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**A Revision of the Neotropical Ants of the
Genus *Cyphomyrmex* Mayr. Part I. Group of
strigatus Mayr (Hym. Formicidae)**

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A Revision of the Neotropical Fungus-Growing Ants of the
Genus *Cyphomyrmex* Mayr. Part I: Group of *strigatus* Mayr
(Hym., Formicidae).

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(With 55 figures and 2 tables)

Introduction

Among the small-sized Attine ants, the genus *Cyphomyrmex* is at once rather distinctive and comparatively rich in species. The genus is presently accepted in the restricted sense of subgenus *Cyphomyrmex* (Emery, 1913: 251; 1922: 341), whereas the other four subgenera, viz. *Mycetarotes*, *Mycetophylax*, *Mycetosoritis* and *Trachymyrmex* are now generally treated as independent genera. The evidence in favor of this position is growing steadily. But there remain a few problems concerning the relationship between *Cyphomyrmex* and certain species of the genera *Mycetophylax* and *Mycetosoritis*.

As far as *Mycetophylax* is concerned, its status became uncertain when I discovered that the type species *brittoni* (Wheeler) was a junior synonym of *Cyphomyrmex conformis* Mayr. Although the latter is in many ways quite close to *Cyphomyrmex morschi* Emery, its lack of a clearly bordered antennal scrobe speaks for its transfer to *Mycetophylax*. Thus *Mycetophylax* was saved from synonymy and *Cyphomyrmex* became much more homogeneous (cf. Kempf, 1962: 34-35).

The situation of *Mycetosoritis asper* (Mayr) and *M. clorindae* Kusnezov offers a tougher problem. Both are rather distinct from the type species *M. hartmanni* (Wheeler), on account of their clearly circumscribed antennal scrobe, in the fashion of the *strigatus*-group of *Cyphomyrmex*. Since the male of both species in question is still unknown, and both possess standing hairs at least on parts of the body and appendages, I suggest to keep them out of *Cyphomyrmex*, if only as a provisional and temporary measure.

Thus, after establishing the boundaries of this investigation, it is possible to retain the group definition given by Emery (1922: 341) and to go on with the species level review, the principal scope of the present study. But first a brief synopsis of the chief attempts at synthesis and revision made heretofore.

Mayr (1887: 556-557) published the first key to the 6 species known at that time. Emery's (1894: 224-227) and Wheeler's (1907: 719-727) contributions deserve special mention, because in addition to the description of new forms, they also tried to review the difficult *rimosus*-complex. Santschi (1931: 278-281) has critically dealt with several southern forms; but prisoner of the prevailing quadrinomial system and given to excessive splitting, he failed to reach satisfactory results.

Weber (1940: 408-413) undertook the arduous task of compiling a comprehensive key to all the species, subspecies and varieties of *Cyphomyrmex*, at a time when myrmecology had not yet broken the shackles of the highly artificial taxonomic system, built up principally by Forel. Hence he had to juggle strenuously in order to accommodate in his key the profusion of infraspecific variants, to which he himself added freely. One serious flaw in Weber's key consists in the misplacement of *olitor* and *lectus*, which are quite distinct from *rimosus*, and close to *morschi*, *bruchii* and *daguerrei*.

Kusnezov (1949: 427-456; 1957: 9-12) has twice dealt with the Argentine forms. He described new species and presented keys for the identification of workers, but without proper assimilation of the work of his predecessors. Much more critical is Creighton's treatment of the two North American forms of the genus (1950: 310-317), which also contains a detailed discussion of the *rimosus-minutus* tangle.

True revisionary work was continued by Weber (1958: 259-261) who proposed two new synonyms in the *rimosus* complex upon a study of types in the Emery collection. My own recent contribution (Kempf, 1962: 29-35) was already mentioned above and will be referred to again further below. The imposing wealth of published data on the biology of several forms of the genus will be briefly disclosed under the respective species.

Acknowledgments. — In addition to copious material contained in my private collection (WWK), which also includes the former Borgmeier collection of ants (CTB), I have received on loan critical specimens, especially types, from the following sources: Departamento de Zoologia da Secretaria de Agricultura do Estado de São

Paulo (DZSP), through the courtesy of Mr. Karol Lenko; Museum of Comparative Zoology at Harvard University (MCZ), through the courtesy of Dr. Howard E. Evans; Muséum d'Histoire Naturelle de Genève (MHNG), through the courtesy of Dr. C. Besuchet; Instituto Miguel Lillo de Tucumán (ML), through the courtesy of Dr. W. Weyrauch; Naturhistorisches Museum, Basel (NHMB), through the courtesy of Dr. Fred Keiser; Naturhistorisches Museum, Wien (NHMW), through the courtesy of Dr. Max Fischer; private collection of Prof. N. A. Weber (NAW), at Swarthmore College.

I am indebted to the Conselho Nacional de Pesquisas of the Brazilian Government, for the material aid in the form of a fellowship, under which this research was performed. Special thanks are also due to Mr. Fritz Plaumann, of Nova Teutônia, Brazil, for much of the fine material in my collection, which he has collected over the years.

Note. — Before his death in January 1963, the late Dr. N. Kusnezov had promised me to send a good representation, including types, of all the *Cyphomyrmex* species described by him. The last I heard of the proposed shipment, was that he was about to dispatch the package through the mails. However, the package, if ever sent, did not arrive at its destination. Upon further inquiry, Dr. W. Weyrauch, now at the Miguel Lillo Institution, informed me that the official collection of the Institute, in which the Kusnezov collection of ants is deposited, does not contain any material of Kusnezov's types in genus *Cyphomyrmex*, except a few slides with whole mounts of *nemei* females and males and *quebradae* females. A big jar in the alcohol collection with the inscription "*Cyphomyrmex*" only contained empty vials. Dr. Weyrauch found also in the collection of dry, unmounted duplicate material for exchange a few envelopes with series of *nemei*, *quebradae* and *cochunae*, which were sent to me as a gift. Since no type material of *vallensis* and *lilloanus* could be located, it is apparently lost, unless Kusnezov deposited some of it in other collections before his death. I wish to thank Dr. Weyrauch and his staff, who spent many days in searching the Kusnezov collection, in order to fulfill my request.

Cyphomyrmex Mayr

Cyphomyrmex Mayr, 1862: 690 (Type: *Cyphomyrmex minutus* Mayr, 1862 = *C. rimosus minutus* Mayr, worker, monobasic). — Kempf, 1962: 29-30 (Syn.).
Cyphomyrmex (*Cyphomyrmex*): Emery, 1913: 251. — Emery, 1922: 340-342.
Cyphomyrmex (*Cyphomannia*) Weber, 1938: 183 (Type: *Cyphomyrmex* (*Cyphomannia*) *laevigatus* Weber, 1938, worker, by original designation and monobasic).

As regards the generic features, the reader is referred to Emery's diagnosis in the Myrmicinae section of *Genera Insectorum* (1922: 341). It needs only one correction that concerns the development of the preocular carinae, which either curve mesad above eyes in the usual Attine fashion (most species of the *rimosus*-group), or run caudad as a straight pleat to the occipital corner where they join, after forming a loop, the posterior extension of the frontal carinae (all species of the *strigatus*-group).

The subgenus *Cyphomannia* was sunk as a synonym, because its type species, *laevigatus*, belongs to the same group that contains the type species of the nominal subgenus, *rimosus minutus* (cf. Kempf, 1962: 29-30).

