view, drawn to a smaller scale (Santiago del Estero). — Fig. 25. *P. ? eduarduli*, soldier in dorsal view (Chaco). — Fig. 26. *P. quadratus*, soldier, head in lateral view (holotype). — Fig. 27. *P. fiebrigi*, female, fore wing (Córdoba). — Fig. 28. *P. litogaster*, female fore wing (Catamarca). — (Kempt del.)

Head disc subquadrate to subrectangular, completely marginate round its scarcely raised, somewhat crenulate border; the anterior corner rounded, the posterior corners either obliquely truncate or rounded. Floor of disc rather flat, slightly excavated antero-laterally. In profile, the sides of the head do not cover

the dorsum of the cephalic disc, and the distance between the upper border of the eye and the rim of the disc is much less than the diameter of the eye. Sides of disc subparallel. Occipital border straight in smaller specimens, rounded in larger specimens. Occipital lobes either bluntly rounded, or angulate or even subdentate. Floor of disc, sides of head and occiput reticulate-punctate and foveolate in smaller specimens, whereas in larger specimens the foveolae are close together and the intervals form a network of raised rugosities. Lower face of head reticulate-punctate with sparse, elongate foveolae, and a few rugosities antero-laterally.

Thorax subopaque. Shoulders dentate. Sides of pronotum at the level of the usually vestigial, never strongly marked nor crested transverse carina, forming a blunt angle, the posterior corner of the pronotum being subrectangular. Mesonotum with a subtruncate projecting lateral lobe. Mesoepinotal suture distinct, scarcely impressed mesally. Sides of basal face of epinotum usually with two lateral, angulate or rounded and slightly projecting lobes and a stouter tooth at the posterior corner. Declivous face slightly excavated, its sides marginate. Mesopleural tooth absent. Sculpture, in general, as on head, but the foveolae are smaller, the intervals often shining. Laterotergite of pronotum longitudinally costate at the lower half. Pleura more or less rugose.

Peduncular segments usually equal in width (not always, sometimes the postpetiole is distinctly broader!). Postpetiole greatly convex middorsally. Gaster elongate-ovate. Antero-lateral lobes solid, submarginate, not crested. First tergite finely reticulate-punctate, the anterior fifth having fine longitudinal rugosities. Piligerous punctures scarcely impressed, inconspicuous.

Pilosity, in general, not differing from that of *bivestitus*, and *fossithorax*, with the exception of the following: Foveolae of head disc with short, thick, more or less decumbent hair, the free end of which does usually not project beyond the rim of the pit. Rim of cephalic disc with sparse, thick, subclavate, projecting setae. Scalelike hair of thorax, peduncle, and gaster appressed.

F e m a l e [Fig. 14]. — Total length 8.4-8.9 mm; maximum length of head 1.85-2.03 mm; of thorax 2.46-2.53 mm. Black; the following yellowish-brown: antero-lateral portion of head disc (variable as regards extension, occasionally the entire rim of disc and the sides may be included), a narrow, elongate spot

on the shoulder, usually (not always, variation i. e. absence of spots noticed in female specimens of a colony that usually have them!) four spots on the first gastric tergite, extensor face of tibiae. Scape and tarsites more or less fuscous-ferruginous.

Same diagnostic features as in soldier, excepting the following characteristics: Head disc distinctly more elongate. Shape of peduncular and epinotal teeth quite variable, not always as shown in fig. 14. Mesopleural tooth always present, but sometimes very small. Wings somewhat infuscated, veins brown. Venation of fore wing not significantly different from that of *liogaster*. Fore wing, when folded over the back, projects a little over the apex of the normally contracted gaster.

Male. — Specimens of this caste, which is still undescribed, are available belonging to the series which was described as var. *gaudens* by Santschi. They will be treated in another study.

Distribution. — The species, as presently defined, is known to occur in Southern Brazil, State of Rio Grande do Sul, in Southern Paraguay, and in the Argentine provinces of Buenos Aires, Entre Rios, Santa Fé, Formosa, Tucumán, Catamarca and Córdoba.

Specimens examined: 185; 143 workers, 33 soldiers, 7 females and 2 males, as follows: Brazil, State of Rio Grande do Sul, locality unknown (from Coll. E. Wasmann): 1 worker (Emery det.) [NHMW]. Nova Petrópolis, 1928, P. Buck, S. J.: 2 workers, 1 soldier [WWK]. Campinas, near Erechim, Dec. 1954, G. Mazurana: 4 workers [WWK]. — Argentina, Buenos Aires: San Isidro: 9 workers, 6 soldiers [MACN, WWK]. Isla Martin Garcia: 12 workers, 1 female [MACN, WWK]. Tigre, Lizer: 1 worker [MACN]. Loc. unknown: 1 worker [MACN]. — Santa Fé: Rosário: 2 workers, 2 soldiers (1 soldier is labelled "*peltatus ellenriederi* Forel, cotypus"), 1 female [MACN]. Corunda: 1 worker [MACN]. — Entre Rios: Estación Gilbert: 3 workers, 1 soldier [MACN]. Paraná, Febr. 4, 1931, J. F. Sallelas: 1 female [MACN]. Loc. unknown: 6 workers, 2 soldiers [MACN]. — Formosa: Las Lomitas, N. Kusnezov: 2 workers [ML]. — Salta: Cafayate, N. Kusnezov: 1 worker [ML]. Guemes: 2 workers, 1 soldier [MACN]. Loc. unknown, Weiser: 1 worker [MACN]. — Catamarca: Santa Maria: 2 workers [MACN]. La Cienaga, Belén, 1926, Weiser & Wolters: 3 workers [MACN, WWK]. Punta Balasta, Weiser: 1 worker [MACN]. — Tucumán: Tafi Viejo, Aug. 17, 1954, N. Kusnezov: 67 workers, 8 soldiers, 2 females [WWK, MACN]. Loc.

unknown: 1 worker (labelled "*peltatus ellenriederi* var. *tucumana* Forel, cotypus") [MACN]. — Córdoba: Alta Gracia, La Granja, Sierra de Córdoba, Febr. 1922, C. Bruch: 6 workers, 5 soldiers, 3 females, 1 male (*peltatus ellenriederi* var. *gaudens* Santschi, nidotypes or syntypes) [MACN, WWK]. Same locality and collector, Jan. 1922-Febr. 14, 1925: 13 workers, 7 soldiers, 1 male [MACN, WWK].

Variation and synonymical notes. — Although I did not manage to see the types of *peltatus* s. str. for reasons pointed out above, I take the risk of proposing the subspecies *ellenriederi* Forel as a synonym of the former. The differential features of the latter as indicated by Forel and shown by the types by no means exhibit any significant deviation from the description and figures of *peltatus* Em.

According to Forel, the peculiarities of *ellenriederi* soldiers that distinguish them from the typical *peltatus*, are as follows: 1. Rounded, not obliquely truncate, postero-lateral border of cephalic disc. 2. Rounded, not obliquely truncate occipital lobe. 3. Absence of a marked transverse pronotal carina. 4. Sides of basal face of epinotum without a strongly projecting lobe. 5. Presence of a rather sharp margination on the anterior border of the antero-lateral gastric lobes. An examination of a greater quantity of topotypical material of *ellenriederi*, from the provinces of Santa Fé, Entre Rios and Buenos Aires, reveals that none of aforesaid features represents a stable condition. To the contrary, the form exhibits its foremost variability precisely in these characters, which cannot be used for separating taxonomically diverse entities. The same may be said about the diagnostic characters, pointed out for the *ellenriederi* female: 1. less distinctly marginate posterior border of head disc; 2. lack of a projecting tooth on the upper border of antennal scrobe; 3. lack of the four light spots on the first gastric tergite. They also break down, when larger series are considered.

The var. *jocans*, based on a unique stray soldier specimen from Catamarca (holotype in the Forel collection, was not seen), in my opinion, represents nothing but a more fully grown soldier of *peltatus*, of the lighter color variety. It should be noted that both *peltatus* and *ellenriederi* were originally described upon rather small soldier specimens. The present variant does not deserve taxonomic standing.

Santschi's variety *gaudens* is by far the most distinctive variant of *peltatus*, and I hesitated for some time in synonymizing it. This form was described on a fair nest series of all castes, taken in Alta Gracia, province of Córdoba, where it has subsequently been taken on several occasions. Soldiers are characterized by relatively larger size (6.3-7.9 mm), more elongate head disc, with the sides either strongly converging caudad (type series) or subparallel (other series from type locality). The occipital lobes are always angulate, often subdentate, the occipital half of the rim of the head disc forming a semicircular curvature. The transverse pronotal carina, broadly interrupted mesally, is always visible and marks the vertex of the pronounced angle formed by the dorsum of thorax, as seen in profile. Petiole always clearly narrower than postpetiole, the lateral spines of both segments more pointed and more acute. This variant is darkest in color. Soldiers of the type series have the head disc dark reddish-brown, and the extensor face of tibiae fuscous-testaceous. Other series are nearly piceous black and quite

shining, with a strongly infuscated reddish brown spot on the head disc above the antennal scrobe and having the rim of the head of the same color. Females with the same characters, the shoulders lacking a light spot. Workers appear to be characterized by the petiole, which is much narrower than the postpetiole, the more projecting and pointed teeth of thorax and peduncle, the more pronounced constrictions of the thorax and the usually well marked excision of the lateral border of head, in front of the eyes. Also the antero-lateral lobes of the gaster are strongly depressed, plate-like, and semidiaphanous.

Females and soldiers of this form are known only from the type locality, whereas isolated workers from Catamarca: Punta Balasta, La Cienaga; Salta: loc. unknown; Tucumán: rejected syntype of "var. *tucumana*" are tentatively referred to the same variant. However, I refrain myself from giving this form taxonomic recognition, because none of its characters are of absolute value, and among the more generalized *peltatus* stock of Argentina specimens are found that bridge the narrow gap in one or more characters. Yet the final word on the var. *gaudens* can be said only after much more material has been collected and painstakingly studied.

Forel's variety *tucumana*, described upon several stray specimens of at least two distinct species, has been synonymized with *bivestitus*, by proper lectotype selection, as stated on a foregoing page.

Finally, after a long period of hesitation, I decided to synonymize *peltatus* (*sensu novo*) with *jheringi*, a species hitherto known principally from Rio Grande do Sul, Southern Brazil. The knowledge of the latter species is based upon little more than a dozen individuals, mainly workers, and only two soldiers. After a careful examination of 7 workers and 1 soldier of *jheringi* from three different localities, I reached the conclusion that it may not be kept separate from *peltatus*. Indeed, not a single tangible character exists to permit a sound differentiation between both forms. The workers from Rio Grande do Sul agree both in size and general features with those from the Argentine Republic, and their measurements are as follows: Total length 4.8-5.5 mm; maximum length of head 1.28-1.46 mm; maximum length of thorax 1.39-1.60 mm; cephalic index 0.90-0.95. The only differences that distinguish them from most (not all!) Argentine specimens, lie in the scarcely excised lateral border of head in front of the eyes, in the slightly more expanded pronotum, the sides of which converge more strongly behind the second lateral tooth, and in the more pronouncedly lamellate antero-lateral borders of the gaster, which is also shorter and broader [Pl. 2, Fig. 2]. Both soldier specimens known are distinctive by the incompletely marginate cephalic disc, which lacks the postero-lateral carinae between the floor of the disc and the occipital lobes. This feature, however, is not at all significant, because the small size of both soldiers (Emery's specimen is said to measure "*capite extenso*" 5.5 mm; the soldier from Nova Petrópolis measures: total length 5.9 mm; maximum length of head 1.64 mm; maximum length of thorax 1.71 mm), the lack of projecting setae on the antero-lateral rim of the cephalic disc, the development of the thorax and precisely the incompletely marginate cephalic disc, reveal at the first glance that they are not full-grown soldiers, but intermediates between the soldier and worker caste [Pl. 3 Fig. 6].

Emery is not to blame for not having realized these facts. His knowledge of *peltatus* was based on two females and a damaged soldier from San Salvador, Paraguay, and that of *jheringi* on several workers and a lone, underdeveloped soldier from Rio Grande do Sul, Brazil.

Yet, since in his original description of *jheringi* he also mentioned, as belonging to the same species, a small worker, received from Paraguay, he unwittingly gave the first clue that finally led to the presently proposed synonymy.

The preceding treatment, given to the forms of *peltatus*, may possibly leave the impression that drastic or even excessive lumping has been effected. However, the tree of ant systematics is so full with dead wood, that one of the chief tasks of myrmecologists consists in pruning, i. e. freeing formicid classification of useless and cumbersome branches, even under the risk of trimming away, once in a while, a live twig. At any rate, the intricate splitting of *peltatus* in subspecies and varieties, as proposed by Forel and Santschi, cannot be maintained upon the presently available evidence.

The figures, concerning the present species, were made upon material from Rosario, Santa Fé, the type locality of the untenable race *ellenriederi* Forel.

18. *Paracryptocerus* (*Harnedia*) *fossithorax* (Santschi)

(Figs. 6, 9)

Cryptocerus fossithorax Santschi, 1921, An. Soc. Cient. Argent. 92 : 125-126, figs. 1A & B (Soldier, worker; Rio Negro: Viedma).

When Santschi described this species, he was so deeply impressed by the conspicuous pits on each side of the mesonotum of the soldier, that he named it after this feature. Granting that such a character is quite unusual for an ant of the genus *Paracryptocerus* it now appears that it does not possess any diagnostic value at all. The Bruch collection contains several nidotype specimens of *fossithorax*, probably the entire original series with the exception of the few syntypes seen and kept by Santschi. None of the nidotype soldiers of the Museum of Buenos Aires exhibits the striking mesonotal grooves, being entirely normal as regards this structural detail. Hence it follows, that the soldier specimen seen by Santschi represents either a teratoid aberration, or, more probably, a soldier-female intercaste (dinergatogyne), because, generally, any kind of pits, grooves or other modifications of the sides of the mesonotum is related to the incipient formation of wings. After cancelling out this character, it remains that *fossithorax* is not as distinctive as purported by Santschi's description. On the contrary, it is a close ally of *peltatus* and possibly *bohlsi*. From the former it may be differentiated as follows: Soldier. — Rim of cephalic disc beset with thin, short, pointed hair (clubbed and thick in *peltatus*). Worker. — Shape of dentition of lateral border of pronotum, to be pointed out in the description.

Types. — Syntypes presumably in the Santschi collection (not seen!); eight nidotypes, two soldiers and six workers, of the original nest series, taken near Viedma, Prov. Rio Negro, Argentina, by Dr. Hildemann, in branches of "Chañar" [MACN].

Worker [Fig. 6]. — Total length 3.8-4.7 mm; maximum length of head 1.09-1.37 mm; of thorax 1.07-1.28 mm. Very close to *jheringi*, from which it differs by the ensemble of the following features:

Color reddish-brown; dorsum of body, especially of head, more or less infuscated; legs usually lighter, yellowish-brown. One specimen is nearly black, with fuscous-ferruginous legs. Shape of head variable, subquadrate to subrectangular (but cephalic index: 0.88-0.90, definitely above *bivestitus*, with which it agrees to some extent in the shape of the lateral thoracic crest). Sides of head slightly emarginate above eyes, especially in larger specimens, which also show an apparently more elongate head. Sides of pronotum usually, not always, little converging caudad, its border with a denticulate crest. This crest contains at least two to four distinct, acute, strong teeth, and inbetween these teeth smaller denticles. All teeth are foliaceous. Sides of mesonotum either straight or weakly dentate. Mesoepinotal suture distinct only laterally, absent in the middle. Anterior corner of basal face of epinotum with an obtuse, smaller tooth, followed posteriorly by a larger triangular tooth. Inferior corner of declivous face angulate, or even dentate. Peduncular segments of equal width. Petiole with strong lateral tooth, pointing obliquely backwards. Postpetiole with the customary lateral spines, the tips of which are rounded in front, and pointed behind. Postpetiole strongly convex dorsally. Antero-lateral lobes of the usually rather short gaster thick, prominent, rounded, their borders at most very bluntly marginate, not depressed, nor forming a thin edge. Sculpture and pilosity not visibly different from *peltatus*.

Soldier [Fig. 9]. — Total length 6.5-7.3 mm; maximum length of head disc 1.75-2.10 mm; of thorax 1.71-1.86 mm. Likewise very similar to *jheringi*, except for the combination of the following features:

Black; antero-lateral portion and lateral border of cephalic disc yellow to reddish-brown; a yellowish spot on each shoulder of the larger specimen. Gaster and legs fuscous-ferruginous. Head disc completely marginate, more or less rounded postero-laterally; lateral borders not raised, especially in larger specimen, which has the antero-lateral portion of disc completely flat, not excavated. Clypeus with less pronounced teeth on the anterior border, its lateral sutures less distinct than in *jheringi*, not forming a prominent ridge. Foveolae of floor of head disc slightly more crowded than in *jheringi*, about 18 pits in a transverse row at the level of the eyes. Occipital lobes with a blunt tooth. Thorax with a transverse pronotal carina, which is not interrupted mesally in the larger worker. Apex of lateral mesonotal lobe not truncate, but subtriangular. Sides of basal

face of epinotum without a prominent lateral lobe in larger specimen, with a triangular lobe in smaller specimen. Sculpture and pilosity much the same as in *jheringi*, with the exception of the projecting setulae on the rim of the head disc, which are fine and pointed at tip.

Comparing the specimens with the description and figures of *bohlsi* Emery (1896), another cryptic species of doubtful identity, one notices the following divergences:

Worker. — The present species differs by its lighter color, the irregular dentition of the lateral border of pronotum (tridentate in *bohlsi*), the feeble tooth on the side of mesonotum, the lack of another tooth behind the large triangular tooth on sides of epinotum. — Soldier. — Differs from *bohlsi* by the lighter color, the light spot on shoulders, the lack of an excavation on the antero-lateral portion of head disc, the borders of which are not strongly upturned. Tooth on posterior corner of basal face of epinotum not conspicuously upturned.

On account of the lack of more tangible characters and the poor knowledge of the species, *fossithorax* remains in a rather doubtful state.

19. *Paracryptocerus (Cyathomymex) pallens* (Klug)

Cryptocerus pallens Klug, 1824, Ent. Monogr. pp. 206-207.
Cryptocerus (Cyathocephalus) pallens Emery, 1915, Bull. Soc. Ent. France, p. 192.
Cryptocerus (Cyathomymex) pallens Creighton, 1933, Psyche 40 : 100.

The present species is readily identified by using the keys on a foregoing page. The problem of its several varieties does not concern the populations in the Southern realm of its vast territory, and will be dealt with in another study.

General distribution (including varieties): From Mexico to Northern Argentina. The first published Argentine record is given in the present study.

Specimens examined: 5; 3 workers and 2 soldiers, as follows: Formosa: Las Lomitas, N. Kusnezov: 2 workers, 2 soldiers [ML]. — Misiones: El Dorado, N. Kusnezov: 1 worker [ML].

Appendix to Part I

Paracryptocerus (Paracryptocerus) minutus (Fabricius)

Cryptocerus minutus Fabricius, 1804, Syst. Piez., p. 420. — (?) Bruch, 1914, Rev. Mus. La Plata 19 : 218 (Misiones; Corrientes).
Paracryptocerus (P.) minutus Kempf, 1951, Rev. de Ent. 22 : 169-176, figs. 122, 123.

After sending the manuscript to the printer I received from the Instituto Miguel Lillo, Tucumán, several specimens which

truly belong to the present species, and thus increase the list of the Argentine *Paracryptocerus* species. This is the first authentic record for the occurrence of *minutus* in the Argentine Republic. As stated previously, Bruch's records of 1914, referring to specimens from the provinces of Misiones and Corrientes, are highly questionable, on account of the confusion of the present species with *pusillus*.

In the preceding key both workers and soldiers of *minutus* will run out with *pusillus*, from which they are briefly differentiated as follows:

Worker. — Eyes large, their greatest diameter longer than one third of the median head length; petiole with a long lateral spine; tibiae yellowish brown above.

Soldier. — Frontal carinae not prolonged caudad as a distinct, upturned carina above eyes; maximum length of head greater than interocular width; occipital border convex.

Specimens examined: 2 workers, as follows: Formosa, Laishi: 1 worker [ML]. — Tucumán, March 28, 1948, Coll. Garcia: 1 worker [ML].

PART II

Revision of the Subgenera *Harnedia* M. R. Smith and *Cyathomyrmex* Creighton

(With 8 plates)

Introduction

This section, dealing with the subgenera *Harnedia* and *Cyathomyrmex* of the genus *Paracryptocerus* continues and completes the revisionary studies of the ant tribe Cephalotini, which this writer started in 1948. While working on the major part of this task, the results of which were published in 1951, I was forced to exclude the treatment of the two aforesaid groups, because sufficiently representative material could not be secured. In subsequent years this situation was advantageously changed, when I was able to study the Cephalotini material of the Bruch collection in Buenos Aires, containing a great many authentic specimens of *Paracryptocerus* forms, authored by Forel and Santschi, which were of a great help in solving the most intricate

part of the problems. The study of these Argentine species was performed separately and is published in Part I of the present study.

After clearing up, to some extent, the darkest area of the systematics of the entire Cephalotini tribe, the greatest obstacle had been taken out of the way and the path was free for reviewing the remaining species of *Harnedia* and *Cyathomymex*. The result of this study is presented in the following pages.

As in previous installments, the systematic review of each species is concentrated upon the soldier and worker caste. The sexual forms, still incompletely known, have not been given a similar treatment, although the females, as far as known or available, are briefly discussed and differential characters have been indicated. The male caste is completely put aside, and their investigation will be the subject of another study, already on the way, which I hope to complete in a near future.

The higher forms of *Paracryptocerus* are poorly represented in collections. Being almost exclusively arboreal twig-dwellers, these insects are not commonly captured by the usual collecting methods. Stray specimens have occasionally been taken when running up and down on tree trunks, but the discovery of their nests was usually a matter of mere chance. Several species are still known only from the type series, others have never, or only scarcely, been collected in their native habitat, but were discovered by U. S. Plant Quarantine stations on imported plants, especially orchids. As a rule, the distribution of most of the species, treated in this article, is not well known and their range of individual and nest variability is poorly understood.

For this reason I resolved to neglect completely the study of possibly existing geographical races, a study, which in my opinion postulates as an indispensable condition a fairly good knowledge of the distribution and the variability of each species. However, previously proposed infraspecific forms have not been synonymized on merely theoretical grounds, but because they did not seem to comply with the prerequisites for subspecific status, being solely individual variants.

Two new species, *fleddermanni* and *sobrius*, and the still undescribed castes of *striativentris* (female), *targionii* (female), *curvistriatus* (soldier, female) are described, and several new synonyms are proposed, the latter being noted at their respective place.

Acknowledgments. — I wish to express my sincere gratitude to the following persons for loan, gift, or exchange of material, or information on specimens, either of their private collections, or of collections with which they are associated through curatorship or otherwise: Dr. Mário Autuori, São Paulo (IBSP), Dr. Joseph Bequaert, Cambridge, Mass. (MCZ), Dr. Thomas Borgmeier, O. F. M., Jacarepaguá, D. F. (CTB), Dr. William L. Brown, Jr., Cambridge, Mass. (MCZ), Dr. William F. Buren, U. S. Dep. of Health, Dr. C. Ferrière, Geneva, Switzerland (MHNG), Father Beraldo Fleddermann, O. F. M., Agudos, S. P., Father Columbano Gilbert, O. F. M., Agudos, S. P., Dr. Cincinato R. Gonçalves, Rio de Janeiro, D. F. (DDSV), Dr. Delfa Guiglia, Genova, Italy, Dr. N. Kusnezov, Tucumán, Argentina (ML), Dr. F. Maidl, Vienna, Austria (NHMW), Dr. W. M. Mann, Washington, D. C. (CWMM now: USNM), Father Reinaldo Mueller, O. F. M., Agudos, S. P., Dr. R. N. Orfila, Buenos Aires (MACN), Dr. V. S. L. Pate, Philadelphia, Pa. (ANSP), Dr. M. R. Smith, Washington, D. C. (USNM), Dr. W. W. Weyrauch, Lima, Peru.

Abbreviations

a) Museums or Collections:

ANSP	Academy of Natural Sciences, Philadelphia, Pa.
CTB	Collection of Fr. Borgmeier. (All Cephalotini material now in WWK).
CWMM	Collection of Dr. W. M. Mann (now in USNM).
DDSV	Divisão de Defesa Sanitária Vegetal, Rio de Janeiro.
IBSP	Instituto Biológico, São Paulo.
MACN	Museo Argentino de Ciencias Naturales, Buenos Aires (Bruch collection).
MHNG	Muséum d'Histoire Naturelle de Genève, Switzerland (Forel collection).
MCZ	Museum of Comparative Zoology, Cambridge, Mass. (Wheeler collection).
ML	Instituto Miguel Lillo, Tucumán, Argentina.
NHMW	Naturhistorisches Museum, Wien, Austria (Mayr collection).
USNM	U. S. National Museum, Washington, D. C.
WWK	My private collection.

b) **Castes:** For the sake of brevity, a letter is used to indicate the caste of each species examined; thus "S" for soldier, "W" for worker, "F" for female or queen, "M" for male.

c) **States of Brazil:** For the same reason, the state names of Brazil, have been abbreviated in the Bibliography, as follows:

BA — Bahia	PR — Paraná
DF — Distrito Federal	RJ — Rio de Janeiro
GR — Guaporé (Territory)	RS — Rio Grande do Sul
MT — Mato Grosso	SC — Santa Catarina
PA — Pará	SP — São Paulo

As regards technical aspects of the work and information on measurements, the introduction to a previous study (Kempf, 1951, pp. 8-11), should be consulted. The line drawings were made with the aid

of a Spencer Camera Lucida and a Zeiss-Winkel monocular microscope. Specimens of each caste have been drawn to the same scale, the females to the smallest, the soldiers to a higher, the worker to the highest scale. The only exception is made by the soldier of *setulifer* [Pl. 8, fig. 3], which has been drawn to the same scale as the worker [Pl. 8, fig. 4] and consequently to a larger scale than the remaining soldiers.

Due to the discovery of a few new, somewhat aberrant, forms, the previously published key to the subgenera of *Paracryptocerus* (Kemp f, 1951, p. 156), has now become obsolete and is replaced by the following key.

Revised Key to the Subgenera of *Paracryptocerus*

A. Workers

(Note: The worker of *P. (Cyathomyrmex) setulifer* (Emery) will key out to *Harnedia*, or more precisely, to the *angustus*-group of this subgenus, from which it is separated in the specific key on a following page).

1. Lateral border of head with a deep notch near the occipital border for lodging the eye, which does not project beyond the maximum width of the head [Pl. 8, Figs. 6, 7].....
Cyathomyrmex Creighton [in part]
- Lateral border of head without such a pronounced notch, at most slightly concave above eyes, which visibly project beyond the maximum width of the head [Pl. 1, Fig. 1]..... 2
2. Extensor face of hind femora, as seen in profile, angulate or denticulate near the middle [Pl. 7, Fig. 5]; or, if the angle is not distinctly formed, then either the apical half of the extensor face bears a longitudinal crest, and/or the sides of the epinotum have a straight-edged crest 3
- Extensor face of the spindle-shaped hind femora, as seen in profile, gently and evenly curved, neither forming an angle, nor denticulate near the middle, nor bearing a longitudinal crest on the apical half [Pl. 6, Figs. 13, 14]; or, if somewhat angulate near the middle [Pl. 6, Fig. 15], then the scapular angle is free, i. e. not included in the lateral pronotal crest, the sides of the pronotum and epinotum bear only short teeth, the petiole is always deeper than long and never broader than the postpetiole [Pl. 2, Fig. 4]..... 4
3. Sides of the epinotum with a continuous, only exceptionally denticulate, always foliaceous crest, beginning at the anterior angle of the basal face [Pl. 7, Fig. 2]..... *Harnedia* M. R. Smith [in part]
- Sides of the epinotum not crested, but dentate or spinous, or, if crested, then the crest begins at some distance behind the anterior angle of the basal face
Paracryptocerus Emery [in part] (Kemp f, 1951, p. 157 ss.)
4. Basal face of epinotum with a pair of spines on each side, the posterior spine as long as, or longer than, the length of the petiole; declivous face of the epinotum well differentiated from, more or less perpendicular to, the basal face
Paracryptocerus Emery [in part] (Kemp f, 1951, p. 157 ss.)

- Basal face of epinotum with a variable number of teeth on each side, the longest always shorter than the length of the postpetiole; declivous face of epinotum continuous with the basal face, forming a gentle and rather even curvature, when seen in profile [Pl. 1, Fig. 3; Pl. 2, Fig. 8]..... *Harnedia* M. R. Smith [in part]

B. Soldiers

1. Dorsum of head flat to excavated, surmounted by a marginate, saucer-shaped disc, or, if not completely marginate posterolaterally, then the pronotum is scarcely expanded laterad, not much broader than the mesonotum, its sides converging only gently mesad..... 2
- Dorsum of head convex or at most somewhat flattened, but never excavated nor surmounted by a marginate disc, or if a posterolateral margination is present in front of, and above, the occipital lobes, then the pronotum is greatly expanded laterad, its sides converging very strongly behind the transverse carina toward the much narrower mesonotum..... *Paracryptocerus* Emery (Kempf, 1951, p. 160 ss.)
2. Head disc excised in front, above the mandibles [Pl. 3, Fig. 5]....
Harnedia M. R. Smith
- Head disc not excised in front, above the mandibles [Pl. 8, Figs. 3, 5, 8] *Cyathomyrmex* Creighton

I. Subgenus *Harnedia* M. R. Smith

Cryptocerus (*Cryptocerus*) Emery, Bull. Soc. Ent. France, p. 192. — Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 308.
Paracryptocerus (*Harnedia*) M. R. Smith, 1949, Psyche, 56: 20-21. — Kempf, 1951, Rev. de Ent. 22: 155-156.

Type of the subgenus: *Cryptocerus umbraculatus* Fabricius, 1804 [= *Paracryptocerus* (*Harnedia*) *umbraculatus* (F.)].
By original designation.

As pointed out in a preceding study (Kempf, 1951, pp. 155-156), the species groups established in the genus *Paracryptocerus* are more distinctive and recognizable than the three subgenera created by Emery in 1915. Whereas the former are seemingly natural entities, the latter are more or less artificial subdivisions, based upon the threefold degree of differentiation and development of the head disc in the soldier and female caste. A similar group character for the worker caste is still wanting. However, it is not feasible to raise the species groups to subgeneric rank, on account of the existing intergradient or unplaceable forms. Therefore I continue upholding the traditional divisions, with the modifications introduced by myself, in 1951 (concerning the translation of the *pavonii*-group to the subgenus *Paracryptocerus* s. str.), until a programmed and necessary study of the sexual forms, especially the males, can be satisfactorily completed.

The subgenus *Harnedia* comprises two rather clearly delimited assemblies of species: the *angustus*-group and the *pinelii*-group, and furthermore an isolated, highly distinctive and remarkable species, *viz. umbraculatus*, which for this very reason has been accorded group-standing by Emery (1922). Since the *pinelii*-group was reviewed in an earlier study (Kemp f, 1952), only the groups of *angustus* and *umbraculatus* remain to be revised. This task will be taken up on the following pages.

I refrain myself from transcribing, or commenting upon, Emery's lengthy subgeneric diagnosis, because the only valid and useful separatory character coincides with the shape of the head in soldiers and females, as mentioned before. These two castes of species belonging to *Harnedia* have their head surmounted by a completely marginate, flat or excavated, rarely gently convex disc, which is excised in front above the manibles. The only known exception is made by the Argentine *bruchii* (olim: *ridiculus*), doubtless a member of the *angustus*-group, the soldiers and females of which have the disc little developed, incompletely marginate posterolaterally, imitating in this regard the feature obtained in some forms of the *pavonii*-group of *Paracryptocerus* s. str. Incidentally, the same is true for the underdeveloped soldier of *jheringi* from Brazil, which also may lack the posterolateral margination of the cephalic disc.

Key to the Species

(Note: This key does not consider the endemic Argentine forms, which have been treated separately in Part I. of the present study, and omits *adolphi*, *bohlsi*, *goeldii* and *insularis*, because typical specimens of these were not available).

A. Workers

1. Lateral border of pronotum and epinotum with a continuous, foliaceous crest, the edge of which may be either straight, or sinuous, or denticulate; extensor face of hind femora, as seen in profile, angulate or denticulate near the middle, or, if not distinctly so, then the postpetiole bears on each side a broad, short, foliaceous lobe [Pl. 7, Figs. 2, 5] 2
- Lateral border of pronotum and epinotum more or less distinctly dentate — the former exceptionally with an apically truncate, projecting, thin plate —, never with a continuous, foliaceous crest; hind femora fusiform [Pl. 6, Figs. 13, 14], or if somewhat angulate above [Pl. 6, Fig. 15], as seen in profile, then the pronotum and the epinotum bear three teeth on each side [Pl. 2, Fig. 4] 3

2. Lateral border of pronotum with a strong, foliaceous tooth [Pl. 7, Fig. 2]; petiole longer than deep, without a distinctly raised anterior face above the thoracic insertion [Pl. 10, Fig. 9].....
umbraculatus (Fabricius)
- Lateral border of pronotum lacking a strong tooth; petiole always deeper than long, with a distinctly raised, more or less perpendicular anterior face above the thoracic insertion.....
pinelii-group (see: Kempf, 1952, p. 5 ss.)
3. Evenly scattered standing hair, besides the scalelike, decumbent hair, on dorsum of head, thorax, peduncle and gaster..... 4
- Dorsum of head, thorax, peduncle and gaster devoid of standing hair, except for the apex of the gaster, and sometimes portions of the lateral border of head, thorax, peduncle and gaster.... 7
4. Scapular angle not distinct from first prothoracic tooth; anterior border of gaster scarcely or not at all emarginate at the postpetiolar insertion, immarginate anterolaterally [Pl. 2, Fig. 8]..... 5
- Scapular angle distinct from first prothoracic tooth; gaster emarginate anteromesially at the postpetiolar insertion, marginate on the border of the distinctly projecting anterolateral lobes [Text-figs. 1, 2]... 6
5. Lower face of head longitudinally striato-rugose; frontal carinae testaceous and semitranslucid [Pl. 8, Fig. 1].... *wheeleri* (Forel)
- Lower face of head reticulate-rugose; frontal carinae partly infuscated and solid [Pl. 2, Fig. 8]..... *rohweri* (Wheeler)
6. Dorsum of head and thorax finely reticulate-punctate and sparsely foveolate; standing hair much shorter than the diameter of the tibiae, always straight, never flexuous [Textfig. 1].. *fiebrigi* (Forel)
- Dorsum of head and thorax coarsely reticulate-rugose; standing hair at least as long as the diameter of the tibiae, flexuous [Textfig. 2]
pilosus (Emery)
7. Scapular angle not distinct from first prothoracic tooth (Central American species) [Pl. 2, Figs. 5-7]..... 8
- Scapular angle distinct from first prothoracic tooth (principally South American species) [Pl. 2, Fig. 4]..... 10
8. First gastric sternite longitudinally striate laterally, the striae of each side converging mesad in front of the posterior border and fusing with those of the opposite side; lower face of head coarsely longitudinally striate [Pl. 2, Fig. 7]..... *curvistriatus* (Forel)
- First gastric sternite only finely longitudinally rugose, the rugae not converging mesad in front of the posterior border; lower face of head not very coarsely longitudinally rugose..... 9
9. Mesoepinotal suture impressed; dorsum of postpetiole, in profile rather gently convex [Pl. 2, Fig. 6; Pl. 6, Fig. 6].....
aztecus (Forel)
- Mesoepinotal suture obsolete; dorsum of postpetiole, in profile, conspicuously convex, presenting an anterior ascending and a posterior sloping face, meeting at an angle [Pl. 2, Fig. 5; Pl. 6, Fig. 7] *texanus* (Santschi)
10. Lateral border of pronotum with a broad, apically truncate, projecting, thin plate 11
- Lateral border of pronotum only dentate..... 12
11. Maximum length of head exceeding the interocular width; gaster elongate and somewhat depressed; scalelike hair appressed, long and flat *emeryi* (Forel)
- Interocular width exceeding maximum length of head; gaster short and subglobose; scalelike hair oval, short and slightly convex....
patei Kempf

12. Anterolateral platelike, thin crest of gaster extending caudad well beyond the conspicuous stigma of the first tergite [Pl. 1, Figs. 1, 2, 6] 13
— Anterolateral crest of gaster either absent, or not extending beyond the more or less visible stigma of the first tergite. 14
13. First gastric sternite very coarsely longitudinally striate, or at least coarsely longitudinally rugose; tips of petiolar spines obliquely deflected caudad [Pl. 1, Figs. 1, 6]. *striativentris* (Emery)
— First gastric sternite very finely reticulate-punctate, or rarely very finely rugose; tips of petiolar spines not obliquely deflected caudad [Pl. 1, Fig. 2]. *angustus* (Mayr)
14. Both peduncular segments dorsally with a sharp transverse carina [Textfig. 4] *quadratus* (Mayr)
— Both peduncular segments dorsally without a sharp transverse carina 15
15. Hind femora, in profile, nearly angulate above near the middle, not fusiform [Pl. 6, Fig. 15]; scalelike hair on gaster as long and conspicuous as that on thorax and head [Pl. 2, Fig. 4].
coffeeae Kempf
— Hind femora, in profile, fusiform, not angulate above near the middle; scalelike hair on gaster finer and shorter than that on head and thorax, usually simple, not canaliculate. 16
16. Lateral border of epinotum always with three or more acute teeth; anterolateral lamelliform crest of gaster distinctly set off, translucent and subhyaline [Pl. 2, Figs. 1, 3]. 17
— Lateral border of epinotum usually with one, at most with two distinct acute or obtuse teeth; anterolateral lamelliform crest of gaster either absent, or, if present, then partly opaque and infuscated [Fig. 5; Pl. 2, Fig. 2; Pl. 8, Fig. 4]. 18
17. Lateral border of head distinctly emarginate and upturned above eyes; postpetiole middorsally acuminate [Pl. 2, Fig. 1; Pl. 6, Fig. 10] *targionii* (Emery)
— Lateral border of head scarcely or not at all emarginate nor upturned above eyes; postpetiole dorsally very gently convex, not acuminate [Pl. 2, Fig. 3]. *fleddermanni*, n. sp.
18. Border of frontal carinae, occipital lobes, teeth of thorax and peduncle, sides and posterior border of first gastric tergite with thick, obtuse, projecting hair; anterolateral corner of gaster with a whitish spot; dorsum of postpetiole nearly flat [Pl. 8, Fig. 4].
setulifer (Emery) [subg. *Cyathomyrmex*]
— Projecting setae completely absent, except for the anteriormost portions of frontal carinae and apex of gaster; gaster completely black; dorsum of postpetiole conspicuously convex [Textfig. 5; Pl. 2, Fig. 2] *jheringi* (Emery)

B. Soldiers

1. Hind femora, in profile, distinctly angulate or denticulate above near the middle [Pl. 7, Fig. 5], or, if not so, then the apical half of the femora bears a longitudinal crest; lateral border of declivous face of epinotum with a foliaceous crest [Pl. 7, Fig. 3]. 2
— Hind femora fusiform [Pl. 6, Figs. 13, 14], neither angulate nor denticulate above near the middle, or, if somewhat angulate, then the lateral border of the declivous face is merely marginate, never crested [Pl. 6, Fig. 15; Pl. 4, Fig. 5]. 3