To date, *Cyphomyrmex* comprehends 28 species and 17 subspecies and varieties, 12 of which are attached to *rimosus*, 3 to *bigibbosus*, 1 to *salvini* and 1 to *olitor*. As shown previously (Kempf, 1962: 30) the genus is divisible into two rather well-defined species groups, according to characters found in the worker and female caste:

I. Group of *rimosus*: Preocular carina curving mesad above eyes, not joining up with the postocular carina, which extends from the occipital corner to posterior or inferior border of eye (this character is not well-expressed in *longiscapus* and allies, which resemble the *strigatus*-group in this respect); mandibles with 5 teeth only; two or no median pronotal tubercles present. A revision of this group will be taken up in Part II of the present study, to be published at a later date.

II. Group of *strigatus*: Preocular carina extending all the way back to the occipital corner, forming the inferior border of the antennal scrobe; mandibles with 7 or more teeth, gradually diminishing in size towards base; a single median pronotal tubercle usually well-developed in the worker caste.

The present study concerns itself with this group, which comprises the following species and new synonyms (W = worker; F = female; M = male):

1. *auritus* Mayr, 1887, W F M
2. *strigatus* Mayr, 1887, W F M
3. *plummanni* Kempf, 1962, W
4. *paniscus* Wheeler, 1925, W F M
5. *bigibbosus* Emery, 1894, W F M
= *tumulus* Weber, 1938, NOV. SYN.
6. *faunulus* Wheeler, 1925, W F — NOV. STAT.
= *petiolatus* Weber, 1938, NOV. SYN.
7. *morschi* Emery, 1887, W F
= *personatus* Santschi, 1923, NOV. SYN.
8. *daguerrei* Santschi, 1933, W
9. *olitor* Forel, 1893, W F M
= *quebradae* Kusnezov, 1949, NOV. SYN.
10. *vallensis* Kusnezov, 1949, W
11. *bruchi* Santschi, 1917, W
12. *lectus* Forel, 1911, W — NOV. STAT.
13. *nemei* Kusnezov, 1957, W F M
14. *lilloanus* Kusnezov, 1949, W
15. *occultus* n. sp., F (M)

Types of all forms, with the exception of *strigatus*, *bigibbosus*, *vallensis* and *lilloanus*, have been examined.

The group as a whole, is confined to continental South America, and attains its highest degree of diversity in southeastern Brazil and northern Argentina.

On the species level, the present review recognizes 15 species, one of them being described as new to science. Whereas two forms hitherto considered as subspecies are raised to specific rank, four forms are placed into synonymy. The above proposed arrangement is not to be considered as final. Several species, especially those in the vicinity of *olitor*, viz. *daguerrei*, *vallensis*, *bruchi* and *nemei*, are still known only from scanty type material. Inasmuch as the extent of their infraspecific variability has not yet been explored, these species continue subject to doubt and hesitation. That this range is appreciable seems to be suggested by *olitor*, of which copious material is known from southeastern Brazil.

The revision undertaken in the following pages deals exclusively with the worker and female caste. The males are completely set aside, because they are known of only half of the described species. In addition, the scarce material available does not permit a comparative treatment, without which isolated descriptions are practically useless.

Note on measurements. — The total length is the sum of the maximum lengths of head with closed mandibles, thorax, petiole, postpetiole and normally expanded gaster. The head length is the maximum length of the head capsule, in full-face view, between two parallel lines drawn across the anteriormost point of clypeus and the posteriormost point of occiput or occipital lobes: the head width is the maximum width of the head capsule behind the eyes; the thorax length (Weber's length) is obtained in profile, and consists of the distance between the anteriormost point of the pronotum proper and the metasternal angle.

Key to the species for workers

(*C. nemei* and *vallensis* are not included. The worker of *occultus* is still unknown).

1. Promesonotum without tubercles..... 14. *lilloanus* Kusnezov
- Promesonotum with at least some of the tubercles developed..... 2
2. Occipital lobes distinctly auriculate (Figs. 1-6), protruding also in profile (Figs. 44-49); antennal scrobe opaque with indistinct micro-sculpture 3
- Occipital lobes not auriculate (Figs. 7-12), or if somewhat projecting in full-face view, they do not project in profile (Figs. 50-55); antennal scrobe superficially reticulate and somewhat shining..... 8

3. Tergum I of gaster laterally carinate with two additional longitudinal carinae on disc 4
 — Tergum I of gaster lacking discal carinae, lateral ones usually not well-developed 6
4. Occipital lobes horn-like, longer than their maximum width (Fig. 1); mesonotum with high, acute conical spines (Fig. 13).....
 1. *auritus* Mayr
 — Occipital lobes distinctly shorter than their maximum width (Figs. 4, 6); mesonotum bluntly tuberculate (Figs. 17, 18)..... 5
5. Frontal lobes nearly straight and scarcely constricted behind, sub-continuous with frontal carinae (Fig. 4); hind femora noticeably broadened and angulate beneath at basal third, with a prominent foliaceous rim on posterior border..... 3. *plaumanni* Kempf
 — Frontal lobes more rounded and distinctly constricted behind, not continuous with frontal carinae (Fig. 6); hind femora not conspicuously broadened nor angulate at basal third, lacking a foliaceous rim on posterior border..... 2. *strigatus* Mayr
6. Scape in repose surpassing occipital lobe (Fig. 3); pronotal and posterior mesonotal tubercles well-developed and conical; epinotum in profile angulate or dentate (Fig. 20)..... 4. *paniscus* Wheeler
 — Scape in repose not surpassing occipital lobe (Figs. 2, 5); only anterior mesonotal tubercles well-developed, high and conical, all other very low, tumuliform (Figs. 15, 16); epinotum in profile rounded and unarmed 7
7. Posterior border of postpetiole deeply excised (Fig. 30).....
 5. *bigibbosus* Emery
 — Posterior border of postpetiole straight (Fig. 31).....
 6. *faunulus* Wheeler
8. Basal face of epinotum very short and completely unarmed (Fig. 14); frontal carinae covering the upper orbit of eye in full-face view (Fig. 12); inferior occipital corner with a foliaceous rim (Fig. 55) 12. *lectus* Forel
 — Basal face of epinotum almost as long as declivous face, bearing posteriorly a pair of at least feeble tubercles or teeth; frontal carinae less expanded laterad, not reaching the upper orbit of eye in full-face view; inferior corner of occiput without a foliaceous rim.... 9
9. Posterior loop of antennal scrobe only vestigially marginate, its lateral border not coinciding with lateral border of head (Fig. 11); antero-inferior corner of pronotum produced forward in a short spine (Fig. 24)..... 7. *morschi* Emery
 — Posterior loop of antennal scrobe sharply marginate, its lateral border coinciding with lateral border of head; antero-inferior corner of pronotum subrectangular 10
10. Scape in repose conspicuously surpassing the occipital corner (Fig. 8); hind femora longer than maximum length of head capsule, ventrally not dilated nor carinate at basal third.....
 8. *daguerrei* Santschi
 — Scape in repose barely if at all surpassing the occipital corner; hind femora not longer than maximum length of head capsule, ventrally dilated or angulate and carinate at basal third..... 11
11. Lateral lobes of petiole ventrally deeply excavate, outer borders broadly foliaceous; midpronotal and antero-lateral mesonotal tubercles indistinct, dorsum of thorax in profile strikingly flat (Fig. 21).....
 10. *bruchi* Santschi

- Lateral lobes of petiole ventrally at most shallowly excavate and mostly solid; midpronotal and antero-lateral mesonotal tubercles distinct, dorsum of thorax in profile convex with prominent tubercles and deeper impressions (Figs. 19, 23)..... 9. *olitor* Forel

Key to the known females

1. Tergum I of gaster with 4 longitudinal carinae, two on disc and one on each side 2
- Tergum I of gaster lacking a pair of longitudinal carinae on disc; sides either marginate or immarginate..... 3
2. Occipital lobes long, horn-like, longer than their width at base; midpronotal tubercles usually present; epinotal spines well-developed
 1. *auritus* Mayr
- Occipital lobes short and rounded, shorter than their width at base; midpronotal tubercles always absent; epinotum practically unarmed..
 2. *strigatus* Mayr
3. Antennal scrobe densely but indistinctly granulate and opaque; paraptera of mesonotum with a tooth that either projects upward or caudad 4
- Antennal scrobe sharply and distinctly reticulate and somewhat shining; paraptera of mesonotum flattened above, its lateral and posterior margin completely rounded without a projecting tooth.. 6
4. Antennal scape in repose surpassing occipital lobes; epinotal spines well developed; lateral borders of gastric tergum I marginate.....
 4. *paniscus* Wheeler
- Antennal scape in repose not surpassing occipital lobes; epinotal spines at best vestigial; lateral borders of gastric tergum I immarginate 5
5. Posterior border of postpetiole with a deep mesial excision, flanked by prominent tubercles. 5. *bigibbosus* Emery
- Posterior border of postpetiole straight, without a mesial excision..
 6. *faunulus* Wheeler
6. Hind femora longer than head capsule, slender, ventrally not gradually dilated towards basal third nor angulate, their posterior ventral border not carinate; antennal scape in repose surpassing occipital angle or lobe 7
- Hind femora shorter than head capsule, ventrally gradually dilated towards basal third where they form a more or less distinct angle; their postero-ventral border carinate to crested; antennal scape in repose not surpassing occipital lobe..... 8
7. Petiole longer than broad, its dorsum with a pair of prominent and laterally compressed teeth; maximum diameter of eyes nearly one third of head length..... 15. *occultus* n. sp.
- Petiole broader than long, dorsally completely flattened without teeth; maximum diameter of eyes less than one fourth of head length 7. *morschi* Emery
8. Longitudinal furrow on tergum I of gaster broad and distinct, traversed by regulae; epinotal spines almost obsolete.....
 13. *nemei* Kusnezov
- Longitudinal furrow on tergum I of gaster less distinctly impressed, not traversed by regulae; epinotal spines usually fairly well developed
 9. *olitor* Forel

Species	Total L.	Head L.	Head W.	Thorax L.	H.femur L.
<u>auritus</u>	4.1-4.8	1.01-1.25	0.85-0.99	1.28-1.47	1.20-1.47
<u>paniscus</u>	4.1-4.5	1.01-1.07	0.93-0.98	1.23-1.36	1.20-1.25
<u>daguerrei</u>	3.4	0.80-0.83	0.75	1.01-1.07	0.85
<u>faunulus</u>	3.4-4.0	0.80-0.98	0.75-0.85	1.01-1.20	0.96-1.20
<u>bigibbosus</u>	3.2-3.4	0.75-0.83	0.67-0.75	0.92-1.04	0.83-0.91
<u>plaumanni</u>	3.2-3.4	0.82-0.91	0.69-0.79	0.98-1.07	0.72-0.83
<u>strigatus</u>	2.9-3.7	0.75-0.89	0.67-0.80	0.91-1.17	0.72-0.98
<u>bruchii</u>	3.0	0.72	0.72	0.93	0.67
<u>olitor</u>	2.6-3.5	0.64-0.85	0.56-0.77	0.78-1.09	0.59-0.83
<u>lectus</u>	2.7-2.8	0.64-0.67	0.59-0.61	0.80-0.83	0.59-0.61
<u>morschi</u>	2.5-3.0	0.64-0.72	0.52-0.64	0.75-0.93	0.61-0.80

Table I

Comparison between critical measurements of workers

Species	Total L.	Head L.	Head W.	Thorax L.	H.femur L.
<u>auritus</u>	5.4	1.20	0.99	1.65	1.60
<u>paniscus</u>	5.2	1.12-1.15	1.04-1.07	1.60	1.39-1.44
<u>faunulus</u>	4.2-4.8	0.96-1.07	0.83-0.93	1.25-1.41	1.07-1.28
<u>strigatus</u>	4.0-4.3	0.93-0.96	0.83-0.91	1.23-1.36	0.91-1.07
<u>occultus</u>	4.0	0.83-0.88	0.72	1.17-1.28	1.01-1.06
<u>bigibbosus</u>	3.8	0.84	0.79	1.20	0.96
<u>morschi</u>	3.5-3.8	0.80-0.83	0.69-0.72	1.07-1.15	0.85-0.98
<u>nemei</u>	3.5	0.80	0.69	1.04	0.75
<u>olitor</u>	3.3-3.5	0.75-0.80	0.67-0.72	0.96-1.07	0.72-0.75

Table II

Comparison between critical measurements of females

1. *Cyphomyrmex auritus* Mayr

(Figs. 1, 13, 25, 46)

Cyphomyrmex auritus Mayr, 1887: 559-561 (Worker, female, male; Brazil: Santa Catarina). — Moeller (1893), 1941: 103-109, pl. 7, fig. 25 (Brazil, Santa Catarina: Blumenau; Bion.). — Luederwaldt, 1926: 268 (Brazil, Santa Catarina: Ibirama; Bion.).

Types. — In the Mayr collection at the "Naturhistorisches Museum", Vienna, Austria; not seen. A single worker, from Santa Catarina State, formerly belonging to the H. v. Jhering collection (now DZSP), is probably a syntype of Mayr's original series, as suggested by the peculiar type of mounting.

Worker. — Total length 4.1-4.8 mm; head length 1.01-1.25 mm; head width 0.85-0.99 mm; thorax length 1.28-1.47 mm; hind femur length 1.20-1.47 mm. Yellowish brown to dark reddish brown. Integument densely granular, opaque, including antennal scrobe.

Head as shown in Fig. 1. Mandibles with 8-9 teeth. Clypeus: anterior border mesially excised, middle portion obliquely raised towards front, with two prominent teeth next to origin of frontal lobes. Two pairs of longitudinal carinae on dorsum of head, one in front, following the impressed frontal area, the other more widely spaced on vertex. Supraocular tooth conical and prominent, with a subcarinate ridge arising from its base and extending obliquely backwards to the inferior occipital angle on sides of head. Inferior or outer border of antennal scrobe only vestigially carinate between eyes and occipital lobes. The latter auriculate or horn-like (Fig. 46), each considerably longer than its maximum width. Lower border of sides of head carinate. Antennal scape in repose not projecting beyond tip of occipital lobe. All funicular segments distinctly longer than broad.

Thorax as shown in Fig. 13. Pronotum: anterior and lateral border of dorsal face marginate to carinate; a single low conical median tubercle on disc; lateral tubercles low, tooth-like; antero-inferior corner with a small, subacute tooth. Mesonotum: 2 pairs of long conical teeth, the anterior pair longest. A broad and deep impression between the posterior mesonotal tooth and the anterior end of the paired longitudinal carinae of basal face of epinotum, which terminate posteriorly in a small tooth. Legs slender and long; femora lacking carinate ventral edges; hind femora not conspicuously dilated nor ventrally angulate on basal third.