2. Posterior corner of basal face of epinotum without a projecting spine; petiole always deeper than long
pinellii-group (see: Kempf, 1952, p. 5 ss.)
- Posterior corner of basal face of epinotum with a projecting spine; petiole depressed, distinctly longer than deep [Pl. 7, Fig. 3].....
umbraculatus (Fabricius)
3. Anterolateral corners of gaster immarginate; postpetiolar insertion of gaster scarcely emarginate; sides of basal face of epinotum with a conspicuous tooth or spine, pointing laterad, in front of the unarmed posterior corner [Pl. 4, Fig. 2]..... 4
- Anterolateral corners of gaster marginate or even crested, or, if the margination is little pronounced, then the postpetiolar insertion is deeply emarginate; sides of basal face of epinotum with one or more triangular teeth or prominent lobes; posterior corner of basal face dentate or unarmed 5
4. Lateral projecting lobe of mesonotum broadly rounded, not angulate nor dentate; rim of cephalic disc beset with a fringe of projecting setae [Pl. 4, Fig. 2]..... *rohweri* (Wheeler)
- Lateral projecting lobe of mesonotum angulate or dentate; rim of cephalic disc without a fringe of projecting setae [Pl. 8, Fig. 2]..
wheeleri (Forel)
5. Evenly distributed standing hair on dorsum of thorax, peduncle and gaster, and somewhat oblique on the legs..... 6
- Standing hair confined to the apex and the sternites of the gaster, absent on dorsum of thorax, peduncle and gaster; hair on legs appressed 7
6. Scalelike hairs, arising from the pits of the cephalic disc, long, their apex recurved and projecting beyond the rim of the pit; standing hair on thorax, peduncle and gaster short and straight [Textfig. 11] *fiebrigi* (Forel)
- Scalelike hairs, arising from the pits of the cephalic disc, short, decumbent, the apex not projecting beyond the rim of the pit; standing hair on thorax, peduncle, gaster and legs long and flexuous [Textfig. 8] *pilosus* (Emery)
7. Transverse pronotal carina mostly obtuse, neither prominent nor conspicuously crested, very broadly interrupted mesially; cephalic disc either lacking a distinctly marginate border posterolaterally behind the eyes, or completely marginate; in this latter case the gaster is very strongly emarginate anteromesially at the postpetiolar insertion [Figs. 10, 12; Pl. 3, Fig. 6]..... 8
- Transverse pronotal carina always sharply crested, often very prominent, the mesal interruption either absent or much narrower; cephalic disc always completely marginate; postpetiolar insertion of gaster never strongly emarginate 9
8. Head, in profile, strongly convex above; scalelike hair of cephalic disc erect, the apex recurved and projecting well beyond the rim of the pits [Textfigs. 10, 26]..... *quadratus* (Mayr)
- Head, in profile, rather flat above; scalelike hair on cephalic disc appressed, not projecting from the pits [Textfig. 12; Pl. 3, Fig. 6]..
jheringi (Emery)
9. Lateral borders of pronotum scarcely converging mesad behind the transverse pronotal carina; pronotum scarcely broader than mesonotum [Pl. 3, Fig. 1]..... *targionii* (Emery)
- Lateral borders of pronotum more conspicuously converging mesad behind the transverse pronotal carina; pronotum always noticeably broader than the mesonotum 10

10. Transverse pronotal carina interrupted mesially by a narrow, longitudinal, slitlike incision; dorsum of gaster completely black, without light spots on the anterior corners; gaster subglobose, unusually short and deep *patei* Kempf
- Transverse pronotal carina either uninterrupted mesially, or excised by a broader, never slitlike, notch; dorsum of gaster always with light spots, at least on the anterior corners; gaster always conspicuously depressed, never subglobose 11
11. A stout, raised tooth, the tip of which is recurved laterad, on the posterior corner of the basal face of epinotum, or, if such a tooth is little developed, then the lateral border of the occipital lobes forms a sharp carina, running forward to the inferior border of the eye and the shoulders are dotted with yellowish or brown [Pl. 3, Figs. 2, 3, 4] 12
- Posterior corner of basal face either unarmed or with a smaller, never strongly raised and recurved tooth; lateral border of occipital lobes either not strongly marginate, or, if marginate, then running forward and upward in the direction of the superior border of the eye; shoulders never dotted with light color..... 14
12. Cephalic disc distinctly truncate behind; floor of disc only foveolate, visible from the side, when head is seen in profile [Pl. 3, Figs. 2, 5] *angustus* (Mayr)
- Cephalic disc not truncate behind but rounded; floor of disc densely foveolate and reticulate-rugose, invisible from the side, when head is seen in profile [Pl. 3, Figs. 3, 4]..... 13
13. Floor of cephalic disc with a median convexity and lateral concavities, not uniformly flat; mandibular excision at a much lower level than rest of disc; first gastric sternite not striate laterally [Pl. 3, Fig. 4] *fleddermanni*, n. sp.
- Floor of cephalic disc flat, except for the strongly raised borders; supramandibular excision at nearly the same level as rest of the disc; first gastric sternite laterally longitudinally striate [Pl. 3, Fig. 3] *striativentris* (Emery)
14. Floor of cephalic disc reticulate-rugose and foveolate; posterior border of disc round, without a trace of truncation or a pair of teeth; transverse pronotal carina not interrupted in the middle; lateral processes of peduncular segments very short [Pl. 4, Fig. 1]..... *aztecus* (Forel)
- Floor of cephalic disc only foveolate, the intervals between the pits not forming a network of raised rugosities; posterior border of cephalic disc never uniformly and evenly rounded, but at least either vestigially truncate, or bidentate, or angulate posterolaterally; transverse pronotal carina with a conspicuous median notch; peduncular spines longer 15
15. Posterior border of cephalic disc raised and upturned; scalelike hair on first gastric tergite nearly as large and conspicuous as that on thorax 16
- Posterior border of cephalic disc flat, not upturned; scalelike hair on first gastric tergite much finer and smaller than that on thorax 17
16. Floor of cephalic disc with an anteromedian convexity; posterior corner of basal face of epinotum dentate; first gastric sternite not striated [Pl. 4, Fig. 5]..... *coffea* Kempf
- Floor of cephalic disc flat, without an anteromedian convexity; posterior corner of basal face of epinotum unarmed; first gastric sternite laterally striated [Pl. 4, Fig. 3]..... *curvistriatus* (Forel)

17. Lateral processes of peduncular segments solid, gradually tapering off toward apex; foveolae on cephalic disc and mesonotum crowded [Pl. 4, Fig. 4]..... *texanus* (Santschi)
 — Lateral processes of peduncular segments more distinctly set off from the body, platelike, slender and long; foveolae on cephalic disc and mesonotum sparse [Pl. 4, Fig. 6]..... *sobrius*, n. sp.

A. Group of *Paracryptocerus* (H.) *angustus* (Mayr)

This is, by far, the biggest group of the genus, containing 26 species (not counting the species founded upon isolated females). It is characterized as follows:

Worker. Small or medium-sized. Frontal carinae membranaceous, semitransparent (exceptions: *emeryi*, *patei*, *rohweri*). Scapular angle either free or incorporated in the lateral pronotal crest. Lateral border of pronotum generally with one or more short teeth (exceptions: *emeryi* and *patei*, which have a projecting, truncate plate, as in the *pavonii*-group). Lateral border of epinotum marginate, without a straight-edged, foliaceous crest, but with one or more short teeth, exceptionally with a longer spine (*rohweri* and *wheeleri*). Hind femora fusiform (exception: *coffea*, which has the hind femora slightly angulate). Hind metatarsi (tarsite I) subprismatic, neither conspicuously flattened nor broadened at the base (exception: *patei*). Peduncular segments with a solid spinelike or toothlike process on each side, never with foliaceous, platelike, apically blunt lobes. Body of petiole always deeper than long, with a distinct, vertically to obliquely truncate anterior face raised above the thoracic insertion. — **Soldier.** Hind femora, metatarsi and peduncular segments as in worker. Head surmounted by a well developed, marginate disc, which is either truncate or rounded posteriorly (exceptions: *bruchii* and smaller soldiers of *jheringi*, in which the posterolateral margination of the cephalic disc is only vestigial or wanting). — **Female and male.** No group characters have been found, so far, for these castes.

The following forms, some of which have already been treated in previous parts, are referred to the *angustus*-group:

a) Species based on workers or soldiers.

1. *Paracryptocerus (Harnedia) adolphi* (Emery)
2. *P. (H.) angustus* (Mayr)
**P. (H.) angustus* var. *clarior* (Forel) nov. syn. of *angustus* (Mayr)
- *3. *P. (H.) aztecus* (Forel)
- *4. *P. (H.) bivestitus* (Santschi), revised in Part I. of this paper.
5. *P. (H.) bohlsi* (Emery)
P. (H.) bohlsi var. *medusa* (Santschi), nov. syn. of *bohlsi* (Emery),
with doubt.
- *6. *P. (H.) bruchi* (Forel), revised in Part I.
- *7. *P. (H.) coffeae* Kempf
8. *P. (H.) curvistriatus* (Forel)
9. *P. (H.) denticulatus* (Emery), nov. syn. of *targionii* (Emery)
P. (H.) denticulatus var. *variegata* (Forel), nov. syn. of *targionii*
(Emery)
- *10. *P. (H.) emeryi* (Forel), treated in Kempf, 1951
- *11. *P. (H.) fiebrigi* (Forel), revised in Part I.
- *12. *P. (H.) fleddermanni*, n. sp.
- *13. *P. (H.) fossithorax* (Santschi), revised in Part I.
14. *P. (H.) goeldii* (Forel)
15. *P. (H.) jheringi* (Emery), revised in Part I.
- *16. *P. (H.) liogaster* (Santschi), revised in Part I.
- *17. *P. (H.) patei* Kempf, treated in Kempf, 1951
- *18. *P. (H.) pilosus* (Emery), revised in Part I.
P. (H.) pilosus insularis (Wheeler), nov. stat.
19. *P. (H.) prodigiosus* (Santschi), revised in Part I.
- *20. *P. (H.) quadratus* (Mayr), revised in Part I.
- *21. *P. (H.) rohweri* (Wheeler)
- *22. *P. (H.) sobrius*, n. sp.
23. *P. (H.) striativentris* (Emery)
24. *P. (H.) targionii* (Emery)
25. *P. (H.) texanus* (Santschi)
- *26. *P. (H.) wheeleri* (Forel)

b) Species based solely on females:

27. *P. (H.) bimaculatus* (F. Smith)
28. *P. (H.) cognatus* (F. Smith)
29. *P. (H.) crenaticeps* (Mayr)
30. *P. (H.) klugi* (Emery)
31. *P. (H.) notatus* (Mayr)
32. *P. (H.) pallidicephalus* (F. Smith)

The asterisk (*) in front of the name of the respective form means that type specimens have been examined.

The present section deals exclusively with the forms not yet revised in preceding parts or studies. In order to make easier a comprehensive view of the group, related species have been brought together into so-called species-subgroups, the common characters of which are given. This procedure serves only practical purposes and should prove helpful in identification.

a) Subgroup of *P. (H.) angustus* (Mayr)

Component species: *angustus*, *fleddermanni*, *striativentris*, *targionii*, and probably also *adolphi* and *goeldii*, known only in the worker caste. Most of the preceding species are restricted to southern Brazil and adjacent areas. The range of *adolphi* seems somewhat ampler, whereas *targionii* occurs throughout the Guiana-Brasilia subregion.

Common characters: **Worker.** Lateral border of head slightly emarginate in front of, slightly convex and more or less upturned above, eyes (exception: *fleddermanni*). Scapular angle free, not incorporated in the lateral pronotal crest. Sides of epinotum bearing at least three teeth, not counting the minute denticles, if present. Lateral processes of petiole more or less spinelike, not strongly recurved at apex (more toothlike in *fleddermanni*). Anterolateral, platelike, translucent crest and stigma of the first gastric tergite conspicuous. Anterolateral corners of gaster blunt, broad, not forming the characteristic lobes of the following subgroup. Standing hair confined to mandibles and apex of gaster. — **Soldier.** Lateral border of cephalic disc raised, scarcely or not at all crenulate, concealing the floor of the disc, when head is seen in profile (exception: *angustus*). Pronotum greatly expanded laterad, much broader than mesonotum (exception: *targionii*). Transverse pronotal carina usually sharp or even crested. Lateral lobes of mesonotum obliquely truncated. Posterior corner of basal face of epinotum with a strong, upturned tooth, the apex of which points directly laterad (exception: *fleddermanni*). Gaster moderately emarginate anteromesially, its lateral lobes not strongly projecting, their border marginate or even narrowly crested. First gastric tergite quadrimaculate. Standing hair as in the worker. — **Female.** Posterior corner of epinotum with a strong tooth, pointing obliquely caudad and laterad. Standing hair as in worker and soldier (exception: *fleddermanni*).

Paracryptocerus (Harnedia) angustus (Mayr)

(Pl. 1 Figs. 2, 4, 7; Pl. 3 Figs. 2, 5; Pl. 6 Fig. 5)

Cryptocerus angustus Mayr, 1862, Verh. Zool.-bot. Ges. Wien 12: 759-761 (F, S; Brazil). — Mayr, 1866, Sitz.-ber. Akad. Wiss. Wien 53: 515 (S). — Mayr, 1887, Verh. Zool.-bot. Ges. Wien 37: 565-567 (S, W, F, M; Brazil SC). — Emery, 1887, Bull. Soc. Ent. Ital. 19: 361 (Brazil RS). — Emery, 1894, Bull. Soc. Ent. Ital. 26: 203, Pl. 3, figs. 6-9 (S, W, F). — Emery, in: von Jhering, 1894, Berl. Ent. Zs. 39: 383-384, fig. (W; Brazil RS: Taquara, S. Lourenço). — Forel, 1908, Verh. Zool.-bot. Ges. Wien (1908), p. 354 (Brazil SP). — Forel, 1912, Mém. Soc. Ent. Belg. 19: 201 (Brazil DF: Corcovado, RJ: Nova Friburgo). — (?) Santschi, 1912, Rev. Suisse Zool. 20: 529 (Argentina: Santiago del Estero). — (?) Bruch, 1915, Rev. Mus. La Plata 19: 530. — Luederwaldt, 1918, Rev. Mus. Paul. 10: 40 (Brazil SP: Raiz da Serra). — Luederwaldt, 1926, Rev. Mus. Paul. 14: 269 (= "*Procryptocerus*" = Lapsus!).

Cryptocerus angustus var. *clarior* Forel, 1912, Mém. Soc. Ent. Belg. 19: 201 (W; Brazil DF: Rio de Janeiro) nov. syn.
Cryptocerus (Cryptocerus) angustus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 117. — Borgmeier, 1937, Arch. Inst. Biol. Veget. 3 (2): 244-245 (Brazil SP: Raiz da Serra, SC: Itajai, Gaspar, RS: Pareci Novo, Nova Petrópolis).

Types. — A female and a damaged soldier from Brazil, the exact locality not being known, deposited in the Museum of Natural History, Vienna, Austria [NHMW]. The *angustus* specimens received on loan for study in 1948 from Mayr's collection, through the courtesy of the late Dr. F. Maidl, carried type labels, even though they belong to the series taken by Hetschko in the State of Santa Catarina, and were mentioned by Mayr only in 1887.

Worker [Pl. 1, Figs. 2, 4, 7]. — Total length 4.0-6.2 mm; maximum length of head 1.18-1.75 mm; maximum length of thorax 1.18-1.82 mm. Black; the following ferruginous: apex of mandibles, scape and last funicular segment, edge of frontal carinae and occipital lobes, tibiae, the four apical tarsites, anterolateral corners of gaster just inside of the pale, translucent crest; remaining portions of frontal carinae pale testaceous.

Head subopaque, subquadrate; its maximum length subequal to the distance between the eyes, usually slightly longer. Clypeal sutures vestigial. Lateral border of head slightly diverging caudad, the posterior portions distinctly sinuate and upturned above eyes. Occipital corners obliquely truncate, the inner angle of the truncation forming a toothlike, apically rounded, projecting lobe. Occipital border deeply emarginate. Dorsal face of head moderately convex discally, finely reticulate-punctate, more sparsely covered with squamiferous foveolae, which become more numerous and crowded toward the occipital border. Lower face of head finely reticulate-punctate, somewhat shiny, and reticulate-rugose discally and cephalad.

Thorax subopaque. Anterior border of pronotum oblique laterad, straight and transverse mesally. Shoulders subacute. Sides of pronotum with two approximated triangular teeth, followed by a more or less sinuate, or even very obtusely angulate, crest, the posterior corner rectangular or obtuse. Promesonotal suture vestigial or absent. Mesonotum with a blunt or rectangular tooth projecting from each side. Mesoepinotal suture vestigial or absent, usually marked only near the lateral border. Lateral border of basal face of epinotum tridentate: the first tooth, forming the anterior corner of the basal face, small and sub-

rectangular, followed by a second, much larger, acute tooth, and a third, again smaller, tooth, which however is acute and usually points more or less caudad. Between the second and third tooth often a minute, scarcely visible, denticle. Declivous face discally excavated, relatively well differentiated from the basal face, its lateral borders marginate. Dorsum of thorax finely reticulate-punctate rather densely covered with squamiferous foveolae, especially so along the lateral border. Laterotergite of pronotum with a few longitudinal rugosities near its inferior border. Thoracic pleura densely covered with squamiferous foveolae. Fore coxae reticulate-punctate.

Peduncular segments [cfr. Pl. 6, Fig. 5] subopaque, the dorsolateral sculpture as on dorsum of thorax and head. Petiole subequal in width to postpetiole, its anterior face obliquely truncate, finely reticulate-punctate and somewhat shining, its superior corners slightly projecting above the dorsal face in the form of a pair of very small denticles. Anterior corners of petiole rounded, the sides with an acute spine, pointing laterad and slightly caudad. Postpetiole with a similar, slightly recurved spine on each side, its dorsal face strongly convex, both longitudinally and transversely.

Gaster subopaque, elliptical, strongly emarginate anteromesially, the anterolateral border with a hyaline, thin crest, which extends backwards on the sides beyond the conspicuous stigma of the first tergite, and continues caudad as a distinct margination reaching almost the posterior border of the same tergite, which is finely reticulate and superficially foveolate. Foveolae longer and smaller than on thorax. First sternite finely, yet sharply reticulate-punctate, usually without longitudinal rugosities.

Standing hair on mandibles, anterior border of clypeus, along the edge of the frontal carinae and the posterior border of gastric tergites and sternites. Decumbent hair in the form of short, thick, canaliculate, highly shining scales, on the dorsum of body, cheeks, pleura, and extensor face of femora. Similar scales, but longer, simple on the sides of femora, tibiae, lower face of head and the first gastric sternite.

Soldier [Pl. 3, Figs. 2, 5]. — Total length 6.2-8.5 mm; maximum length of head 1.85-2.50 mm; maximum length of thorax 1.78-2.28 mm. Black; upper half of sides of head and floor of cephalic disc more or less reddish-brown, the latter usually, not always, with a large, elongate, anteromedian black spot; marginate edge of cephalic disc infuscated; tip of scape,

tibiae, tarsites ferruginous; extensor face of tibiae lighter in color; first gastric tergite with the customary four yellowish spots, the pair of each side often confluent.

Head somewhat shiny; surmounted by a subquadrate, very seldom elongate, flat, completely marginate disc. Borders of disc scarcely crenulate and very little raised, not concealing the floor of the cephalic disc, when seen in profile. Anterior portion of disc semicircular, its sides subparallel up to some distance behind the posterior border of eyes, where they form an obtuse angle and converge strongly mesad to meet the truncate, straight, transverse posterior border. Clypeal sutures vestigial. Floor of disc slightly excavate and a little transparent above the antennal scrobes. Occipital lobes sharply marginate, their lateral border convex, forming a blunt tooth at the posterior corner. Floor of disc and sides of head very finely and densely punctate, more sparsely foveolate. Lower face of head more shiny, microsculpture and foveolae more superficial, the latter very sparse.

Thorax shiny on dorsum, opaque on sides. Pronotum nearly as broad as head, its anterior angle with a triangular tooth, its sides excised behind the tooth, then convex at the level of the transverse carina, the following part strongly converging mesad and a little sinuous. Transverse pronotal carina usually very pronounced, the lateral portions concave, strongly raised and sharply edged, the median portion convex, less prominent, only bluntly marginate in the middle. Promesonotal suture usually only vestigial. Sides of mesonotum with an obliquely truncate, projecting, marginate lateral lobe. Mesoepinotal suture deeply impressed laterad, slightly marked or only vestigial or even absent in the middle. Basal face of epinotum very short and broad, its sides with a broad triangular tooth and its posterior corner with a strong tooth, projecting upward and laterad. Sculpture of dorsum of thorax as on floor of cephalic disc, the squamiferous foveolae smaller and more crowded. Laterotergite of pronotum very sparsely foveolate, usually with a few rugosities near the inferior border. Pleura more densely foveolate on the inferior half. Fore coxae occasionally with a few transverse rugosities on the external face, near the apex, but usually only reticulate-punctate.

Peduncular segments [Pl. 6, Fig. 5], in general, as in worker, the lateral spines stouter, solid, those of petiole more conspicuously recurved.

Gaster elliptical, the tergites subopaque, the sternites slightly more shining. Distinctly emarginate anteromesially at the postpetiolar insertion, the anterolateral border sharply marginate, the anteriormost portion usually very narrowly crested. Lateral margination of first tergite ending near the stigma. First tergite finely reticulate-punctate, the squamiferous foveolae more superficial and elongate. First sternite similarly sculptured, often with a few fine longitudinal rugosities anterolaterally.

Standing hair on mandibles and tip of gaster. A fringe of very sparse and thickish hair projecting from the anterolateral border of the cephalic disc. Squamiform hair decumbent, always in foveolae, similar to those of worker, always highly shiny, with reflexes of polished brass.

Female. — For a complete diagnosis see the original description by Mayr, below. I have seen two specimens, cursorily examined in previous years. The first came from Misiones [MACN], and the other from Southern Brazil [NHMW]. This caste is readily recognized by the head characters, which it shares with the soldier.

Male. — This caste was described by Mayr in 1887.

Specimens examined: 109; 81 workers, 18 soldiers, 2 females, 8 males, as follows: Argentina: *Misiones*, loc., date, coll. unknown: 1 W, 1 F [MACN]. Brazil: *Rio Grande do Sul*, Pareci Novo, 18.XI.1925, B. Rambo, S. J.; 2 W, 2 S [WWK, IBSP]. — *Santa Catarina*, Itajaí, 1928, M. Silva Fontes: 33 W, 11 S, 6 M [WWK, IBSP]. Gaspar, 1928, M. Silva Fontes, 1953, R. Mueller, O.F.M.: 3 W [WWK, IBSP]. Poço Grande, 1953, R. Mueller, O.F.M.: 1 W [WWK]. Col. S. Teresa, nr. Florianópolis, 10.IV.1952, C. Gilbert, O.F.M.: 1 W [WWK]. Loc. unknown, June, Hetschko: 1 W, 1 S, 1 F, 1 M [NHMW]. — *Paraná*, Rio Negro, Dec. 1955, R. Mueller, O.F.M.: 3 W [WWK]. Rolândia, XI.53, IV.54, W. W. Kempf, O.F.M.: 6 W [WWK]. Arapongas, Col. Esperança, 26.VII.1955, W. W. Kempf, O.F.M.: 9 W [WWK]. — *São Paulo*, São Paulo, 15.XI.1928 and s/d, J. Lane: 2 W [WWK]. Raiz da Serra, Luederwaldt: 1 S, 1 M [WWK]. Agudos, 3.X.1954 (nest), 1955 (strays), W. W. Kempf, C. Gilbert, O.F.M.: 8 W, 3 S [WWK]. — *Rio de Janeiro*, Pôrto das Caixas, II.1928, O. Conde: 5 W [WWK, IBSP]. — *Distrito Federal*, Horto Florestal and Floresta da Tijuca, 1954, C. R. Gonçalves: 3 W [DDSV]. Rio de Janeiro, Goeldi: 3 W (types of var. *clarior* Forel) [MHNG].

Distribution. — From Rio de Janeiro south through the States of S. Paulo, Paraná, S. Catarina and Rio Grande do Sul, Brazil, and in the Province of Misiones in the Argentine Republic. The Argentine records have been discussed in the preceding section.

Discussion. — *Paracryptocerus angustus*, due to Mayr's excellent original description, has always been a well recognized form. It comes closest to *striativentris* (Em.), with which it shares approximately the same range of distribution. — The workers or *angustus* and *striativentris* are the only known forms that possess the sharply crested antero-lateral border of the gaster, where the hyaline, thin crest extends backwardly much beyond the clearly visible stigma of the first tergite. The present species differs, however, from *striativentris* by the lack of coarse longitudinal striation on the first gastric sternite, by the deeply excised occipital border of the head and the shape of the denticulate border of the pronotum. — The soldiers of *angustus*, *striativentris* and *targionii* resemble each other in having a stout, recurved and raised tooth on the posterior corner of the basal face of the epinotum. The soldier of *angustus* may be separated from the other two species by its lacking the distinctly raised lateral border of the cephalic disc, the floor of which is visible, when the head is seen from the side. Other distinguishing features for this caste consist in the color and type of sculpture of the head disc. Furthermore, the difference in width of pro- and mesonothm, offers another separatory character, to tell it apart from *targionii*. — The female, the characters of which have not been investigated during the present study, may yet be readily recognized by the characters of the cephalic disc, which she has in common with the soldier. This caste agrees with the other mainly southern forms of the group, by having on the posterior corner of the basal face of the epinotum a strong tooth which projects obliquely laterad.

Synonymy. — The variety *clarior* (Forel), herewith proposed as a synonym of the typical form, was erected upon several workers, which Goeldi collected in the vicinity of Rio de Janeiro. An examination of three syntype specimens revealed that it may not be separated specifically from *angustus*, nor does it deserve the status of a geographical race. Nevertheless the variety exhibits a few morphological differences from the typical *angustus* material, which are worth mentioning. One specimen was measured, with the following result: Total length 5.6 mm; maximum head length 1.48 mm; of thorax 1.56 mm. All three specimens are distinctive [Pl. 1, Fig. 7] by the number and shape of the thoracic teeth: the posterior portion of the lateral border of the pronotum, behind the second tooth more distinctly and rather irregularly denticulate; lateral tooth of mesonotum broader, truncate or bluntly rounded; lateral border of epinotum with four or even five distinct teeth, i. e. the vestigial denticle between the second and third tooth usually present in the typical form, is here prominently formed, and there is another accessory tooth, arising from the anterior base of the common third tooth. All three specimens were light brown in color, but this difference may not be taken too seriously, since all three were evidently callows (soft integument noticeable!).

Variation. — All other worker specimens captured in the proximity of Rio de Janeiro (all strays), differ both from the above mentioned "var. *clarior*" and the typical *angustus* by the position of the pronotal teeth, which are farther removed from the scapular angle [Plate 1, Fig. 4]. — In the soldier caste, the presence and extent of the anteromedian black area of the cephalic disc, is subject to variation. Specimens from Pareci Novo RS and Raiz da Serra SP lack it almost entirely, the head disc being completely reddish-brown. A soldier from Pareci Novo has the petiole distinctly narrower than the postpetiole. Likewise the curvature of the lateral peduncular teeth is quite variable. The soldiers taken at Agudos SP are noticeable by the more elongate head disc [Pl. 3, Fig. 5], which is rectangular, having nearly straight and subparallel sides, and also the lighter parts of the floor of the disc somewhat infuscated. In addition the transverse pronotal carina of these latter specimens is less pronounced, blunt and almost obsolete in the middle and where it touches the lateral border of the pronotum. Likewise the spines of the petiole are pointing more caudad than usual. — Variation in length of single nest series is as follows: Itajaí SC, (50 specimens) workers: 5.2-6.2 mm; soldiers: 7.5-8.5 mm; Agudos SP, (9 specimens) workers: 4.3-5.4 mm; soldiers: 6.2-8.1 mm. Workers measuring over 6.2 mm have been found to be intercastes, exhibiting to a variable degree characters of the soldier.

Biology. — The species appears to be nesting regularly in plant cavities (Mayr, 1887, p. 567; Luederwaldt, 1926, p. 269; Borgmeier, 1937, p. 245), usually in hollow twigs or branches. Borgmeier (l. c.) mentions a nest found in a rotten board. In Colônia Esperança, nr. Arapongas PR, I found many workers running up and down the trunk of a big "paineira" tree (*Chorisia speciosa*), in whose branches they were probably nesting. The nest detected by myself in Agudos SP, counting very few individuals, of which quite a few, including the female, were lost, was in a natural cavity of a green branch, about 3 cm in thickness, of a small tree, growing on swampy grounds.

Original Description

Cryptocerus angustus Mayr (1862). — "Weibchen. Laenge: 10-11 mm. Schwarz, groesstentheils glanzlos, die beiden Seitenraender und der Hinterrand der Oberseite des Kopfes breit hufeisenfoermig roth gefaerbt, oder die ganz Oberseite des Kopfes roth und nur die Mitte derselben schwarz; Mandibeln, Basis der Geissel, Vorderbeine, Knie, Schienen und die letzteren Tarsenglieder der Mittel- und Hinterbeine, die Mitte der Unterseite des Hinterleibs braunroth; vier gelbrothe grosse laengliche Makeln an der Oberseite des ersten Hinterleibsegmentes und zwar an den Vorder- und Hinterecken. Eine kurze, spaerliche, abstehende Behaarung findet sich nur an den Fuehlern und auf der Unterseite des Hinterleibes, hingegen ist die goldfarbige, anliegende, schuppenartige Behaarung am ganzen Koerper verbreitet, und zwar so, dass jedes Haerchen am Kopf in einem tiefen, am uebrigen Koerper aber in einem seichteren Gruebchen liegt. Der Kopf ist eben so geformt wie bei *C. flavomaculatus* [= *umbraculatus* (F.) W.W.K.], er hat oben einen eben solchen Rand, der den ganzen Kopf begrenzt, beiderseits eine solche Kante von dem Rande des Mandibelgelenkes bis zum Hinterrande des Kopfes, nur einige Abweichungen finden sich vor, und zwar: Der

Kopf ist deutlich laenger als breit, waehrend er bei *C. flavomaculatus* nur unbedeutend laenger als breit ist, der kantige, obere Hinterrand ist nicht ausgerandet und jener Rand, der die beiden Hinterecken des Kopfes verbindet, ist nicht gekerbt. Die Sculptur des Kopfes ist wie bei *C. flavomaculatus*. Der Thorax ist im Allgemeinen eben so wie bei *flavomaculatus* gebildet; er ist aber schmaeler, die Kante zwischen den vorderen Seitenecken des Pronotum ist sehr undeutlich, aber ebenfalls gekerbt, so dass fast nur die kleinen rundlichen Kerbzahne sichtbar sind, ferner ist statt den breiten Kanten, welche seitlich die Basalflaeche des Metanotum begraenzen, auf jeder Seite ein dreieckiges Zaehnchen, welches zwischen dem Enddorne und der Metanotum-Postscutellumnaht sitzt; die Sculptur des Thorax ist, mit Ausnahme der lederartig gerunzelten abschuessigen Flaeche ebenso wie die des Kopfes. Das Stielchen ist ebenfalls im Allgemeinen so wie das von *flavomaculatus* gebildet, die beiden Glieder sind aber etwas kleiner, die seitlich zurueckgekrueemten Zaehne am ersten Gliede spitzer und laenger, der Zahn an der Unterseite des zweiten Gliedes ist kuerzer und stumpfer, ueberhaupt nicht so deutlich, an der oberen Seite ist dasselbe in der Mitte ausgerandet. Der Hinterleib ist viel schmaeler und laenger erscheinend als bei *flavomaculatus*, die beiden Seiten desselben sind ziemlich parallel, er ist fast doppelt so lang als breit; die Leiste vorne zu beiden Seiten des Hinterleibes ist, wie bei *flavomaculatus*, kurz; der ganze Hinterleib ist dicht, fein, eingestochen punctiert, ueberdies sind noch seichte Gruebchen vorhanden, in denen die goldfarbigen Haerchen liegen. Die Beine sind kurz und ungezaehnt".

Paracryptocerus (Harnedia) striativentris (Emery)

(Pl. 1 Figs. 1, 6; Pl. 3 Fig. 3; Pl. 5 Fig. 3; Pl. 6 Fig. 4)

Cryptocerus striativentris Emery, 1894, Bull. Soc. Ent. Ital. 26: 203-205, Pl. 3, figs. 10-12 (S, W; Brazil SC, RS, DF: Rio de Janeiro). — Emery in: v. Jhering, 1894, Berl. Ent. Zs. 39: 384 nota, fig. (W; Brazil RS: Taquara or S. Lourenço). — Forel, 1912, Mém. Soc. Ent. Belg. 19: 199 (Brazil SC: Itajai).
Cryptocerus (Cryptocerus) striativentris Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 119.

Types. — When Emery described the present species, he had before himself specimens coming both from the States of Rio Grande do Sul and Santa Catarina, and from the Federal District, Brazil. Yet he mentioned expressly that he considered typical only the specimens from Santa Catarina. A further restriction of the type locality appears unfeasible at the present time, as the precise indication of the place of capture is ignored. The type specimens could not be found by Dr. Delfa Guiglia in the Museum of Genova, where Emery's collection is presently kept.

Worker [Pl. 1, Figs. 1, 6]. — Total length 3.1-4.8 mm; maximum length of head 0.89-1.35 mm; maximum length of thorax 0.89-1.35 mm. Black; the following ferruginous: tip of mandibles, funicular segments II-IV, anterolateral corners of gaster, just inside of the pale, translucent crest; light brown: edge of frontal carinae, tip of scape, funicular segment I, tip of femora, tibiae, tarsites; pale-testaceous: remaining portion of frontal carinae.

Head subopaque, subquadrate; slightly more elongate than in *angustus*, the maximum length always somewhat exceeding the interocular width. Clypeal suture vestigial. Lateral border of head somewhat diverging caudad, distinctly emarginate in front of, convex and slightly upturned above, eyes. Occipital corners obliquely truncate, the truncated edge either notched or straight, the inner angle never forming a prominent triangular tooth. Occipital border gently concave. Dorsal face of head gently convex, finely reticulate-punctate, more sparsely covered with squamiferous foveolae, which increase in number toward the occipital border. Lower face of head finely reticulate-punctate, sparsely and very superficially foveolate, the foveolae very elongate.

Thorax subopaque. Anterior border of pronotum very gently convex, almost straight. Shoulders rectangular. Lateral border of pronotum quite variable, even in specimens of the same nest. Typically there is a pronounced triangular or subacute tooth next to the scapular corner, followed by a sharply marginate, often irregularly crenate or denticulate crest. Especially in very small specimens, this crest presents occasionally two distinct, though apically rounded or truncate, rather foliaceous teeth, so that in this case the sides of the pronotum are really tridentate. Posterior corner of pronotum subrectangular. Promesonotal suture vestigial or absent. Mesonotum with a laterally projecting tooth on each side, which is subacute in small specimens, blunt, broadly and obliquely truncate in larger specimens. Occasionally there is a minute and sharp tooth behind the preceding tooth. Mesoepinotal suture usually absent, seldom vestigial. Lateral border of basal face of epinotum tridentate, all three teeth usually acute, the second by far the largest. Behind the third tooth, on the marginate border of the declivous face one or two very small denticles may be present. Declivous face continuous with basal face, not clearly separable from each other, forming in profile a gentle and even curvature. Dorsum of thorax finely

reticulate-punctate and foveolate, in the same fashion as dorsum of head, but the foveolae are more numerous and crowded, so that on the mesoepinotum the integument becomes reticulate-rugose. Laterotergite of pronotum with longitudinal striae. Thoracic pleura principally longitudinally rugose with very densely interspersed squamiferous foveolae. Fore coxae coarsely and obliquely striate on the outer face.

Peduncular segments subopaque, the dorsolateral sculpture as on head and thorax. Petiole subequal in width to the postpetiole, its anterior face obliquely truncate, finely reticulate-punctate, usually not sharply marginate nor denticulate at its point of contact with the dorsal face, but sometimes as in *angustus*. Lateral spines of both segments depressed, platelike, foliaceous, semitransparent, more recurved than in *angustus*. Dorsal face of postpetiole more gently convex than in *angustus*.

Gaster subopaque, elliptical, strongly emarginate anteromesially, the anterolateral border with a transparent thin crest, which extends backwards beyond the conspicuous stigma of the first gastric tergite, which is very sharply reticulate-punctate, and covered with superficially impressed elongate squamiferous foveolae. First sternite, as a rule, very coarsely and regularly longitudinally striate.

Pilosity essentially the same as in *angustus*.

Soldier [Pl. 3, Fig. 3]. — Total length 4.7-6.3 mm; maximum length of head 1.46-2.00 mm; maximum length of thorax 1.32-1.64 mm. Black; the following yellowish-brown: floor of cephalic disc, sides of head, anterior corner of pronotum, lateral portions of transverse carina, edge of lateral lobes of mesonotum, teeth of basal face of epinotum, apical half of extensor face of femora; ferruginous: mandibles, edges of yellowish-brown markings on thorax and gaster, tarsites; testaceous: tibiae, the four spots on first gastric tergite, which in full grown workers are fused in a horseshoe-like fashion, as shown by the figure. All sharply marginate edges inside the light areas are conspicuously darker.

Head subopaque, surmounted by an oval, somewhat excavated, disc. Borders of disc scarcely crenulate, conspicuously raised and upturned laterally, concealing the floor of the disc, when seen in profile. Occipital border of disc not raised, round, not truncate. Clypeal suture, at most vestigial, usually absent. Floor of disc, except for the raised lateral borders, rather flat, with a very gentle anteromedian convexity, flanked by very

shallow concavities above the antennal scrobe, where the integument is somewhat transparent. Occipital lobes sharply marginate, the lateral border gently convex, the posterior angle obtuse. Floor of disc and sides of head finely reticulate-punctate, coarsely reticulate-rugose and foveolate, the squamiferous foveolae much broader than their raised intervals. Lower face of head rather shiny, almost smooth postero-laterally, with very superficial microsculpture and sparse foveolae.

Thorax subopaque dorsally, opaque laterally. Pronotum nearly as broad as head, its anterior corner with a triangular tooth, its sides slightly excised behind the tooth, then convex at the level of the transverse carina, then strongly converging mesad toward the mesonotum. Transverse pronotal carina, as seen from the front, very deeply excised in the middle; concave laterally, when seen from above; very prominent and sharply edged, excepting the mesial notch. Promesonotal suture vestigial. Mesonotum with a broad, obliquely truncate and marginate projecting lobe on each side. Mesoepinotal suture deeply impressed laterally, usually well marked but superficial mesially. Basal face of epinotum very short and broad, its lateral border with a triangular tooth and its posterior corner with a very stout, apically rounded tooth which points upward and laterad. Dorsum of thorax finely reticulate-punctate, sparsely foveolate on pronotum, more densely foveolate on mesoepinotum, the foveolae much smaller than those on cephalic disc. Laterotergite of pronotum sparsely foveolate and somewhat rugose. Pleura mainly foveolate. Fore coxae slightly rugose on the outer face.

Peduncular segments as in worker, but the petiole is distinctly narrower, bearing on each side a short tooth, which points obliquely caudad. Postpetiole, as seen in profile, conspicuously convex above, its lateral spines solid, not platelike.

Gaster subopaque, the thin anterolateral crest and the lateral margination of first gastric tergite as in *angustus*, the sides of gaster, however, less convex. First gastric sternite longitudinally striato-rugose, the striae not as coarse as in worker.

Pilosity as in *angustus*, except for the hair arising from the pits of the cephalic disc, which is minute, scarcely visible, not glittering, nor strictly decumbent.

Female (undescribed) [Pl. 5, Fig. 3]. — Total length 7.1-7.2 mm; maximum length of head 1.71-1.78 mm; maximum length of thorax 1.93-1.96 mm. Black; lightly colored parts very much as in soldier, except for the following: median portion of

cephalic disc infuscated to a variable extent; anterolateral portion of head disc, overlying the antennal scrobe, pale testaceous and somewhat transparent; anterior corner of pronotum yellowish-brown; the four gastric spots always separate, never anastomosing.

Cephalic disc oval, elongate, more converging caudad than cephalad, the occipital border rounded, not truncate. Floor of disc rather flat, its lateral borders scarcely raised, not concealing completely the floor of the disc, when head is seen in profile. Occipital lobes forming a blunt angle at the corner. Posterior ocelli quite removed from the occipital border of the disc. Anterior corner of pronotum with a platelike triangular tooth. Sides of pronotum subparallel. Transverse pronotal carina distinct, yet not prominent, but broadly interrupted in the middle and vanishing toward the lateral border of the pronotum. Scutum pronouncedly transverse. Basal face of epinotum with a lateral more or less triangular lobe and a posterior acute tooth which points caudad et laterad. Mesopleural tooth well marked. Petiole on each side either with a short tooth or with a thin, drawn-out and delicate spine. Gaster not very deeply excised in front, its anterolateral border always marginate, occasionally crested. First gastric sternite conspicuously longitudinally rugose on the sides. Wings hyaline, veins light brown. Fore wing, when folded over the back, reaching slightly beyond the apex of the normally extended gaster. Venation of fore wing as shown on Pl. 6, Fig. 4. Sculpture and pilosity similar to that of soldier.

Specimens examined: 110; 80 workers, 20 soldiers, 9 females and 1 male, as follows: Brazil: *Rio Grande do Sul*, Pareci Novo, 17.X.1926, B. Rambo, S. J.: 1 W, 1 S, 1 F [WWK]. — *Santa Catarina*, Itajaí, 1928, M. Silva Fontes: 72 W, 12 S, 4 F, 1 M [WWK, IBSP]. Same locality, date and collector unknown: 1 W, 1 S [NHMW]. Blumenau, XII.1953, R. Mueller, O.F.M.: 1 W [WWK]. Rodeio, XII.1955, R. Mueller, O.F.M.: 1 W [WWK]. Corupá, XII.1953, Maller: 1 F [DDSV]. Loc., date unknown Hetschko: 1 W, 1 S, 1 F [NHMW]. — *Paraná*, Rolândia, 5.XI.1951, 20.III.1953, W. W. Kempf: 3 W [WWK]. — *Rio de Janeiro*, Campo Belo, 26.X.1925, J. F. Zikán: 5 S, 2 F [WWK, IBSP].

Distribution. — Southern Brazil, from Rio Grande do Sul north to Rio de Janeiro. A record for the State of S. Paulo is wanting. Emery reports the species from Rio de Janeiro. The specimens from Campo Belo, State of Rio de Janeiro,

examined by myself, disagree with the typical form in a few significant details and will be dealt with further below.

Discussion. — Like *angustus* the present species is easily identified and has not as yet given rise to taxonomic confusion. In the worker the length of the anterolateral crest of the gaster, which extends caudad visibly beyond the stigma, and the subsequent pronounced margination of the sides of the gastric tergite reaching almost the posterior border, sets it apart from all species but *angustus*. It differs from the latter in the following features: the striate first gastric tergite, the feebly emarginate occipital border, the scarcely convex anterior border of the pronotum, the shape of the lateral pronotal crest, the smaller size and the color of the tibiae. — By the stout tooth on the posterior corner of the basal face of the epinotum, pointing upward and laterad, the soldier comes closest to *angustus* and *targionii*. It differs from the latter by the width of the mesonotum, and from the former by the color, sculpture and convexity of the cephalic disc, and the striate first sternite of the gaster. The rounded, not truncated, occipital border of the cephalic disc, sets it apart from both the preceding forms. The female of *striativentris* shares with *angustus*, *fleddermanni* and *targionii* the position of the ocelli, which are quite removed from the occipital border, and the presence of diverging teeth on the posterior corner of the basal face of the epinotum. It differs from *angustus* and *targionii* by not having the occipital border truncated, but round, and differs from *fleddermanni* by not having the cephalic disc deeply excavate, the sides highly raised, but rather flat, and the floor of the disc being somewhat visible, when head is seen from the side. It differs from all three forms by the sculpture of the first sternite of the gaster, which is longitudinally rugose on the sides.

Variation. — A few stray workers, taken near Rolândia, State of Paraná, differ from the typical form by having the striation of the first gastric sternite not quite as coarse and regular, the sculpture being striato-rugose, the rugosities much finer. A small series of 5 soldiers and 2 females from Campo Belo, State of Rio de Janeiro, has not been considered in the preceding diagnoses, on account of several important divergences. The soldiers (total length 6.2-6.7 mm; max. length of head 2.00-2.10; max. length of thorax 1.64-1.78 mm) are distinctive by the larger size, the bright yellow cephalic disc, with a black clypeal area, the very prominent and crested transverse pronotal carina, the petiole which is as broad as postpetiole, having on each side a conspicuous and recurved spine, the first gastric sternite, which is only finely rugose, the rugosities running principally in a longitudinal direction, but anastomosing transversely. The female (total length 7.8-7.9 mm; maximum length of head 1.92-1.96 mm; maximum length of thorax 2.07-2.14 mm). Has the median blackish area of the head disc more elongate and broader, the lateral delicate spinules of petiole very pronounced, the maculae of the first gastric tergite nearly anastomosing on each side, the first gastric sternite with a very fine, nearly vanishing rugosity. Only one fore wing is preserved, which is distinctive by the lack of the first recurrent vein, and consequently the absence of a closed discoidal cell. Nevertheless these specimens resemble *striativentris* so closely in all other features, that it is advisable to keep them with this form. Specimens from Rio de Janeiro, mentioned by Emery, are said to vary in the following details: Soldier: Lateral projections of

epinotum more pronounced, gaster nearly black, with only the anterior pair of light maculae present; Worker: Lateral border of pronotum with 3 to 4 denticles.

In this connection I wish to mention, that the preceding diagnosis of the soldier applies strictly only to full-grown members of this caste. Smaller soldiers have the light color of the gaster and thorax much reduced, and even the head disc exhibits darker colors.

Paracryptocerus (Harnedia) adolphi (Emery)

(Pl. 1, Figs. 3, 5)

Cryptocerus adolphi Emery, 1905, Bull. Soc. Ent. Ital. 37: 172-173, fig. 33 (W; Brazil MT, Coxipó).
Cryptocerus (Cryptocerus) adolphi Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 117.

This species was founded on a unique worker, taken by Prof. Silvestri at Coxipó, in the vicinity of Cuiabá, State of Mato Grosso, Brazil. The holotype specimen is supposed to be in the Emery collection, although it could not be found by Dr. D. Guiglia, who looked for it, at my request, in 1949. The rather short description is as follows:

In order to complete this description, Emery's figure has been redrawn [Pl. 1, Fig. 5] at approximately the same scale of the other workers presented in this study. The species bears evident relationship to the group of *angustus*, *fleddermanni*, *striativentris* and *targionii*, but may be immediately recognized by the unusually long lateral spines of the peduncular segments. Emery ventured the opinion that it may possibly be the worker of *targionii* (based upon the soldier), a suspicion which is disproved in this study, inasmuch *denticulatus* is the worker of the latter and its junior synonym (cfr. infra).

Worker. — "Bruno chiaro, lati del capo in avanti largamente pellucidi; un lembo pellucido ai lati della base del gastero. Capo e torace un poco lucidi, sparsi di punti squamuligeri; gastero opaco, con punti delicatissimi, dai quali sorgono peluzzi molto sottili e poco appariscenti. La forma e le proporzioni del corpo, le spine del torace e dei segmenti peziolari risultano dalla figura. Zampe non prismatiche nè angulose. L. 3,8 mm. Coxipó (Matto Grosso), un esemplare".

A unique stray worker, collected by Father Borgmeier at Cabo Frio RJ, Brazil, during August 1926 [IBSP], resembles rather closely the present species, especially on account of the peculiarly drawn out peduncular spines [Pl. 1, Fig. 3]. The specimen measures 3.8 mm. in length; the maximum head length being 1.14 mm., the maximum length of the thorax 1.10 mm. It disagrees, however, with the description and figure of the typical *adolphi* in the following characters:

1. Black; legs, mandibles and antennae more or less ferruginous; front carinae and anterolateral gastric crests yellowish and semi-transparent. The difference in the general body color may well be accounted for by the fact that Emery's specimen could have been a callow.

2. Head proportionally smaller and not quite as broad as in the typical form (see figures), with the sides slightly more converging cephalad.

3. First and second lateral prothoracic teeth closer together, separated by a rectangular excision, and conversely, second and third prothoracic teeth farther apart from each other and separated by a rounded and deep excision.

In the preceding key, in which this species has not been considered, the Cabo Frio specimen runs to couplet 17, but differs from both alternatives in combining a scarcely convex dorsum of the postpetiole with a slightly sinuous lateral border of the head, which is raised and upturned above the eyes. The shape of the peduncular segments and the tridentate lateral border of the epinotum offer additional distinguishing features. It certainly represents a different species from those listed in the keys, but its association with *adolphi*, although quite probable, still remains subject to possible doubts.

Paracryptocerus (Harnedia) fleddermanni, n. sp.

(Pl. 2 Fig. 3; Pl. 3 Fig. 4; Pl. 5 Fig. 1)

Types. — A soldier (holotype) and a worker (paratype) from São Sebastião SP, collected by my confrère, Fr. Beraldo Fleddermann, O.F.M., on January 30, 1955 [WWK]. Another worker (paratype) taken by myself at the same locality earlier on February 5, 1953 [WWK]. A female (paratype) captured by R. L. Araujo in February 1940, near Alto da Serra SP [IBSP].

Soldier (Holotype) [Pl. 3, Fig. 4]. — Total length 5.4 mm; maximum length of head 1.64 mm; maximum length of thorax 1.46 mm. Black; the following light brown or yellowish brown: sides of head, occipital lobes, floor of cephalic disc, dorsum of thorax, tip of postpetiolar spines, tip of femora; dirty testaceous: tibiae, the four gastric maculae, the latter infuscated and the anterior pair fused to each other; ferruginous: tip of mandibles, except for the chewing border, basal funicular

segments, cheeks, the four apical tarsites. Cephalic disc and pronotum with an anteromedian black band. Mesoepinotum ferruginous to infuscated discad.

Head rather shiny; surmounted by a subcircular, somewhat elongate (46:43), deeply excavated, completely marginate disc. Lateral and posterior border of disc strongly raised and upturned, concealing the floor of the disc, when head is seen in profile. Anterior border of disc strongly curved, its sides gently convex, its posterior border evenly rounded, not truncate. Clypeal sutures invisible. Floor of disc conspicuously concave laterally and behind, having a prominent anteromedian and caudad another yet more feeble convexity. In front of the anterior bulge, the floor of the disc abruptly slopes downward to the supramandibular excision, which is at a distinctly lower level than the rest of the disc. Occipital lobes sharply marginate and crested, their lateral border convex, converging caudad, their posterior border concave, both borders forming at their junction a prominent, apically rounded tooth. Floor of disc and sides of head coarsely foveolate, the diameter of the pits more than twice as large as the diameter of the raised, highly shining intervals, which form a network with large meshes. Above the antennal scrobe the floor of the disc is semitransparent and the foveolae are transversely compressed, the intervals very distinct in the form of transverse rugosities. Lower face of head reticulate-rugose and sparsely foveolate discad, more or less longitudinally rugose posterolaterad.

Thorax rather shiny above, subopaque on sides and declivous face. Anterior border of pronotum straight in the middle, slightly oblique and concave laterally, the latter joining the former at a distinct very obtuse angle. Anterior corner of pronotum subdentate, the first half of the lateral borders subparallel, forming a thin, raised crest, which grades imperceptibly into the bisinuous, mesially not excised nor interrupted, but strongly crested transverse pronotal carina. Anterolateral portion of pronotum unusually excavate. Posterior half of borders of pronotum immarginate, sinuous, strongly converging caudad, forming a right angle at the posterior corner. Promesonotal suture vestigial. Sides of mesonotum with a projecting, strongly marginate, slightly crested, obliquely truncate lobe. Mesoepinotal suture complete and impressed. Basal face of epinotum transverse, its anterior corner subdentate, its sides with a more or less triangular lobe, its posterior corner with a tooth, similar to that of *striativentris*,

pointing upward, but scarcely laterad, being however feeble, not stout. Declivous face somewhat excavated with a prominent, sharply marginate border on each side. Dorsum of thorax reticulate-rugose and foveolate, the bottom of the pits being finely punctate. Foveolae much smaller and less regular than those of the cephalic disc, usually inconspicuous, especially on mesonotum where more or less transverse and crowded rugosities prevail. Sides of thorax finely and sharply reticulate-punctate. Laterotergite of pronotum reticulate-rugose above, longitudinally rugose below. Pleura with few, rather vanishing rugosities. Declivous face of epinotum finely reticulate-punctate, and finely and sparsely transversely rugose. Fore coxae reticulate-punctate.

Peduncular segments irregularly rugose and foveolate above, sides and lower face finely reticulate-punctate. Petiole somewhat narrower than postpetiole, its lateral teeth pointing obliquely caudad, its anterior face obliquely truncate and submarginate above. Postpetiole with the customary curving spines, the tip of which is strongly recurved caudad. Anterior face first vertical than curving caudad to a horizontal position, forming a triangular submarginate area dorsally on the body of the postpetiole.

Gaster elliptical, emarginate anteromesially, its anterolateral lobes marginate yet not visibly crested. Both the first tergite and sternite are opaque, finely reticulate-punctate, the latter having also very fine and sparse longitudinal rugosities.

Standing hair, as usual, on mandibles, funiculus, and on tip of gaster. A fringe of sparse, thickish hair around the anterolateral edge of the cephalic disc reaching the anterior border of the eyes. Decumbent, squamiform, usually canaliculate, always glittering, silvery hair on lower face of head, epinotum, sides of thorax, dorsum of peduncular segments, and first gastric tergite. From each of the very large pits on cephalic disc arises a minute, thick, curved hair; similar, yet more erect, and somewhat longer hair arises from the pits on promesonotum. Simple decumbent scalelike hair on legs and gastric sternite.

Worker (Paratypes) [Pl. 2, Fig. 3]. — Total length 3.7-4.2 mm; maximum length of head 1.07-1.21 mm; maximum length of thorax 1.03-1.18 mm. Black; the following ferruginous: tip of mandibles, tip of scape, basal funicular segments, tip of thoracic and peduncular teeth, tip of femora, all tarsites; pale testaceous: frontal carinae, anterolateral gastric crests and an irregular, narrow spot just inside of the crest, on the anterolateral gastric lobes; fuscous testaceous: edge of frontal carinae, tibiae.

Head subopaque, subquadrate; its maximum length slightly exceeding the interocular width (34:31; 30:28). Clypeal and frontal sutures vestigial. Lateral borders of head slightly diverging caudad, straight, the posterior portions neither excised in front of, nor sinuate nor upturned above, eyes. Occipital corners obliquely truncate, the inner corner obtuse. Occipital border gently emarginate. Dorsum of head a little convex, finely reticulate-punctate, more sparsely covered with squamiferous foveolae, which are more numerous and somewhat crowded toward the occipital border; frontal carinae flat, without conspicuous foveolae. Lower face of head longitudinally rugose, with sparse squamiferous foveolae anteromesially.

Thorax subopaque. Anterior border scarcely convex, nearly straight. Shoulders rubrectangular. Lateral border of pronotum with two approximated triangular, slightly foliaceous teeth, followed by an irregularly edged foliaceous crest, which is either irregularly denticulate or crenate, or exhibits another larger, yet blunt tooth; the posterior corner subrectangular. Promesonotal suture vestigial or absent. Mesonotum with a short pointed tooth, projecting from each side. Mesoepinotal suture slightly impressed laterally, absent in the middle. Lateral border of basal face of epinotum with three or four small teeth, and an additional denticle on the sides of the declivous face. The latter excavated in the middle. Dorsum of thorax finely reticulate-punctate, rather densely foveolate, especially on mesonotum, where the intervals between the crowded pits form a raised reticule of intertwining rugosities. Sides of thorax, including the laterotergites of pronotum, horizontally striato-rugose. Fore coxae with a few fine longitudinal rugosities.

Peduncular segments as in soldier, but the postpetiole is less strongly convex above, and lacks the distinct median triangular area.

Gaster subopaque, elliptical, longer than in *striativentris*, strongly emarginate anteromesially, the anterolateral lobes with a narrow, transparent, thin border which does not reach backwards beyond the stigma of the first tergite, the sides of which are practically immarginate behind the spiracle. First tergite and sternite finely reticulate-punctate, the latter also with very fine and sparse longitudinal rugosities.

Standing hair on mandibles, clypeal border, funicular segments, apical border of gastric tergites and sternites II-IV, along the edge of the frontal carinae and lateral borders of

head, none on the occipital corner. Squamiform, canaliculate, silvery, decumbent hair rather abundant in all foveolae of dorsum of body, more sparsely on frontal carinae, legs, lower face of head, sides of thorax, gastric sternites, where they are usually smaller and simple, not canaliculate.

Female (Paratype) [Pl. 5, Fig. 1]. — Dealate. Total length 7.5 mm; maximum length of head 1.89 mm; maximum length of thorax 2.14 mm. Black; the following orange: sides of head, occipital lobes, floor of cephalic disc, except for the large central black area, shoulders; fuscous-ferruginous: mandibles, basal funicular segments, tarsi; testaceous: tibiae, especially the extensor face; the four gastric maculae are pale yellow; all crests inside of the orange colored parts are light brown.

Resembling the soldier, with the differences of the caste. Cephalic disc more elongate (53:43), deeply excavated, floor of disc invisible, when head is seen in profile. The posteromedian bulge of head disc scarcely distinguishable. Anterior depression behind the supramandibular excision as in soldier. Posterior ocelli removed from the occipital border. Two imaginary lines drawn from the anterior ocellus to each of the posterior ocelli form a right angle. The same characteristic occipital lobes as in soldier. Sculpture of head identical, except for the foveolae on floor of cephalic disc, which are more transverse, and the transverse raised rugosities more prominent, than the longitudinal ones. Thorax relatively elongate (length: width proportion 60:44). Anterior border of pronotum crenulate laterally, the anterior corner bluntly angulate and crested. Anterolateral excavation and transverse carina of pronotum similar to that of soldier. Lateral borders of pronotum straight, slightly converging caudad. Scutum and scutellum coarsely and densely reticulate-rugose, without clearly visible foveolae. Sides of basal face of epinotum with a rather rounded lobe. Posterior tooth pointing obliquely caudad, as in *striativentris*. Mesopleural tooth present, not prominent. In front of this tooth the mesopleura are vertically rugose, behind the tooth horizontally rugose. Peduncular segments as in figure, the lateral tooth of the petiole longer, more acute lacking a thin, drawn out tip, as frequently in *striativentris*. Postpetiole with a middorsal triangular area as in soldier. Both the first gastric tergite and sternite opaque, finely yet sharply reticulate-punctate, the latter with dense fine longitudinal rugosities. Squamiform hair scarce or little apparent, that of

gaster extremely small, visible only at high magnification, simple. Instead both on thorax, postpetiole and gastric tergite there are evenly scattered, short, standing hairs. The same also on the legs.

Specimens examined: 4; 1 soldier, 2 workers, 1 female, as follows: Brazil: *State of São Paulo*, São Sebastião, on a tree, on the road to Caraguatatuba, 30.I.1955, B. Fleddermann, O.F.M.: 1 S, 1 W (Holotype and paratype) [WWK]. São Sebastião, on a tree in the orchard of the Franciscan Monastery, Bairro de S. Francisco, 5.II.1953, W. W. Kempf: 1 W (Paratype) [WWK]. Alto da Serra, II.1940, R. L. Araujo: 1 F (Paratype) [IBSP].

Distribution. — Inasmuch the species has been found both near sea-level in the town of São Sebastião, on the northern shore of the State of S. Paulo, and at the heights of the Cubatão mountains, near Alto da Serra, on the Santos-S. Paulo railroad, a hundred kilometers away from the first locality, at an altitude of presumably 800 meters, it seems probable that it ranges at least along the southeastern slopes of the Serra do Mar within the State of S. Paulo.

Discussion. — Although the preceding descriptions of the three castes of the species are based upon stray individuals, there is no reasonable doubt against their association with the same species. The female reproduces quite a few of the morphological peculiarities of the soldier, which constitute a strong argument in favor of both being conspecific. The holotype soldier was taken together from the same tree on the same date with a worker specimen, which again, though less stringently, seems to suggest that both belong to the same species. At any rate all three castes differ conspicuously from all other known species and their respective castes.

The worker disagrees significantly with *angustus* and *striativentris* by the length of the laminate anterolateral border of the gaster (anterolateral crest). Among the remaining species with free scapular corner, it comes closest to *targionii*, from which *fleddermanni* can be differentiated by the flat, straight, lateral border of the head, the absence of two sharp denticles on the anterior border of the dorsum of petiole, and a median tooth on the dorsum of postpetiole, the lack of standing hair on the posterior border and the sides of the first gastric tergite.

The soldier is a relative of *angustus*, *striativentris* and *targionii*, differing from all three by the little developed posterior epinotal teeth, the shape and development of the cephalic disc. It comes closest to *striativentris*, with which it disagrees in lacking the striation of the first gastric sternite, in having a deeply excavated anterolateral portion of the pronotum, in the peculiar pilosity of thorax, the prominent occipital lobes, and the characters already mentioned above.

The female likewise exhibits the strongest affinities with *striativentris*, being, however, quite distinctive by the shape of the head, the development of the cephalic disc, the occipital lobes, the transverse pronotal carina, the excavated pronotum, the more elongate scutum, the peculiar pilosity.

The male is not known.

Paracryptocerus (Harnedia) goeldii (Forel)

Cryptocerus goeldii Forel, 1912, Mém. Soc. Ent. Belg. 19: 205-206 (W; Brazil RJ: Serra Vermelha).
Cryptocerus (Cryptocerus) goeldii Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 118.

Type. — A unique worker (holotype), taken by Goeldi in the Serra Vermelha, State of Rio de Janeiro, Brazil, in the Forel collection [MHNG].

The type of this species, not known from other material, was not available for this study. However, it seems quite certain that it represents a form which differs appreciably from all other species treated in the present section. According to the description, *Paracryptocerus goeldii* combines the general features of *denticulatus* (= *targionii*) with the following striking peculiarities:

1. Occipital border of head with a translucent lamella on each side, which is as broad and nearly as long as that of *laminatus* (F. Smith) [subgenus *Paracryptocerus*, see Kempf, 1951].

2. Lateral appendages of peduncular segments blunt at apex, lamelliform, not spinelike.

3. Gaster circular, as broad as long, with a broad translucent crest on the anterolateral border, as in *laminatus*.

Emery associated this species with the *angustus*-group in the broad sense, and it is quite probable that it belongs to the same group in the stricter sense.

For the sake of identification, I transcribe the original description:

Cryptocerus goeldii Forel (1912). — Ouvrière. — "L. 4.4 mill. — Entre *denticulatus* Em. et *laminatus* Sm. Le bord postérieur de la tête a de chaque côté une lamelle translucide, jaune aussi large et presque aussi longue que celle du *laminatus*, mais la tête est bien plus longue et moins rétrécie devant que chez cette espèce, à peu près comme chez *denticulatus*. Le thorax est beaucoup plus étroit et plus allongé que chez *laminatus* et *denticulatus*; la suture promésonotale est absolument nulle (assez distincte chez *denticulatus*). Promésonotum aussi long que large (bien plus large chez les deux autres). Une petite élévation médiane à la limite du pronotum et du mésonotum. Le thorax est bordé de petites dents, comme chez le *denticulatus* et n'a pas d'épines. Le bord du pronotum a 4 dentelures (3 dents chez *denticulatus*), celui du mésonotum une dent et celui de l'épinotum 5, comme chez *denticulatus*. Les noeuds sont à peu près comme chez *denticulatus* et *laminatus*, mais leurs prolongements latéraux sont lamelliformes et obtus (récourbés en arrière) et non spiniformes. L'abdomen est circulaire, aussi large que long (allongé et rétréci derrière chez les deux autres espèces); la lamelle translucide jaune de ses bords antérieurs est aussi grande que chez

laminatus. — Mat, densément réticulé-punctué, avec des points espacés sétigères. La pubescence adjacente est plus large et plus abondante que chez *laminatus* et *denticulatus*, brillante, partout cannelée au milieu; quelques poils dressés extrêmement courts et épais au bord de la tête. — Noir. Arêtes frontales, lamelles occipitales, rebord translucide de l'abdomen devant, denticules du thorax et une assez large bande marginale du dos de l'abdomen que s'arrête sur son quart postérieur, d'un jaune à peine roussâtre. Pattes variées de brun et de jaunâtre. — Serra Vermelha, province Rio de Janeiro (Goeldi)".

It should be noted, however, as regards the characters mentioned for *denticulatus* (= *targionii*), that this species generally does not possess a distinct promesonotal suture, and the dentition of the lateral border of the pronotum is quite variable.

Paracryptocerus (Harnedia) targionii (Emery)

(Pl. 2 Fig. 1; Pl. 3 Fig. 1; Pl. 5 Fig. 2; Pl. 6 Fig. 10)

- Cryptocerus targionii* Emery, 1894, Bull. Soc. Ent. Ital. 26: 205, Pl. 3, figs. 15, 16 (S; Brazil MT). — Forel, 1904, Ann. Soc. Ent. Belg. 48: 175 (Fr. Guiana: Cayenne). — Forel, 1911, Sitz.-ber. K. Bayer. Akad. Wiss. (1911) p. 258 (Paraguay: San Bernardino).
Cryptocerus denticulatus Emery, 1894, Bull. Soc. Ent. Ital. 26: 206, Pl. 3, fig. 17 (W; Bolivia: Salinas on Beni River). — Forel, 1911, Sitz.-ber. K. Bayer. Akad. Wiss. (1911) p. 261 (Paraguay: San Bernardino). — Forel, 1912, Mém. Soc. Ent. Belg. 19: 199 (Colombia: Rurithaka, Sierra de Santa Marta). Nov. syn.
Cryptocerus denticulatus var. *variegata* Forel, 1911, Sitz.-ber. K. Bayer. Akad. Wiss. (1911) p. 262 (W; Brazil: Amazon River). Nov. syn.
Cryptocerus (Cryptocerus) targionii Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 119.
Cryptocerus (Cryptocerus) denticulatus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310.

Types. — The holotype soldier specimen of *targionii* (unique!) was captured in the State of Mato Grosso, Brazil, locality, date and collector being unknown. This specimen is not in the Emery collection, according to the information received from Dr. Guiglia. The type locality of *denticulatus* is Salinas, on the Beni River in Bolivia, where it was taken by Luigi Balzan; type specimens are in the collection of the Museum of Genova. Forel founded his var. *variegata* on specimens collected by Bates on the Amazon River, Brazil, deposited, at that time, in the Museum of Munich; a single syntype specimen is in the Forel collection [MHNG]. None of the aforesaid types has been seen by this writer.

Worker [Pl. 2, Fig. 1]. — Total length 4.3-4.7 mm; maximum length of head 1.18-1.28 mm; maximum length of thorax 1.25-1.28 mm. Black; the following ferruginous: tip of

mandibles, four apical tarsites; dark testaceous: extensor face of tibiae, tip of femora, tip of scape; light testaceous: frontal carinae, except the narrow edge which is darker.

Head subopaque; subquadrate; the interocular width subequal to the maximum length. Clypeal sutures vestigial. Anterior half of lateral border of head distinctly diverging caudad, conspicuously emarginate in front of, somewhat convex and upturned above, eyes. Occipital corners obliquely truncate, the truncated border sometimes notched, its inner angle obtuse. Occipital border gently concave. Dorsal face of head moderately convex, finely reticulate-punctate, more sparsely covered with squamiferous foveolae, which increase in number toward the occipital border. Lower face of head rather shiny, finely yet superficially reticulate-punctate, sparsely and finely longitudinally rugose, very sparsely foveolate.

Thorax subopaque. Anterior border almost straight, scarcely arcuate. Shoulders subrectangular. Lateral border of pronotum typically bidentate anteriorly, the first tooth triangular, the second triangular or obtuse, both closely together and somewhat foliaceous. Behind these teeth the lateral border continues as a sharply marginate, slightly converging crest, on which minor notches, or even a third but always blunt posterior tooth may be present. Posterior corner subrectangular. Promesonotal suture absent, rarely vestigial. Sides of mesonotum with a projecting, usually apically truncate, tooth. Mesoepinotal suture absent. Sides of epinotum with three or four conspicuous, larger, acute teeth, and generally one or more minute denticles especially on the sides of the declivous face. All the larger teeth are pointed and one or more may be bifid. Declivous face slightly distinct from the basal face, somewhat excavated discally. Dorsum of thorax finely reticulate-punctate and more densely foveolate than on dorsum of head, yet the integument never becomes reticulate-rugose, i. e. the intervals between the pits do not form a raised network of rugosities. Sides of thorax longitudinally striate, or striato-rugose. Fore coxae reticulate-punctate only.

Peduncular segments [Pl. 6, Fig. 10] subopaque. Dorsum irregularly reticulate-rugose and foveolate. Petiole subequal in width to postpetiole, its anterior face obliquely truncate, its upper border with a prominent denticle on each side, more conspicuous than in *angustus*. Sides of petiole with a rather delicate, long spine, which is nearly straight, pointing obliquely caudad. Postpetiole in the usual fashion with the curved spines on each

sides, the tip of which is strongly recurved. Anterior face of postpetiole distinct, first vertical, then curving into a horizontal position, forming a submarginate triangular area on dorsum of the segment, the vertex of which is often acuminate, or at least distinctly marginate.

Gaster elliptical, subopaque. Anterolateral border crestlike, hyaline, prominent, extending caudolaterad to the stigma of the first gastric tergite, the sides of which are immarginate behind the stigma. Both the first tergite and sternite are finely reticulate-punctate, the latter without longitudinal rugosities.

Standing hair on mandibles, anterior border of clypeus, anterior curvature of frontal carinae, on sides of head above eyes, and rather abundantly on the posterior border of all gastric sternites and tergites. Squamiform, appressed hair, which is silvery, and usually canaliculate, in the foveolae of dorsum of head, thorax and peduncular segments, cheeks, extensor face of femora and tibiae. Simple and less conspicuous elsewhere, minute and very thin on first gastric tergite, except for the portion next to the anterior border, where they are more conspicuous and canaliculate.

Soldier [Pl. 3, Fig. 1]. — Total length 6.3-6.8 mm; maximum length of head 2.03-2.14 mm; maximum length of thorax 1.75-1.85 mm. Black; the following yellowish brown: cephalic disc, — except for the antero-median clypeal area —, sides of head, occipital lobes, anterior border and corners of pronotum, epinotal teeth; ferruginous: edge of cephalic disc, tip of scape, basal funicular segments, four apical tarsites, sides and flexor face of tibiae; pale-testaceous: four gastric maculae, which are separate from each other; brownishtestaceous: extensor face of tibiae, apical half of extensor face of fore femora.

Head rather shiny; surmounted by an elongate, oval, scarcely excavate, completely marginate disc. Lateral border of disc slightly raised, concealing the floor of the disc, when head is seen in profile. Anterolateral border of disc strongly curved, its sides more gently convex and distinctly converging toward the truncate, transverse, flat occipital border. Clypeal sutures vestigial. Floor of disc flat. Occipital lobes sharply marginate on the sides, their lateral border gently convex, their posterior border straight, forming a subrectangular corner at their junction. Floor of disc and sides of head coarsely and rather densely foveolate, the foveolae being separated by a raised network of

highly shining rugosities. Above the anterior portion of the antennal scrobe the floor of the disc is semitransparent and the foveolae are only superficial. Lower face of head finely reticulate-punctate, finely obliquely to transversely rugulose, very sparsely foveolate.

Thorax somewhat shining on mesonotum, subopaque on pronotum and epinotum, opaque on sides. Anterior border gently convex. Anterior corner of pronotum subdentate, the first half of its lateral borders subparallel, the second half convex, somewhat converging caudad. Transverse pronotal carina only narrowly crested, not prominently raised, broadly and shallowly excised mesially, when seen from the front. Promesonotal suture vestigial. Mesonotum nearly as broad as pronotum, its sides with an obliquely truncate, posterolaterally marginate, very stout, projecting lobe. Mesoepinotal suture impressed. Basal face of epinotum broad, its sides with a triangular lobe and stout, upturned tooth on the posterior corner, the tip of which points laterad as in *striativentris*. Declivous face somewhat excavated in the middle, its lateral borders marginate. Dorsum of thorax finely reticulate-punctate, — except for the mesonotum where the microsculpture is vanishing —, densely foveolate, the foveolae much smaller than those of cephalic disc. Sides of thorax finely but sharply reticulate-punctate. Laterotergite of pronotum with a few oblique rugosities. Mesopleura foveolate. Declivous face reticulate-punctate. Fore coxae without striae or rugosities.

Peduncular segments irregularly reticulate-rugose and foveolate, subopaque. Petiole with a denticle on each dorsal corner of the obliquely truncate anterior face, and a strong, oblique tooth on each side. Postpetiole as in worker, the median dorsal triangular area not acuminate at its vertex, but only marginate.

Gaster elliptical, subopaque. Anterolateral lobes marginate or even narrowly crested in smaller specimens. Both the first tergite and sternite are opaque, finely punctate without rugosities.

Standing hair as usual on mandibles, tip of gaster and very sparse on first gastric sternite. A fringe of thick standing hair only anterolaterally around the cephalic disc. Foveolae on head disc with the same minute, scarcely visible, thick semi-erect hair, as in *striativentris*. Squamiform hair distinct on cheeks, lower face of head, dorsum and sides of thorax, peduncle and legs, always silvery, but small. Minute and very delicate, much smaller than in *angustus*, *fleddermanni* and *striativentris* on first tergite.

Female (undescribed). — A dealate specimen [USNM n. 36.72989] has been examined in 1950, and the following descriptive notes were then taken:

Total length 7.8 mm; maximum length of head 1.95 mm; maximum length of thorax 2.19 mm; maximum width of head disc 1.70 mm; maximum width of thorax 1.65 mm; maximum length of first gastric tergite 3.69 mm; maximum width of first gastric tergite 1.71 mm. Black; the following orange: cephalic disc, except for the anteromedian trapezoidal black area, upper half of sides of head, occipital lobes, shoulders; ferruginous: tip of femora, tibiae, except for the testaceous extensor face; pale yellow: the four gastric maculae which are comparatively smaller than those found in *striativentris*. It differs from *striativentris*, its closest relative, as follows:

Occipital border of cephalic disc broadly truncate. Intervals between foveolae on cephalic disc slightly broader. Occipital lobes rectangular and subdentate at their corner. Anterior border of thorax more convex. Sides of pronotum straight. Scutum relatively longer and narrower (46:60). Sides of epinotum with a rounded lobe. Laterotergite of pronotum striate. First gastric tergite shorter and broader (103:70). First gastric sternite nearly smooth, without noticeable rugosities.

I have in my collection a damaged dealate female specimen [Pl. 5, Fig. 2] (gaster and postpetiole missing), taken at St. Agustino, Island of Trinidad, by P. J. Darlington, which appears to belong to the same species, agreeing with the above described female in all essential features, except for the unusually small size. Measurements: Maximum length of head 1.50 mm; maximum length of thorax 1.89; maximum width of head disc 1.35; maximum width of thorax 1.35 mm. Black area on cephalic disc larger. Two imaginary lines drawn from the anterior ocellus to each of the posterior ocelli form a distinctly obtuse angle. Dorsum of thorax and upper half of mesopleura regularly covered with squamiferous foveolae. Scales decumbent and silvery. Hair in foveolae of cephalic disc more scalelike and more decumbent, than in *striativentris*. Floor of disc somewhat visible when head is seen in profile, being gently convex mesially. Borders of disc not visibly raised nor upturned.

Male. — This caste remains yet to be described.

Specimens examined: 30; 18 workers, 7 soldiers, 2 females, 3 males, as follows: Colombia: Burithaca, Sierra de Santa Marta, Forel: 1 W [MHNG]. Exact. loc. unknown, on

imported orchids, captured at Hoboken, N. J., U.S.A., on *Cattleya*, sp.: 2 W, 3 S [USNM]. — Venezuela: Caracas, on imported *Cattleya*, intercepted at S. Francisco, Cal., U.S.A.: 5 W, 2 S, 3 M [USNM, WWK]. Loc. unknown, on imported orchids, *Cattleya* and other (?), by U. S. Plant Quarantine Inspectors: 6 W, 2 S, 1 F [USNM, WWK]. — Trinidad: St. Augustino, IV. 1927, P. J. Darlington: 1 F [WWK]. — Surinam: Paramaribo, A. Reyne: 1 W (Coll. W. W. Mann) [USNM]. — Brazil: *State of São Paulo*: Agudos, on mango tree, 11.X. 1953, W. W. Kempf: 3 W [WWK].

Distribution. — Collection data from widely scattered localities indicate that the range of the present species covers most of tropical and subtropical cisandean South America, from Colombia, Venezuela, south to Bolivia, Paraguay, and southeastern Brazil (S. Paulo).

Discussion. — *Paracryptocerus targionii* evidently belongs to the subgroup of *angustus*, *striativentris*, *fleddermanni*, *adolphi* etc. — The worker differs from *angustus* and *striativentris* by the length of the laminate anterolateral border of the gaster, and the margination of the first gastric tergite; from *fleddermanni* by having the lateral borders of the head upturned above, and excised in front of, the eyes; from *adolphi* by the shape of the peduncular segments; from both the preceding species by the denticles on the anterior border of the dorsal face of the petiole, and the marginate triangular area on the dorsum of the postpetiole. — The soldier resembles most closely *angustus* and *striativentris*, but differs from both by the broad mesonotum. Additional characters, that distinguish it from *angustus* are the large foveolae on the floor of the head disc, which is invisible when head is seen from the side, the strongly and uniformly converging sides of the cephalic disc, which do not form an angle or abrupt curvature at the level of the eyes. The truncated posterior border of the cephalic disc, which is highly shining, the lack of striation and rugosities on the first gastric sternite, and the less prominent, only shallowly notched, transverse pronotal carina separate this caste from *striativentris*. — The same differences, *mutatis mutandis*, apply to the female, which is closest to *striativentris*, from which it has already been differentiated on a foregoing page, in the description.

Synonymy. — As shown by several nest series from Venezuela, containing soldiers and workers of the same colony, *denticulatus* Emery is nothing but the worker of *targionii*, which was first proposed upon an isolated soldier. The former name is the junior synonym by page precedence. I also relegate into synonymy the var. *variegata* (Forel), for the following reasons: First of all, typical *denticulatus* specimens, identified as such by Forel, show that this author had a correct concept of the species. Hence proposing the Amazon specimens as a mere variety, Forel clearly vouches for conspecificity. The differential characters for the variety are mainly color patterns, not at all significant, and a slight divergence in the peduncular segments, although the description does not seem to elucidate too well this divergence. In order to help future revisers, I transcribe below the original diagnosis of this variety.