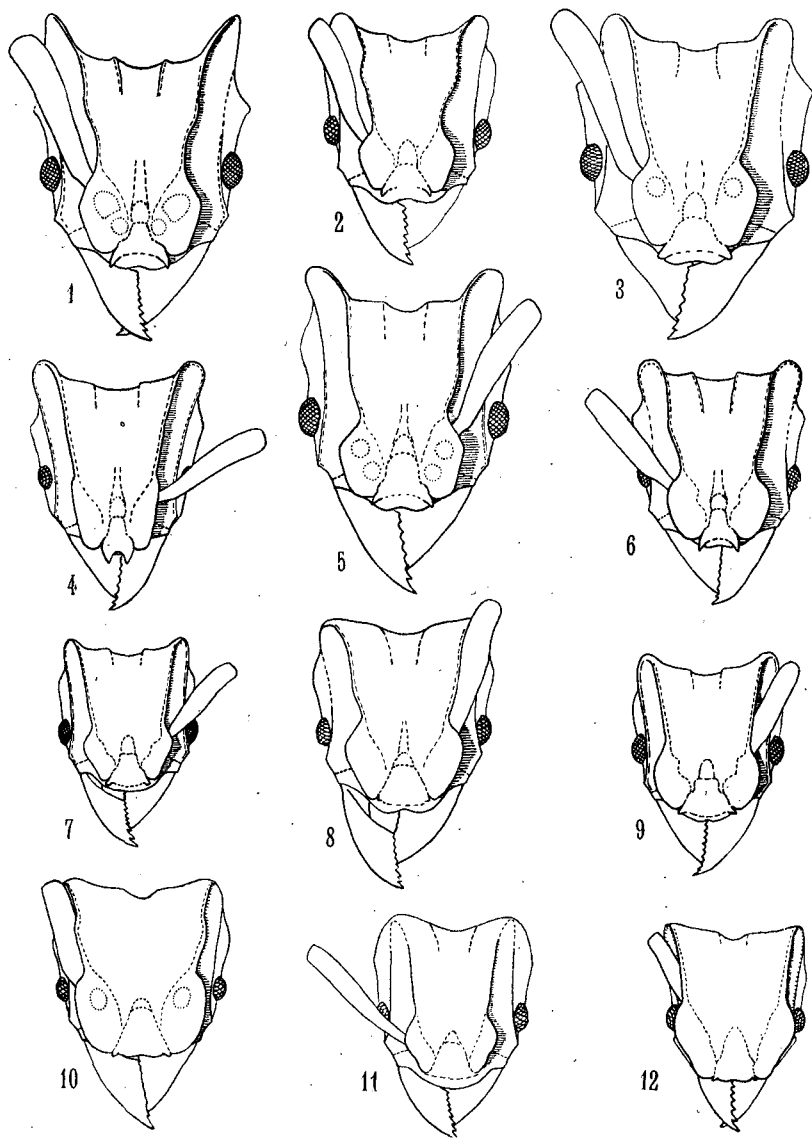
Pedicle as shown in Figs. 13 and 25. Petiole, in dorsal view, with a quadrate node, anterior corners angulate, dorsum with a pair of short, tooth-like ridges. Postpetiole usually not

broader than long, its sides subparallel; in profile, perpendicularly raised in front below the prominent, paired, anterior tubercles, connected with the paired posterior tubercles by subparallel longitudinal blunt ridges; space between ridges excavate, more deeply so on posterior half. First tergum of gaster with a pair of median and another pair of lateral sharp longitudinal carinae, the median pair often tuberculate near its anterior end.

Hairs appressed, scarce, minute, fine, not scalelike, slightly more conspicuous along ridges, on spines and on tubercles; still more prominent on scapes and legs.

F e m a l e. — Total length 5.4 mm; head length 1.20 mm; head width across supraocular spine 0.99 mm; thorax length 1.65 mm; hind femur length 1.60 mm. Very much like the worker, with the differences of the caste. Head exactly as in worker, with the same prominent occipital lobes. Anterior half of middle portion of clypeus perpendicular to posterior half, wedged in between frontal carinae, both faces forming at their junction a marked emarginate edge between the lateral clypeal teeth. Lateral ocelli situated on the outer face of the paired ridges of vertex. Pronotum with a single median tubercle, and a lateral tooth on each side, the latter connected with the anterior border by a low but marked carina, separating the dorsum from the sides of pronotum; antero-inferior tooth acute and prominent. Scutum with a broad and deeply impressed Y-like furrow, the area between the arms of the Y raised, laterally marginate, mesially excavate; lateral areas forming a blunt and raised tuberosity, mesad along stem of Y-shaped furrow, being excavate laterad, with a deeply impressed pit next to transcutal suture; the lateral border forming a prominent, upturned ridge. Scutellum antero-mesially impressed, paraptera with a prominent tubercle; postero-mesial portion of scutellum bidentate, with a low, blunt tubercle preceding each tooth. Epinotal spines subtriangular, blunt at apex, prominent. Legs as in worker, but femora ventrally faintly marginate yet not incrassate at basal third, not forming an angle on flexor face. Petiole as in worker, but postpetiole is decidedly transverse, i. e. the sides are conspicuously diverging caudad, the anterior tubercles are slightly lower and the posterior tubercles are more widely separate. Gaster with the two pairs of longitudinal sharp carinae as in worker.

M a l e described by Mayr (1887). No specimens seen.



Cyphomyrmex Mayr

Head of worker in full-face view. Fig. 1. *auritus* Mayr. — Fig. 2. *bigibbosus* Emery. — Fig. 3. *paniscus* Wheeler (paratype). — Fig. 4. *plaumanni* Kempf (holotype). — Fig. 5. *faunulus* Wheeler. — Fig. 6. *strigatus* Mayrs. — Fig. 7. *olitor* Forel (lectotype). — Fig. 8. *daguerrei* Santschi (paratype). — Fig. 9. *quebradae* Kusnezov (= *olitor* Forel) (lectotype). — Fig. 10. *bruchi* Santschi (lectotype). — Fig. 11. *morschi* Etzery (?syntype). — Fig. 12. *lectus* Forel (lectotype). — Kempf *del.*

Distribution. — So far, this species has been collected only in the Itajaí River valley in Santa Catarina State, and in the costal mountain range near São Paulo City.

Specimens examined: Brazil, Santa Catarina State, s/loc., 1 worker (syntype?) (DZSP), Ibirama (H. Luederwaldt) 8 workers (DZSP, WWK); São Paulo State: Alto da Serra (R. Spitz) 14 workers, 1 female (WWK), Estação Biológica de Boracéia near Salesópolis (K. Lenko) 32 workers, 1 female (DZSP, WWK).

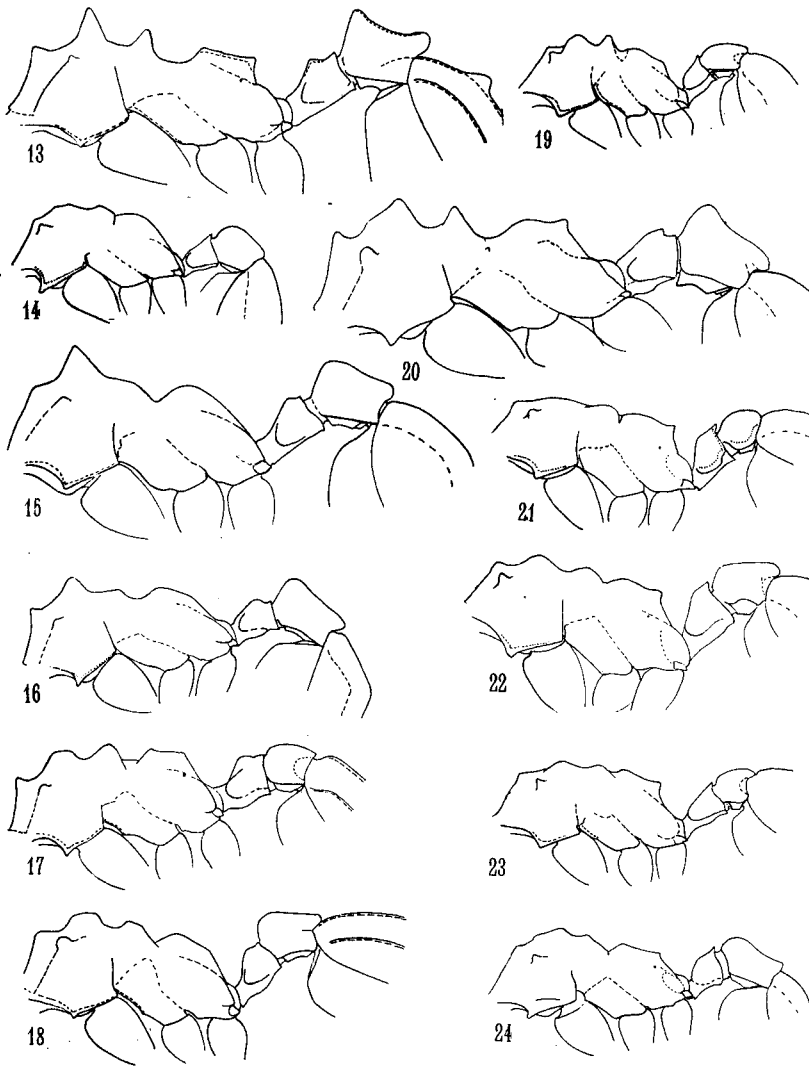
Discussion. — *C. auritus* is a highly distinctive species and its closest relative is *strigatus*, a smaller sympatric form, from which it is however easily separated by the characters given in the key. Further differences will be given under *strigatus*.