Variation. — Individual variability of the present species is not very noticeable. Some of the Venezuelan workers are outstanding in having the mesoepinotum conspicuously convex both transversely and longitudinally, and forming, in profile, a pronounced curvature with the declivous face of the epinotum. Variation concerning the dentition of the epinotum has already been treated in the description. The worker from Burithaca, Colombia has the fringe of projecting setae, on the anterior curvature of the frontal carinae more extended, the setae being longer, and the obtuse swelling formed by the lateral border of the head, in front of the preocular excision, is less conspicuous. A smaller soldier from Venezuela differs by the light yellowish color of the head disc, the anterior corner of the thorax, and the nearly white gastric maculae. The tibiae are light testaceous.

Biology. — Nothing particular is known about the habits of the species, besides the interesting fact, that all specimens intercepted by U. S. Plant Quarantine inspectors were taken on orchids, and when genus given, on *Cattleya*. The available data, however, do not enforce the conclusion that the present species is restricted to the aforesaid plant hosts.

Original Description

Cryptocerus denticulatus Emery var. *variegata* Forel (1911). — "Arbeiter. L. 3.3-3.6 mm. Kleiner als die Stammart. Pronotumrand vierzahnig, indem die zwei beim Arttypus an der Basis gelöseten Zähne hier scharf getrennt sind. Erstes Stielchenglid breiter und kuerzer, oben nicht so flach; zweites Stielchenglid umgekehrt etwas laenger, mit etwas kuerzeren Fortsaetzen. Endhaelfte der Schenkel, Schienen, Endhaelfte der Tarsen, Fuehlerschaft, Basis der Geissel, Thoraxzaehne, Stielchenzaehne, Hinterecken des Kopfes und Oberseite des Hinterleibes rostrot. Rest der Geissel, ein sehr grosser Fleck in der Mitte des Hinterleibes und zwei kleinere vorn dunkelbraun; Stirnlamellen roetlichgelb; Rest des Kopfes und des Thorax fast schwarz. Manchmal der Hinterleib braunschwarz mit rostroetlichen Raendern. Sonst wie der Arttypus. Amazonas (Coll. Bates)".

b) Subgroup of *P. (H.) jheringi* (Emery)

Component species: *bivestitus*, *bohlsi*, *bruchii*, *fossithorax*, *jheringi*, *prodigosus*, *quadratus*. Mainly Argentine forms, only *bohlsi*, *jheringi* and *quadratus* occurring beyond the limits, of the Argentine Republic.

Common characters: Worker. Rather closely related to the preceding group. Scapular angle free. Lateral border of pronotum dentate. Lateral border of epinotum, counting the anterior corner, only with two larger teeth (exception: *bohlsi*). Lateral processes of petiole either short and stout, or long and more slender, always conspicuously recurved at apex. Antero-lateral corners of gaster with a narrow, compact, conspicuously

projecting lobe, the border of which is generally not conspicuously marginate nor crested (exception: *jheringi*, especially Brazilian specimens). — Soldier. Anterolateral border of cephalic disc more distinctly crenulate (exception: *bruchii*). Floor of cephalic disc distinctly visible, when head is seen in profile (exception: *bivestitus*). Transverse pronotal carina blunt, generally not prominent nor crested. Mesonotum nearly as broad as pronotum, the latter not appreciably expanded laterad. Stout tooth on posterior corner of basal face of epinotum, if present, with its tip never strongly recurved laterad. Peduncular segments and anterolateral gastric lobes as in worker. — Female. Basal face of epinotum quite variable, but never as in the preceding subgroup. Lateral processes of postpetiole strongly recurved at apex.

Only *P. (H.) bohlsi* will be treated. As regards the remaining species, see Part I. of this study.

Paracryptocerus (Harnedia) bohlsi (Emery)

Cryptocerus bohlsi Emery, 1896, Zool. Jahrb. Syst. 9: 631-633, fig. C (S, W; Paraguay: San Salvador). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 207.
Cryptocerus (Cryptocerus) bohlsi Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309.
Cryptocerus (Paracryptocerus) bohlsi var. *medusa* Santschi, 1919, An. Soc. Cient. Argent. 87: 45 (S; Brazil MT). — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 115. Nov. syn.

Types. — Several soldiers and workers, taken by Dr. J. Bohls in the vicinity of San Salvador, Paraguay, in woody thorns of *Acacia* sp. (probably *cavenia*, according to Wheeler, 1942). Like most of Emery's type specimens belonging to this tribe, they were not found in the collection of the Museum of Genova, by Dr. D. Guiglia. — The holotype soldier (unique) of the variety *medusa* is presumably in the Santschi collection, Museum of Basel, or in the Museum of Paris. This specimen was captured by Le Moult in the State of Mato Grosso, Brazil.

The present species is known only from type material, which was not accessible during this study. Although the poor descriptions do not allow for an absolutely certain identification, they are nevertheless sufficiently detailed to show that *bohlsi* is a very close relative of *jheringi* and the Argentine *fossithorax*. Emery's description of *bohlsi* seems to suggest the following differential features, which separate it from *jheringi*: a) soldier. — 1. Lack

of a light spot on the anterior corner of pronotum (present in larger soldiers of *jheringi*; the type of *bohlsi* is a full-grown soldier!); 2. Foveolae on cephalic disc farther apart from each other, separated by an interval which is as broad as the diameter of the pits; 3. Shape of basal face of epinotum, which possesses laterally a broad, little projecting, blunt lobe, and on the posterior corner a very stout, bluntly tipped, slightly raised tooth. b) worker. — 1. Thoracic and peduncular teeth, knees and scape yellowish; 2. Thorax broader; 3. Dentition of the lateral border of epinotum, having on the anterior corner a blunt tooth, followed by a larger triangular tooth, preceding another small denticle, which may be absent, and on the sides of the declivous face two additional small teeth; 4. Gaster elliptical, very short and broad.

The variety *medusa* is tentatively synonymized under the assumption, that the differences which, according to Santschi's description, separate it from the typical form, are the only detectable distinguishing features of that form (See the original description below!).

Original Description

Cryptocerus bohlsi Emery (1896). — "Soldat. Pechschwarz, Vorder- und Seitenraender des Kopfes, Fuehlerschaft, Kniegelenke, Dorsalrand der Tibien und zum Teil die Tarsen rostrot. Kopf besonders vorn etwas glaenzend, alles uebrige glanzlos; das ganze Tier ist fein und dicht punktiert, ausserdem tragen zerstreute Punkte glaenzende Schuppenboerstchen; letztere Punkte sind am Kopf groesser, gruebchenartig und von einander durchschnittlich so weit entfernt, wie sie breit sind; am Thorax sind sie kleiner und dichter gestellt; am Hinterleib sehr klein und nicht gruebchenartig. Der Kopf traegt eine deutlich gerandete aber convexe Scheibe, deren Raender nur an der Vorderhaelfte bedeutend aufgebogen und nur vorn crenuliert sind; vorn ist die Scheibe ausgeschnitten und laesst die Mandibeln unbedeckt; die Vorderecken sind stark gerundet, die Seiten fast gerade und nach hinten ein wenig convergierend, der Hinterrand gerade, die Hinterecken gerundet-gestutzt. Stirnfeld und Stirnrinne deutlich. Die Hinterecken des Kopfes treten hinter der Scheibe hervor. Pronotum mit in der Mitte unterbrochenem Querkamm, seine Vorderecken sind scharf zahnartig, die Seitenraender parallel, etwas uneben; die Seiten des Mesonotums sind aufgebogen, aber stumpf; vor denselben je ein stumpfer Vorsprung. Stielchensegmente kurz, nicht breit, seitlich mit nicht dornartigem, nach hinten gebogenem Fortsatz. Hinterleib laenglich oval, vorn ausgerandet, ohne scharfen Rand, matt und ungefleckt. Schenkel oben nicht eckig. Laenge 6-6 2/3 mm. — Arbeiter. Schwarz, die Seitenraender des Vorderkopfes, die Zaehne des Thorax und Stielchens, Gelenke der Beine und Fuehlerschaft gelb. Dem *C. jheringi* sehr aehnlich. Der Thorax ist aber breiter, Metanotum und Stielchen mit anders gestellten und anders gebildeten Fortsaetzen. Der Kopf hat die gewoehnliche Form, wie bei *C. angustus* und Verwandten; die Hinterecken nicht so breit gestutzt wie bei dieser Art. Am Pronotum befinden sich

jederseits 3 Zaehne, von denen der vordere der laengste, der hintere der breiteste ist; das Mesonotum ragt seitlich zahnartig hervor. An den Seiten des Metanotums steht ganz vorn ein stumpfer, schwarzer Zahn, weiter hinten ein grosser, platter, gelber, welcher in seiner Form variiert und dem manchmal noch ein ganz kleiner folgt; weiter folgen noch 2 kleine, gelbe Zaehne, deren vorderer der groessere ist; der hintere kann rudimentaer bleiben. Die Stielchenknoten sind sehr kurz, ungefaehr gleich breit und tragen jederseits je einen schwach nach hinten gekruemmten Fortsatz; der des 2. Gliedes ist dicker und am Ende abgestutzt. Hinterleib wenig laenger als breit, vorn ausgerandet. Laenge 4-4 $\frac{1}{3}$ mm. — Aus Akaziendornen".

Cryptocerus (Paracryptocerus) bohlsi var. *medusa* Santschi (1919). — "Soldat. Long. 7 mm. Couleur comme chez le type, mais en outre une tache ferrugineuse, de chaque côté du bord postérieur du premier segment du gastre. Celui-ci est un peu strié à la base, pour le reste comme chez le type. — Brésil: Mato Grosso (Le Moul't). 1 soldat".

c) Subgroup of *P. (H.) pilosus* (Emery)

Component species: *fiebrigi*, *liogaster* and *pilosus*.

Common characters: It is rather doubtful whether these species form a natural group. *P. fiebrigi* is quite distinct from *pilosus* and *liogaster*, the latter being perhaps only what has been termed a geographical race, of *pilosus*. Nevertheless, they are here classified together because they combine with the general features of principally subgroup b, the unusual peculiarity of possessing in the worker, soldier, and female caste, besides the decumbent scalelike pilosity also standing hair, evenly scattered on the dorsum of the body and the legs. Since all three species have been revised in Part I of this study, I therefore limit myself to pointing out a few group characters. — **W o r k e r.** Scapular angle free, petiolar spines either as in subgroup a or b. — **S o l d i e r.** Cephalic disc rounded behind. Mesonotum nearly as broad as pronotum. Tooth on posterior corner of basal face of epinotum as in subgroup a, i. e. upturned and strongly recurved laterad at apex. — **F e m a l e.** No group characters have been found besides the erect pilosity, which however occurs sporadically also in females of other groups.

d) Subgroup of *P. (H.) emeryi* (Forel)

Component species: *emeryi*, *patei*. Both species have already been dealt with in the appendix of a preceding study (Kempf, 1951, pp. 233-240). All four castes are known of *patei*, whereas of *emeryi* only the worker has been described.

Common characters: Worker. Scapular angle free. Lateral borders of pronotum with a platelike, apically truncate or excised process (lateral pronotal lamellae). Lateral border of epinotum with a single, large, triangular tooth. Femora fusiform. Hind metatarsi a little or noticeably broadened and flattened at base. Postpetiole flat above. Gaster very scarcely emarginate in front. — Soldier and female. (Only of *patei*!) Head disc circular, flat, slightly truncate and bluntly bidentate behind, its lateral borders scarcely raised. Gaster scarcely emarginate mesially in front, the first tergite immaculate, i. e. without light spots.

e) Subgroup of *P. (H.) coffeae* Kempf

So far, this division contains only the nominate species, which may not be attached to any other subgroup on account of the peculiar combination of characters, to be pointed out below.

Paracryptocerus (Harnedia) coffeae Kempf

(Pl. 2 Fig. 4; Pl. 4 Fig. 5; Pl. 5 Fig. 4; Pl. 6 Figs. 8, 15)

Paracryptocerus (H.) coffeae Kempf, 1953, Pap. Avuls. Dep. Zool. S. Paulo 11: 79-88, figs. 1-13 (W, S, F, M; Colombia, Prov. Cundinamarca: Tibacuy).

Types. — Two nest series taken by Sixto Vargas Bernel and Rafael Gonzalez Mendoza, on March 13, 1952, in hollowed out green branches of coffee shrubs (*Coffea arabica* L.), in the coffee plantation "Alberto J. Williamson", nr. Tibacuy, Cundinamarca Province, Colombia, at an altitude of 1500 m. The type series consists of the holotype worker [WWK], and 48 workers, 3 soldiers, 17 females and 4 males, all paratypes [WWK, IBSP]. Paratype workers have been deposited in some other collections [CTB, MCZ, MACN, USNM].

Worker [Pl. 2, Fig. 4]. — Total length 3.9-4.7 mm; maximum length of head 1.09-1.24 mm; interocular width 1.09-1.24 mm; maximum length of thorax 1.12-1.28 mm. Black; the following ferruginous: tip of mandibles, scapes, thoracic and peduncular teeth, the tibiae and tarsites; frontal carinae testaceous with their edge light ferruginous; funicular segments fuscous-brown, becoming darker toward apex of funiculus; anterolateral gastric lobes with a light spot, light brown or ferruginous.

Head subopaque; quadrate, the interocular width always equal to the maximum length of head. Clypeal sutures vestigial. Lateral borders of head diverging very little caudad, straight, not emarginate in front of, nor noticeably upturned above, eyes. Occipital corners obliquely truncate with slightly crenulate border. Occipital border gently emarginate between the lobes. Upper face of head scarcely, but evenly convex, finely reticulate-punctate, more coarsely reticulate-rugose and foveolate. Lower face of head identically, but much more superficially sculptured, rather shiny.

Thorax subopaque. Anterior border gently arcuate. Shoulders rectangular. Lateral borders of pronotum with two triangular teeth in front, followed by a more or less crenate border, the posterior corner rectangular. Promesonotal suture obsolete. Mesonotum, on each side, with a pointed, projecting tooth. Mesoepinotal suture mostly vestigial, usually fading out in the middle. Lateral border of basal face of epinotum with a sub-rectangular tooth on the anterior corner, followed behind by a larger, triangular and somewhat foliaceous tooth, which again is followed by another similar, yet smaller tooth. Declivous face somewhat differentiated from basal face, its borders marginate but unarmed. Sculpture of dorsum of thorax as on head, the declivous face finely reticulate-punctate and opaque. Sides of thorax horizontally striato-rugose. Fore coxae without rugosities on the outer face. Hind femora [Pl. 6, Fig. 15], as seen in profile, not fusiform, but the extensor face forms a distinct angle, the vertex of which is bluntly rounded.

Peduncular segments subopaque, their dorsal face sculptured as dorsum of head and thorax. Petiole not quite as broad as postpetiole, its anterior face truncate, forming dorsolaterally on each side a small tubercle at its junction with the dorsal face. Lateral processes spinelike, gently curved and pointed at apex. Dorsum of postpetiole flat, its lateral processes long with strongly recurved tip.

Gaster subopaque, oval, rather strongly emarginate anteromesially, its anterolateral lobes rather broad, bearing anteriorly a vestigial, very narrow, foliaceous crest, which does not reach caudad to the level of the stigma of the first tergite. The latter finely reticulate-punctate, reticulate-rugose, forming elongated meshes. First sternite with fine longitudinal rugosities on the sides.

Standing hair on mandibles, funicular segments and apex

of gaster. A row of short, thick setae projects from the lateral edge of the frontal carinae, which reaches back to the occipital corner. Scalelike hair very distinctive, long, canaliculate, golden, appressed, on dorsum of head, thorax, peduncle, gaster, and extensor face of femora and tibiae. Finer, simple or canaliculate on lower face of head, gastric sternites and sides of the leg segments.

Soldier [Pl. 4, Fig. 5]. — Total length 5.2-5.4 mm; maximum length of head 1.57-1.62 mm; maximum width of head disc 1.48-1.52 mm; maximum length of thorax 1.48-1.50 mm. Black; the following fuscous-ferruginous: Mandibles, antero-lateral portion of head disc; ferruginous: legs; first gastric tergite with four yellowish-brown spots, the posterior pair very small.

Head rather shiny, surmounted by an oval, deeply excavate, completely marginate disc, with its somewhat crenulate borders strongly raised, concealing the floor of the disc, when head is seen in profile. Lateral borders of cephalic disc convex, converging caudad, forming with the straight to slightly concave occipital border an obtuse angle. Clypeal sutures vestigial. Antero-lateral portions of disc, above the antennal scrobe, slightly transparent, having in the middle, just in front of the center, a gently bulging convexity. Occipital lobes obliquely truncate at apex, the truncated border sharply marginate, continuing cephalad as a vestigial carina, toward the superior border of the eye, but fading out halfway before reaching it. Inferior border of cheeks not distinctly marginate. Floor of cephalic disc finely yet superficially or even only vestigially reticulate-punctate, either only coarsely foveolate, or reticulate-rugose and foveolate. Sides of head, occiput and lower face reticulate-rugose and foveolate.

Thorax somewhat shining on mesonotum, subopaque on pronotum and epinotum, opaque on sides. Pronotum much broader than mesonotum, its anterior border arcuate and convex in the middle, very slightly concave at the sides, its anterolateral corner dentate, its sides subparallel or slightly converging caudad in front of the transverse carina, strongly converging and slightly sinuate behind the carina, the latter very prominent, sharply edged and strongly raised, shallowly excised in the middle, when seen from the front. Promesonotal suture obsolete except on the sides. In profile, the pronotum and mesonotum are at a right angle, the vertex of which is formed by the transverse carina. Mesonotum flat, with a blunt, or obliquely truncated, projecting lobe on each side. Mesoepinotal groove deeply impressed. Basal face of

epinotum gently transversely convex, its anterior corner bluntly rounded, its sides with a strong triangular, pointed tooth, followed at the posterior corner by a similar, somewhat smaller tooth, which is slightly raised, pointing laterad. Declivous face shallowly excavated, its sides marginate. Pronotum, in front of the carina, finely reticulate-punctate, coarsely and rather densely foveolate. Remaining portion of dorsum of thorax coarsely reticulate-rugose and foveolate, the rugosities highly shining. Sides of thorax and declivous face finely but sharply reticulate-punctate, with a few rugosities on the former. Coxae and femora as in worker [Pl. 6, Fig. 15].

Peduncular segments [Pl. 6, Fig. 8] and gaster as in worker, except for the posterior pair of light spots on the first gastric tergite. Anterolateral lobes of gaster sharply marginate, not crested. Pilosity as in worker, except for the following: Scalelike hair arising from the pits on cephalic disc shorter, and around the rim of the disc a row of thick, short, projecting setae, extending backward to the level of the eyes, where they continue on the sides until the occipital corner.

Female [Pl. 5, Fig. 4]. — Total length 6.9-7.2 mm; maximum length of head 1.64-1.71 mm; maximum length of thorax 1.90-1.95 mm. Color as in soldier. The four spots on first gastric tergite are lighter and much more extensive. No light spot on shoulders. In general as in soldier, with the differences peculiar of the caste.

Cephalic disc slightly more elongate, less excavate, the lateral upturned borders not concealing in profile completely the antero-median convexity of the floor of the disc. Posterior third of disc nearly flat, the borders scarcely raised, the posterior border not distinctly truncated but rather rounded. Ocelli very small, lying in pits which do not differ in size from the squamiferous foveolae. Posterior pair of ocelli very close to the occipital border. Transverse pronotal carina less prominent, interrupted mesially, fading out laterally before reaching the sides of thorax. Scutum coarsely foveolate. Scutellum reticulate-rugose and foveolate. Basal face of epinotum extremely short, with an obtuse tooth on each side, and another smaller tooth on the posterior corner. Declivous face somewhat excavate, very finely reticulate-punctate, almost smooth. Laterotergites of pronotum and mesopleura foveolate. Hind femora fusiform, not angulate above. Petiole with a short tooth on each side, the postpetiole with lateral processes, which are obliquely truncate. First gastric tergite much longer than

thorax, nearly twice as long as broad. Only the first fourth of the first tergite bears fine longitudinal rugosities. Scalelike hair as in worker, but finer and smaller. Standing hair also occurs all over the first gastric tergite, and sparsely, not regularly distributed, on peduncular segments, legs, and thorax. Wings infumated, with dark-brown veins, the pterostigma black. Veins in the apical field almost well-developed, not quite vestigial. Fore wing, when folded over the back extending beyond the apex of the normally contracted gaster.

The male has been described in the original paper (Kempf, 1953).

Specimens examined: only the type series, already described above. No other specimens are known to me.

Discussion. — *P. coffeae* possesses no real close relative, and may not be assigned to any of the species-subgroups. — The worker differs from the subgroups of *wheeleri* and *curvistriatus* by the free scapular angle, and the lack of standing hair on the body sets it apart from the subgroups of *pilosus* and *wheeleri*; the dentate border of the pronotum from the subgroups of *emeryi*; the tridentate condition of the epinotum from the subgroup of *jheringi* and *wheeleri*, the normally emarginate anterior border of the gaster from the subgroups of *emeryi* and *wheeleri*; the narrowly crested and inacute anterolateral lobes of the gaster from the subgroup of *angustus*; the nearly angulate hind femora from all subgroups. — The soldier is distinctive by the prominent transverse pronotal crest, differing from the subgroup of *jheringi*; by the lack of evenly scattered standing hair, differing from the subgroups of *pilosus* and *wheeleri*; by the normally emarginate anterior border of the gaster, differing from the subgroups of *emeryi* and *wheeleri*; by the broadly expanded pronotum, differing from the subgroup of *jheringi* and *pilosus*; by the lack of a stout, upturned and recurved tooth on the posterior corner of the epinotum, from the subgroup of *angustus* and *pilosus*; by the quadrimaculate first gastric tergite, differing from the subgroups of *emeryi*, *curvistriatus* and *wheeleri*. — The female differs from the *angustus*-group by the lack of a strong, obliquely diverging spine on the posterior corner of the basal face of epinotum, and from the same subgroup and that of *jheringi*, by having the posterior pair of ocelli close to the occipital border. The quadrimaculate gaster distinguishes it from the subgroup of *curvistriatus*, which it resembles more closely. It is at once distinct from the known females of that subgroup by its longer head, and the peculiar shape of the lateral processes of the postpetiole.

Biology. — This species was discovered as a serious pest of the coffee plantations. Due to its habit of establishing the nests in the medullary part of green coffee branches, it has caused considerable damage, at least at the place of its discovery. Unfortunately more conclusive data are unknown to me. Most likely, the species has been transferred to the coffee shrubs from the shade trees planted between the tiers of coffee. With both colonies of *P. coffeae* were living in the

same cavity of the nest (in symbiosis?) ants of an unidentified species of the genus *Myrmelachista* (in the original paper I committed a serious blunder by stating that the inquiline ants belonged to the genus *Brachymyrmex*, which, to my knowledge, are not twig-dwellers).

f) Subgroup of *P. (H.) curvistriatus* (Forel)

Component species: The following Central American species, *aztecus*, *curvistriatus*, *sobrius*, and *texanus* appear to be more closely related to each other, although there is some doubt whether they form a true natural group.

Common characters: Worker. Occipital border emarginate between the obliquely truncate lateral lobes. Scapular angle incorporated in the lateral tridentate border of the pronotum. Mesonotum with a lateral tooth (indistinct in *curvistriatus*). Lateral border of epinotum tridentate, the third tooth always very small (only one tooth in *aztecus*). Femora fusiform. Tips of lateral processes of petiole never strongly recurved caudad. Gaster emarginate anteromesially, between the broad, little projecting anterolateral lobes, which are distinctly marginate, but usually without a conspicuous platelike crest. Gaster bimaculate. Standing hair sparsely along portions of the lateral border of head, and on tip of gaster. — Soldier. Anterolateral border of cephalic disc scarcely or vestigially crenulate, always raised. Pronotum noticeably broader than mesonotum, its shape different from that of subgroup a. Mesonotum on each side with a truncate or dentate lobe. Lateral border of basal face of epinotum with a triangular tooth, the posterior corner with a very small, often vestigial tooth, practically unarmed. Gaster and standing hair resembling those of worker. In case of the gaster being quadrimaculate, the posterior pair is of a different, much darker color, than the anterior pair. — Female. Posterior pair of ocelli very close to the occipital border of cephalic disc. Gaster as in soldier.

Paracryptocerus (Harnedia) aztecus (Forel)

(Pl. 2 Fig. 6; Pl. 4 Fig. 1; Pl. 6 Figs. 6, 13)

- Cryptocerus aztecus* Forel, 1901, Ann. Soc. Ent. Belg. 45: 125-126 (W, S; Mexico, Morelos: Cuernavaca). — Wheeler, 1901, Amer. Nat. 35: 527. — Wheeler, 1901, Ann. Soc. Ent. Belg. 45: 201. — Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21: 407, Pl. 14, fig. 6 (S.). — Wheeler, 1910, Ants, Columbia Univ. Press, pp. 99, 102, fig. 63D (S.). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 207.
- Cryptocerus (Cryptocerus) aztecus* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309.
- Cryptocerus (Cyathocephalus) aztecus* Skwarra, 1934, Oekol. Stud. Koenigsberg, p. 129 (Mexico, Morelos: Cuernavaca).

Types. — Syntype workers and soldiers, taken by Wm. M. Wheeler, at Cuernavaca, Morelos, Mexico, on December 27, 1900, nesting in epiphytic *Tillandsia benthamiana* [MCZ, MHNG]. One worker and one soldier from the Wheeler collection and one worker of the Forel collection have been examined.

Worker [Pl. 2, Fig. 6]. — Total length 3.8-4.0 mm; maximum length of head 1.03-1.07 mm; maximum length of thorax 1.11-1.14 mm. Black; the following ferruginous: mandibles, tip of scape, basal and apical funicular segments, edge of frontal carinae, tip of tibiae, tarsites; rest of frontal carinae dark testaceous and semitransparent; tip of femora brown; anterolateral corners of gaster with a light spot, varying from yellow to ferruginous.

Head subopaque, strongly depressed, subquadrate, yet the maximum length distinctly exceeding the interocular width. Lateral border of the frontal carinae subparallel, not visibly excised in front of eyes. Lateral border scarcely upturned above eyes. Occipital corners obliquely truncate, the posterior border sharply marginate, gently emarginate. Eyes small, their greatest diameter less than one fourth of maximum head length. Dorsum of head finely reticulate-punctate, the macrosculpture being inbetween foveolate and reticulate-rugose and foveolate, the pits rather crowded, not deeply impressed, their diameter exceeding the width of their intervals. Lower face very finely reticulate-punctate, and not very coarsely reticulate-rugose, the rugae forming elongate meshes.

Thorax opaque, strongly depressed, its anterior border strongly arched mesially, somewhat concave laterally. Scapular angle incorporated in the sharply marginate lateral borders of pronotum, which conspicuously converge caudad and bear in front a subacute tooth, in the middle a vestigial, very obtuse tooth, forming a rectangular tooth at the posterior corner. Mesonotum with a more or less rounded lobe on each side. Promesonotal suture vestigial or obsolete. Promesonotum scarcely convex, the posterior portion of the mesonotum sloping abruptly downward to the impressed mesoepinotal suture and the epinotum which lies at a somewhat lower level than the promesonotum, when seen in profile. Anterior corner of basal face of epinotum subrectangular, not toothlike, the lateral border sharply marginate, forming a blunt, broad, scarcely projecting angle. Declivous face somewhat differentiated from basal face, its lateral border marginate. Dorsum of thorax finely and sharply reticulate-

punctate, with coarse anastomosing rugosities forming a network, in the meshes of which lie the squamiferous foveolae. Declivous face of epinotum and sides of thorax finely reticulate-punctate with sparse, longitudinal (horizontal) rugosities, anastomosing on the pleura.

Peduncular segments opaque, their dorsal sculpture as that on dorsum of thorax. Petiole narrower than postpetiole, its anterior face nearly perpendicularly truncate, its sides bearing a small tooth, pointing laterad. Postpetiole with longer, rather stout anterolateral processes, the tips of which point obliquely caudad. Dorsum rather flat, lacking longitudinal ridges.

Gaster elliptical, opaque, strongly depressed, gently emarginate anteromesially, the anterolateral lobes broad, scarcely projecting, sharply marginate, lacking a transparent crest. The margination continues caudad along the lateral border, beyond the anterior half of the first tergite, which is finely reticulate-punctate, with rather fine, mostly longitudinal, rugosities. The squamiferous points not impressed. First sternites smooth and shining discad, reticulate-punctate laterad with more prominent, longitudinal rugosities on the sides.

Standing hair, as usual, confined to mandibles and tip of gaster, and a few short, thick setae, projecting from the lateral border of head, above eyes. Squamiform hair in foveolae of head, thorax and peduncle silvery, canaliculate, but short and rather small. Finer, simple, almost minute on gaster and legs.

Soldier [Pl. 4, Fig. 1]. — Total length 5.1-6.3 mm; maximum length of head 1.46-1.89 mm; of thorax 1.43-1.68 mm. Black; the following reddish-brown: mandibles, sides of head, occiput, pronotum in front of the transverse carina (rather infuscated), tip of femora, sides of tibiae, tarsites except the metatarsus; yellowish-brown: floor of cephalic disc, except for the anteromedian reddish-brown area, tip of scape, basal and apical funicular segments, extensor face of tibiae, and the two spots on the anterolateral lobes of gaster.

Head rather shiny, surmounted by an elliptical, elongate, excavate disc, the sides of which are strongly upturned all around, but scarcely crenulate. Floor of disc slightly raised anteromesially, just behind the vestigial delimited clypeal area, the lateral and posterior portion of the disc excavate, not visible from the side, when head is seen in profile. Portion above frontal carinae semitransparent. Occipital lobes rectangular with their corner rounded, their borders strongly marginate posteriorly,

vestigially marginate anteriorly, which in profile appears as an ascending ridge running forward toward the upper margin of eye, but fading out before reaching it. Lower border of cheeks marginate. Floor of disc and sides of head and occiput coarsely and strongly reticulate-rugose, forming more or less rounded meshes, which are deeply excavate their bottom finely but only vestigially punctate, both ridges and pits are shining. Lower face of head with similar yet more superficial sculpture.

Thorax subopaque on dorsum, opaque on sides. Pronotum much broader than mesonotum, its anterior border gently arched, its anterolateral corner dentate, its lateral border strongly marginate, nearly straight evenly converging caudad, both in front and behind the slightly crested and raised transverse carina, which is not conspicuously interrupted mesially. Promesonotal suture present. Mesonotum on each side with a prominent, broadly truncate, oblique, strongly marginate lobe. Mesonotum flat. Mesoepinotal suture indicated by a depression in front of the transversely gently convex basal face of epinotum, the lateral border of which bears a triangular, broad little prominent projection, forming a blunt angle. Posterior angle of basal face unarmed. Declivous face of epinotum superficially reticulate-punctate, slightly excavate, somewhat shiny, its lateral border marginate. Dorsum of thorax with the same sculpture as on cephalic disc, but the bottom of the foveolae, circumscribed by the shiny ridges, is rather opaque, due to heavier microsculpture. Sides of thorax, including laterotergite, finely reticulate-punctate, irregularly rugose and reticulate-rugose. Squamiform foveolae sparse. Hind femora [Plate 6, Figure 13] fusiform. Peduncular segments [Plate 6, Figure 6] and gaster as in worker, the former stouter, and the lateral processes slightly shorter. The lateral margination of the first gastric tergite is less distinct, likewise the longitudinal ridges on each side of the mesially smooth first gastric sternite. Conversely, the fine mostly longitudinal rugosities on first gastric tergite a little more prominent.

Standing hair as in worker, in addition a row of projecting, slightly clubbed setae, around the cephalic disc, excluding the posterior border, on the occipital lobes, on the sides of pronotum and a few on the tips of peduncular spines and the posterior border of the body of the postpetiole. Scalelike hair very prominent, rather long, silvery, decumbent, in the foveolae of head, thorax and peduncle, smaller on legs, minute on gaster.

Female and male are still unknown.

Specimens examined: 12; 6 workers and 6 soldiers, as follows: Mexico: Morelos, Cuernavaca, 27.XII. 1900, Wm. M. Wheeler (in *Tillandsia benthamiana*): 2 W, 1 S (syntypes) [MCZ, MHNG]. Same locality, 22. and 24.VI. 1929, E. Skwarra (in *Tillandsia circinnata*): 4 W, 5 S [MCZ, WWK].

Distribution. — This species is still known only from its type locality in Mexico, where it has been taken both by Prof. Wheeler and Miss Skwarra between the leaves of bromeliads of the genus *Tillandsia*.

Discussion. — The present species is quite distinguishable, disagreeing with the remaining three species in the following features: Worker. Head slightly longer than broad between the eyes; mesoepinotal suture impressed; lateral border of basal face of epinotum lacking a distinct tooth, but forming only an obtuse angle; dorsum of petiole rather flat. — Soldier. Cephalic disc elongate, perfectly rounded behind, without vestigial teeth projecting from the posterior border; floor of disc reticulate-rugose, the rugae enclosing very large foveolae; lateral processes of peduncular segments short and stout, never long and spinelike.

The descriptions and figures are based upon specimens of my collection (2 W, 2 S) which I received on an exchange basis from the Museum of Comparative Zoology, through the kindness of the Curator Dr. J. Bequaert. The other specimens mentioned above were cursorily examined in 1950 and 1951, during my sojourn in the United States. Moreover, the description of the soldier applies strictly only to full-grown specimens, whereas smaller specimens disagree sensibly in the length of the head, the extent of the lightly colored parts, and the development of the transverse pronotal carina, in which characters they reproduce more the features of the worker caste.

Biology. — Wheeler, the discoverer of the species, gives the following account of the habits of the species: "Common, nesting in the epiphytic *Tillandsias* in a small acacia grove south west of the town. Soldiers and workers, larvae and pupae were stored like sardines between the leaves of the *Tillandsias*. No males or females were seen. This species was often found in parabiosis with *Crematogaster brevispinosa* Mayr" (1901, Ann. Soc. Ent. Belg. 45: 201). Nearly thirty years later, Miss Skwarra found the same species at the same locality, again nesting in epiphytic bromeliads, *Tillandsia circinnata*. In the nests of these ants were also found exuviae of *Microdon* sp. and a few workers of *Leptothorax spininodis* Mayr var. (Cleptobiosis?).

I also wish to mention that among the type specimens was a pterergate soldier with beautifully developed wingstubs on each side of the mesonotum, being in all other respects normal. Wheeler (1905, 1910) has given a description and a picture of the specimen which is deposited in the collection of the Museum of Comparative Zoology at Harvard University, where I examined it in 1951.

Paracryptocerus (Harnedia) curvistriatus (Forel)

(Pl. 2 Fig. 7; Pl. 4 Fig. 3; Pl. 5 Fig. 5; Pl. 6 Figs. 2, 11, 14)

Cryptocerus curvistriatus Forel, 1899, Biol. Centr.-Amer. Hym. 3: 52 (W; Costa Rica: Turrialba).
Cryptocerus (Cryptocerus) curvistriatus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310.

Types. — A unique worker, collected at Turrialba, Costa Rica, by A. Alfaro, and received from Emery for description by Forel. According to a communication received from Dr. Ferrière, curator of the Muséum d'Histoire Naturelle de Genève, Switzerland, the type specimen is not in the Forel collection, nor has it been found in the Emery collection in Genova, Italy, by Dr. Guiglia.

Worker [Pl. 2, Fig. 7]. — Total length 4.2-4.8 mm; maximum length of head 1.18-1.36 mm; maximum length of thorax 1.21-1.43 mm. Black; the following ferruginous: tip of mandibles, tip of scape, basal funicular segment, tip of apical funicular segment, tarsites II-V; testaceous: frontal carinae, tip of femora, extensor face of tibiae, maculae of gaster, tip of thoracic teeth and peduncular spines.

Head opaque, subquadrate, maximum length of head subequal to, often slightly exceeding, the interocular width. Clypeal sutures vestigial. Lateral border of head sinuous in front of, upturned above eyes. Occipital lobes broadly obliquely truncate. Occipital border emarginate. Head gently convex above. Dorsum of head finely reticulate-punctate, rather densely foveolate, or even reticulate foveolate. Lower face of head regularly and coarsely longitudinally striate.

Thorax opaque. Anterior border arched in the middle, concave at the sides. Scapular angle incorporated in the lateral, tridentate border of pronotum. The two anteriormost teeth closer together, triangular, acute, somewhat foliaceous, the posterior tooth on the posterior corner either subrectangular or pointed, in the latter case pointing obliquely caudad. Promesonotal suture vestigial or obsolete, indicated at most by the lack of scalelike hair. Mesonotum with a very small denticle on each side, practically unarmed. Mesoepinotal suture as promesonotal suture, absent or marked merely by a lack of scalelike hair. Lateral border of basal face tridentate, the anterior two teeth very distinct, the second largest, the third tooth, on the junction of the declivous face, minute. Dorsum of thorax coarsely and longitudinally striato-rugose, reticulate-rugose in front, near the anterior border

of pronotum. Declivous face neither excavate, nor distinctly marginate on its borders, but longitudinally striate. Laterotergite of pronotum horizontally striate. Pleura horizontally striato-rugose. Outer face of fore femora longitudinally or obliquely striato-rugose.

Peduncular segments [Pl. 6, Fig. 11] opaque, sculptured as dorsum of thorax, except for the lower face which is longitudinally striate. Petiole with a vertically truncate, finely reticulate-punctate, anterior face, which terminates above on each side with a projecting small denticle. Lateral processes spinelike, their apices gently curved, and acute. Postpetiole broader than petiole, its dorsum gently convex, its lateral spines very long, their apices more, but never strongly, recurved.

Gaster opaque, oval, emarginate anteromesially. The broad, scarcely prominent anterolateral lobes with a hyaline, narrow crest on their border, which extends backwards to the level of the stigma. Lateral border of gaster bluntly marginate beyond the anterior half of the first tergite. Dorsum of gaster finely reticulate, with larger mostly longitudinal, yet occasionally anastomosing rugosities, much finer than on thorax. First sternite smooth and shiny discally, longitudinally striate laterad, the striae converging behind in front of the posterior border forming concentric arches.

Standing hair on tip of gaster, anterolaterally and above the eyes on the lateral border of head. Scalelike hair canaliculate, silvery, appressed, highly shiny, in foveolae of head, between the costae of thorax, and on dorsum of peduncle and gaster, and on the extensor face of femora and tibiae. Usually simple, always smaller on sides of legs, on lower face of head, and on first gastric sternite.

Soldier (undescribed) [Pl. 4, Fig. 3]. — Total length 5.3-6.1 mm; maximum length of head 1.57-1.82 mm; maximum length of thorax 1.43-1.61 mm. Black; the following ferruginous: mandibles except chewing border, first funicular segment, apex of ultimate funicular segment, tarsi II-V; yellowish-brown: anterolateral portions of cephalic disc, tip of femora, extensor face of tibiae, gastric maculae.

Head somewhat shiny, surmounted by a subcircular, excavate disc, the floor of which is rather flat, the sides of which are strongly raised, concealing the floor of the disc, when head is seen in profile. The lateral border of the cephalic disc, somewhat behind the eyes, curves abruptly more strongly mesad, forming

an obtuse angle and joining the concave or convex occipital border at another angle, which is occasionally drawn out in the form of a very blunt tooth. Clypeal sutures vestigial. Floor of disc semitransparent above the antennal scrobe. Occipital lobes forming a more or less rounded corner, their posterior border strongly marginate. Floor of disc, sides of head and occiput finely yet superficially reticulate-punctate, covered with dense, somewhat larger, squamiferous foveolae, the intervals between the pits usually not exceeding, generally less than, the diameter of the pits. Lower face of head superficially reticulate, highly shining, sparsely foveolate.