Bionomics. — Moeller (1893) found this species to be rather common in the environs of Blumenau, where he performed his pioneering studies on the fungus culture of Attine ants. Excluding strays, he detected about 50 colonies of *auritus* and *strigatus*, the exact number for each species is not given. Nests are preferably established in rotten wood in advanced state of decay. Cavities are generally small, usually not measuring more than 8 cc in volume. One nest, under the bark of a decaying log, was flat, measuring 15 by 15 cm. Like most small Attini, *C. auritus* workers were feigning death upon being disturbed, but recovered more speedily from the cataleptic state than *Apterostigma* workers. The fungus garden consisted of a regular sponge-like mass, similar to that of *Apterostigma pilosum* and *A. moelleri*, built upon the floor of the nest. The substrate consisted mainly of insect feces. In artificial nests the ants accepted eagerly saw-dust and manioc flour as substrate. Although the specific identity of the fungus is not known, it seems to be a basidiomycete. The gongyliidia of the fungus cultivated by *auritus* are irregular in shape and thickness (cf. Moeller, pl. 7, fig. 25), different from those obtained in the culture of *strigatus* nests. In captivity both species accepted and ate each others' fungus, rejecting however that of *Apterostigma* and *Acromyrmex* species.

The colony discovered by Spitz in the vicinity of Alto da Serra, São Paulo State, consisted of approximately 30 workers and 1 dealate queen. The nest was in a decaying log in the forest. The substrate consisted of small vegetable debris, which gave the alcohol, in which it was preserved, a greenish color. The colony encountered by Lenko at Boracéia was also in a decaying log, facing another log, and numbered 32 workers and 1 female.

Luederwaldt's (1926) observations agree essentially with the preceding data. He found a nest of *auritus*, containing approximately 60 workers between epiphytic roots, in an artificially enlarged cavity. The fungus garden was subglobular, having half the size of a chicken's egg. Upon opening the nest, the ants fell into the well-known cataleptic state.

Note. — According to Mayr's description, the female lacks a median pronotal tubercle. The two queens observed by myself have a rather well-developed median tubercle, as stated in the description. Perhaps this is a variable feature.

*Cyphomyrmex* Mayr

Thorax and pedicel of worker in side-view. Fig. 13. *auritus* Mayr. — Fig. 14. *lectus* Forel (lectotype). — Fig. 15. *faunulus* Wheeler. — Fig. 16. *bigibbosus* Emery. — Fig. 17. *plaumanni* Kempf (paratype). — Fig. 18. *strigatus* Mayr. — Fig. 19. *olitor* Forel (lectotype). — Fig. 20. *paniscus* Wheeler (paratype). — Fig. 21. *bruchi* Santschi (lectotype). — Fig. 22. *daguerrei* Santschi (paratype). — Fig. 23. *quebradae* Kusnezov (lectotype). (= *olitor* Forel). — Fig. 24. *morschi* Emery (?syntype). — *Kempf det.*

2. *Cyphomyrmex strigatus* Mayr

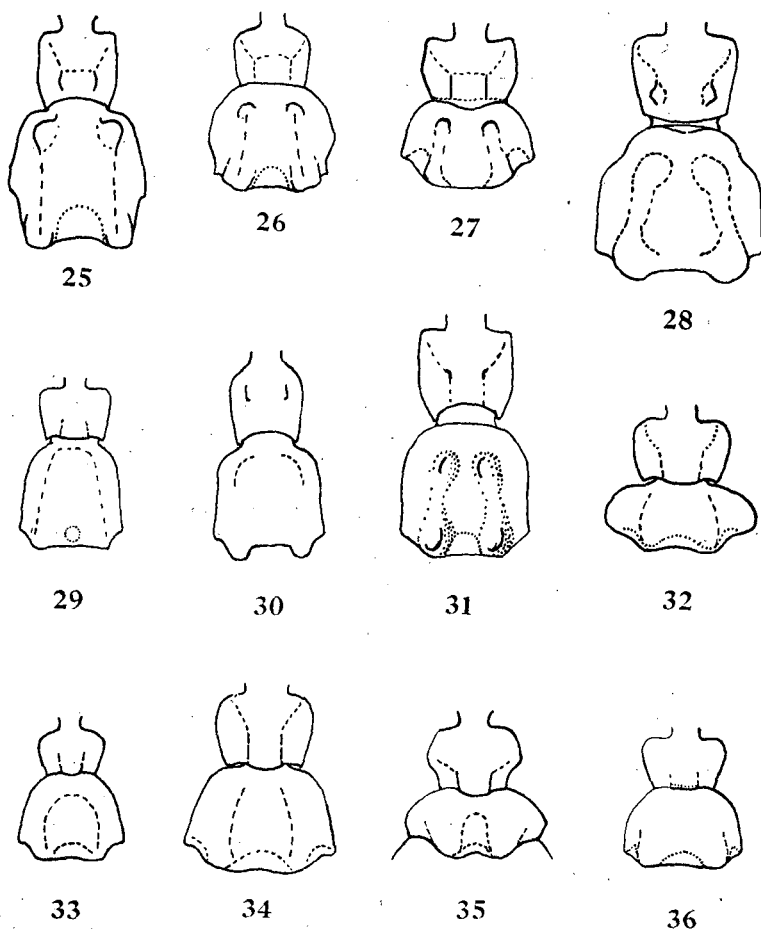
(Figs. 6, 18, 26, 44)

Cyphomyrmex strigatus Mayr, 1887: 558-559 (Worker; Brazil: Santa Catarina). — Forel, 1893: 606-607 (Female, male; Brazil, Santa Catarina: Blumenau). — Moeller (1893), 1941: 105-107, pl. 7, fig. 26 (Worker; Brazil, Santa Catarina: Blumenau; Bion.). — Forel, 1911: 295 (Brazil, São Paulo: Raiz da Serra). — Luederwaldt, 1926: 268 (Bion.). — ? Wheeler, G. C., 1948: 669-670, pl. 2, figs. 7-8 (Larvae; Panama Canal Zone).

Types. — Worker, in the Mayr collection at the "Naturhistorisches Museum, Wien". Not seen.