Thorax subopaque. Anterior border arched mesially, slightly excised laterally; the anterior corner strongly dentate; the lateral border between this tooth and the strongly crested, raised, mesially broadly and shallowly interrupted transverse carina, is excised; following the carina strongly converging mesad, nearly straight. Promesonotal suture distinct. Mesonotum with a rounded or subangulate lobe on each side. Mesoepinotal suture impressed. Anterior corner of basal face of epinotum subdentate, followed posteriorly by a narrow, deep notch, and behind this notch a rather small, yet acute, tooth pointing obliquely cephalad, the posterior corner unarmed. Declivous face scarcely excavate, finely reticulate-punctate, with a few sparse longitudinal rugosities on its upper half, its lateral border marginate. Dorsum of thorax sculptured as head disc, except on the anteromesial portion of basal face of epinotum where a few strong but very short longitudinal rugae are apparent. Sides of thorax opaque, finely reticulate-punctate, with occasional, rather irregular, rugosities. Fore coxae somewhat striate on the outer face. Femora fusiform [Pl. 6, Fig. 14].

Peduncular segments as in worker, but lacking the strong rugosities on dorsum, and the petiole small denticles on the upper border of the anterior face. Gaster similar to that of worker, the anterolateral hyaline crest very narrow or vestigial, not reaching back to the stigma of the first tergite. Longitudinal rugosities on first tergite very prominent on anterior third. Conversely the lateral rugosities or striae of the first sternite do not all, or just a few, converge concentrically and fuse mesially in front of the posterior border. Standing hair as in worker, a row of rather prominent setae around the border of the cephalic disc, reaching to backward beyond the eye, also a few laterally on the occipital lobe. Scalelike hair silvery,

decumbent, in foveolae of head, thorax, peduncle. Cheeks and lower half of pleura very densely scaled. Scalelike hair small and very sparse on gaster, also sparse on lower face of head, sides of legs, and first sternite.

Female (undescribed) [Pl. 5, Fig. 5]. — Total length 7.2-7.5 mm; maximum length of head 1.75-1.78 mm; maximum length of thorax 2.10-2.14 mm. In general resembling the soldier, with the differences of the caste and the following noteworthy features.

Posterior third of cephalic disc not excavate, but slightly convex; the lateral borders not raised. Posterior pair of ocelli very close to the occipital border. Transverse pronotal crest sharply marginate, not as prominent as in soldier, broadly interrupted mesially, not quite attaining the lateral border of pronotum. Lateral border of basal face of epinotum with a blunt triangular lobe, and a similar very short tooth on the posterior corner. Lateral processes of peduncular segments very short, the postpetiole, as seen in profile, strongly convex above. Gaster relatively short and broad. Outer face of fore coxae with a few vestigial, oblique rugosities. First gastric sternite mostly smooth, finely striato-rugose anterolaterally, the striae not converging behind in front of the posterior border. Wings slightly infumated. Fore wing [Pl. 6, Fig. 2] extending backwards slightly beyond the tip of the normally extended gaster, lacking a transverse cubital vein, the radial vein touching directly the cubital vein (r-m absent, according to the terminology of H. H. Ross).

Male. — Several stray specimens seem to belong to the same species, which will be taken up in another study.

Specimens examined: 69; 46 workers, 9 soldiers, 10 females and 4 males, all captured in the U. S. on imported plants by U. S. Plant Quarantine Inspectors, with the following data: Costa Rica, Dec. 27, 1935, on *Cattleya dowiana*, n. 36-30: 8 W, 1 S [USNM]. April 26, 1944, on wild *Cattleya* (Hoboken, N. J.), n. 46-6652: 8 W, 2 S, 1 F [USNM]. Dec. 22, 1944, on *Cattleya dowiana* (S. Francisco Cal.), n. 45-1256: 3 W, 1 F [USNM]. June 24, 1946, on *Cattleya dowiana* (Brownsville, Tex.), n. 46-10028: 1 W, 1 S, 3 F [WWK]. Oct. 15, 1945, on *Cattleya dowiana* (San Francisco, Cal.), n. 45-18656: 6 W, 1 S [USNM]. Aug. 11, 1945, on orchid, pseudobulb (Brownsville, Tex.), n. 45-15882 and 45-15883: 7 W, 2 S, 4 F, 4 M [USNM, WWK]. Nov. 8, 1945, on *Cattleya dowiana* (San Francisco, Cal.), n. 45-19708: 2 S, 1 F [USNM]. March

4, 1938, on wild orchid, pseudobulb, n. 38-6748: 3 W [USNM]. — Honduras, May 19, 1941, on *Cattleya* sp. (Hoboken, N. J.), n. 41-8337: 3 W [USNM]. — Guatemala, May 14, 1946, on *Epidendron aromaticum* (Hoboken, N. J.), n. 46-8236: 6 W [USNM, WWK]. — Dominican Republic (?), March 25, 1946, carton containing beans (Hoboken, N. J.), n. 46-6464: 1 W [USNM].

Distribution. — This is a Central American species, known from Guatemala to Costa Rica. Since the record from Hispaniola I., Dominican Republic, is based upon a stray individual, the origin of the specimen is rather doubtful; it might have gotten mixed up accidentally with the beans coming from that Island. As regards the Guatemalan specimens, there must have been another mix-up. The workers, mentioned above, evidently belong to *curvistriatus*, whereas the soldiers and females, having the same date and lot number are obviously of another species, new to science, which will be described further below.

Discussion. — Although the type could not be examined, there is not the slightest doubt concerning the identification of the above mentioned specimens as belonging to *curvistriatus*. The species is remarkably distinctive, and these characters are clearly stated in Forel's description. The worker is at once recognized by the striking sculpture of the thorax and gaster. The soldier differs from the other species of the present group, by the raised posterior border of the cephalic disc, which does not form an evenly rounded curvature, by the sculpture of the first gastric sternite, and by the shape of the epinotum. The female differs from *coffeae*, *sobrius* and *texanus*, the closest known females, by the ensemble of the following characters: Lateral process of postpetiole in the form of a short, acute tooth; gaster relatively short and broad; fore wing lacking a transverse cubital vein.

Biology. — It is certainly a striking fact that nearly all of the nest series were taken on *Cattleya dowiana*. This seems to suggest a specialization or at least a decided preference of these ants for said orchid as plant host. Although having been frequently captured in the U. S., on imported epiphytic orchids, the species is recorded from its native habitat only once (the type). The suggested nesting restrictions could possibly explain why it has not been taken more frequently in the field. Of course, it is realized that the preceding suggestions are mere speculations. Their value consists only in directing the attention of future collectors, who might want to be looking for the species, to find out all about the habits of this pretty ant.

Paracryptocerus (Harnedia) sobrius, n. sp.

(Pl. 4 Fig. 6; Pl. 5 Fig. 6; Pl. 6 Fig. 1)

Types. — 4 soldiers (holotype and paratypes) and 8 females (paratypes) intercepted by U. S. Plant Quarantine Inspectors at Hoboken, N. J., on imported *Epidendron aromaticum*, from Guatemala, on May 14, 1946, n. 46-8236 [USNM, WWK].

Worker. — Unknown.

Soldier (holotype) [Pl. 4, Fig. 6]. — Total length 6.3 mm; maximum length of head 1.85 mm; maximum width of cephalic disc 1.86 mm; maximum length of thorax 1.68 mm; maximum width of thorax 1.71 mm. Black; the following fuscous-ferruginous: mandibles, anterolateral portions of cephalic disc, tip of scape, tibiae, tarsi, tip of peduncular spines; anterolateral corners of gaster with a yellowish-brown spot.

Head subopaque, subquadrate, surmounted by a nearly circular, anterolaterally somewhat excavate, mesially slightly convex, posteriorly nearly flat disc, the borders of which are indistinctly crenulate but distinctly upturned laterally, more noticeably crenulate but not upturned posteriorly. Median portion of posterior border of cephalic disc vestigially excised or truncate between the vestigial, scarcely noticeable, occipital denticles. Floor of disc scarcely visible when head is seen in profile. Borders of occipital lobes sharply marginate, the lateral border crenulate, visible from the side as a distinct carina which runs forward and upward on the sides of head toward the upper border of eye, but fading out before reaching it. Floor of disc finely but superficially reticulate-punctate, with sparse, larger foveolae, the intervals between the foveolae being usually as broad, or even much broader than, the diameter of the pits. Foveolae larger, slightly more crowded on the sides of head and occiput. Lower face of head very finely reticulate-punctate, very sparsely foveolate.

Thorax opaque, finely reticulate-punctate throughout. Anterior border convex mesially, slightly concave laterally. Anterior corner with a prominent tooth. Lateral border of pronotum subparallel, crenulate, in front of the transverse carina, straight, converging caudad behind the carina, the posterior corner separated from mesonotum by a deep and narrow excision. Transverse pronotal

carina not conspicuously crenate, sharply marginate, moderately prominent, shallowly excised mesially. Promesonotal suture vestigial. Lateral lobes of mesonotum obliquely truncate and marginate. Mesoepinotal suture impressed laterally, vestigial mesially. Anterior corner of basal face of epinotum subrectangular, vestigially denticulate, followed behind by a broader, triangular projecting lobe, the posterior corner at most slightly dentate, practically unarmed. Declivous face not excavate, its lateral borders submarginate. Foveolae on dorsum of thorax slightly larger, and more crowded than on head disc, densely crowded on posterior half of basal face of epinotum, where the integument becomes reticulate-rugose. Sides of thorax with occasional irregular rugosities and grooves. Fore coxae with vestigial, fine, oblique rugulae on apical half of the outer face.

Peduncular segments opaque. Foveolae very dense, and irregular in shape. Postpetiole broader than petiole, the latter on each side with a strong, obliquely reflexed spine, the spine itself not curved. Anterior face of petiole obliquely truncate, bearing on the upper marginate broader two minute denticles. Postpetiole with conspicuously longer, rather delicate lateral processes, the tip of which is obliquely recurved caudad. Body of postpetiole, as seen in profile, convex, the deepest portion just a little behind the anterior border.

Gaster opaque, subovoid. Anterior border moderately excised mesially, very narrowly crested laterally. First tergite finely reticulate-punctate, with slightly larger, yet very fine, rugosities, which form a scarcely raised network between the slightly impressed piligerous punctures. First sternite with a smooth posteromedian area, which is shiny, the rest subopaque, finely reticulate-punctate, with very fine longitudinal rugosities on the sides.

Standing hair thick, obtuse on apex, around the rim of cephalic disc, up to the posterior border, on the lateral border of occipital lobes, on the anterior half of the border of pronotum, one or two on mesonotal lobes, tip of peduncular spines, and a few on the anterolateral gastric crests and along the posterior border of the gastric sternites and tergites, and sparsely on the posterior half of the first sternite. Decumbent hair scalelike, silvery, canaliculate, rather short in all foveolae of head, thorax and peduncle. Very conspicuous on mesopleura where they are largest. Very fine and minute on the first gastric tergite. Rather dense on the extensor faces of femora and tibiae.

Female (paratypes) [Pl. 5, Fig. 6]. — Total length 6.5-6.8 mm; maximum length of head 1.57-1.64 mm; maximum width of cephalic disc 1.46-1.50 mm; maximum length of thorax 1.89 mm; maximum width of thorax 1.43-1.50 mm. In general resembling the soldier, with the peculiarities of the caste.

Cephalic disc more elongate, the floor mostly convex, only the anterolateral portions being slightly excavated. Anterolateral borders of disc slightly raised. Posterior half of disc either trapezoidal or more or less rounded. Posterior pair of ocelli very close to the occipital border. Lower face of head with the foveolae slightly larger and denser, and occasional longitudinal grooves. Occipital lobes with scarcely crenate border, the posterior corner rounded. Anterior corner of thorax dentate, the tooth not very prominent. Transverse pronotal carina little raised, vestigial toward the lateral border of pronotum, shallowly excised mesially. Lateral border of basal face of epinotum with a triangular lobe, the posterior corner unarmed, the posterior border nearly straight and transverse. Scutum very sparsely foveolate, the pits being somewhat denser on pronotum and scutellum, very dense and crowded on basal face of epinotum. Declivous face not excavate, its lateral borders immarginate. Mesopleural tooth prominent. Fore coxae with oblique rather coarse rugosities toward apex, of outer side. Petiole with obliquely truncate anterior face, the upper border of which is sharply marginate, forming with the dorsal face, as seen in profile a subacute angle. Lateral tooth of petiole relatively strong and projecting. Postpetiole with the same, yet shorter, rather delicate, more or less straight, lateral processes as in soldier. In profile the dorsum of this segment forms an anterior steeply ascending face, and a posterior descending face, meeting at an acute angle, the deepest part of the segment being farther removed from the anterior border, nearly in the middle of the length of the segment. Gaster sub-cylindrical, dotted with pale-yellowish on the anterior corner, and bearing on each anterolateral lobe a very narrow thin crest. Wings nearly hyaline, the pterostigma almost black, the veins brown. Venation of fore wing [Pl. 6, Fig. 1] normal, transverse cubital vein (or vein: *r-m*) present. Fore wing, when reiflexed backwards extending well beyond the normally contracted gaster.

Male. — Unknown.

Distribution. — The species is known only from type material, coming from Guatemala.

Discussion. — Strangely enough, as already mentioned before, the above described soldiers and females arrived accompanied by workers, bearing the same lot number, and taken on the same plant at the same date; these workers obviously belong to *curvistriatus*. However, there is no doubt that the latter are not conspecific with the former, differing from the known soldiers and females of *curvistriatus* rather remarkably. The only plausible explanation for the association of the two forms seems to be that there must have been a mix-up as regards these specimens, either during the collecting or the labelling and mounting.

From *curvistriatus* the present species is readily differentiated. The soldier differs as follows: It lacks the yellowish-brown color on anterolateral portions of the cephalic disc, on extensor face of tibiae, being ferruginous or fuscous-ferruginous instead. Head subopaque, the posterolateral border of disc not abruptly curved mesad, not forming an angle with the preceding part of the border; foveolae on cephalic disc much sparser. Pronotum less conspicuously expanded laterad, its sides little converging toward mesonotum. Basal face of epinotum of different shape. Posterior border of cephalic disc flat, not raised nor upturned. Gaster more elongate, lacking on the sides of the first sternite distinct longitudinal striae, being only finely rugose. — The female of *sobrius* may be distinguished from *curvistriatus* on account of the following features: Color characters and details of cephalic disc as in soldier. Anterior corner of thorax with a less prominent tooth; the thorax itself is narrower, less constricted behind. Basal face of epinotum of different shape, peduncular segments with more projecting lateral processes. Gaster more elongate, not striate on the sides of the first sternite. Fore wings not lacking a transverse cubital vein.

On the other hand, the present species is very closely related to *texanus*; the differences between both species are of a much subtler kind, yet still apparent. The soldier of *sobrius* differs from *texanus* as follows: Foveolae on cephalic disc sparse, never crowded, the intervals nearly always as broad as the diameter of the pits, often broader, and very superficially reticulate-punctate. Posterolateral border of cephalic disc not forming a distinct angle when curving toward the occiput. Anterior corner of thorax dentate, the sides conspicuously crenate in front of the less prominent transverse carina. Behind the carina the lateral border of the pronotum is straight, not sinuous, less conspicuously converging mesad. Lateral lobe of mesonotum obliquely truncate. Mesoepinotal suture scarcely impressed. Peduncular segments with different lateral processes, those of postpetiole not gradually tapering toward apex, but delicate right from the base. Standing hair more abundant. — As I have not seen a female of *texanus* it is hard to state the differences for this caste of *sobrius*. Looking at the figure by Gregg (Creighton & Gregg, 1954) representing the female of *texanus*, one realizes that the similarity is very close. The only significant differences I can detect consist in the decidedly sparser foveolae on head disc and scutum, and the different shape of the basal face of the epinotum.

Paracryptocerus (Harnedia) texanus (Santschi)

(Pl. 2 Fig. 5; Pl. 4 Fig. 4; Pl. 6 Fig. 7)

- Cryptocerus angustus* Wheeler, 1910 (nec Mayr, 1862), Ants, Columbia Univ. Press, pp. 151, 567 (Texas). — 1926, Ibidem, Ed. 2, pp. 151, 567.
- Cryptocerus texanus* Santschi, 1915, Bull. Soc. Ent. France (1915), pp. 208-209, Fig. 2, a, b, c (S, W; Texas). — Creighton & Gregg, 1954, Psyche, Cambridge, 61 (2): 41-57, figs. 1-3, Pls. 3-4 (S, W, F; U.S.A.: Texas; Mexico: Nuevo Leon; Biology, Distribution).
- Cryptocerus angulosus* Wheeler, 1916 (nec F. Smith, 1867), Proc. New Engl. Zool. Club 6: 35 (lapsus for *C. angustus* Mayr).
- Cryptocerus (Cryptocerus) texanus* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Smith, M. R., 1947, Proc. Ent. Soc. Wash. 49 (1): 30, 34, 37-40 (S, W, F, M; U.S.A.: several localities in southwestern Texas). — Smith, M. R., 1947, Amer. Midl. Nat. 37 (3): 583. — Creighton, 1950, Bull. Mus. Comp. Zool. Harvard 104: 296-298 (U.S.A.: Southwestern Texas; northern Mexico).
- Paracryptocerus (Harnedia) texanus* M. R. Smith, in: Muesebeck, Krombein & Townes, 1951, Hym. Amer. N. of Mex., Agric. Monogr. U. S. Dep. Agric. 2: 825 (U.S.A.: Texas; Mexico).

Types. — Soldier and worker taken by J. Bondroit in Texas, — no precise locality is given —, presumably deposited in the Santschi collection, Basel, Switzerland. No type specimens have been examined.

During a prolonged sojourn in the United States I was able to see several representatives of this species, both in the collection of my colleague of studies and friend, Dr. Wm. F. Buren, and in the collections of the U. S. National Museum and the Museum of Comparative Zoology at Harvard. Dr. Buren also presented me with a soldier and two workers, which he took at Columbus, Texas. Since the latter individuals are the only specimens at hand at the write-up of this paper, and also because the species has already been revised by Dr. M. R. Smith (1947), who saw many more specimens, I prefer to transcribe his diagnoses:

Worker [Pl. 2, Fig. 5]. — "Length 3.6-4 mm. Posterior border of head weakly emarginate, posterolateral corners not excised, dorsal surface largely convex except toward the sides, anterior border with a distinct emargination exposing much of the mandibles. Promesonotal suture lacking or very poorly indicated, mesoepinotal suture present but not strongly developed. Thorax marginate on each side, bearing spines arranged in the following order: Two on pronotum, one on mesonotum, and two on epinotum (the anterior one lying near the mesoepinotal suture and sometimes feebly developed). Petiolar and postpetiolar nodes and also their spines similar to those of the soldier but smaller, the postpetiolar spines usually less reflexed apically. Gaster as in soldier.

Pitlike impressions on head and thorax smaller and more irregular than in soldier, the sculpturing on the thorax especially with a reticulate-rugose trend, on gaster similar to soldier's.

Pilosity similar to that of soldier, in nature and arrangement.

Black; mandibles, frontal carinae, antennae, apex of each femur, tibiae, and all tarsal segments except the metatarsal reddish brown. Frontal carinae and a basal spot on each side of gaster whitish yellow. The spot on each side near the posterior border of the first gastric segment, which is sometimes present in the soldier, apparently missing in the worker".

Soldier [Pl. 4, Fig. 4]. — "Length 4.5-5.4 mm. Cephalic disk proportionately broader than in *rohweri*, approximately as broad as long, with a posterior border usually weakly emarginate, occasionally straight, posterolateral corners oblique, sides less subparallel and front rounded, bearing a distinct median emargination which exposes much of the mandibles. A convexity near the center of the disk. Border weakly or not crenulate. Pronotum as broad as head. Transverse pronotal crest well developed, sharp, but interrupted in the middle, somewhat crenate; lateral border of pronotum usually spineless, except for a very feeble indication of an anterolateral spine. Promesonotal and mesoepinotal sutures weakly to moderately well indicated, the mesoepinotal suture usually the more distinct of the two. Mesonotum projecting laterally as a short, angular lobe. Epinotum concave posteriorly, each lateral margin with three lobes, if one includes the anterolateral and posterolateral corners, the median lobe larger than the other two. Each side of petiolar and postpetiolar nodes [Pl. 6, Fig. 7] with a short spine, that on the postpetiolar node usually larger and more strongly reflexed posteriorly. Gaster oblong, with a very distinct basal emargination, and with weakly developed anterolateral margins.

Pitlike impressions on the head and thorax much smaller, finer and apparently less circular than in *rohweri*. Gaster very finely granulate, but lacking the rugulae of *rohweri*.

Gaster beneath and apically with short, erect hairs; rest of body and appendages apparently devoid of hair except a few on the pronotal crest. Body and appendages with short, appressed silvery hairs, the pitlike impressions on head and thorax each bearing only one of these hairs.

Black; mandibles, antennae, frontal carinae, occasionally the entire border of the cephalic disc, apex of each femur, tibiae tarsi and sometimes a spot on each side near the posterior border of the first gastric segment reddish-brown, in addition there is always a whitish yellow basal spot on each side of the gaster".

Female. — "Length 6.0-6.6 mm. Smaller than *rohweri*. Impressions on head and thorax smaller, finer and less circular. Mandibles, frontal carinae, antennae, tibiae and all of tarsal segments except the metatarsal, reddish brown; basal spot on each side of gaster whitish-yellow (body of *rohweri* entirely black). Silvery appressed hairs conspicuous over the body and appendages, these lacking in *rohweri*. Anterolateral corners of pronotum not so acute. Epinotum concave posteriorly (straight in *rohweri*). Postpetiolar node more compressed anteroposteriorly and with much larger and more prominent spine. Differing from soldier and worker (of *texanus*) in having sparse, short, suberect hairs on thorax, postpetiole, and gaster. Description based on a wingless female".

Male. — This caste has likewise been described by Dr. Smith (1947). A discussion of it is reserved for another study.

Distribution. — Southwestern Texas, from San Antonio and Columbus south to Brownsville and into Northern Mexico, Nuevo Leon province. (For a precise indication of localities of capture see the papers by M. R. Smith, 1947, and Creighton and Gregg, 1954).

Discussion. — Very little has to be added to the descriptions transcribed from Dr. Smith's review of the North American forms of the genus *Paracryptocerus*, except for a remark on his measurements and mentioning a few supplementary distinguishing characters for the worker caste.

As regards the measurements, I believe that Dr. Smith limited himself to taking a single linear spread measurement of the insect not taking into account the relative position of the succeeding tagmata. At any rate, his results appear to underestimate the general linear body measurement by .4-.5 mm, as compared with the measurements performed according to the synthetic method, adopted in this paper. Thus my two workers have the following dimensions: Total length 4.0-4.4 mm; maximum length of head 1.07-1.14 mm; maximum length of thorax 1.14-1.21 mm. The soldier measures as follows: Total length 5.8 mm; maximum length of head 1.75 mm; maximum length of thorax 1.57 mm.

Complementary characters for the worker caste are the following: Head scarcely longer than the interocular width. Lateral border of head a little upturned above eyes. Lower face of head mostly longitudinally rugulose, the rugae anastomosing transversely, forming elongate meshes. Anterior border of thorax gently and evenly arched. Scapular angle incorporated in the lateral pronotal crest, the latter being feebly tridentate, if one counts the anterior, subacute and the posterior subrectangular corner, the intermediate tooth very obtuse, scarcely projecting. Promesonotal and mesoepinotal suture either indicated or absent (Santschi, in the original description mentions a distinct promesonotal suture, whereas either suture is absent in my specimens from Columbus, Tex.). Lateral border of epinotum tridentate, the anterior tooth

Biology. — The study of the habits of the Cepaholitini ants has scarcely been touched, and all we presently know is mainly due to incidental and cursory observation by two collectors in the field. Only the biology of the present species opens an exception to this rule, because Creighton and Gregg, in the already mentioned paper (1954), presented a surprisingly profound account of the habits of *P. texanus*, as a result of careful field observations and research on captured colonies in artificial nests. Perhaps the most important contribution of this pioneering study lies in the demonstration of phragmosis i. e. occlusion of the nest entrance or passage by means of using the head and/or a part of the body of the insects itself, as practiced by the soldier of *texanus*. They also elucidated how this phragmosis is done in all details, and how incoming members of the colony manage to get by the guard. The same paper contains also useful remarks and observations concerning nest preferences, food habits and distribution of the species. For further information the interested reader and student is referred to the original study.

g) Subgroup of *P. (H.) wheeleri* (Forel)

Component species: *insularis*, *rohweri*, *wheeleri*; all three from northwestern Mexico or the state of Arizona, U. S.

Common characters: Worker. Occipital border not emarginate, either straight or slightly convex. Prominent occipital lobes absent. Scapular angle incorporated in the lateral pronotal crest. Mesonotum unarmed. Lateral processes of epinotum spine-like. Peduncular spines very slender and recurved. Anterior border of gaster not or only slightly emarginate mesially, without projecting anterolateral lobes. First gastric tergite with fine longitudinal and dense rugosities or striae, at least on the anterior third. Standing hair scattered over the entire dorsum of head, thorax, peduncle and gaster; oblique, not decumbent on legs. — Soldier. Somewhat resembling the members of the preceding group, but differing in the following features: Anterior and posterior corners of basal face of epinotum not angulate, but rounded. Lateral border of basal face with a solid, prominent, strong tooth. Gaster scarcely emarginate at the postpetiolar insertion. Anterior third of the immaculate first gastric tergite finely and densely longitudinally rugulose. Standing hair as in worker, except on head. Oblique hair on legs.

This group, as far as the pilosity is concerned, imitates the condition found in the *pilosus*-subgroup, but differs completely as regards body structure and details of sculpture. The assembly of these three species is especially distinctive by its highly aberrant worker, as already pointed out by Forel, in 1901, when he described *wheeleri*.

Paracryptocerus (Harnedia) insularis (Wheeler) nov. stat.

Cryptocerus pilosus insularis Wheeler, 1934, Pan-Pacif. Ent. 10: 140 (W; Mexico: Maria Madre Island).

Types. — A single worker specimen captured on Maria Madre Island, the northernmost of the "Las Tres Marias" islands, in the Pacific Ocean, roughly 70 miles off the shore of the state of Naqarit, Mexico. The present location of the type is unknown. It is not in the Wheeler collection, at the Museum of Comparative Zoology in Cambridge, Mass.

The original description is as follows:

"Worker minor. Length 4.3 mm. Differing from the typical *pilosus* in having the three lateral teeth of the pronotum longer and more acute, the mesonotum neither projecting nor angulate on the sides, the pair of lateral teeth of the epinotum developed as short, acute spines, the lateral backwardly directed spines of the petiole and postpetiole more slender and more unequal in length, and the anterior border of the gaster at the articulation of the postpetiole less concave and without angular projections and pale spots. The basal third of the gaster is finely, regularly, longitudinally striate".

Discussion. — The characters given in the preceding differential diagnosis provide sufficient evidence, showing that *insularis* has no relationship with *pilosus*, and furthermore that it is a close relative, if not a synonym, of either *wheeleri* or *rohweri*. Its true status cannot be decided upon the description alone. I propose to let it stand, for the time being, as an independent species, because the description contains two, though very trivial, characters, which do not agree with *wheeleri* and *rohweri*: the more prominent lateral teeth of the pronotum and the slightly emarginate anterior border of the gaster.

It is simply inexplicable why Wheeler did not see this relationship, having in his collection types of both *rohweri* and *wheeleri*, and lacking, as he himself confesses, a direct knowledge of *pilosus*. He compared *insularis* with specimens, taken by Mann, in northeastern Brazil, and identified as *fiebrigi* (Forel). As shown in the first part of the study, these specimens constitute a real puzzle, which could not be solved because the specimens in question could not be located in the collections of Wheeler and of Mann. It is, of course, possible that these specimens were not *fiebrigi* at all, but a different, perhaps undescribed species, giving thus rise to Wheeler's misconception.

Paracryptocerus (Harnedia) rohweri (Wheeler)

(Pl. 2 Fig. 8; Pl. 4 Fig. 2; Pl. 6 Fig. 12)

Cryptocerus (Cyathocephalus) rohweri Wheeler, 1916, Proc. New Engl. Zool. Club 6: 32-35, fig. 2 a, b (S, W; U.S.A.: Arizona, Buehman Canyon near Redington).
Cryptocerus (Cryptocerus) rohweri Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — M. R. Smith, 1947, Proc. Ent. Soc. Wash. 49 (1): 34-37 (S, W, F; U.S.A.: Arizona, several localities). — M. R. Smith, 1947, Amer. Midl. Natural, 37: 583, Pl. 14, fig. 51 (S). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 208. — Creighton, 1950, Bull. Mus. Comp. Zool. Harvard 104: 297.
Paracryptocerus (Harnedia) rohweri M. R. Smith, in: Muesebeck, Krombein & Townes, 1951, Hym. Amer. N. of Mex. Agric. Monogr. U. S. Dep. Agric. 2: 825.

Types. — "Buehman Canyon near Redington, 3,300 feet, Santa Catalina Mountains, Arizona, M. Chrisman. In galleries excavated at the base of a dead limb and against the green wood of "palo verde" *Cercidium torreyanum* Sarg., Hopkins, U. S. no. 10193" (M. R. Smith, 1947a, p. 36 [USNM, MCZ, WWK]. Lectotype soldier in the U. S. National Museum.

Worker (paratype) [Pl. 2, Fig. 8]. — Total length (only one specimen measured) 5.2 mm; maximum length of head 1.28 mm; maximum length of thorax 1.43 mm. Black; the following ferruginous: mandibles, part of frontal carinae, apex of femora and tibiae, tarsites II-V.

Head opaque, trapezoidal. Occipital corners not lobate, nor obliquely truncate, forming merely an obtuse angle. Occipital border straight and transverse. Dorsal face, excepting the rather flat, posteriorly very thick and scarcely translucent frontal carinae, and the declivous clearly limited clypeus, convex, finely and sharply punctate, coarsely foveolate, the pits wanting on the frontal carinae and on the clypeus. Lower face coarsely reticulate-rugose and foveolate.

Thorax opaque. Anterior border convex in the middle, slightly concave toward the sides. Scapular angle incorporated in the lateral pronotal crest, the latter tridentate, the anterior two teeth closer together, triangular, the third tooth, forming the posterior corner of the crest, subrectangular. Promesonotal suture absent. Sides of mesonotum unarmed, immarginate. Mesoepinotal suture absent. Each side of epinotum with a slender spine, pointing laterad and slightly upward and caudad. In profile the dorsum of the thorax noticeably sloping behind pronotum, the latter convex and ascending. The entire thorax sharply punctate. Dorsum reticulate-rugose, the meshes elongate on the mesonotum. Declivous face with longitudinal striae. Laterotergite of pronotum reticulate-rugose and foveolate. Pleura longitudinally rugose.

Peduncular segments [Pl. 6, Fig. 12] opaque, their dorsal face mostly longitudinally rugose. Body of petiole subglobose, its anterior face vertically truncate; from each side of the petiole at some distance from the anterior border, arises a slender, long, slightly curved and pointed spine, pointing obliquely caudad and upward. Postpetiole with anteriorly broad, posteriorly more constricted body. A slender, longer, more recurved and pointed spine arising from each side, next to the anterior border. Dorsum of postpetiole, as seen in profile, nearly flat.

Gaster oval, opaque, finely and sharply punctured throughout. Postpetiolar insertion not emarginate, anterolateral borders immarginate. First tergite finely and densely longitudinally rugulose. First sternite more conspicuously longitudinally rugose on the sides.

Standing hair pointed, short, sparingly scattered over dorsum of head, thorax, peduncle and gaster, also on sternites, more oblique, but not decumbent, on legs. Silvery scalelike hair minute on posterior portions of head disc, larger and more conspicuous on cheeks, dorsum of thorax, laterotergite of pronotum, dorsum of peduncular segments, lacking on gaster, but present on apical half of extensor face of femora. All foveolae on dorsum of head bear a small decumbent hair, visible only under high magnification.

Soldier (paratype) [Pl. 4, Fig. 2]. — Total length (one specimen only measured) 6.9 mm; maximum length of head 1.85 mm; maximum length of thorax 1.82 mm. Black; the following fuscous-ferruginous: anterolateral portions of head (variable in extent, always much infuscated), extreme tip of last funicular segment, knees and tarsites II-V.

Head subopaque, surmounted by a slightly elongate disc (52:47), the borders of which are evenly rounded anteriorly, except for the supramandibular excision, subparallel and rather straight on the sides, then abruptly, yet not forming a sharp angle, curved mesad, to join the scarcely convex, subtruncate occipital border. Floor of disc moderately excavated anteriorly, shallowly excavated laterally, scarcely behind, having in the center a little prominent convexity. Occipital lobes subrectangular. Clypeal sutures obsolete. Lateral border of lower face of head not distinctly marginate. Integument of head finely reticulate-punctate, more superficially and densely on dorsum, more coarsely on lower face. Likewise densely covered with large, rounded foveolae, the intervals between the foveolae not as broad as the diameter of the pits.

Thorax opaque. Anterior border convex in the middle, slightly concave toward the sides. Anterior corner sharply dentate, the lateral border of the pronotum subparallel and crenulate in front of the carina, converging, rather straight behind the carina, not forming a prominent corner when joining the mesonotum. Transverse carina sharply marginate and somewhat crenulate, broadly yet shallowly excised in the middle. Promesonotal suture vestigial. Lateral lobes of mesonotum scarcely projecting, broad, rounded, immarginate. Mesoeponotal suture distinct. Anterior and posterior corner of basal face of epinotum rounded, not angulate. On each side, somewhat in front of the posterior corner, a strong, prominent spine, pointing mainly laterad. Sculpture of thorax as that of head, the foveolae sparser, except on basal face of epinotum. Bottom of foveolae rather shiny. Foveolae very sparse and irregularly dispersed on sides of thorax, which also present reticulate rugosities. Declivous face without macrosculpture.

Peduncular segments opaque, dorsally reticulate-rugose and foveolate, their shape and lateral processes as in worker, but their bodies are more transverse, broader, and the spines are shorter. Postpetiole much broader than petiole.

Gaster dorsally opaque, ventrally more shining. Postpetiolar insertion very little emarginate. Anterolateral borders of gaster immarginate, never crested. First tergite heavily and densely punctate, with fine, longitudinal, dense rugosities, fading out caudad, before reaching the half. Sculpture of sternite identical but more superficial.

Standing hair long and pointed at tip around the rim of cephalic disc anterolaterally; shorter and sparingly on dorsum of thorax, peduncle, and gaster, and on the sternites. Oblique on legs. Decumbent hair in foveolae of head and thorax usually very fine and scarcely visible, scalelike, silvery and glittering only on posterior border of basal face of epinotum, on peduncular segments, none on legs and gaster.

Female (as described by M. R. Smith, 1947a, p. 35-36). — "Length 7.3 mm. Cephalic disk differing from that of soldier in that the border is less elevated, especially in the posterior half; posterior border and posterolateral corners less defined; most of disk convex except anterolaterally. Transverse pronotal crest not strongly developed as in soldier. Anterior wing brown, with a distinct stigma, a cubital and discoidal cell, and also an appendiculate radial cell. Petiolar and postpetiolar nodes

differing from those of soldier, in that the lateral spine is absent on the petiolar node and is indicated on the postpetiolar node by a weak anterolateral spine or tubercle. Sculpture, pilosity and color similar to that of soldier".

Male. — Unknown.

Specimens examined: 4; 2 soldiers and 2 workers of the type series, as explained above [USNM, WWK].

Distribution. — Southern Arizona in the United States.

Discussion. — The differential diagnosis for the species will be given under *wheeleri*, its closest relative. *P. rohweri* has been pictured by Wheeler (1916), but his figures are very sketchy. As Dr. Smith already pointed out, most of the specimens seem to lack a promesonotal suture in the worker caste, i. e. all specimens deposited in the U. S. National Museum. I don't know whether the single worker in the Wheeler collection at Harvard has this feature. At any rate, the presence or absence of this character is seldom of importance in the worker caste. Both Wheeler and Smith overlooked the fact, that the foveolae on the dorsum of the head of soldiers and workers are not deprived of decumbent hair, but a hair is present in each foveola, although it is very small and thin, and can be seen with higher magnification (I used 8×8 in a wide-field microscope). The same holds for the foveolae on the dorsum of the pronotum and mesonotum of the soldier.

The two paratype workers examined by myself are in some respects intercastes, i. e. intermediates between the soldier and worker caste, because both have the occiput somewhat truncated, and separated from the vertex by a vestigially marginate, arched carina (see Pl. 2, Fig. 8). Also the partly infuscated and thickened frontal carinae could be interpreted as a sign of an overgrown worker.

Paracryptocerus (Harnedia) wheeleri (Forel)

(Pl. 8, Figs. 1, 2)

Cryptocerus wheeleri Forel, 1901, Ann. Soc. Ent. Belg. 45: 126-128 (W. S.; Mexico, Morelos: Cuernavaca). — Wheeler, 1901, Amer. Nat. 35: 527. — Wheeler, 1901, Ann. Soc. Ent. Belg. 45: 201 (Biol.). — Wheeler, 1916, Proc. New Engl. Zool. Club 6: 34-35, Figs. 2 c-d (S, W). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 208.
Cryptocerus (Cryptocerus) wheeleri Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — M. R. Smith, 1947, Proc. Ent. Soc. Wash. 49 (1): 36-37.

Types. — Workers and soldiers taken by Wheeler in December 1900, nesting in epiphytic *Tillandsia (benthamiana)*, according to Wheeler, 1942), in a small acacia grove, southwest of the town of Cuernavaca, state of Morelos, Mexico [MCZ, USNM, MHNG, WWK].

Since this species resembles very closely the preceding *rohweri*, the following descriptions of the worker and soldier will confine themselves to the diagnostic characters.

Worker (paratypes) [Pl. 8, Fig. 1]. — Total length 3.7-4.2 mm; maximum length of head 0.96-1.12 mm; maximum length of thorax 1.11-1.22 mm. Black; the following ferruginous: funicular segments, tibiae, tarsites (tibiae II and III may be fuscous-ferruginous); pale yellowish: frontal carinae, spines of epinotum and peduncular segments.

Differs from *rohweri* by the smaller size and different color (as stated above) and in the following features: Frontal carinae thin, subhyaline, not infuscated in part. Lateral border of head more distinctly excised in front of the eyes. Dorsum of head inconspicuously foveolate but instead distinctly and finely longitudinally rugose. Lower face of head longitudinally striato-rugose, the median striae converging in front and fusing with each other, forming concentric arches. Dorsum of thorax principally longitudinally rugose, the rugae becoming quite regular on the basal face of the epinotum, foveolae inconspicuous or absent. Diastema between the first and second tooth of the lateral pronotal crest longer, the teeth farther removed from each other. Lateral epinotal spines longer, more delicate. Sides of thorax longitudinally striate. Body of peduncular segments narrower, its lateral spines longer, more delicate, those of postpetiole more strongly recurved. First gastric tergite more distinctly, yet very finely and regularly longitudinally striate, except for the sides, which are merely reticulate-punctate. First sternite equally longitudinally striate on the sides. Standing hair much longer, and more abundant, evenly scattered over the body and appendages.

Soldier (lectotype, WWK) [Pl. 8, Fig. 2]. — Total length 6.2 mm; maximum length of head 1.78 mm; maximum length of thorax 1.64 mm. Black; the following fuscous-ferruginous: anterolateral portions of cephalic disc, tibiae and tarsites.

Differs significantly from *rohweri*, as follows: Supramandibular excision distinctly narrower. Cephalic disc more expanded in front, its sides converging caudad, and somewhat constricted at the level of the eyes. Posterior half of cephalic disc entirely flat, the anterior half conspicuously excavated anterolaterally, just inside of the strongly raised, sharply crested border. Foveolae on floor of cephalic disc, as well as on the

sides and the lower face of head, noticeably smaller and sparser. Occipital lobes broadly rounded to broadly obliquely truncate. Mesonotum shorter and broader with a projecting, angulate lobe at each side. Sculpture of thorax more superficial, the integument less opaque, somewhat shiny. Foveolae on thorax as small and sparse as those on head. Spines of peduncular segments shorter. Gaster with the same sculpture pattern as in *rohweri*, but much more superficial, the posterior half of the first tergite nearly shiny. Standing hair extremely scarce. The rim of the cephalic disc lacks the fringe of projecting setae.

Female and male. — Unknown.

Specimens examined: 10; 6 workers and 4 soldiers, as follows: Mexico, Morelos: Cuernavaca, in *Tillandsia benthamiana*, XII.1900, W. M. Wheeler: 5 W, 3 S [WWK, MCZ, USNM, MHNG, lectotype soldier, in my collection, all other paratypes]. — From unknown locality in Mexico, intercepted at Nogales, Arizona, U.S.A., with bamboo rakes and tomato fruit, XI.1945, III.1946, U. S. Plant Quarantine Inspectors: 1 S, 1 W [USNM].

Discussion. — The specimens intercepted by U. S. Plant Quarantine stations at Nogales, Arizona, on the Mexican border, do not shed any light on the distribution of the species, since the exact origin of these insects is unknown. But the morphological properties of the two individuals, reproducing mainly the typical *wheeleri* features, exhibit likewise characters which almost seem to bridge the narrow gap between this species and *rohweri*, casting at the same time serious doubts on the specific distinctiveness of all three species of the present group.

The scanty, presently available, material does not permit a definitive solution of the problem. Yet I feel obliged to state the peculiar features of aforesaid specimens.

The worker has the upper face of the head completely covered with both thick, not pointed, standing hair and also quite visible scalelike hair. The same type of pilosity is also found on the gaster, which moreover exhibits anterolaterally a vestigial light spot on each side. The sculpture of the first gastric tergite is rather longitudinally rugose than striate. The dorsum of the thorax is reticulate-rugose. The integument is not as shiny as in the typical *wheeleri*. In short, this worker, as regards the sculpture of the thorax and the gaster, is clearly an intermediate between *wheeleri* and *rohweri*, whereas the peculiar pilosity removes it from both species, as also do the light spots on the anterior corners of the gaster.

The soldier, likewise a stray specimen, has the cephalic disc anterolaterally even more conspicuously excavated, and the lateral borders more strongly raised, and the sculpture of the floor of the disc is exactly as in the typical *wheeleri*. The transverse pronotal carina is blunt, lacking a distinct mesial excision. The lateral lobe of the mesonotum is rather rounded than angulate, and not conspicuously projecting, resembling in this detail *rohweri* instead of *wheeleri*.

The foregoing description of the two intergradient specimens show clearly that the characters actually used for separating the species of the present group, are not all equally good. Even, if on hand of adequate material of the *wheeleri* subgroup, future revisers should decide in favor of maintaining the presently recognized forms, a new and more thorough differentiation of the species would have to be made.

h) Species based exclusively on females

In his treatment of the ant tribe Cephalotini, given in fasc. 174c of *Genera Insectorum*, Emery (1922) placed in the *angustus*-group (pp. 309-310), the following seven species, known only from isolated females: *bimaculatus* (F. Smith), *crenaticeps* (Mayr), *fervidus* (F. Smith), *klugi* (Emery), *notatus* (Mayr), *pallidicephalus* (F. Smith), *serraticeps* (F. Smith). The last species, *i. e. serraticeps*, has already been identified by myself previously (Kempf, 1951, p. 132) as belonging to the genus *Eucryptocerus*. Another generic transfer, concerning *fervidus* (F. Smith), together with the establishment of a new case of synonymy, has to be effected, as follows:

Cryptocerus fervidus F. Smith, 1876 [= *Zacryptocerus membranaceus* (Klug), 1824] n. o. v. syn. In order to substantiate this synonymy, I first wish to transcribe F. Smith's original description:

Cryptocerus fervidus F. Smith (1876). — "Female: Length $5\frac{1}{2}$ lines. Chestnut brown, the abdomen with an indistinct pale macula on each side at its base and an ovate one placed obliquely at its apex. The head rather longer than broad, slightly convex above, with the lateral margins raised; the posterior margin of the vertex obliquely truncate; two minute tubercles on the vertex in front of the truncation; the flagellum of the antennae dark fuscous. The thorax of the same width as the head; the prothorax oblique, with the margins sharp and slightly raised; behind the insertion of the wings narrowed, and with a short spine on each side of the metathorax posteriorly; the scutellum semi-circular. The abdomen oblong; the sides parallel, the anterior margin incurved, with the lateral angles slightly rounded; the first node of the peduncle subquadrate, slightly narrowed posteriorly, the second node transverse and with a short spine at the anterior angles. Hab. Rio". (Trans. Ent. Soc. London p. 605, Pl. 11, fig. 1, 1876).

The type specimen was not available for examination. But the description and figure of *fervidus*, despite the customary shortcomings of F. Smith in this matter, exhibit several characters that show at once that this species must be placed in the genus *Zacryptocerus*. The decisive features consist in the large size,

the shape of the head and thorax, the light color and the four pale spots on the first gastric tergite. The specific placement of the form does likewise not involve considerable difficulties. The specimen represents most certainly the still undescribed female of *membranaceus* (Klug), differing from the female of *clypeatus*, according to F. Smith's own statements (cf. F. Smith, 1854, p. 217, for the description of the female of *clypeatus*), in darker color (chestnut instead of reddish-yellow) and smaller size (5.5 lines instead of 6 lines). Exactly the same characters distinguish the workers of both species. The type locality of *fervidus* clinches the case of synonymy, since only *membranaceus* is known to occur in Rio de Janeiro.

After the removal of the preceding form, another species, *cognatus* (F. Smith), falsely classified by Emery (1922) as a variety of *Paracryptocerus minutus* (F.), has to be returned to the present group. Emery's move may not be justified, as I had the opportunity to show in a previous paper (Kempf, 1951, p. 176).

These shifts in classification being accomplished, the list of species, belonging to the present section, is as follows:

- P. (H.) bimaculatus* (F. Smith), 1860
- P. (H.) cognatus* (F. Smith), 1862
- P. (H.) crenaticeps* (Mayr), 1866
- P. (H.) klugi* (Emery), 1894
- P. (H.) notatus* (Mayr), 1866
- P. (H.) pallidicephalus* (F. Smith), 1876

Paracryptocerus (Harnedia) bimaculatus (F. Smith)

Cryptocerus bimaculatus F. Smith, 1860, Journ. Ent. 1: 77, Pl. 4, fig. 4 (F; Mexico).
 — Forel, 1899, Biol. Centr.-Amer. Hym. 3: 49.
Cryptocerus (Cryptocerus) bimaculatus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309.

Original description. — "C. niger; capite antice et lateribus testaceis; abdomine elongato, basi utrinque flavomaculato. — Female. Length 3 lines. Black; the head and thorax with strong confluent punctures; the abdomen with a longitudinal striation at the base, the striae slightly divergent. The head, viewed in front ovate, slightly widest anteriorly, and emarginate in the middle in front; the sides of the head rufo-testaceous. Thorax transverse anteriorly, very slightly rounded, with the lateral angles acute; the sides of the thorax parallel to the insertion of

the antennae [!], from thence to the apex of the metathorax gradually narrowed, the metathorax abruptly truncate; the wings subhyaline, with the nervures fusco-testaceous. Abdomen elongate, the base emarginate, the apex rounded; a large ovate yellowish white macula at each of the basal angles; the nodes of the peduncle with a small acute spine on each side. Hab. Mexico. In the Collection of the British Museum".

Discussion. — Emery placed the present species in the *angustus*-group, and his choice appears to be sound. Nothing more can be said about the identity of this female, except for stating, by mere guessing, that it could possibly be conspecific with either *texanus*, *sobrius* or *aztecus*.

Paracryptocerus (Harnedia) cognatus (F. Smith)

Cryptocerus cognatus F. Smith, 1862, Trans. Ent. Soc. London (3) 1: 411-412, Pl. 13, fig. 4 (F; Brazil AM: Ega = Tefé).
Cryptocerus (Paracryptocerus) minutus var. *cognatus* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 307. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 116.

Original description. — "C. aterrimus, thorace antice posticeque spinoso, elongatus, abdomine flavo-quadrimaculato. — Female. Length $2\frac{1}{2}$ lines. Head obscurely ferruginous above, black beneath; the mandibles obscure ferruginous; the antennae fusco-ferruginous, with the scape and the base and apex of the flagellum rufo-testaceous; the tips of the femora, tibiae, and tarsi ferruginous; the abdomen elongate, half the length of the insect, deeply emarginate at the base, the lateral angles of its base with a large yellow spot, and a large ovate yellow spot on each side towards the apex of the first segment. The wings ample, fusco-hyaline; the nervures testaceous; the stigma brown. The head and thorax rather strongly punctured; the abdomen very delicately shagreened, and with a few fine scattered punctures. The anterior and posterior angles of the thorax with short spines, the anterior pair acute. Hab. Ega on the Amazon. In Coll. Smith. — This species closely resembles the *C. quadrimaculatus*, but it is considerably smaller; on a comparison with examples of that species the following differences present themselves: the head is of a different colour and much more oblong, the sides being much more straight; the thorax is more elongate, and the metathorax has at its base, on each side, a small angular tooth; its thorax and abdomen are subopaque, in *C. 4-maculatus* they are shining".

Discussion. — As I have pointed out elsewhere (Kempf, 1951, p. 176), Emery's placement of the present species, who associated it as a variety with *minutus* (Fabr.), does not seem to be sustainable. The very small size (5.2 mm) and the oblong, foveolate head of *cognatus* (according to the description) speak against this allocation. Emery was probably led to this mistake by the fact of Smith differentiating it from *quadrimaculatus* (F. Smith, 1854 nec Klug, 1824; = *spinosus* Mayr, 1862). Surely, Smith does not mention the presence of a cephalic disc, nor does his atrocious figure of *cognatus* suggest this feature. But knowing how this author has gone about in establishing new species, one cannot be sure that his silence referring to important structures means their absence. The puzzle will eventually be solved by examining the type, if still extant. Meantime *cognatus* is best left aside as a *species inquirenda*. Just as a mere guess, I venture the opinion that *cognatus* represents the female of *maculatus* (F. Smith), of the *pinelli*-group. The reason for this suggestion consists in the characters mentioned above, which precisely remove it from *minutus*.

Paracryptocerus (Harnedia) crenaticeps (Mayr)

Cryptocerus crenaticeps Mayr, 1866, Sitz.-ber. Akad. Wiss. Wien 53: 515-516, fig. 15 (F; Colombia).
Cryptocerus (Cryptocerus) crenaticeps Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309.

Original description. — "Femina: Long. 7.5 mm. Elongata, opaca, nigra, antennis rufescentibus, tibiis tarsisque obscure ferrugineis, abdomine maculis duabus basalibus dorsalibus testaceo-rufis; caput et thorax foveolis rotundis numerosis, pilis squamiformibus flavidis insidentibus, instructa; capitis discus subovalis antice emarginatus, marginibus lateralibus elevatis crenatis, margine postico brevi et recto, capitis margo posticus transversus rectus; pronotum planitia antica verticali transversa, angulis duobus lateralibus fortiter deplanato-dentiformibus; scapulae convexae; metanotum, mesonoto paulo angustius, parte basali brevi quadridentata, scilicet: dentibus duobus apicalibus postice et extrorsum versus directis et dentibus duobus obtusis triangularibus lateralibus basalibus, parte declivi verticali, subquadrata, concava, nuda, subnitida, reticulato-rugulosa; petioli nodus primus antice et medio supra planitia transverse subovata, utrimque denticulo indistinctissimo obtuso, postice brevissime conico-subcylindricus, nodus secundus, primo paulo latior, supra transverso-rectangularis, angulis anticis dente extrorsum directo et paulo recurvo, infra denticulo obtuso; abdomen, thorace longius, dense reticulato-punctatum, sparse flavido-pubescent, elongatum, lateribus parallelis, antice emarginatum, postice rotundatum, infra

nitidum; pedes crassi, breves, tenuiter reticulo-punctati; (alae mihi ignotae). — Aus Columbien; im zoologischen Museum in Halle. — Diese Art scheint dem *C. serraticeps* ziemlich nahe zu stehen, unterscheidet sich aber mindestens (Bezug nehmend auf Smith's Beschreibung) durch das Stielchen, dessen zweiter Knoten bewehrt ist, und durch den glanzlosen zweifleckigen Hinterleib".

Discussion. — This is, no doubt, a species belonging to the *angustus*-group. However, *serraticeps* (F. Smith), is no close relation, since this species has been recognized as pertaining to the genus *Eucryptocerus*. Perhaps *coffea*, which likewise is native of Colombia, might be the most resembling species, which differs from *crenaticeps* (according to the description) principally in feabler and blunter dentition of the basal face of the epinotum and the postpetiole, and the gaster dotted with four light spots.

Paracryptocerus (Harnedia) klugi (Emery)

Cryptocerus klugi Emery, 1894, Bull. Soc. Ent. Ital. 26: 210-211, Pl. 4, figs. 27, 28 (F; Brazil MT).
Cryptocerus (Cryptocerus) klugi Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 118.

Original description. — "Femina. Nigra, capite, pronoto, metanoti angulis posticis, petioli spina, scapis, genubus tarsisque rufescentibus, abdominis segmento 3. superne flavo, fascia transversa ante medium nigra, medio postice rufo, infra rufo-ferrugineo, basi nigro. Caput disco subrectangulari, marginato, antice utrinque rotundato et medio emarginato, margine postico transverso, medio inciso, marginibus lateralibus valde elevatis et crenulatis, inter ocellos posteriores carinulis duabus, medio et postice opacum, creberrime punctulatum, lateribus et antice nitidum, praeterea punctis magnis, umbilicatis, setuligeris praesertim in medio sculptum. Thorax pronoto cum carina transversa, ante ipsam area concava nitida ad marginem posticum capitae accipiendum, caeterum opacus, creberrime punctatus et punctis setuligeris sculptus, metanoto postice utrinque cum processu crasso, apice oblique truncato. Abdominis segmentum pedunculare 1. muticum, 2. utrinque dente recurvo, 3. oblongum. Long. 6½ mm. — Matto Grosso (Germain) un esemplare senz'ali".

Discussion. — This highly distinctive female is known only from the single type specimen, the present location of which is ignored. The pair of carinules running forward from the occipital border of the head disc, between the posterior ocelli, show that it is a close

relative of *pinelii*, which possesses the same feature. The latter differs seemingly from *klugi* in having a more rounded cephalic disc, the slightly different shape of the epinotum, the small lateral tooth on the petiole, and the color of gaster. Nevertheless, I experience a great difficulty in banishing the thought, that *klugi* is only a slightly aberrant female of the well known *pinelii*.

Paracryptocerus (Harnedia) notatus (Mayr)

Cryptocerus notatus Mayr, 1866, Verh. Zool.-bot. Ges. Wien, 16: 907 Pl. 20, fig. 16 (F; "Brazil").
Cryptocerus (Cryptocerus) notatus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 119.

Original description. — "Femina: Long. 7.3 mm. Subopaca, fusco-nigra, capite supra, pronoti lateribus, abdominis segmento primo maculis quatuor et marginibus segmentorum posticis tibiisque pallide-ochraceis, capitis patellae disco et margine fuscescentibus; corporis forma et sculptura ut in *C. patellari*, differt patella antice emarginata, mandibulis a supero visibilibus, metanoti parte basali breviori, dentibus lateralibus anticis distinctioribus; alae breves (4.4 mm) subhyalinae, pterostigmate fusco-nigro et costis ochraceis. Brasilien (Mus. Holm.).

Discussion. — The shape of the cephalic disc, as shown in Mayr's figure, and the indication as regards color, wings, and lateral tooth of basal face of epinotum, suggest that the present species is nothing but the female of *striativentris*, described upon soldiers and workers at a much later date (1894) by Emery. The type is not in the collection of Mayr [NHMW], but was received on loan by Mayr, from the Museum of Stockholm, where it probably still exists.

Paracryptocerus (Harnedia) pallidicephalus (F. Smith)

Cryptocerus pallidicephalus F. Smith, 1876, Trans. Ent. Soc. London (1876), p. 606, Pl. 11, fig. 5 (F; Mexico).
Cryptocerus (Cryptocerus) pallidicephalus Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 310.

Original description. — "Female: Length 3½ lines. Black, with the head, tibiae and the base of the abdomen laterally, and a subovate macula on each side near its apex, ochraceous. Head oblong, rather widest in front, the margins raised, dish-shaped; covered with large shallow punctures; the eyes and head beneath black; the antennae, with the scape, pale ferruginous,

and the flagellum black. Thorax punctured, each puncture with a pale seta; the anterior margin of the prothorax arched, the lateral angles acute and pale testaceous; the sides curved, narrowed posteriorly; the metathorax emarginate, forming a blunt tooth at the lateral angles; the tarsi ferruginous. Abdomen oblong ovate and deeply emarginate at the base; the first node of the peduncle oblong, and having a small tooth on each side; the second node transverse, with a short curved tooth on each side at the base. Hab. Mexico". Type in the British Museum (Natural History).

Discussion. — The preceding description, especially the characters referring to color, raise the strong suspicion, that this species is the still unknown female of *scutulatus* of the *pinelii*-group. If this should be the case, then F. Smith would have added another synonym to those he already created for *scutulatus*, which he described in 1867.

B. Group of *Paracryptocerus* (H.) *umbraculatus* (Fabricius)

On account of its exclusive characters, *Paracryptocerus umbraculatus* (F.) may not be lumped to either the *pinelii*-group or the *angustus*-group of the subgenus *Harnedia*. The distinctive species has been accorded group standing by Emery in 1922, in order to express more fully the morphological gap which separates it from the other species groups of the subgenus. I follow here Emery's proposal, although the *umbraculatus*-group still contains only the nominate species.

The most outstanding features of the present species can be briefly stated, as follows: Workers and soldiers are distinguished from the *pinelii*-group by the shape of the petiole, which is longer than deep, lacking an anterior face, more or less perpendicularly raised above the thoracic insertion [Pl. 6, Fig. 9; Pl. 7, Fig. 4]. The prominent, foliaceous lateral tooth of the pronotum in the worker, and the strongly raised tooth on the posterior corner of the epinotum in the soldier provide additional distinguishing characters. The shape of the petiole and the dentate extensor face of the hind femora [Pl. 7, Fig. 5] distinguish the workers and soldiers from those of the *angustus*-group.

Paracryptocerus (Harnedia) umbraculatus (Fabricius)

(Pl. 6 Figs. 3, 9; Pl. 7 Figs. 1-5)

Cryptocerus umbraculatus Fabricius, 1804, Syst. Piez. p. 420 (W; South America). — Klug, 1824, Ent. Monogr. pp. 210-213 (W, F; Brazil BA: Salvador). — Emery, 1890, Bull. Soc. Ent. Ital. 22: 72, Pl. 9, figs. 1 a-e (W, S, F; Costa Rica: Alajuela, Bagaces). — Forel, 1899, Biol. Centr.-Amer. Hym. 3: 51-52, Pl. 3, figs. 13-16 (W, S, F, M; Mexico: Guerrero, Acapulco; Guatemala: El Reposo, Pantaleon, Paso Antonio; Panama: Bugaba, Volcano de Chiriqui, Caldera, Tolé; Trinidad). — Forel, 1912, Mém. Soc. Ent. Belg. 19: 199 (Colombia: Dibulla, Santa Marta, Narancho). — Skwarra, 1934, Oekol. Stud. Koenigsberg, p. 129 (Mexico: Vera Cruz, Tamarindo).
Cryptocerus quadriguttatus Guérin, 1845, in: Cuvier, Iconogr. Règne Anim. 7: 425 (W; Colombia, Bolivia).
Cryptocerus elegans F. Smith, 1854, Trans. Ent. Soc. London (2) 2: 222, Pl. 19, fig. 3 (W; Colombia; Brazil: PA Santarém).
Cryptocerus flavomaculatus Mayr, 1862, Verh. Zool.-bot. Ges. Wien 12: 757-759 (F; Brazil).
Cryptocerus (Cryptocerus) umbraculatus Emery, 1915, Bull. Soc. Ent. France (1915), p. 192. — Mann, 1916, Bull. Mus. Comp. Zool. Harvard, 60: 449 (Brazil: GR Abuná). — Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 309, Pl. 6, figs. 5 a-b (S, W). — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 119. — Borgmeier, 1937, Arch. Inst. Biol. Veget. 3: 244 (Panama: Pueblo Novo; C. Z. Mt. Hope; Surinam: Paramaribo; Brazil PA: Cachoeira do Bréu).

Types. — A worker, from "South America" is the type of the species. Its present location is unknown to me.

From a taxonomic viewpoint *P. umbraculatus* does not offer any difficulty. Likewise, there is not the slightest doubt concerning the synonymy, proposed by Emery in 1890. Since the species is so well known and readily recognizable, I confine myself to giving only the most essential descriptive data.

Worker [Pl. 7, Fig. 2]. — Total length 5.3-6.2 mm; maximum length of head 1.43-1.68 mm; maximum length of thorax 1.57-1.82 mm. Basic color ochraceous in variable shades, the gaster with four light spots. Frequently the gaster, more seldom the thorax, are more or less heavily infuscated, the former may be entirely black, except for the light spots on the corners. Very rarely the entire insect is fuscous, including the gastric spots. Frontal carinae pellucid. Lateral portion of occipital border with a pellucid, crenulate crest. Vertex often with a pair of denticles. Lateral border of head very strongly upturned above eyes, forming on the inside on each side of dorsum of head, a deeply excavate longitudinal furrow. Scapular corner distinct, yet included in the foliaceous lateral pronotal crest, which contains also a stronger, foliaceous, projecting tooth, being slightly recurved at its apex. Sides of mesonotum usually with a minute foliaceous denticle. Mesoepinotal suture usually impressed. Lateral border of epinotum with a narrow, foliaceous, crenulate or even serrate crest. Hind femora, as seen in profile, angulate and dentate above near the middle [Pl. 7, Fig. 5]. Petiole much longer than deep [Pl. 6, Fig. 9] without a distinctly raised

anterior face above the thoracic insertion. Lateral appendages of peduncular segments with foliaceous, often crenulate or serrate crests. Gaster between cordate and circular, remarkably short and broad, the anterolateral crests pellucid and prominent. Standing hair only on apex of gaster. Scalelike hair in foveolae of head, thorax and peduncle canaliculate and conspicuous, minute and fine on first gastric tergite.

Soldier [Pl. 7, Fig. 3]. — Total length 7.6-8.0 mm; maximum length of head 2.32-2.46 mm; maximum length of thorax 2.18-2.42 mm. Color as in worker. Cephalic disc always broader than long, its lateral borders upturned, the anterior portion of floor of disc shiny, the mesial portions subopaque, the posterior border scarcely raised and bidentate. Occipital lobes with crenulate and crested borders, a small carinule starting on the posterior corner running upwards to the border of the disc. Thorax broadest at the level of the sharply crested transverse pronotal carinae, the broadly expanded pronotum forming at this point a subacute angle. Sides of mesonotum with a small, crested, recurved, angulate lobe. Lateral border of basal face of epinotum finely crested, with a strong tooth on the posterior corner, which is strongly raised and upturned. Declivous face with the lateral borders beset with a foliaceous crest. Hind femora, peduncular segments and gaster similar to those of worker.

Female [Pl. 7, Fig. 1]. — Total length 10.0-11.0 mm; maximum length of head 2.64-2.71 mm; maximum length of thorax 3.18-3.25 mm. Resembling the soldier with the differences of the caste. Cephalic disc distinctly elongate and oval, excavate only above the frontal antennal scrobe, the rest moderately convex. Ocelli not far removed from the posterior border of disc. Borders of occipital lobes sharply crested and crenulate. Basal face of epinotum with a strong, diverging tooth on each of the posterior corners. Femora fusiform, not angulate above. Wings subhyaline, the apical half tinted with brownish, and the veins dark-brown. Venation of fore wing [Pl. 6, Fig. 3] of the usual type, a transverse cubital vein (or vein *r-m*) being present.

Specimens examined: 137; 85 workers, 32 soldiers, 13 females, 7 males, as follows: Bolivia, Chaco, Marcus: 1 S [ML]. Las Cabezas, I.1947: 1 F [ML]. Tumupasa, XII.1921, W. M. Mann: 9 W, 10 S, 6 F [USNM, WWK]. Ixiamas, XII.1921, W. M. Mann: 5 W, 9 S, 3 F [USNM, WWK]. Covendo, W. M. Mann: 2 W [USNM]. Rurrenabaque, X.1921, W. M.

Mann: 9 W [USNM, WWK]. — Brazil: *Espírito Santo*: Vila Velha, Convento da Penha, I.1954, R. Mueller, O.F.M.: 1 W [WWK]. *Pará*: Rio Cuminá, 1928, Sampaio: 1 W [WWK]. Cachoeira do Bréu, X.1928, Sampaio: 1 W [WWK]. *Território de Guaporé*: Abunã, Rio Madeira, Mann & Baker: 16 W, 7 S, 3 F, 7 M [USNM, WWK]. — Peru, Valle Chanchamayo, 800 m, 1.VII.1939, Weyrauch: 3 W, 2 S [USNM, WWK]. — Colombia, Rio Frio, 8.IV.1928, P. J. Darlington: 2 W [MCZ, WWK]. Santa Anna, II.1924, W. M. Mann: 1 W [USNM]. — Surinam, Paramaribo, Buenzli: 1 W [WWK]. — Trinidad, Port of Spain, 31.X.1918, H. Horrison: 1 W [USNM]. Mayaro, 28.IV.1929, P. J. Darlington: 2 W [MCZ, WWK]. — Canal Zone, Barro Colorado I. 20.VI.1924, N. Banks: 1 W [MCZ]. Gatun, 7.IV.1911, E. A. Schwarz: 1 W [USNM]. Mt. Hope, nr. Colón, 8.VIII.1924, W. M. Wheeler: 4 W, 2 S [MCZ, WWK]. — Panama, Pueblo Novo, VI.1930, Bierig: 1 W [WWK]. — Costa Rica, Ojo de Agua, 1.X.1929, A. Alfaro: 3 W [MCZ]. “Turrocares”, VII.1940, Bierig: 2 W [WWK]. Tempisque, 20.I.1937, A. Alfaro: 4 W [ANSP, WWK]. — Honduras, La Ceiba, 10.IX.1916, F. J. Dyer: 1 W [USNM]. — Guatemala, Escuintla, 23.XII.1911, W. M. Wheeler: 9 W [MCZ, WWK]. Livingstone, 5.XI, Barber & Schwarz: 1 W [USNM]. — Mexico, Tabasco: Frontero: 1 S [USNM].

Distribution. — From Vera Cruz and Guerrero Provinces in Mexico south to southeastern Bolivia and Eastern Brazil, State of Espírito Santo. The species seems to prefer the subtropical and tropical rain forests, although little is known about its habits.

II. Subgenus *Cyathomyrmex* Creighton

Cryptocerus (*Cyathocephalus*) Emery, 1915, Bull. Soc. Ent. France, p. 192. — Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 311 (Preoccupied by Kessler, 1868).
Cryptocerus (*Cyathomyrmex*) Creighton, 1933, Psyche 40: 98 (New name).
Paracryptocerus (*Cyathomyrmex*) M. R. Smith, 1949, Psyche 56: 21.

Type of the subgenus: *Cryptocerus pallens* Klug, 1824 [= *Paracryptocerus* (*Cyathomyrmex*) *pallens* (Klug), 1824]. — By original designation.

The distinctive character of the subgenus consists in the completely rimmed, saucer-shaped, cephalic disc, lacking anteromesially a supramandibular excision, in the soldier and female caste (cf. Pl. 8, Figs. 3, 5, 8). A similar subgeneric group character has not been detected for workers and males.

Heretofore the following forms have been recognized:

1. *Paracryptocerus* (*Cyathomyrmex*) *pallens* (Klug)
 - P. (C.) pallens* var. *discocephalus* (F. Smith), nov. syn. of *pallens* (Klug).
 - P. (C.) pallens* var. *patellaris* (Mayr), nov. syn. of *pallens* (Klug).
 - P. (C.) pallens* var. *porrasi* (Wheeler), nov. syn. of *pallens* (Klug).
2. *P. (C.) setulifer* (Emery).
 - P. (C.) setulifer orbis* (Forel), nov. syn. of *setulifer* (Emery).
3. *P. (C.) varians* (F. Smith).
 - P. (C.) varians* var. *jamaicensis* (Forel), nov. syn. of *varians* (F. Smith).
 - P. (C.) varians marginatus* (Wheeler & Mann), nov. hom. of *marginatus* (Fabricius), nov. syn. of *pallens* (Klug).

As pointed out previously (Kempf, 1951, pp. 155-156), it is quite probable that the subgenus represents an artificial rather than a natural group, which may be divided into two series, the first containing solely *setulifer*, revealing affinities to the *angustus*-group of *Harnedia*, the second comprising *pallens* and *varians* (possibly conspecific!), exhibiting many points of contact with the *pinelii*-group of *Harnedia*. The final word on the traditionally accepted subgeneric classification depends from an accurate study of the males, which so far has been impossible on account of the scanty and incomplete material.

All hitherto erected infraspecific forms have been allotted to synonymy for reasons that will be further explained below. The three species of *Cyathomyrmex* may be identified by means of the subjoined key.

Key to the Species

A. Workers

(Note: The worker of *setulifer* will key out with the *angustus*-group of *Harnedia*, and has been treated in the key for that subgenus on a foregoing page).

1. Lateral border of head without a pronounced notch for lodging the eye, which visibly projects beyond the maximum width of the head; lateral border of pronotum bidentate; tip of postpetiolar spines rather strongly recurved [Pl. 8, Fig. 4]..... *setulifer* (Emery)

- Lateral border of head with a pronounced notch for lodging the eye, which does not visibly project beyond the maximum width of the head; lateral border of pronotum with a foliaceous crest; tip of postpetiolar spines not strongly recurved [Pl. 8, Fig. 6, 7]..... 2
- 2. Posterior half of epinotum very strongly converging mesad, the epinotum much narrower at the level of the petiolar insertion than at the anterior corners; petiole much narrower than epinotum [Pl. 8, Fig. 7]..... *variens* (F. Smith)
- Posterior half of epinotum never strongly converging mesad, the epinotum as broad at the level of the petiolar insertion as at the anterior corner; petiole nearly as broad as epinotum, always broader than postpetiole, its lateral spines conspicuously elongate [Pl. 8, Fig. 6] *pallens* (Klug)

B. Soldiers

1. Posterior border of cephalic disc, when seen in profile, not overhanging the occiput; occipital lobes obtuse; gaster black with a light spot on each of the anterior corners [Pl. 8, Fig. 3].....
setulifer (Emery)
- Posterior border of cephalic disc, when seen in profile, greatly overhanging the occiput; occipital lobes angular and subacute; gaster piceous-brown or ferruginous, without pale spots on the anterior corners [Pl. 8, Figs. 5, 8]..... 2
2. Lateral border of declivous face of epinotum at most sharply marginate, never with a conspicuous foliaceous crest; lateral tooth of petiole short [Pl. 8, Fig. 8]..... *variens* (F. Smith)
- Lateral border of declivous face of epinotum always with a prominent foliaceous crest; lateral tooth of petiole nearly always visibly elongate and spinelike [Pl. 8, Fig. 5]..... *pallens* (Klug)

Paracryptocerus (*Cyathomyrmex*) *setulifer* (Emery)

(Pl. 8 Figs. 3, 4)

Cryptocerus setulifer Emery, 1894, Bull. Soc. Ent. Ital. 26: 211, Pl. 4, figs. 34-37 (W, F; Costa Rica: Jiménez). — Menozzi, 1927, Ent. Mitt. 16: 344 (Biol.).
Cryptocerus setulifer orbis Forel, 1906, Ann. Soc. Ent. Belg. 50: 231-232 (W, S; Costa Rica: Hiquito nr. S. Mateo). N. o. v. s. y. n.
Cryptocerus (Cyathocephalus) setulifer Emery, 1915, Bull. Soc. Ent. France, p. 192.
— Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 311. — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 211, Pl. 53, figs. a-c (S, M, W; Panama C. Z.: Ancon).

Types. — Syntypes of the nominate species, workers and female, in the Emery collection, now in the custody of the Museum of Genova, Italy, according to information received from Dr. D. Guiglia. Type specimens of the race *orbis* presumably in the Forel collection (MHNG), although they were not cited on the list received from the curator, Dr. C. Ferrière, in 1949. None of these specimens has been seen by this writer.

Worker [Pl. 8, Fig. 4]. — Total length 3.4-4.4 mm; maximum length of head 1.00-1.18 mm; maximum length of thorax 1.03-1.25 mm. Black; the following testaceous: frontal carinae, tip of last funicular segment, tip of femora, extensor face of tibiae; ferruginous or reddish brown: apex of mandibles, edge of frontal carinae, tip of scape, funicular segment I, tarsite II-V, posterior border of gastric tergites; an oval pale testaceous or whitish spot on each of the anterior corners of the first gastric tergite.

Head opaque, subquadrate, its maximum length subequal to, or often slightly exceeding the interocular width. Supramandibular excision narrow. Clypeal sutures vestigial or absent. Anterior half of the usually noticeably crenulate frontal carinae obliquely converging cephalad, the lateral borders of head subparallel, rather straight, not excised in front of, nor upturned above, eyes. Occipital lobes obliquely truncate. Occipital border gently emarginate. Dorsal face of head gently convex, finely but sharply punctate, more coarsely reticulate-rugose, the rugosities feeble discad, shallowly foveolate. Lower face of head finely reticulate-punctate, with sparse somewhat irregular longitudinal rugosities.

Thorax opaque, its anterior border gently arched. Scapular angle free, not incorporated in the lateral pronotal crest, lying somewhat below the anteriormost tooth of the pronotal crest, but perfectly visible when insect is looked at from the front. Lateral pronotal crest bidentate anteriorly, the first tooth more conspicuous, the second sometimes only vestigial, followed by an usually straight, seldom denticulate, crest, forming posteriorly an obtuse angle, before joining the mesonotum. Promesonotal suture vestigial or obsolete. Lateral lobe of mesonotum angulate or rounded, little projecting, usually not acutely dentate. Mesoepinotal suture impressed. Lateral border of epinotum tridentate, counting the feeble, subdentiform anterior corner and the usually minute, often only vestigial denticle at the junction of the declivous face. The second tooth most prominent. Entire thorax finely punctate, the dorsum also reticulate-rugose and foveolate. Sides of thorax with a few more or less horizontal rugosities on the laterotergite of pronotum and the bottom half of the pleura. Fore coxae not striate. Hind femora fusiform.

Peduncular segments opaque, finely punctate, densely but shallowly foveolate on dorsum. Petiole with a somewhat oblique, slightly shinier, anterior face, and a tooth on each side, facing obliquely caudad. Postpetiole flat on dorsum. Its lateral appendages

more prominent, with rather strongly recurved tips (assuming the shape of an eagle's beak!).

Gaster opaque, oval. First gastric tergite finely and sharply punctured, its anterolateral lobes prominent and rounded, its lateral border marginate on the anterior half. First sternite reticulate-punctate, shinier, especially discad.

Standing hair long and flexuous on gastric sternites; shorter and straight posterolaterally and along the borders of the first gastric tergite; still shorter, and somewhat thickened, on tip of thoracic and peduncular teeth, on the border of epinotum, sporadically, rare, not regularly dispersed, on the rest of the thoracic dorsum, sparse and oblique on legs; very short, clavate at tip, along the crenulate border of frontal carinae and the lateral border of head, back to the occipital lobe. Scalelike, appressed, silvery or whitish, canaliculate, somewhat elongate hair very prominent in foveolae of dorsum of head, cheeks, dorsum of thorax, bottom half of pleura, dorsum of peduncle, extensor face of femora and tibiae; thinner, simple but still very conspicuous and relatively crowded on first gastric tergite.

Soldier [Pl. 8, Fig. 3]. — Total length 5.0-5.2 mm; maximum length of head 1.53-1.57 mm; maximum length of thorax 1.43-1.46 mm. Black; light color as in worker except for the head, which is completely black.

Head opaque, surmounted by a broadly oval, completely rimmed, excavated disc, the posterior end being narrower. Border of disc not as sharp as in *pallens* and *varians*. Floor of disc with a median convexity, slightly in front of the center, which is invisible, when head is seen in profile. Supramandibular excision obsolete, indicated by a longitudinal slit. Occipital lobes bluntly angulate. Occipital portion of disc not overhanging the more or less perpendicularly truncated occiput. Floor of disc more or less reticulate-rugose and coarsely foveolate, the foveolae on disc being unequal in size. Lower face of head rather shiny and longitudinally rugose.

Thorax opaque. Anterior border convex mesially, slightly concave laterally, mesad of the prominent anterolateral tooth. Transverse pronotal carina feebly developed, blunt, broadly interrupted mesially. Lateral border of pronotum somewhat sinuous. Promesonotal suture present or at least vestigial. Lateral lobe of mesonotum angulate or rounded. Mesoepinotal suture impressed. Anterior corner of basal face of epinotum subdentiform,

followed posteriorly by a triangular tooth and another smaller, rectangular tooth on the posterior corner. Declivous face scarcely excavated, its lateral borders marginate, not crested. The entire thorax finely and sharply punctate, the dorsum reticulate-rugose and foveolate, the sides with a few fine more or less vestigial rugosities, especially on the laterotergite of the pronotum and the bottom half of the pleura.

Peduncular segments, gaster and pilosity, in general, as in worker. Gaster often more elongate. Sides of head and lateral rim of cephalic disc with rather long, clavate, dense projecting setae.

Female. — Total length 7.1 mm; maximum length of head 1.57 mm; maximum length of thorax 2.10 mm. Resembling the soldier, except for the peculiarities of the caste.

Extensor face of tibiae more infuscated. Anterolateral gastric spots small, pale testaceous. Cephalic disc as in soldier, but flatter, less distinctly excavated, and when seen in profile, obliquely truncate above and behind, separating from the disc a narrow sickle-shaped band, which slopes toward occiput, being separated from the anterior portion of the disc by a marginate edge. Antermost ocellus in front of this carina, the posterior pair in the sickle-shaped area, lying in deeply excavate pits, facing laterad. (This feature is well represented in Emery's figures, 1894, Pl. 4, figs. 35-37). Basal face of epinotum with a short lateral and another similar tooth on the posterior corner. Sides of petiole practically unarmed. Gaster more elongate, its anterolateral spots very small. Standing hair much more abundant, rather evenly dispersed on dorsum of thorax, peduncle and gaster, and on the sides of the head. Scalelike hair instead less conspicuous, minute on gaster. Wings unknown.

Male. — This caste was described by Wheeler, in 1942.

Specimens examined: 20; 14 workers, 5 soldiers and 1 female (all in my collection: WWK), as follows: Costa Rica: Hamburg Farm, Reventazón, Limón planes, F. Nevermann: 6 W, 3 S. Same locality and collector, 22.I.1938, nest in cauline swellings of *Cordia alliodora*: 8 W, 2 S. La Caja, nr. S. José, 6.IX.1926, F. Nevermann: 1 F.

Distribution. — According to our present knowledge, the range of the species extends from Costa Rica south to the Canal Zone of Panama.