Worker. — Total length 2.9-3.7 mm; head length 0.75-0.89 mm; head width 0.67-0.80 mm; thorax length 0.91-1.17 mm; hind femur length 0.72-0.98 mm. Yellowish brown to dark ferruginous. Integument, including antennal scrobe, indistinctly granulate and opaque. Differs from *auritus* as follows: 1. Smaller in size. Body more compact. Hind femur distinctly shorter than thorax length. 2. Auriculate occipital lobes (Figs. 6, 44) much less protruding, usually shorter than their maximum diameter. Supraocular tooth blunt and obtuse, lacking a distinct ridge between its base and the inferior occipital angle. Funicular segments 2-8 not longer than broad. 3. Lateral pronotal tubercles blunt and stout. Mesonotal armature (Fig. 18) relatively low, consisting of blunt tubercles. Longitudinal ridges on basal face of epinotum blunt, without a prominent tooth on posterior corner. Femora feebly marginate on flexor face. Hind femora gently and gradually thickening from base to basal third, where they form an obtuse, at most weakly carinate, angle on flexor face. 4. Petiolar node subquadrate, occasionally somewhat transverse, its anterior corners in dorsal view rounded; longitudinal crests on dorsum only vestigial. Postpetiole with anterior face moderately raised in vertical direction, anterior dorsal tubercles feeble, sides convex, somewhat constricted to slightly diverging behind: in dorsal view little to somewhat transverse. 5. Appressed hairs on frontal lobes, borders of frontal carinae, frontal and vertical ridges, thoracic tubercles, pedicelar tubercles and ridges, gaster, scapes and legs conspicuous and scale-like.

Female. — Total length 4.0-4.3 mm; head length 0.93-0.96 mm; head width 0.83-0.91 mm; thorax length 1.23-1.36 mm; hind femur length 0.91-1.07 mm. Characters as given for the worker, with the same differences from *auritus*. Note the following: Lateral pronotal tubercles blunt and stout. Scutum and scutellum with shallower depressions and very low and blunt tuberosities. Epinotal tooth tubercular, small to vestigial. Scale-like hairs especially conspicuous on scutum and scutellum.



Cyphomyrmex Mayr

Pedicel of worker in dorsal view. Fig. 25. *auritus* Mayr. — Fig. 26. *strigatus* Mayr. — Fig. 27. *plaumanni* Kempf (paratype). — Fig. 28. *paniscus* Wheeler (paratype). — Fig. 29. *morschi* Emery (syntype). — Fig. 30. *bigibbosus* Emery. — Fig. 31. *faunulus* Wheeler. — Fig. 32. *bruchii* Santschi (lectotype). — Fig. 33. *oilor* Forel (lectotype). — Fig. 34. *daguerrei* Santschi (paratype). — Fig. 35. *quebradae* Kusnezov (lectotype) (= *oilor* Forel). — Fig. 36. *lectus* Forel (lectotype). — Kempf del.

Male described by Forel (1893). No specimens seen.

Distribution. — This species is known to occur in southeastern Brazil, from Rio Grande do Sul to Rio de Janeiro States. The Panamanian record given by G. C. Wheeler (1949), who described the larvae, is questionable. These specimens probably belong to *costatus* or a related species of the *rimosus* group, possessing the same longitudinal median carinae on first gastric tergum as *auritus*, *strigatus* and *plaumanni*.

Specimens examined. — 17 workers and 5 dealate females, as follows: Brazil, Rio Grande do Sul: Barros Cassal, IX-1960 (F. Flaumann) 1 worker (WWK); Santa Catarina State: Nova Teutônia, VII-1959 - VII-1961 (F. Plaumann) 5 workers, 4 females (all strays from berlesate collections) (WWK); Paraná State: Rio Azul, X-1959 (F. Plaumann) 2 workers (WWK); São Paulo State: Raiz da Serra (on São Paulo-Santos Railroad (Luederwaldt) 3 workers (CTB) (DZSP), Ilha dos Búzios, 26-X-1963 (K. Lenko) 5 workers, 1 female (DZSP); Rio de Janeiro State: Glicério nr. Macaé, II-1956 (C. R. Gonçalves) 1 worker (CTB).

Discussion. — The drawings of the worker were based upon a Nova Teutônia specimen (VI-1960). The variation observed is negligible. The specimens from Raiz da Serra, S.P., are lighter, yellowish brown in color, and have the continuation of the preocular carinae behind eyes (inferior border of antennal scrobe) distinct and slightly carinate, the postpetiole more transverse. The single worker from Glicério, R.J., is the smallest, and has the longitudinal carinae of first gastric tergite rather obtuse, in part only vestigial.

Bionomics. — According to Moeller (1893) this species resembles *auritus* as regards the nest side and shape, and the cataleptic behavior of workers upon being disturbed. The fungus garden, however, is of a different aspect, consisting in an irregular agglomerate of small pellets of substrate, loosely heaped one upon another, as in *Apterostigma wasmanni* For. The *mycelium* shows the bromatia or gongylidia better differentiated than in that of *auritus* (cf. Moeller's figures 25 and 26). Yet *auritus* workers in artificial nests freely fed on *strigatus* fungus and viceversa. The sporophore of the fungus is not known, but seems to be a basidiomycete.

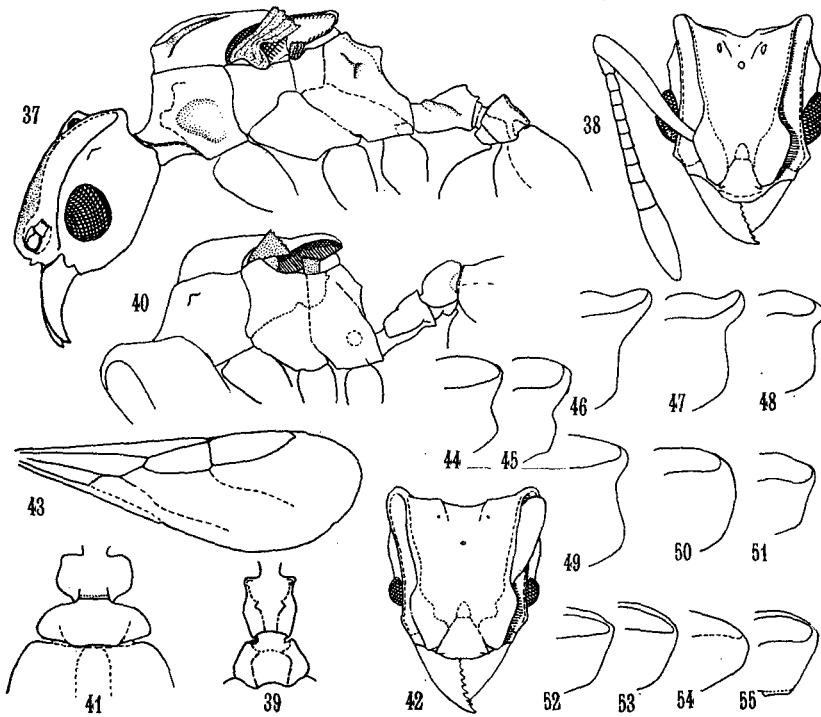
Lüderwaldt (1926) discovered a nest under the bark of a decaying tree. The cavity was rounded-elongate, the fungus mass dirty yellowish and irregular in aspect. The colony consisted of approximately 30 workers.

3. *Cyphomyrmex plaumanni* Kempf

(Figs. 4, 17, 24, 45)

Cyphomyrmex plaumanni Kempf, 1962: 31-33, figs. 29-31 (Worker; Brazil: Santa Catarina, Rio Grande do Sul, Paraná).
? *Cyphomyrmex auritus*: Emery, 1922 (nec Mayr, 1887), pl. 7, figs. 13, 13b (Female: head and fore wing).