Discussion. — Except for the completely rimmed cephalic disc of soldiers and females, all remaining characters of *setulifer* show clearly that it is no close relative of the following *pallens* and *varians*. As mentioned before, the worker even keys out with the *angustus*-group of the subgenus *Harnedia*, differing from all other Central American members of this group in the free scapular angle, and the peculiar pilosity. The main differences from *pallens* and *varians* are contained in the key, on a preceding page.

Synonymy. — When Forel described *orbis* as a race of *setulifer*, he had no direct knowledge of the nominate species, but had to draw his information from the description and figures by Emery. Inasmuch as *setulifer* was proposed solely upon workers and females, and Forel's new "race" was represented exclusively by workers and soldiers, the differential characters for *orbis* apply to the worker caste. These differences, according to Forel, consist principally in the smaller size (3.6 instead of 4.0-4.25 mm, the measurement given for the typical *setulifer*), and in the different shape of the lateral projections of the thorax and the peduncular segments. The difference in body length is of no importance, because the measurements of the type specimens of both *setulifer* and *orbis* fall within the normal range of variation of individual nest series. Similarly the structural divergences do not present a stable, discriminatory condition, but have to be ascribed to individual variation. By examining carefully the descriptions of both forms, and checking them against the material of my collection and that seen in the U. S. during the years of 1948-1951 (MCZ, USNM), I reached the conclusion that *orbis* is a straight synonym of *setulifer*, although I was unable to see the types of either form.

Biology. — According to previously published records, only twice have these insects been found in their nest. In each case, *setulifer* colonies had established themselves in the cauline swellings of *Cordia alliodora* (Menozzi, 1927, p. 344; Wheeler, 1942, pp. 25, 212). There has been a confusion regarding the specific identity of the host plant. As shown by Wheeler (1942, p. 12 ss.) the species in question is *alliodora*, not *gerascanthus*, as only the former is said to have preformed myrmecodomatia. A new record, showing identical nesting habits, is added in this study, since the specimens taken by Nevermann on Hamburg Farm, Costa Rica, were likewise living in the cauline swellings of *Cordia alliodora* (R. and P.). We need more factual evidence in order to decide whether *setulifer* is an obligatory or only a facultative inquiline of this ant plant.

Paracryptocerus (Cyathomymex) pallens (Klug)

(Pl. 8 Figs. 5, 6)

Cryptocerus pallens Klug, 1824, Ent. Monogr. pp. 206-207 (W; Eastern Brazil). — Emery, 1894, Bull. Soc. Ent. Ital. 26: 212, Pl. 4, figs. 29-32 (W, S, F; Syn.; Brazil MT; Costa Rica; Bolivia: Salinas, Beni R.). — Emery, 1896, Zool. Jahrb. Syst. 9: 635-636 (M; Paraguay: San Salvador). — Forel, 1899, Biol. Centr.-Amer. Hym. 3: 51 (Guatemala: El Reposo, Pantaleon). — Forel, 1908, Verh. Zool.-bot. Ges. Wien, p. 354 (Brazil SP: S. Paulo). — Forel, 1909, Deutsch. Ent. Zs. p. 257 (Paraguay: San Bernardino). — Forel, 1911, Sitz.-ber. Bayer. Akad. Wiss. p. 257 (Syn.; Antille St. Vincent).

- Cryptocerus discocephalus* F. Smith, 1854, Trans. Ent. Soc. London (2) 2: 222, Pl. 20, fig. 2 (S; Brazil). — F. Smith, 1858, Cat. Hym. Brit. Mus. 6: 191, Pl. 11, figs. 1-3 (M, S, W; Brazil PA: Vila Nova). — F. Smith, 1876, Trans. Ent. Soc. London p. 608 (F, W; Brazil PA: Vila Nova, Santarém; Antille St. Vincent). — Emery, 1894, Anal. Mus. Nac. Costa Rica, p. 67. Nov. syn.
- Cryptocerus arancoelus* F. Smith, 1854, Trans. Ent. Soc. London (2) 2: 223, Pl. 19, fig. 4 (W; Antille St. Vincent). — Forel, 1893, Trans. Ent. Soc. London, p. 382 (St. Vincent, B.W.I.). — Forel, 1897, Trans. Ent. Soc. London, p. 305 (Grenada, B.W.I.).
- Cryptocerus patellaris* Mayr, 1866, Verh. Zool.-bot. Ges. Wien 16: 907, Pl. 20, fig. 15 (F; Brazil). Nov. syn.
- Cryptocerus pallens* var. *patellaris* Emery, 1894, Bull. Soc. Ent. Ital. 26: 213.
- Cryptocerus pallens* var. *araneolus* Forel, 1899, Biol. Centr.-Amer. Hym. 3: 51 (Antilles). — Forel, 1905, Ann. Soc. Ent. Belg. 49: 158 (Venezuela). — Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21: 128.
- Cryptocerus pallens* var. *discocephalus* Forel, 1911, Sitz.-ber. Bayer. Akad. Wiss. p. 257 (S, W; Brazil: Amazon river).
- Cryptocerus varians marginatus* Wheeler & Mann, 1914 (*nec* Fabricius, 1804), Bull. Amer. Mus. Nat. Hist. 33: 39-40, figs. 17 a-b (S, W, F; Haiti: Diquini, St. Marc, Petionville, Manneville). Nov. hom. et syn.
- Cryptocerus (Cyathocephalus) pallens* Emery, 1915, Bull. Soc. Ent. France, p. 192. — Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 311, Pl. 6, figs. 6 a-d (W, S, M). — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 119. — Skwarra, 1934, Oekol. Stud., Koenigsberg, p. 130 (Mexico, Vera Cruz: Mirador). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard, 90 (1): 209 (Mexico).
- Cryptocerus (Cyathocephalus) pallens* var. *discocephalus* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 311. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 120. — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 210 (Costa Rica).
- Cryptocerus (Cyathocephalus) pallens* var. *patellaris* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 311. — Borgmeier, 1927, Arch. Mus. Nac. Rio 29: 120.
- Cryptocerus (Cyathocephalus) varians marginatus* Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 312. — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 212.
- Cryptocerus varians* Mann, 1922 (*nec* F. Smith, 1876), Proc. U. S. Nat. Mus. 61: 34 (Honduras: Ceiba).
- Cryptocerus (Cyathomyrmex) pallens* Creighton, 1933, Psyche 40: 98.
- Cryptocerus (Cyathomyrmex) varians marginatus* Wheeler, 1936, Bull. Mus. Comp. Zool. Harvard 80 (2): 204 (Haiti: Manneville).
- Cryptocerus (Cyathomyrmex) varians* Weber, 1938 (*nec* F. Smith, 1876), Ann. Ent. Soc. Amer. 31: 502 (Trinidad). — Weber, 1948, Stud. Faun. Curaçao etc., n. 14, pp. 80, 83 (Venezuela: Paraguaná; Colombia: La Goajira).
- Cryptocerus (Cyathocephalus) pallens* var. *porrasi* Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 210-211, Pl. 52, figs. a-c (S, W, F, M; Canal Zone: Quebrada de Oro, Red Tank, Frijoles, Ancon). Nov. syn.

Types. — *P. pallens*, one worker from Brazil. Klug received it from W. Swainson, a British ornithologist and conchologist, who during the years of 1816-1818 collected in the following Brazilian localities: a) environs of Recife; b) lower S. Francisco river; c) Salvador, Bahia, and inland of the same state; d) Rio de Janeiro and Organ Mountains (cf. Borgmeier, 1955, pp. 307-308, footnote). Since the species probably occurs in all aforesaid localities, a fixation or restriction of the type locality appears unfeasible, before the phenomenon of variation of this form has been thoroughly cleared and understood. The type was deposited in the Klug collection and was in the Museum of Berlin at the end of the past century, when Emery had it located and examined (Emery, 1894, p. 212). — *P. discocephalus*, two soldiers from Brazil, the exact place of origin being unknown. Most likely these specimens were not collected by Bates, who however, at a later date, sent complete nest series of the same form, comprising all castes, captured at Vila Nova and Santarém, State of Pará, Brazil, to Frederick Smith (F. Smith, 1858,

1876 l. c.). The latter specimens may not be taken as types. The legitimate type species of *discocephalus* were deposited in the collections of F. Smith (Oxford?) and in the British Museum (Natural History). — *P. araneolus*, several worker specimens, originating from the island of St. Vincent, Lesser Antilles, in the collections of Westwood and F. Smith (Museum of Oxford or British Museum?). — *P. patellaris*, a unique female from Brazil, without precise locality indications, received by Mayr from the Museum of Stockholm, where it probably still exists. — *P. varians marginatus*, workers, soldiers, females, from Diquini, St. Marc, Manneville, and Petionville, Republic of Haiti, Hispaniola Island, captured by Mann in 1912-1913. The type locality is herewith restricted to Diquini (MCZ, USNM, WWK). — *P. pallens* var. *porrasi*, all castes, taken by Wheeler at Quebrada de Oro (type locality), and several other localities in the Panama Canal Zone (MCZ).

P. pallens, as taken in the presently proposed sense, is so much different from all other species of the genus, except for the following *variens*, and at the same time so variable in its structural details, that a formal description is both unnecessary and nearly impossible. Its general habitus is shown by the appended figures (Pl. 8, figs. 5, 6), which likewise exhibit the unique shape of the head, both in soldiers and workers (also in females). This character alone allows for an immediate recognition of either *pallens* or *variens*. The workers and soldiers of the former differ from the latter as follows:

Worker [Pl. 8, Fig. 6]. — Total length 3.9-4.9 mm; maximum length of head 1.03-1.28 mm; maximum length of thorax 1.07-1.39 mm.

1. Epinotum laterally broadly crested, its borders usually subparallel, the posterior half not obliquely nor directly converging toward the petiolar insertion. Border either straight, or crenate, or finely crenulate, or even deeply notched, forming three foliaceous teeth. Epinotum posteriorly (i. e. at the end of the lateral crest) as broad as anteriorly (i. e. at the level of the mesoepinotal suture).

2. Petiole broader than postpetiole, nearly as broad as epinotum, its lateral spines conspicuously elongate.

3. Anterior border of extensor face of hind femora with a noticeable foliaceous crest.

Soldier [Pl. 8, Fig. 5]. — Total length 5.1-7.8 mm; maximum length of head 1.71-2.68 mm; of thorax 1.35-1.93 mm.

1. Lateral border of declivous face of epinotum with a narrow, but conspicuous, foliaceous crest.

2. Basal face of epinotum usually almost as broad as, sometimes even broader than, the mesonotum.

3. Petiole usually with a distinctly elongate lateral spine on each side, usually visibly broader than postpetiole.

4. Sculpture of cephalic disc extremely variable. Usually the integument is nearly shiny, with larger, rather shallowly impressed squamiferous foveolae, which often fade out in part or almost entirely, especially in very large specimens; or the floor of the disc is coarsely reticulate-rugose and foveolate (some specimens from Bolivia, and British Guiana); or the sculpture resembles that of *varians* (specimens from Haiti).

Female and male. — The characters of these castes have not been worked out.

Specimens examined: 187; 121 workers, 52 soldiers, 9 females, 5 males (all WWK, unless noted otherwise!), as follows: Brazil, *State of Rio Grande do Sul*: Pareci Novo, 1927 (22.VI., 25.VII., 26.XII.), P. Hansen, S. J.: 33 W, 7 S. Pôrto Alegre, 2.XII.1930, P. Buck, S. J.: 1 W, 2 S. *State of S. Paulo*: Agudos, in withered branches of coffee shrubs, 28.IX.1953, 3.XI.1953, VIII.1954, W. Kempf, O. Ludovico, R. Mueller, O.F.M.: 19 W, 7 S, 3 F. *Distrito Federal*: Rio de Janeiro, 21.XII.1927, O. Conde: 1 S. *State of Mato Grosso*: Poconé, V.1948, C. Valette: 3 W, 1 S. Várzea Alegre, date and coll. unknown: 1 F. *State of Amazonas*: Coary, V. de Araujo: 1 F. — Argentina (aside from records mentioned in the first part), *Formosa*: Las Lomitas, 23.V.1951, Golbach: 1 W [ML]. — Paraguay, Buena Vista, II.1921, D. Wees: 1 F [MCZ]. — Bolivia, loc., date and coll. unknown: 1 W [MACN]. Reyes, X.1921, W. M. Mann: 2 W, 1 S, 1 F. Rurrenabaque, X.1921, W. M. Mann: 2 W, 1 S. Espia, Beni river, no date, W. M. Mann: 2 W. — British Guiana, Kartabo, Jul.-Aug. 1920, W. M. Wheeler: 6 W, 6 S. — Venezuela, specimens captured on imported plants in the U. S. by Plant Quarantine Inspectors: 9 W, 8 S. — Colombia, Rio Frio, III.1924, W. M. Mann: 4 W, 1 S, 1 F. Santa Anna, III.1924, W. M. Mann: 1 W, 1 S, 1 F. Specimens captured by Plant Quarantine Inspectors in the U. S.: 3 S. — Panama Canal Zone, Frijoles, 23.III.1923, W. M. Wheeler: 1 W. Red Tank, 1.III.1923, in *Cordia alliodora*, W. M. Wheeler: 3 W. Corozal, 12.VII.1924, W. M. Wheeler: 1 W, 2 S. — Costa Rica, San José, H. Schmidt: 1 W. Liberia, 14.I.1930, A.

Alfaro: 3 W. Vila Colon, 26.IV.1936, A. Alfaro: 5 W, 2 S, 1 F. — U. S. Plant Quarantine specimens: 6 W. — Guatemala, U. S. Plant Quarantine specimens: 3 W, 3 S. — Mexico, Vera Cruz: Pueblo Nuevo, 7.VIII.1953, E. O. Wilson: 3 W, 2 S. U. S. Plant Quarantine specimens: 2 W. — Haiti, Diquini, W. M. Mann: 4 W, 2 S (syntypes of *varians marginatus* Wheeler & Mann). Manneville, W. M. Mann: 2 W, 1 S. Petionville, W. M. Mann: 2 W, 1 S.

Distribution. — The remarkably widespread species ranges from northern Argentina, all over cisandean South America, northern Colombia, to Central America, as far north as the state of Vera Cruz in Mexico. It is also common in the lesser Antilles and Hispaniola Island.

Discussion, variation and synonymy. — The amazing variability of the present species favors the suspicion that it consists of either several geographical races or subspecies, or even of two or more closely knit, yet separable, sibling species. However in spite of the effort and time spent in trying to split up the maze of puzzling and varying forms, I achieved no satisfactory results. The only justifiable separation that could be made, is maintaining *varians* as a form distinct from *pallens*. Even this conclusion is only provisional, and may need revision, when more material from the Greater Antilles is available.

The oldest synonym of the group is *araneolus*, which F. Smith, in 1854, proposed on worker specimens from St. Vincent, B.W.I. This author himself implicitly recognized it as synonym, when he listed, in 1876, the St. Vincent specimens under his *discocephalus*, originally erected upon the soldier, in 1854. The synonymy was formally proposed by Emery, in 1894, although Forel, from 1899 to 1911, tried to maintain it as a variety.

In the same revisionary study, Emery also synonymized *discocephalus* with *pallens*. This time Forel's conservatism prevailed, suggesting to keep it as a variety, distinguished by smaller size. After measuring several nest series, I have come to the conclusion that body length alone, especially as regards the soldier, may not be used as a criterion for separating infraspecific taxa of this species. Very large and very small soldiers occur in the same colony. Consequently there is no reason for reviving *discocephalus*.

Mayr's *patellaris*, a female which lacks the anteromedian slit on the cephalic disc, the remnant of the supramandibular excision, always expressed in the other two subgenera of *Paracryptocerus*, but obsolete in *Cyathomyrmex*, is in the Museum of Stockholm. Emery, who suspected its sameness with *pallens*, was informed by Prof. Aurivillius, that the specimen lacks indeed any kind of slit on the anterior border of the disc. On account of the unusual feature, he decided to let it stand as a variety or aberration of *pallens*. I have a female from Coary, on the Amazon, in which the two lobes are tightly pressed together, so that the slit is reduced to a mere suture. Inasmuch as *patellaris* may not be raised to higher taxonomic rank, I propose to drop it entirely.

The subspecies *marginatus*, attached by Wheeler and Mann, to *varians*, is both a homonym of *marginatus* Fabricius (1804, an old synonym of *Cephalotes atratus*, proposed under the name of *Cryptoce- rus*), and a synonym of *pallens*, sharing with the latter the same few differential features, that separate it from *varians*.

Wheeler's variety *porrasi*, distinguished by the coarse, conspicuous scalelike hair, arising from the sparse, large pits of the shiny cephalic disc of the soldier, and by the tridentate border of the epinotum of the worker, represents a recognizable form, which likewise occurs sporadically among my material from Costa Rica and Mexico. However, I doubt very much that these features are apt to differentiate a clearly circumscribed population, having observed variation as regards some of these features in individual nest series. Hence even this form is better placed in synonymy with *pallens*.

Paracryptocerus (Cyathomyrmex) varians (F. Smith)

(Pl. 8 Figs. 7, 8)

- Cryptocerus varians* F. Smith, 1876, Trans. Ent. Soc. London, p. 606, Pl. 11, fig. 4 (W; Cuba). — Emery, 1894, Bull. Soc. Ent. Ital. 26: 211-212, Pl. 4, fig. 33 (W; U.S.A.: Florida). — Emery, 1894, Zool. Jahrb. Syst. 8: 325 (Florida: Key West). — Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21: 80, 102-104, Pl. 7, figs. 1-6 (S, W, F, M; Bahamas: Andros I.; Florida: Card's Point). — Wheeler, 1910, Ants, Columbia Univ. Press, pp. 17, fig. 3M; 99, fig. 53 a-e; 151, 426, 567. — Forel, 1912, Mém. Soc. Ent. Belg. 19: 201 (Jamaica: Kingston). — Weber, 1934, Rev. de Ent. 4: 57 (Biol.; Cuba).
- Cryptocerus (Cyathocephalus) varians* Emery, 1915, Bull. Soc. Ent. France, p. 192. — Emery, 1922, Gen. Ins. Subf. Myrmicinae, fasc. 174c, p. 312. — Wheeler, 1932, Journ. N. Y. Ent. Soc. 40: 11 (Biol.; Florida: Key West, Card's Point, Coconut Grove). — Wheeler, 1942, Bull. Mus. Comp. Zool. Harvard 90 (1): 212, pl. 54 (S, W).
- Cryptocerus (Cryptocerus) varians* Mann, 1920, Bull. Amer. Mus. Nat. Hist. 42: 430 (Bahamas: New Providence, Andros; Cuba: San Antonio de los Baños, Cienfuegos, Castillo, Yateras, Cárdenas).
- Cryptocerus (Cyathocephalus) varians* var. *jamaicensis* Forel, 1922, Rev. Suisse Zool. 30: 97 (W; Jamaica: Kingston). Nov. syn.
- Cryptocerus (Cyathomyrmex) varians* Wheeler, 1937, Bull. Mus. Comp. Zool. Harvard 81 (3): 459 (Cuba: Pico Turquino, Sierra Maestra). — M. R. Smith, 1947, Proc. Ent. Soc. Wash. 49: 30-33 (S, W, F, M; Florida: Miami Beach, Homestead, Saddle Bunch Keys). — M. R. Smith, 1947, Amer. Midl. Nat. 37: 583, Pl. 14, fig. 52 (S; S. Florida). — Creighton, 1950, Bull. Mus. Comp. Zool. Harvard 104: 296, 298, Pl. 38, figs. 1-6 (F, S, W, M; S. Florida).
- Paracryptocerus (Cyathomyrmex) varians* M. R. Smith, in: Muesebeck, Krombein & Townes, 1951, Hym. Amer. N. of Mexico, Agric. Monogr. U. S. Dep. Agric. 2: 825. — M. R. Smith, 1954, Amer. Mus. Novit. n. 1671, pp. 3, 8 (Bahamas: Bimini Islands).

Types. — Syntype workers of *varians* (F. Smith) from Cuba, presumably in the British Museum (Natural History). M. R. Smith (1947, p. 33) and Creighton (1950, p. 298), stating that the original specimens came from the Antilles, no specific island being mentioned, overlooked the fact that F. Smith cites explicitly in the original diagnosis Cuba as habitat and consequently as type locality. — The holotype (unique) worker of the var. *jamaicensis* (Forel) was taken by Forel in the Botanical Garden of Kingston, Jamaica, and is presently in the Forel collection (MHNG). None of the aforesaid specimens was examined.

The present species is a very close relative of the preceding *pallens*, from which it only differs in several rather trivial characters, so that a lengthy description of it is unnecessary. (For descriptions of all castes, see: Wheeler, 1905, pp. 102-104; M. R. Smith, 1947, pp. 30-33). In the following I confine myself to pointing out the most essential distinguishing features, which separate the workers and soldiers of *varians*, from those of *pallens*:

Worker [Pl. 8, Fig. 7]. — Total length 3.6-4.7 mm; maximum length of head 0.96-1.28 mm; maximum length of thorax 1.03-1.32 mm.

1. The shape of the epinotum: the lateral borders of which are anteriorly subparallel or even slightly diverging caudad, then forming an angle or even a distinct tooth and converging mesad behind this angle or tooth, much in front of the petiolar insertion. Lateral borders of epinotum narrowly crested or only sharply marginate.

2. Maximum width of petiole conspicuously less than the maximum width of the epinotum, i. e. the lateral appendages of the petiole are much shorter than in *pallens*.

3. Anterior border of the extensor face of hind femora sharply marginate but not conspicuously crested.

Soldier [Pl. 8, Fig. 8]. — Total length 5.9-6.3 mm; maximum length of head 2.01-2.21 mm; maximum length of thorax 1.50-1.60 mm.

1. Lateral border of declivous face of epinotum at most marginate, never with a foliaceous crest.

2. Basal face of epinotum conspicuously narrower than mesonotum.

3. Petiole with a rather short tooth on each side.

4. Foveolae on cephalic disc relatively small and crowded; about 16-18 pits may be counted along an imaginary line drawn across the disc at its maximum width.

Female and male. — The differential characters for both castes have not been worked out, due to the lack of specimens at the write-up of this paper.

Specimens examined: 23; 19 workers and 4 soldiers (all in my collection: WWK!), as follows: U.S.A., *Florida*: Miami, 23.VI.1945, Wm. F. Buren: 4 W, 2 S. — *Bahamas*, *Andros Island*: Little Golding Key, 19.VI.1904, W. M. Wheeler: 3 W. — *Cuba*, *Habana*: Playa Marianao, 25.V.1933, Bierig: 6 W, 1 S. *Sierra Anafe*, XII.1932, Bierig: 2 W. *Oriente*: El

Caney, W. M. Mann: 2 W, 1 S. *Matanzas*: Cárdenas, W. M. Mann: 1 W. — Jamaica, Halfway Tree, nr. Kingston, 28.I.1937, E. A. Chapin & Blackwelder: 1 W.

Distribution. — The species occurs in southern Florida, south of Miami, in the Bahamas (Andros, New Providence, Bimini), in Cuba and Jamaica. Previously published records for the species, as occurring in Honduras (Mann, 1922), and in Trinidad, Venezuela and Colombia (Weber, 1938, 1948) are obviously based on misidentification and have to be referred to *pallens*.

Discussion and synonymy. — Following Emery (1894, p. 212), Wheeler (1905, p. 104) duly emphasized the close similarity between *varians* and *pallens*, and went as far as surmising that the former may even be regarded as a subspecies of the latter. This view is strengthened by the kind of differential characters which separate these forms, and furthermore by the striking fact, that according to presently known records, both forms replace each other geographically. Another no less striking fact, however, seems to suggest that, at least for the time being, *varians* should better be kept in specific standing rather than be lowered to subspecific rank, because at the point of the closest contact of both forms, between Cuba and Hispaniola, the morphological gap is still quite evident. The form from Hispaniola was originally proposed as a race of *varians* (*marginatus* Wheeler & Mann, 1914), but its features show clearly that it does belong to *pallens*, as shown on a preceding page.

The variety *jamaicensis* (Forel, 1922), known only in the worker caste, of which several topotypical specimens (USNM, WWK) were examined, does not present any noticeably divergent characters to justify its taxonomic standing. The few specimens seen so far, are of slightly, not significantly, larger size, possessing a somewhat broader thorax and darker color. None of these features effaces the typical habitus of *varians*. It is a straight synonym of the nominate species.

Biology. — Weber (1934, p. 57), who had the present species under observation in the laboratory, during his sojourn in Cuba, discovered that the insects were able to run backward as rapidly as forward. He correctly interpreted the phenomenon as a presumable adaptation to life in hollow twigs. Weber also noticed that callows took a long time to acquire adult coloration; the soldiers, in which first darkens the cephalic disc, are speedier in this regard than the workers.

Creighton (1950, p. 298) discusses the variability in color. Specimens grade from piceous brown (with reddish brown appendages) through castaneous to golden yellow. Inasmuch as the light specimens have a hardened integument and forage outside of the nest, as well as the dark ones, he believes that the former are not callows, but color variants. The same author stresses the defensive mechanism of these ants, which unlike most arboreal ants of other genera, do not rely on speed and agility for escape, but press their dorso-ventrally flattened body as close to the substrate as possible. In this position it is very hard to pick them up.

There is some information concerning the plant hosts in which this species establishes its nest. The most frequent findings of colonies have been made between the scalelike leaves of epiphytic *Tillandsia* sp., a bromeliad (Florida: Card's Point, Miami Beach; Bahamas: Andros I.). Also dead twigs and small branches of the Red Mangrove, *Rhizophora mangle*, frequently harbor nests of the species (Miami beach, Homestead, Saddle Bunch Keys in Florida). Other host plants that offer nesting sites are *Bauhinia* sp., *Coccolobis uvifera* (Coconut Grove, Florida), and the culms of tall grasses, *Uniola paniculata*, and sedges, *Cladium jamaicense* (Bahamas: Andros I.).

Winged individuals have been found in the nest by Dr. Buren on June 23 and July 4, 1945.

From a historical point of view it is interesting to recall that the present species first gave rise to the suspicion of phragmosis, as practiced by the soldier. The hypothesis was finally confirmed experimentally in recent years by Drs. Creighton and Gregg, though with a different species (*texanus!*), as mentioned on a foregoing page.

Systematic Conspectus of the Genera and Species

(Forms of doubtful identity are indicated by an asterisc)

Cephalotini M. R. Smith

Procryptocerus Emery

- adlerzi* (Mayr) w, f, m. — S. Brazil.
- balzani* Emery w, f. — Bolivia.
- batesi* Forel w. — Colombia.
- belti* Forel w, f, m. — C. America.
- carbonarius* (Mayr) w. — Colombia, Panama.
- clathratus* Emery w, f. — Brazil: S. Catarina.
- convergens* (Mayr) w, f, m. — S. Brazil.
- coriarius* (Mayr) w, f. — Colombia.
- elegans** Santschi w. — Brazil: S. Paulo.
- ferreri* Forel w. — Colombia.
- gibbosus* Kempf w. — Brazil: Espirito Santo.
- goeldii* Forel w, f, m. — S. Brazil.
- g. guianensis** Weber f. — B. Guiana.
- g. hylaeus* Kempf w. — Colombia, Bolivia, Trinidad.
- gracilis* (F. Smith) w. — Brazil: Amazonas.
- hirsutus* Emery w. — Brazil: Pará, Br. Guiana, Trinidad.
- h. convexus** Forel w. — Brazil: Pará.
- marginatus* Borgmeier w, f, m. — E. Brazil.
- mayri* Forel w. — Colombia.
- m. reichenspergeri** (Santschi) w. — "Brazil".
- paleatus* Emery w. — C. America.
- pictipes* Emery w, f. — C. Rica, Br. Guiana, E. Brazil.
- regularis* Emery w, f. — N. Argentina, S. Brazil, Trinidad.
- rudis* (Mayr) w. — Colombia.
- sampaioi* Forel w. — S. Brazil.

- scabriusculus* Emery w, f. — C. America, Venezuela, Colombia.
schmalzi Emery w, f. — S. Brazil.
schmitti Forel w, f, m. — Venezuela, NE. Brazil.
spiniperdus Forel w, m. — Trinidad.
*striatus** (F. Smith) w. — Brazil: S. Paulo.
*subpilosus** (F. Smith) w. — Brazil: Amazonas.
 *s. attenuatus** (F. Smith) w, f. — Brazil: Pará.
 *s. impressus** Forel w, f. — Panama.
 s. lepidus Forel w. — S. Brazil.
sulcatus Emery w, f. — Brazil: Rio de Janeiro.
 s. curvistriatus Kempf. — Brazil: Espirito Santo.

Cephalotes Latreille

- alfaroi* (Emery) w. — Costa Rica, Panama.
atratus (Linné) w, f, m. — Cisand. S. America.
 a. erectus Santschi w, f. — Colombia, Panama.
decemspinus Santschi w. — Fr. Guiana.
*placidus** (F. Smith) m. — Brazil: S. Paulo.

Eucryptocerus Kempf

- abdominalis* (Santschi) w. — Fr. Guiana, Brazil: Pará.
oculatus (Spinola) w. — Brazil: Pará.
opacus (Santschi) w. — Fr. Guiana, Brazil, Peru.
*serriticeps** (F. Smith) f. — Brazil: Amazonas.

Zacryptocerus Wheeler

- clypeatus* (Fabricius) w, f, m. — Cisandean S. America.
membranaceus (Klug) w, f. — Brazil: Rio, Esp. Santo.

Hypocryptocerus Wheeler

- haemorrhoidalis** (Latreille) w. — Hispaniola.
 h. affinis (Wheeler) w. — Hispaniola.
 h. auricomus (Wheeler) w. — Hispaniola.
 h. hamulus (Roger) w, m. — Hispaniola.
 h. signatus (Wheeler) w, m. — Hispaniola.
 h. unimaculatus (F. Smith) w. — Hispaniola.
 h. vinosus (Wheeler). — Hispaniola.

Paracryptocerus Emery

Subgenus *Paracryptocerus* Emery

Group I

- inaequalis* (Mann) w. — Brazil: Guaporé.
*laminatus** (F. Smith) w. — Brazil: Amazonas.
 l. christophersenii (Forel) w, s. — Colombia, C. America.
minutus (Fabricius) w, s, f. — C. America, S. America.
pusillus (Klug) w, s, f, m. — Cisandean S. America.
 p. columbicus (Forel) w, s. — Colombia.

- simillimus* Kempf w, s. — Br. Guiana, Peru, Bolivia.
spinus (Mayr) w, s, f. — Brazil, Br. Guiana, Bolivia.
*s. peruvianus** (Forel) s. — Peru.

Group II

- complanatus* (Guérin) w, s. — N. Brazil, Guianas.
c. ramiphilus (Forel) w, s. — Brazil: Amazonas.
cordiae (Stitz) w, s, f. — Brazil: Acre; Bolivia.
femoralis (F. Smith) w. — Colombia.
multispinus (Emery) w, s, f. — C. America, Colombia.
m. inca (Santschi) w. — Peru.

Group III

- borgmeieri* Kempf w, s, f, m. — Argentina, Paraguay, Brazil.
cordatus (F. Smith) w, s, f. — Brazil, Peru, Bolivia.
cristatus (Emery) w, s, f. — Central America, Colombia.
depressus (Klug) w, s, f, m. — S. America south of Amazon R.
eduarduli (Forel) w, s, f. — Paraguay, Argentina, Bolivia, Brazil.
pavonii (Latreille) w, s. — Br. Guiana, Peru.
multispinosus (Norton) w, s. — N. Mexico.
m. biguttatus (Emery) w, s, f. — C. America.

Isolated species

- manni* Kempf w, s. — N. Brazil, Br. Guiana.
*duckei** (Forel) s. — Brazil: Amazonas.

Species inquirendae

- conspersus** (F. Smith) w. — Brazil: Amazonas.
*exiguus** (F. Smith) w. — Mexico.
*argentatus** (F. Smith) f. — Colombia.
*basalis** (F. Smith) f. — Nicaragua.
*d'orbignyianus** (F. Smith) f. — "South America".
*fenestralis** (F. Smith) f. — Brazil: S. Paulo.

Subgenus *Harnedia* M. R. Smith

Group I

- adolphi* (Emery) w. — Brazil: Mato Grosso.
angustus (Mayr) w, s, f. — S. Brazil, Argentina.
aztecus (Forel) w, s. — Mexico.
bivestitus (Santschi) w, s, f. — Argentina.
*bohlsi** (Emery) w, s. — Paraguay, Brazil: Mato Grosso.
bruchi (Forel) w, s, f. — Argentina.
coffea Kempf w, s, f, m. — Colombia.
*crenaticeps** (Mayr) f. — Colombia.
curvistriatus (Forel) w, s, f. — Central America.
emeryi (Forel) w. — I. Curaçao.
fiebrigi (Forel) w, s, f, m. — Paraguay, Argentina.
fleddermanni, n. sp. w, s, f. — Brazil: S. Paulo.
fossithorax (Santschi) w, s. — Argentina.
goeldii (Forel) w. — Brazil: Rio de Janeiro.

jheringi (Emery) w, s, f. — Brazil, Paraguay, Argentina.
*insularis** (Wheeler) w. — Mexico: I. Maria Madre.
liogaster (Santschi) w, s, f. — Argentina.
*notatus** (Mayr) f. — "Brazil".
patei Kempf w, s, f, m. — Colombia.
pilosus (Emery) w, s, f. — Paraguay, Brazil, Argentina.
*prodigiosus** (Santschi) s, f. — Argentina.
quadratus (Mayr) w, s, f. — Argentina, Paraguay.
rohweri (Wheeler) w, s, f. — U.S.A. Arizona.
sobrius, n. sp., s, f. — Guatemala.
striativentris (Emery) w, s, f. — S. Brazil.
targionii (Emery) w, s, f. — Cisandean S. America.
texanus (Santschi) w, s, f, m. — U.S.A. Texas, N. Mexico.
wheeleri (Forel) w, s. — Mexico.

Group II

umbraculatus (Fabr.) w, s, f, m. — Tropical S. America, E. Brazil.

Group III

foliaceus (Emery) w, s. — Peru, Bolivia.
incertus (Emery) w, f. — Argentina, W. Brazil.
grandinosus (F. Smith) w, s, f. — Cisandean S. America.
maculatus (F. Smith) w, s, f, m. — C. America, Cisand. S. America.
pinellii (Guérin) w, s, f. — S. Brazil, Argentina.
scutulatus (F. Smith) w, s, m. — C. America, N. South America.

Species inquirendae

*bimaculatus** (F. Smith) f. — Mexico.
*cognatus** (F. Smith) f. — Brazil: Amazonas.
*klugi** (Emery) f. — Brazil: Mato Grosso.
*pallidicephalus** (F. Smith) f. — Mexico.

Subgenus *Cyathomyrmex* Creighton

pallens (Klug) w, s, f, m. — Central and South America.
setulifer (Emery) w, s, f. — Central America.
varians (F. Smith) w, s, f, m. — Florida, Cuba, Jamaica, Bahamas.

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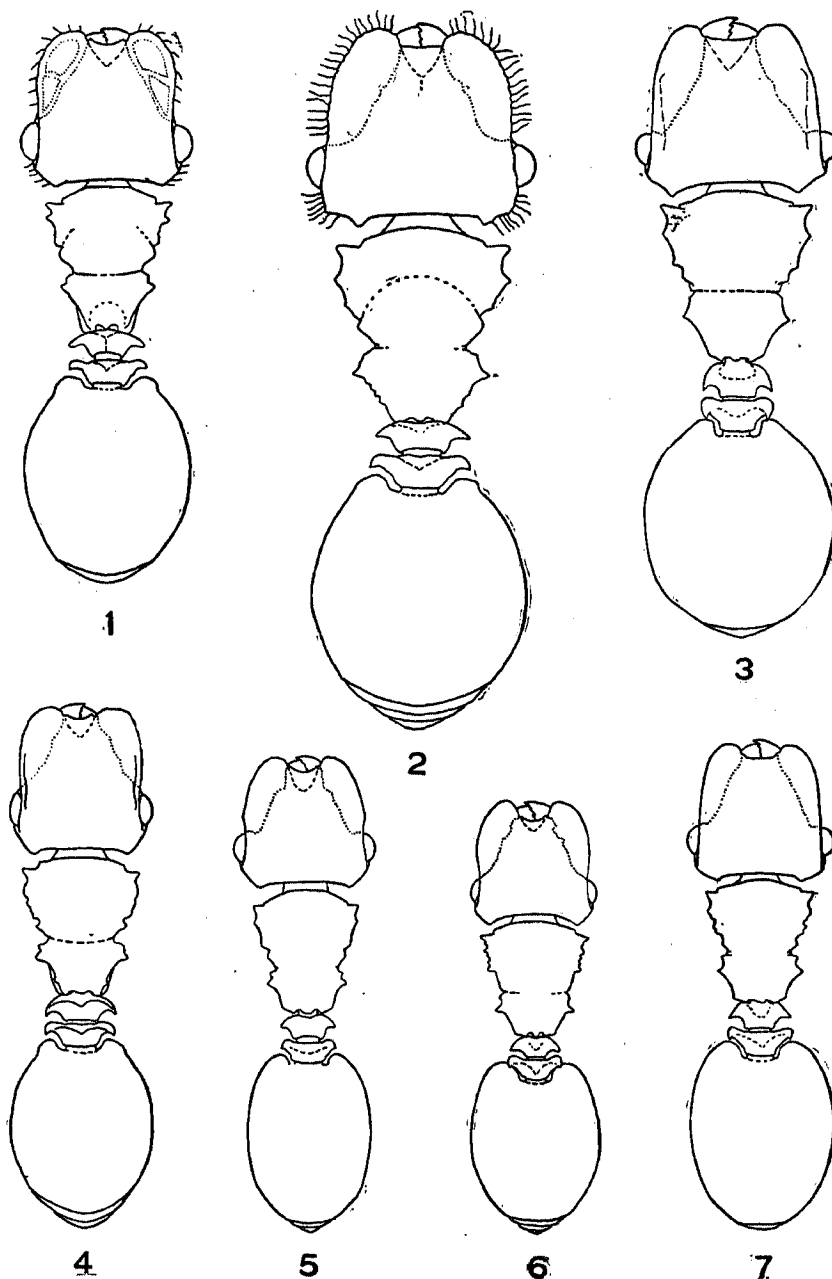
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(Synonyms are in italics)

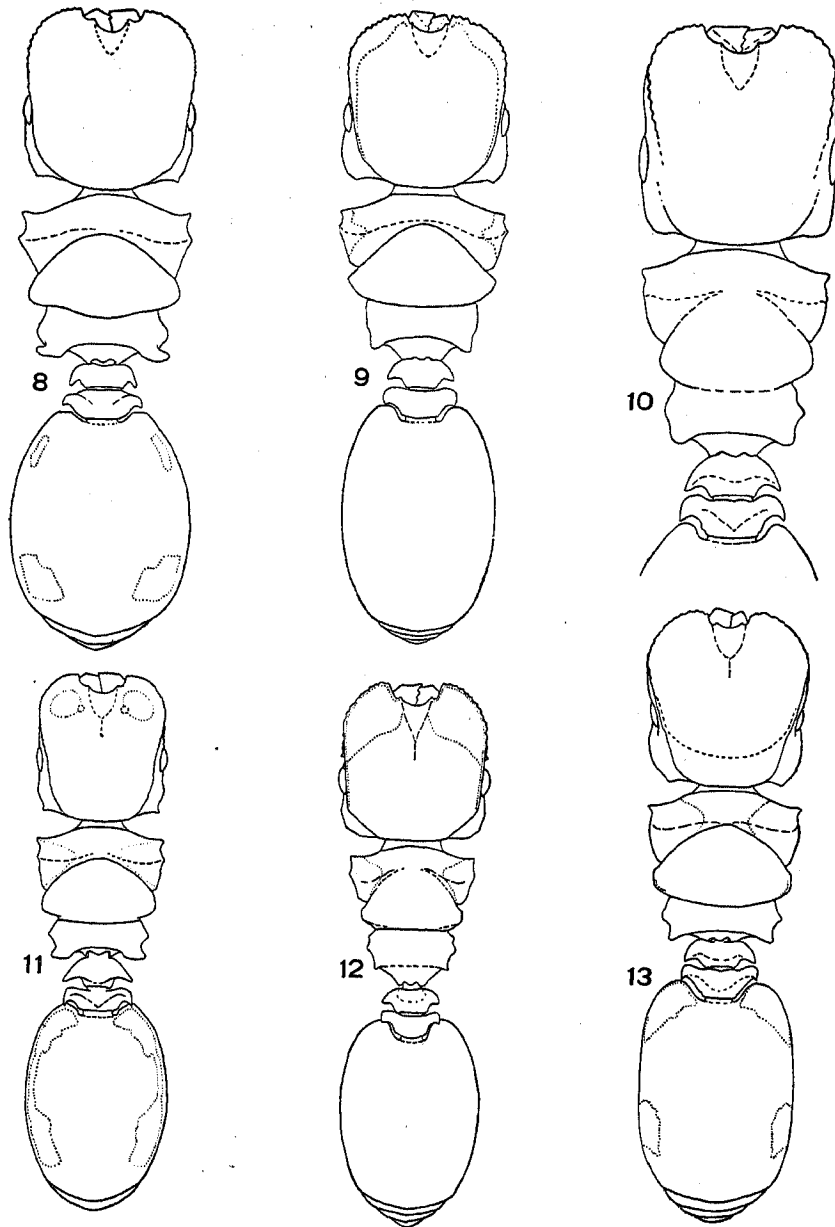
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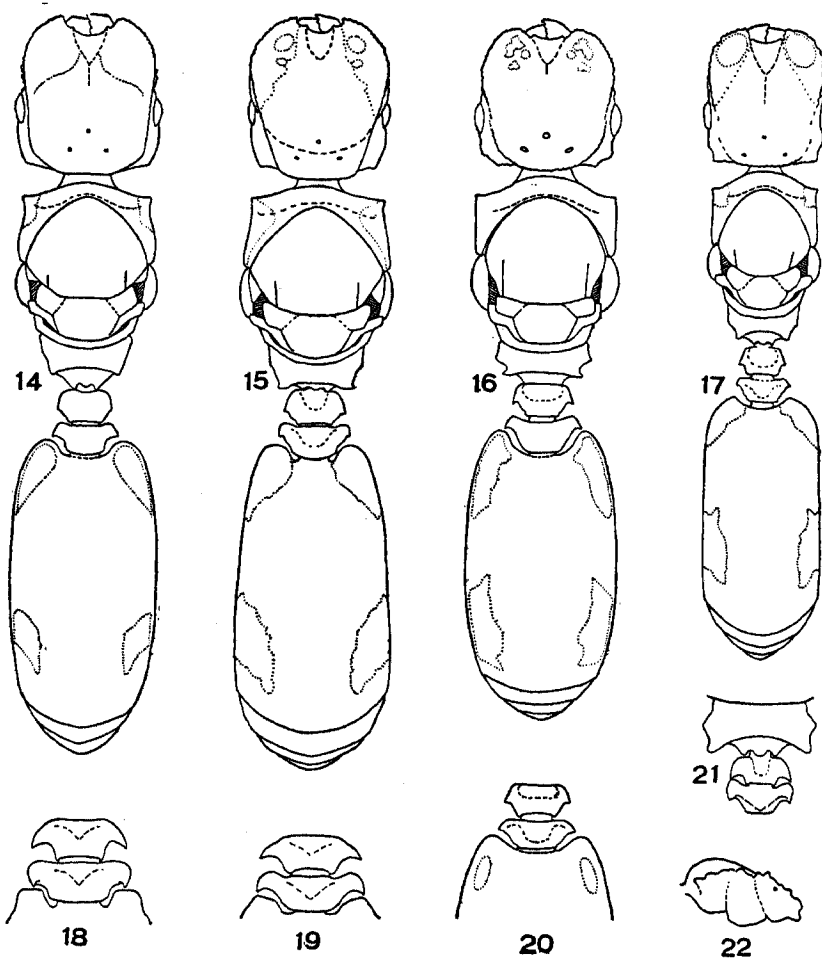
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Genus *Paracryptocerus*, workers in dorsal view: Fig. 1. *P. fiebrigi* (Lectotype; Paraguay). — Fig. 2. *P. pilosus* (Lectotype; Paraguay). — Fig. 3. *P. bruchi* (Lectotype; Catamarca: Huasán). — Fig. 4. *P. quadratus* (Paraguay). — Fig. 5. *P. jheringi* (Santa Fé: Rosario). — Fig. 6. *P. fossithorax* (Rio Negro). — Fig. 7. *P. bivestitus* (Catamarca: Hualfin). Figs. 1, 2, 4 drawn to a larger scale. — (Kempf del.)

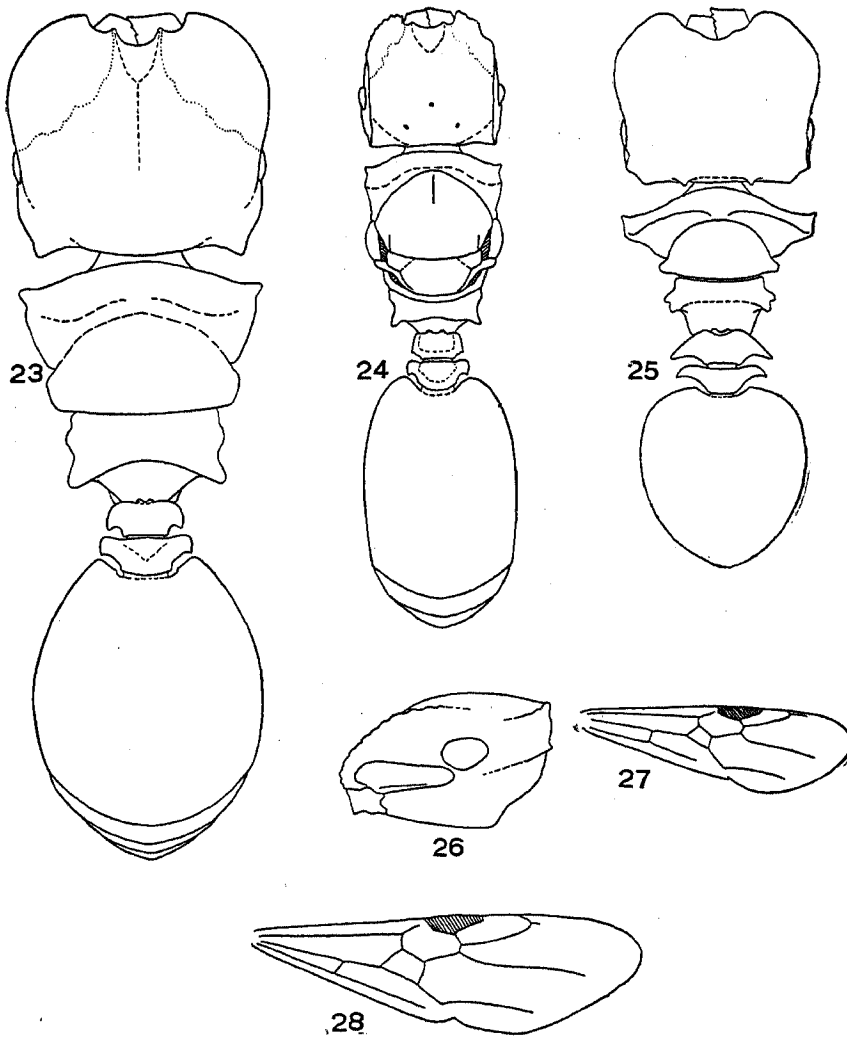


Genus *Paracryptocerus*, soldiers in dorsal view: Fig. 8. *P. pitosus* (Brazil: Agudos). — Fig. 9. *P. fossithorax* (Rio Negro). — Fig. 10. *P. quadratus* (holotype: San Luis). — Fig. 11. *P. jtebrigi* (Córdoba: Alta Gracia). — Fig. 12. *P. jheringi* (Santa Fé: Rosario). — Fig. 13. *P. bivestitus* (Catamarca: Hualfin). Fig. 10 drawn to a larger scale. — (Kempf del.)



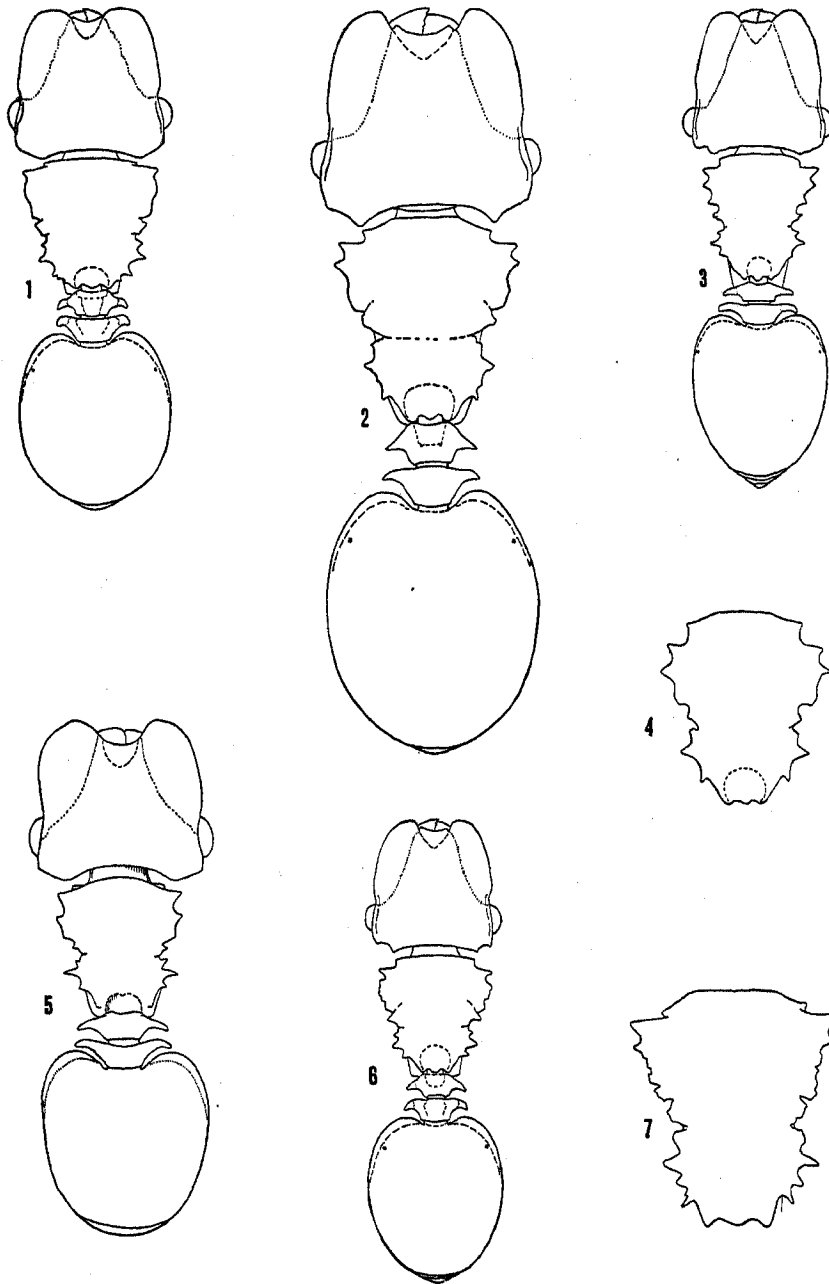
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Peduncular segments slightly shining, with the dorso-lateral sculpture as on dorsum of thorax. Petiole as broad as postpetiole, its anterior face, which is nearly vertically truncate, finely reticulate-punctate, its sides with a strong, short spine, pointing obliquely caudad. Postpetiole with strong lateral processes, which are strongly recurved and resemble the beak of an eagle. Anterior face of postpetiole somewhat inclined, meeting the dorsal face at angle, which separates both faces by a weakly marginate transverse carina.

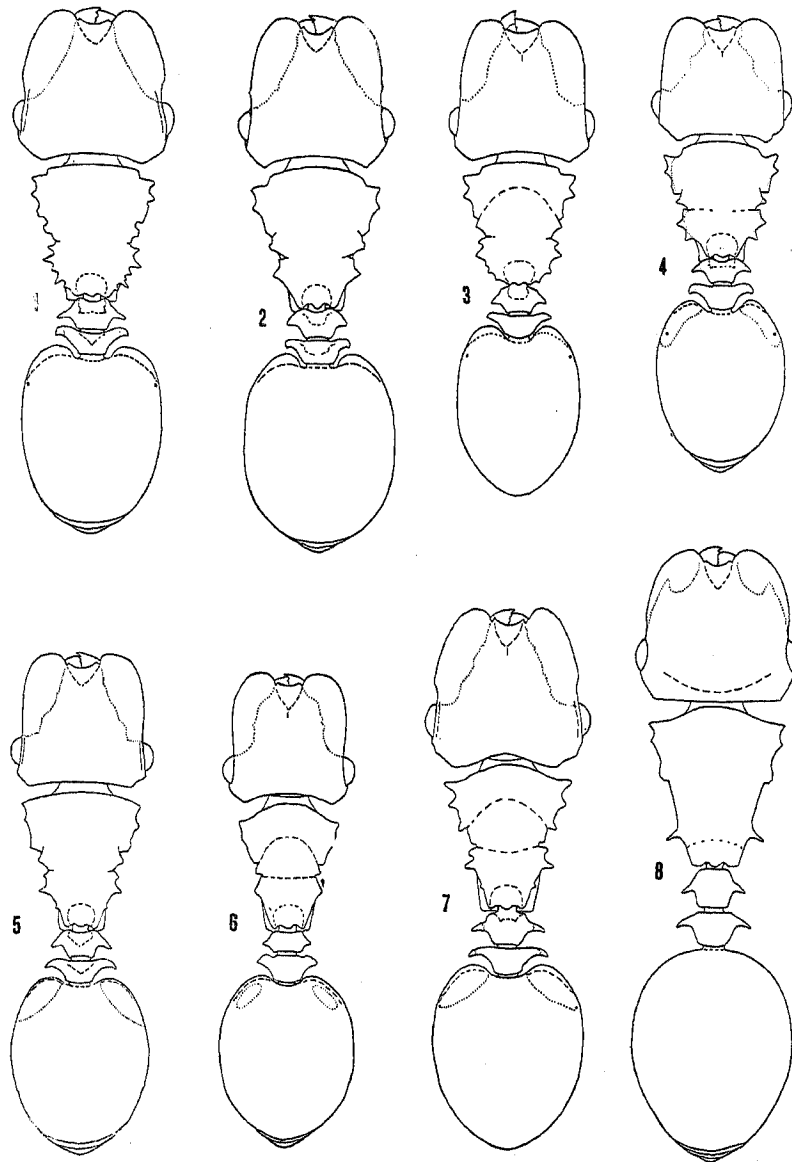


Genus *Paracryptocerus*. Fig. 23. *P. bruchi*, soldier in dorsal view (Santiago del Estero). — Fig. 24. *P. bruchi*, female in dorsal view, drawn to a smaller scale (Santiago del Estero). — Fig. 25. *P. ? eduarduli*, soldier in dorsal view (Chaco). — Fig. 26. *P. quadratus*, soldier, head in lateral view (holotype). — Fig. 27. *P. fiebrigi*, female, fore wing (Córdoba). — Fig. 28. *P. litogaster*, female fore wing (Catamarca). — (Kempt del.)

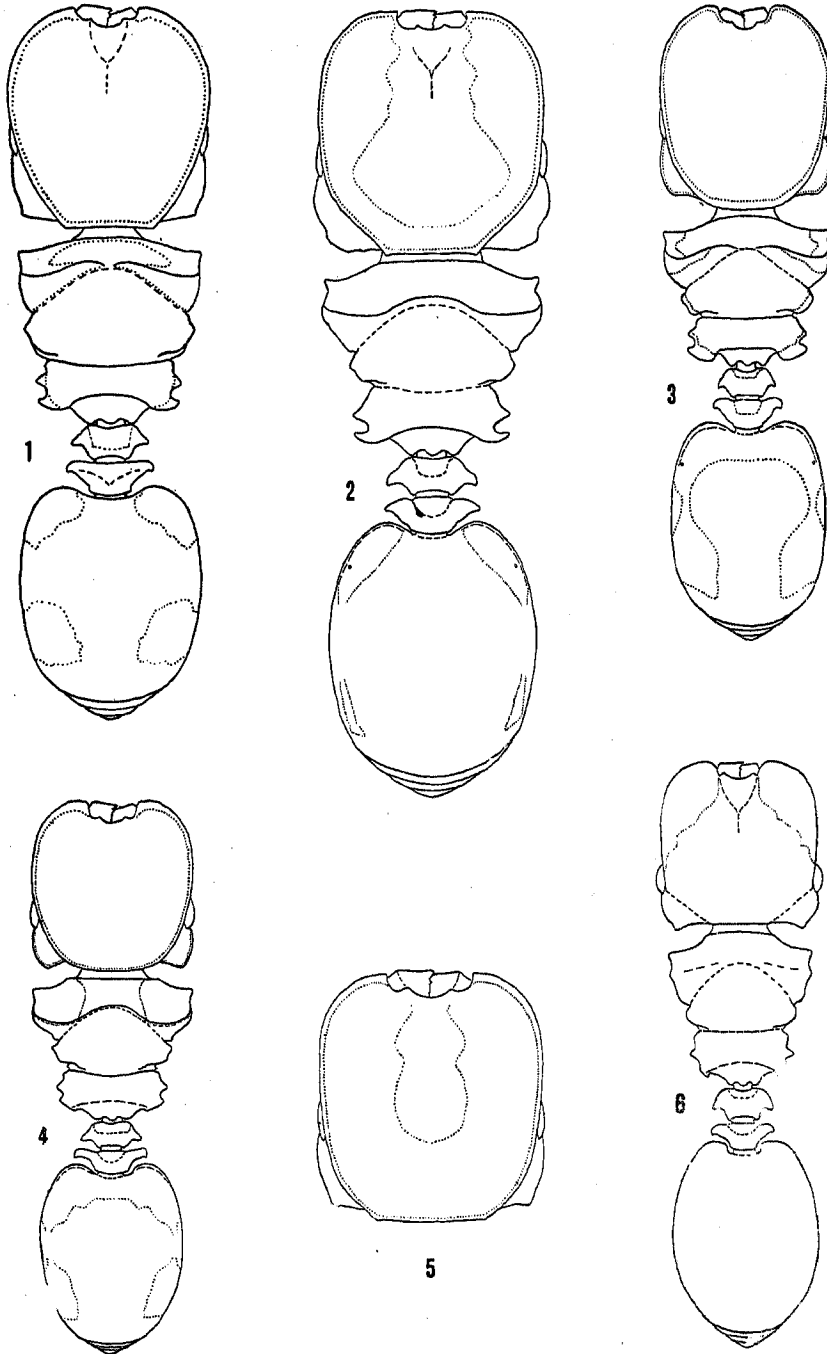
Head disc subquadrate to subrectangular, completely marginate round its scarcely raised, somewhat crenulate border; the anterior corner rounded, the posterior corners either obliquely truncate or rounded. Floor of disc rather flat, slightly excavated antero-laterally. In profile, the sides of the head do not cover



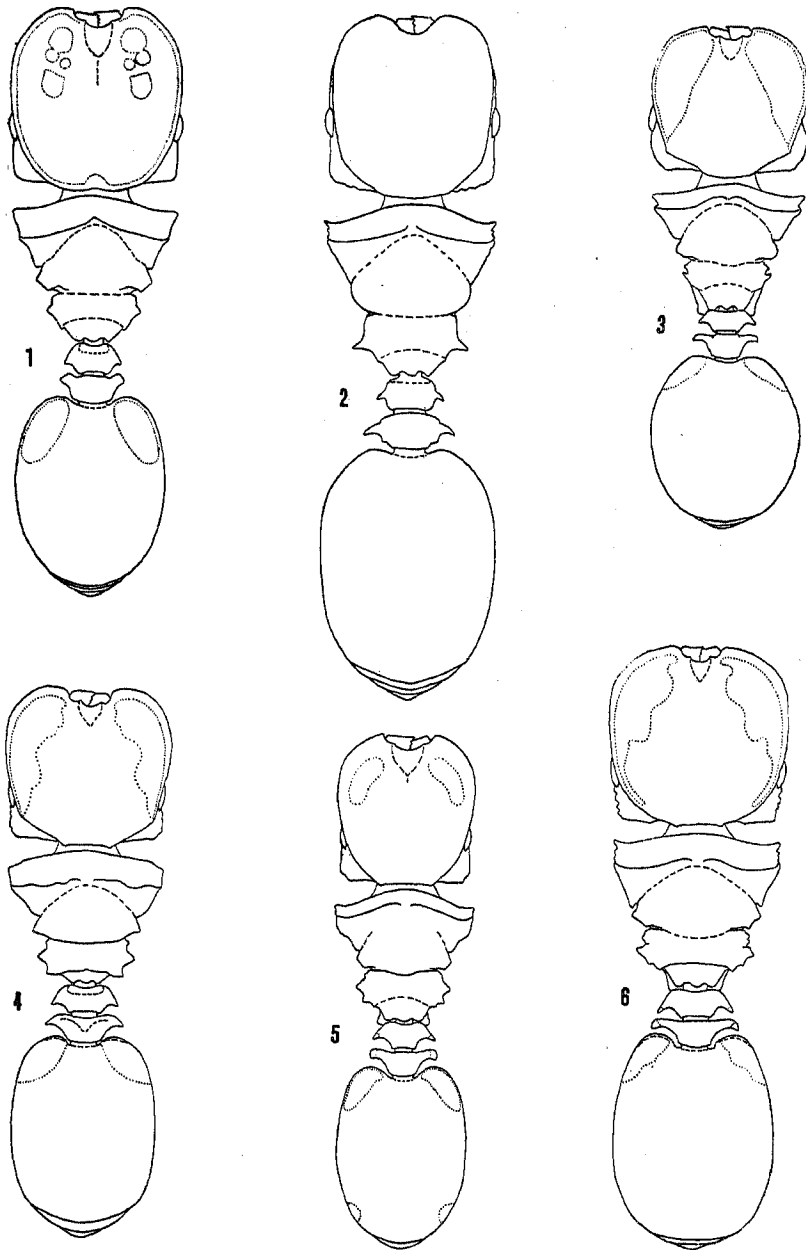
Paracryptocerus (Harnedia) workers in dorsal aspect: Fig. 1. *striativentris* (Rolândia, PR). — Fig. 2. *angustus* (Itajai, SC). — Fig. 3. ?*adolphi* (Cabo Frio, RJ). — Fig. 4. *angustus*, thorax (Pôrto das Caixas, RJ). — Fig. 5. *adolphi* (after Emery, 1905). — Fig. 6. *striativentris* (Itajai, SC). — Fig. 7. *angustus*, thorax (type of "var. *ctarior*" Forel).



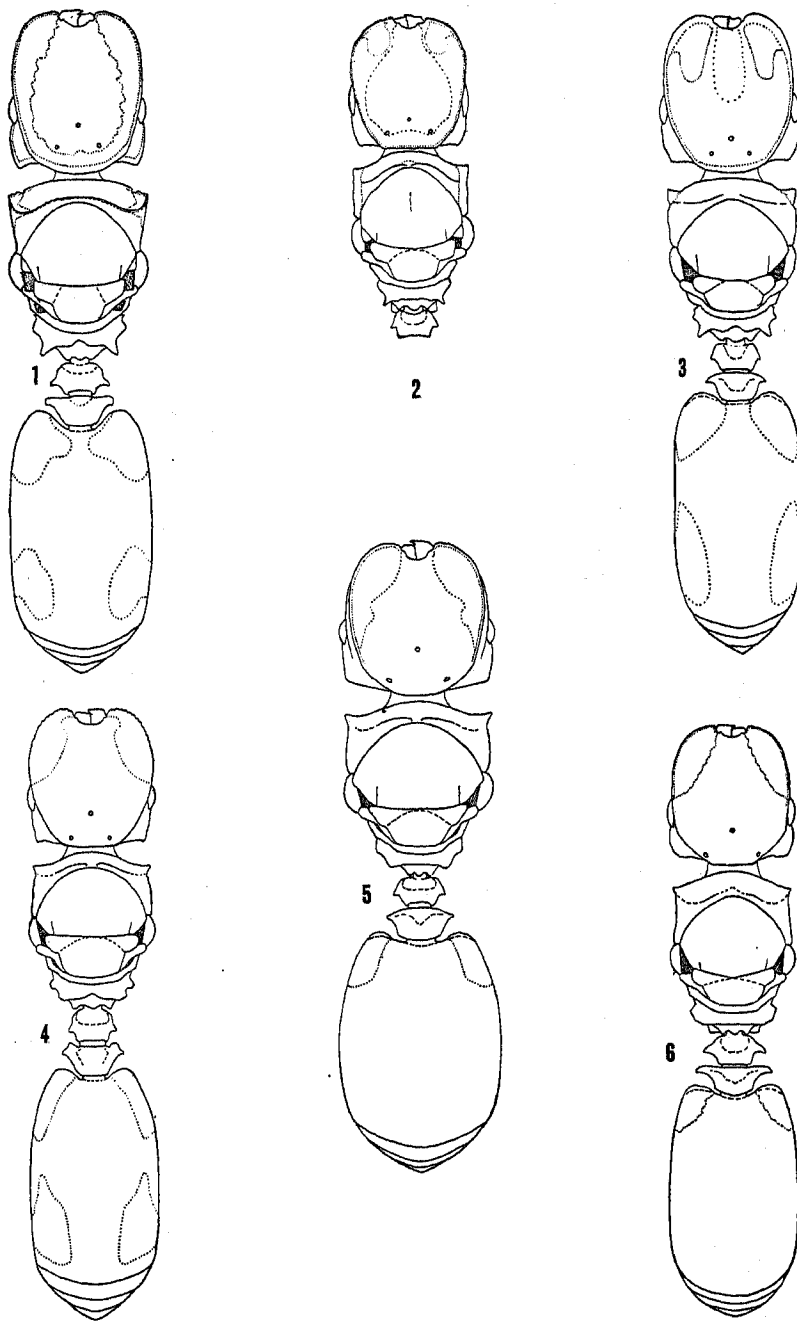
Paracryptocerus (Harnedia) workers in dorsal aspect: Fig. 1. *targionii* (Agudos, SP). — Fig. 2. *jheringi* (N. Petrópolis, RS). — Fig. 3. *fleddermanni* (paratype). — Fig. 4. *coffeae* (paratype). — Fig. 5. *texanus* (Columbus, Tex.). — Fig. 6. *aztecus* (Cuernavaca, Mex.). — Fig. 7. *curvistriatus* (Costa Rica). — Fig. 8. *rohweri* (paratype).



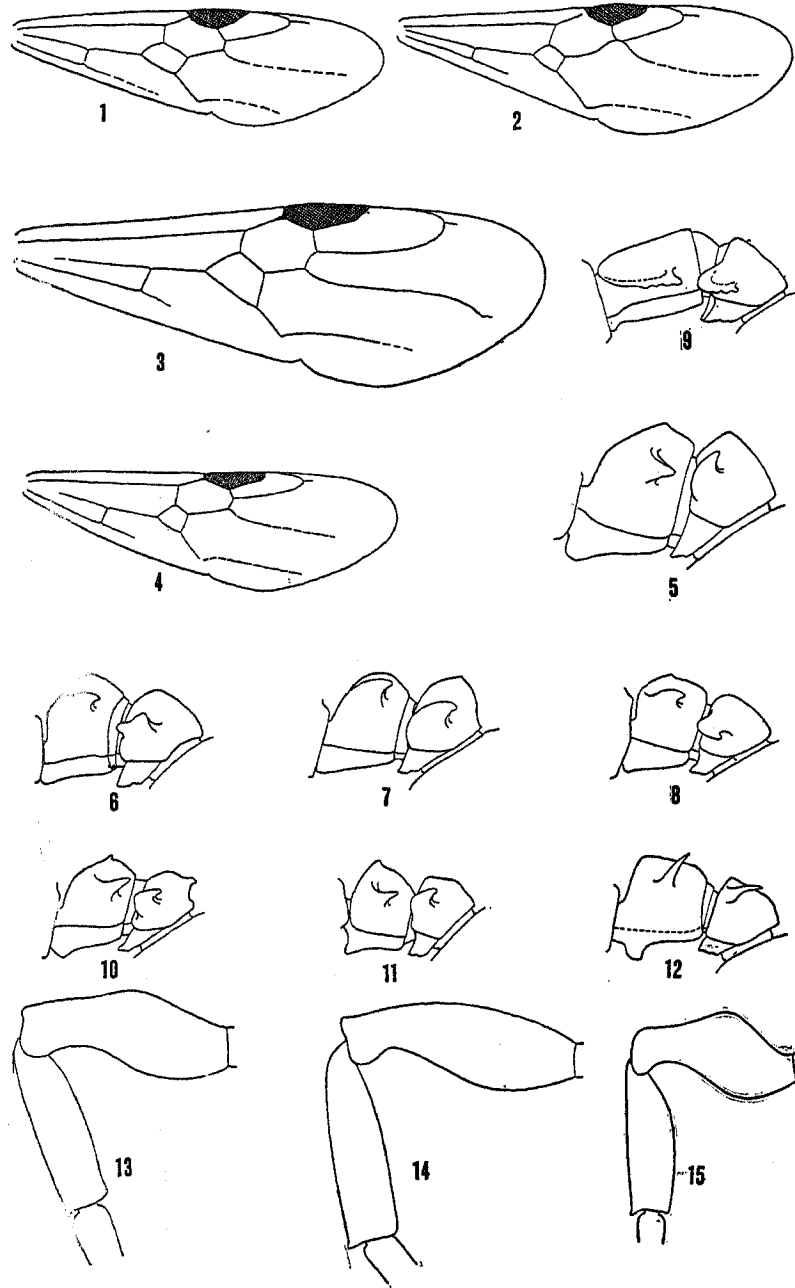
Paracrylocerus (*Harnodia*) soldiers in dorsal aspect: Fig. 1. *targionii* (Caracas, Ven.). — Fig. 2. *angustus* (Itajai, SC). — Fig. 3. *striativentris* (Itajai, SC). — Fig. 4. *Stodermanni* (holotype). — Fig. 5. *angustus*, head (Agudos, SP). — Fig. 6. *Jheringi* (N. Petrópolis, RS).



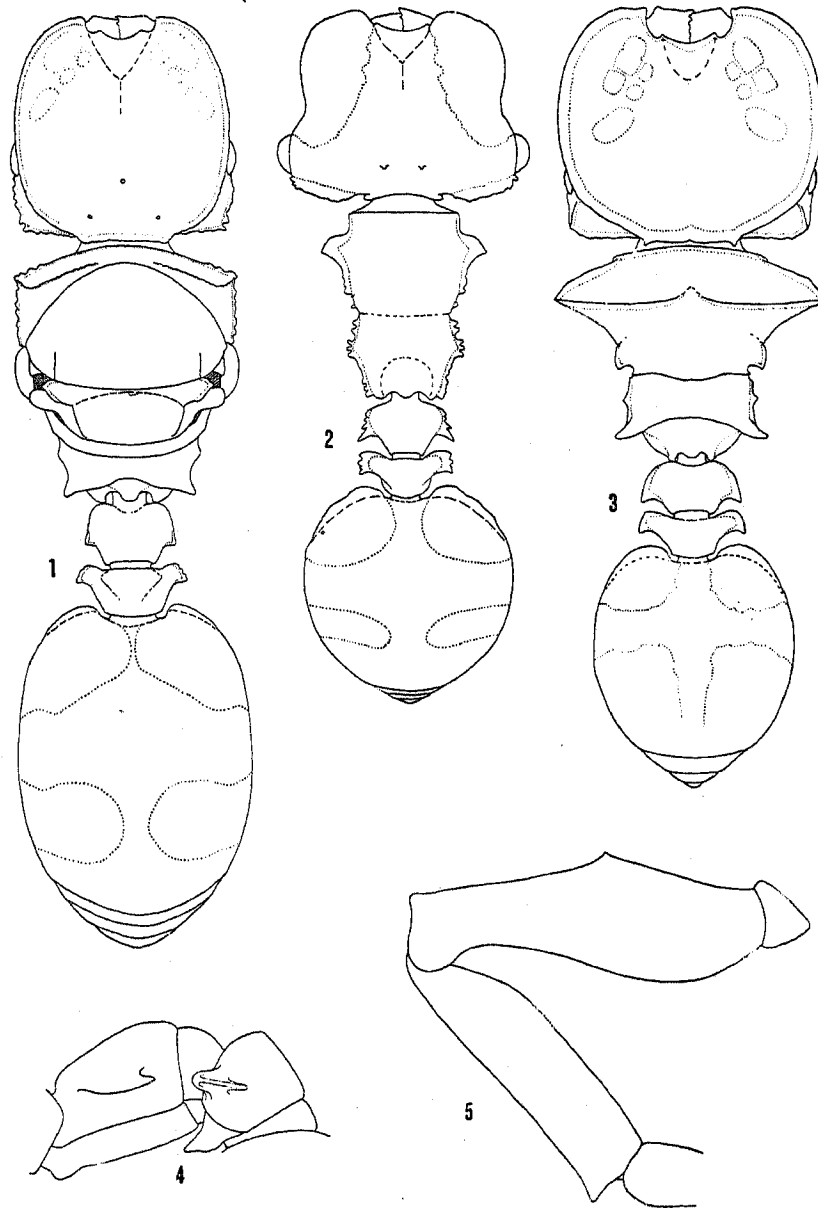
Paracryptocerus (Harnedia) soldiers in dorsal aspect: Fig. 1. *aztecus* (Cuernavaca, Mex.). — Fig. 2. *rohveri* (paratype). — Fig. 3. *curvistriatus* (Costa Rica). — Fig. 4. *texanus* (Columbus, Tex.). — Fig. 5. *coffeae* (paratype). — Fig. 6. *sobrius* (holotype).



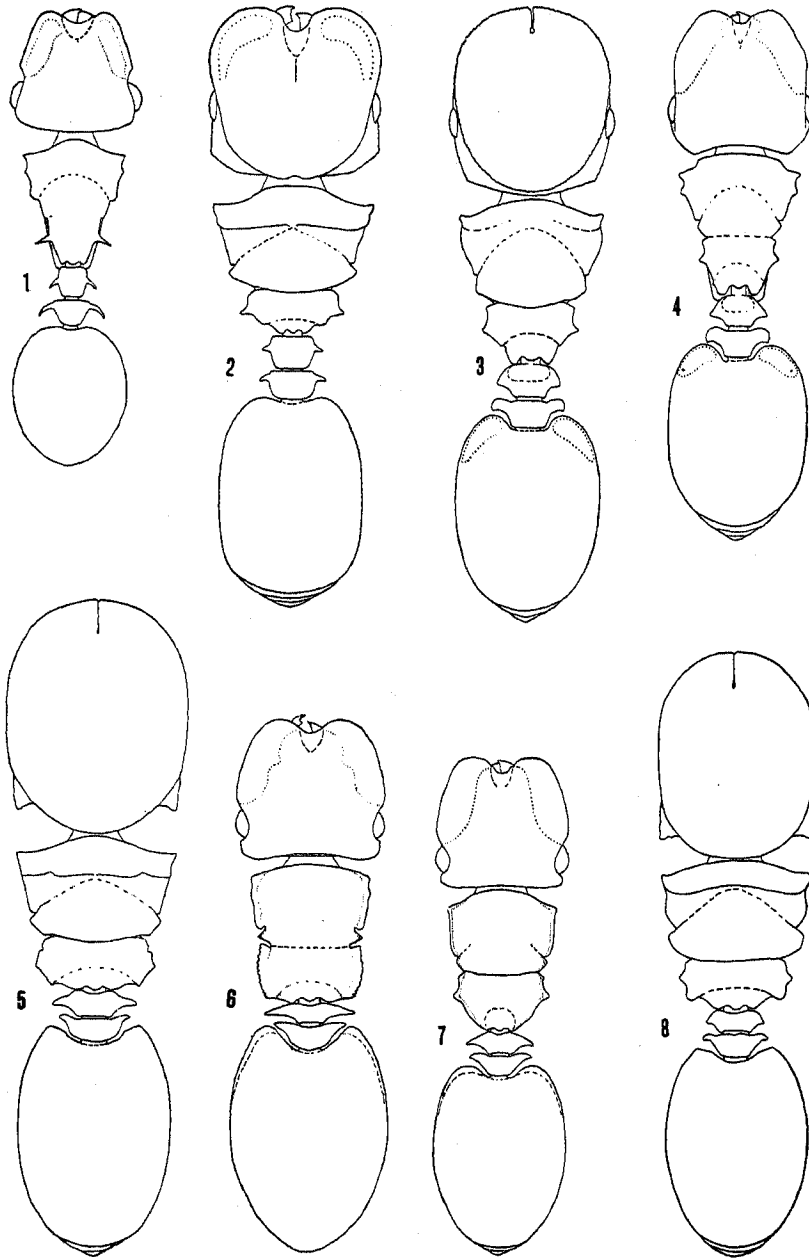
Paracryptocerus (*Harnedtia*) females in dorsal aspect: Fig. 1. *fleddermanni* (paratype). — Fig. 2. *targionii* (Trinidad). — Fig. 3. *striativentris* (Itajai, SC). — Fig. 4. *coffeae* (paratype). — Fig. 5. *curvistriatus* (Costa Rica). — Fig. 6. *sobrius* (paratype).



Paracryptocerus (Harnedia): Figs. 1-4. Fore wing of females. — Figs. 5-8. Peduncle in profile, soldiers. — Figs. 9-12. Peduncle in profile, worker. — Figs. 13-15. Hind femora in profile, soldiers. — Fig. 1. *sobrius*. — Fig. 2. *curvistriatus*. — Fig. 3. *umbraculatus*. — Fig. 4. *striativentris*. — Fig. 5. *angustus*. — Fig. 6. *aztecus*. — Fig. 7. *texanus*. — Fig. 8. *coffea*. — Fig. 9. *umbraculatus*. — Fig. 10. *targonii*. — Fig. 11. *curvistriatus*. — Fig. 12. *rohweri*. — Fig. 13. *aztecus*. — Fig. 14. *curvistriatus*. — Fig. 15. *coffea*.



Paracryptocerus (Harnedia) umbraculatus (F.): Fig. 1. female (Abuná, GR). —
Fig. 2. worker (Vila Velha, ES). — Fig. 3. soldier (Mt. Hope CZ). — Fig. 4.
Peduncle in profile, soldier. — Fig. 5. Hind femur in profile, soldier.



Paracryptocerus, soldiers and workers in dorsal aspect. — Figs. 1-2. *P. (Harnedia) wheeleri*: Fig. 1. worker (paratype). — Fig. 2. soldier (lectotype). — Figs. 3-8. *P. (Cyathomyrmex)*: Fig. 3. *setulifer* (soldier, Costa Rica). — Fig. 4. *setulifer* (worker, Costa Rica). — Fig. 5. *pallens* (soldier, Agudos, SP). — Fig. 6. *pallens* (worker, Agudos, SP). — Fig. 7. *varians* (worker, Cuba). — Fig. 8. *varians* (soldier, Cuba).