Types. — Holotype worker from Nova Teutônia, Santa Catarina State, Brazil (Plaumann) Oct. 1955; 3 paratypes workers likewise from southeastern Brazil: Rio Grande do Sul State, Barros Cassal, Sept. 1960 (F. Plaumann) 1 worker; Erechim, July 1960 (F. Plaumann) 1 worker; Paraná State: Rio Azul, 1000 m, October 1959 (F. Plaumann) 1 worker. All in this author's collection (WWK).

*Cyphomyrmex* Mayr

Figs. 37-39. *occultus* n. sp., female, holotype. Fig. 37. Body in side-view. Fig. 38. Head in full-face view. Fig. 39. Pedicel in dorsal view. — Figs. 40-43. *nemei* Kusnezov, female, lectotype. Fig. 40. Thorax and pedicel in side view. Fig. 41. Pedicel in dorsal view. Fig. 42. Head in dorsal view. Fig. 43. Fore wing. — Figs. 44-45. Occiput of worker in side-view. Fig. 44. *strigatus* Mayr. Fig. 45. *plaumanni* Kempf. Fig. 46. *auritus* Mayr. Fig. 47. *faunulus* Wheeler. Fig. 48. *bigibbosus* Emery. Fig. 49. *paniscus* Wheeler. Fig. 50. *daguerrei* Santschi. Fig. 51. *ollitor* Forel. Fig. 52. *quebradae* Kusnezov. Fig. 53. *bruchi* Santschi. Fig. 54. *morschi* Emery. Fig. 55. *lectus* Forel. — Kempf del.

Worker. — Total length 3.2-3.4 mm; head length 0.82-0.91 mm; head width 0.69-0.79 mm; thorax length 0.98-1.07 mm; hind femur length 0.72-0.83 mm. Fuscous brown; opaque. Rather close to *strigatus*, with the following diagnostic characters: 1) Postero-median portion of clypeus of peculiar shape, with the teeth close together, and prominently overhanging the vertical and slightly excavate anterior portion of clypeus (Fig. 4). 2) Frontal carinae scarcely expanded in front, scarcely rounded, little constricted behind. 3) Preocular carina reaching back to occipital corner as a well-developed, slightly raised carinule, never just vestigial behind eyes. 4) Femora and tibiae prismatic, hind femora broadened beneath ab basal third, with a prominent foliaceous laminule projecting from the posterior border which,

in side view, forms a distinct angle. Apical half of tibial borders distinctly marginate. 5) Postpetiole scarcely elevated in front, without an anterior vertical face; conspicuously transverse and never longer than petiolar node (Fig. 17). 6) Appressed pilosity fine, minute and inconspicuous, never scale-like.

Distribution. — Known only from the four stray type workers, this species is apparently confined to southeastern Brazil.

Note. — Fig. 4 (head) is based upon the holotype specimen, Figs. 17 and 27 were drawn from the Barros-Cassal paratype.

4. *Cyphomyrmex paniscus* Wheeler

(Figs. 3, 20, 28, 49)

Cyphomyrmex paniscus Wheeler, 1925: 42-44 (Worker, female, male; Brazil).

Types. — 3 workers and 3 alate females (MCZ), collected by Hj. Mosén in Brazil (locality not given), examined.

Worker (lectotype). — Total length 4.5 mm; head length 1.07 mm; head width 0.98 mm; thorax length 1.36 mm; hind femur length 1.25 mm. Light reddish brown. Integument opaque and finely granular, including the antennal scrobe.

Head as shown in Fig. 3. Mandibles finely striolate-punctate, chewing border serially dentate with (7-) 9 teeth. Clypeus: anterior border mesially excised, middle portion obliquely raised toward front, with two prominent lateral and widely separated blunt teeth next to the origin of frontal lobes. Two pairs of longitudinal carinules on dorsum of head, one extremely feeble just behind the deeply impressed frontal area, the other strong, more widely spaced and posteriorly slightly converging on vertex. Frontal carinae behind moderately expanded frontal lobes scarcely sinuous and slightly diverging. Supraocular tooth conical and prominent, not connected by a low ridge with inferior occipital corner. Inferior or outer border of antennal scrobe only vestigially carinate and somewhat indistinct between eyes and occipital lobes. The latter (Fig. 49) prominent, rounded, not longer than their maximum width. Lower border of sides of head bluntly marginate but not carinate. Antennal scape in repose slightly projecting beyond tip of occipital lobe. All funicular segments distinctly longer than broad.

Thorax as shown in Fig. 20; slender. Pronotum: anterior and lateral border of dorsal face marginate and carinate; a single prominent conical median tubercle on disc; lateral tubercles

likewise prominent, blunt, projecting obliquely sideways; antero-inferior corner of laterotergite with a small, acute tooth. Mesonotum: two pairs of prominent tubercles, anterior pair with elongate, laterally compressed base, triangular in profile, posterior pair of subequal height, subconical. A deep and broad impression between posterior pair of mesonotal teeth and the anterior end of the widely spaced and feeble longitudinal carinules of basal face of epinotum which terminate behind in a small, rectangular tooth (sometimes indistinct). Legs relatively long and slender, hind femora weakly dilated and vestigially carinate on postero-inferior border at basal third.

Pedicel as shown in Figs. 20 and 28. Petiole broader than long, anterior corners in dorsal view narrowly rounded, anterior face oblique, terminating in front of small paired dorsal tubercles. A shallow median impression between these tubercles. Postpetiole broader than long, compact, much broader than petiole, with a long raised perpendicular anterior face; dorsal face quadrituberculate, pairs of each side connected by a faint longitudinal, blunt and posteriorly diverging ridge, area between ridges, and laterad of posterior tubercles shallowly excavate, posterior border of postpetiole between posterior tubercles slightly emarginate. Tergum I of gaster laterally marginate and subcarinate. Instead of a median pair of carinae there is a faint, longitudinal, median impression on anterior half.

Small, fine, glittering and scattered hairs on body and appendages appressed; more conspicuous and denser on scapes and legs.

Female (paratypes). — Total length 5.2 mm; head length 1.12-1.15 mm; head width 1.04-1.07 mm; thorax length 1.60 mm; hind femur length 1.39-1.44. Similar to the worker, with the usual differences of the caste. Differs from *auritus*, as follows:

Head differences as stated below for worker. In addition, the anterior half of middle portion of clypeus is not quite perpendicular to, but rather continuous with, the posterior portion, wedged in between frontal lobes. Inferior head border only bluntly carinate. Midpronotal tooth small, lateral pronotal teeth well-developed and conspicuously projecting laterad. Mesonotum quite resembling, but welts, ridges and furrows not so strong. Scutellum lacking a distinct tumulus in front of the shorter apically blunt posterior teeth. Excision between the same teeth shallower. Epinotal spines fingerlike with the tips curved inwards. Petiole

distinctly broader than long and narrower in the rear than in front. Postpetiole exactly as in worker, the sides scarcely convex and not conspicuously diverging caudad, dorsal longitudinal ridges blunt, but stronger than in worker. Gaster only laterally and weakly carinate on tergum I which bears in the middle a deeply impressed hairless longitudinal furrow, reaching beyond half. Rest of gaster finely tuberculate. Wings infumated, dull reddish-brown with slightly darker veins.

Male described by Wheeler (1925). No specimens seen.

Discussion. — The present species is known only from the type series. In over-all similarity *C. auritus* seems to be the closest relative. The worker of *peniscus* differs from the former in the following characters: 1. Head broader, occipital lobes shorter and rounded both in dorsal and lateral view, not horn-like; supraocular tubercle lacking the connecting ridge with inferior occipital corner; scape projecting beyond the tip of occipital lobes. Inferior border not carinate. 2. Thorax: lateral and median pronotal tubercles higher; mesonotal tubercles subequal in height, anterior pair laterally compressed and triangular in profile; ridges on basal face of epinotum weak and more widely spaced. 3. Pedicelar segments broader than long. Petiole with anterior corners rounded; postpetiole with the connecting ridge between anterior and posterior tubercles blunt and low. 4. Gaster lacking the median pair of longitudinal costae on tergum I, having instead a faint longitudinal impression.

Wheeler's description is very good and detailed, with the exception of the following details: 1. His measurements are too low, due to a single linear-spread measuring. 2. The statement referring to a deep promesonotal constriction is a lapsus, should be mesoepinotal constriction. 3. I am at odds with the 3 pits mentioned for the petiole. At any rate, the types have no paired anterior pits on node; the posterior unpaired pit is the impression between the dorsal tubercles.

Variation. — The lectotype worker is the tallest. The smallest of the three measures as follows: Total length 4.1 mm; head length 1.01 mm; head width 0.93 mm; thorax length 1.23 mm; hind femur length 1.20 mm.

Note. — Unfortunately, the exact origin of the specimens is unknown. Among other captures by Hj. Mosen in Brazil, Wheeler cites *Acromyrmex disciger* Mayr, a typical denizen of southeastern Brazil. Hence it is quite probable that *peniscus* came from this region, the habitat of its closest relatives.

5. *Cyphomyrmex bigibbosus* Emery

(Figs. 2, 16, 30, 48)

Cyphomyrmex bigibbosus Emery, 1894: 226-227 (Worker; Brazil: Pará). — Kempf, 1959: 216 (Brazil, Amapá: Serra do Navio).
Cyphomyrmex bigibbosus tumulus Weber, 1938: 185-187 (Worker, female, male; British Guiana: Forest Settlement on Mazaruni River; Oronoque River). — Weber, 1940: 413, figs. 7, 11, 12 (Worker, male; British Guiana; Key). — Weber, 1946: 126-128 (British Guiana; Bion.). — NOV. SYN.

Types. — The lone holotype worker of *bigibbosus* is in the Emery collection at the "Museo Civico di Storia Naturale", Genova, Italy; not seen. Syntypes of *tumulus*: 3 workers examined (MCZ, NAW).

Worker. — Total length 3.2-3.4 mm; head length 0.75-0.83 mm; head width 0.67-0.75 mm; thorax length 0.93-1.04 mm; hind femur length 0.83-0.91 mm. Fuscous reddish brown; head usually darkest; mandibles, coxae, femora and sometimes also thorax light brown. Integument, including antennal scrobe, densely granular and opaque.

Head as shown in Fig. 2. Mandibles with 7-8 teeth. Clypeus: anterior border mesially excised; central portion of clypeus obliquely raised towards front, with two acute teeth next to origin of frontal lobes. Vertex with a pair of short carinules. Supraocular tumulus blunt, rounded, not prominent. Preocular carinae reaching the gently produced occipital lobes (Fig. 48), closing completely the antennal scrobe. Lower border of sides of head carinate. Antennal scapes, in repose, not projecting beyond tip of occipital lobes. Only funicular segments 1 and 10 distinctly longer than broad.

Thorax as shown in Fig. 16. Pronotum: the single median tubercle quite distinct, the lateral ones very low and blunt, continued forward as a faint, often more or less obsolete, margination that separates the pronotal dorsum from the sides: antero-inferior corner acutely dentate. Mesonotum: anterior pair of tubercles prominent and conical, posterior pair very low but distinct and blunt. Mesoepinotal constriction conspicuous but relatively shallow in profile. Epinotum completely rounded and unarmed. Hind femora a little dilated ventrally but not visibly carinate posteriorly at basal third.

Pedicele as shown in Figs. 16 and 30. Petiole in dorsal view rather longer than broad, anterior corners of node not sharply angulate, dorsal ridges at best vestigial, posterior dorsal border without a raised carinule. Postpetiole, in dorsal view, subquadrate not transverse, with a perpendicular anterior face, a rather flat dorsal face, having the posterior border deeply excised between a pair of prominent horizontal tubercles. Tergum I of gaster strongly vaulted, lacking lateral margination and longitudinal carinae. Hairs minute, appressed, glittering, scattered, quite inconspicuous, on body and appendages.

Female. — Total length 3.8 mm; head length 0.84 mm; head width 0.79 mm; thorax length 1.20 mm; hind femur length

0.96 mm. Resembling the worker with the differences of the caste. Differs from *faunulus* (see below) in the following features: Bicolored, head and gaster fuscous, thorax brown. Occipital lobes much less projecting both in full-face view as in profile, much as in worker. Midpronotal tubercle faint but still distinguishable. Pair of anterior tubercles between arms of Mayrian furrows very low; scutum laterally not deeply furrowed. Paraptera postero-laterally with a short tooth. Posterior scutellar teeth much shorter, about as long as their width at base. Epinotal teeth completely absent. Pedicel as in worker; petiole elongate, with subparallel sides, anterior corners rather rounded; postpetiole with the same deep mesial excision on posterior border, flanked by prominent lobes, as in worker. Gaster bigibbous on anterior third of tergum I.

Male described by Weber (1938), as of *tumulus*.

Distribution. — This species is known only from the Amazon valley in Brazil and from British Guiana.

Specimens examined. — Brazil, Amapá Territory: Serra do Navio (K. Lenko) 30 workers (DZSP, WWK); Amazonas State: Manaus (K. Lenko) 1 female (DZSP). — British Guiana: Forest Settlement on Mazaruni River (N. A. Weber) 3 workers (syntypes of *C. bigibbosus tumulus*) (NAW, MCZ).

Discussion and synonymy. — Besides the typical form, described by Emery upon a lone worker from Pará, Brazil, three additional races have hitherto been proposed, viz. *faunulus* Wheeler, *petiolatus* Weber and *tumulus* Weber. This splitting shows the serious effort of dealing with the undeniable variability of the species. But the result is nevertheless inadequate, not only from a geographical viewpoint, but mainly because the previous authors have seemingly misidentified the typical *bigibbosus*. Although I have been unable to secure the holotype of the latter, I believe that Emery's concise description contains sufficient elements to show that *bigibbosus s. str.* is identical with *tumulus* on account of the little drawn out occipital lobes, the acute inferior pronotal angle, the well-developed mid-pronotal tubercle and principally the postpetiole "postice impresso et bituberculato". On the other hand, *bigibbosus sensu* Weber is really a different form, taking the second oldest name of *faunulus*, with *petiolatus* as its junior synonym. On account of the afore mentioned characters, *C. faunulus* is apparently sufficiently distinct from *bigibbosus* to be considered a genuine species. It is sympatric with *bigibbosus*, but occupies, according to our present knowledge, a much greater territory of dispersal.

The head of the *bigibbosus* worker is strikingly similar to that of *strigatus*, but the configuration of the thorax, the pedicel and the gaster shows clearly the conspicuous differences between both species.

Variation. — The scanty material available for this investigation is rather uniform. The series from Serra do Navio shows a vestigial lateral margination of tergum I of gaster, which in profile forms an

obtuse angle at basal third, as shown in Fig. 16. This condition does not obtain in the series from British Guiana, but is well-expressed in the queen from Manaus.

Bionomics. — Professor Weber made field studies of the present species ("*bigibbosus tumulus*") in British Guiana. His account (Weber 1946: 126-128) contains the only available published data and should be consulted by all those that are particularly interested in this subject. Following is a brief résumé of his findings:

C. bigibbosus is a rain forest species and seems to prefer high humidities. The nest chambers were found in rotted wood, mostly in excavate cells, but also under bark. The cavity size is variable but averages about 20-25 cc. The fungus garden is mostly sessile, resting on the floor, but variously attached at the sides. Occasionally the chains of fungus garden are also suspended from the ceiling. The substrate is heterogeneous, consisting mainly of yellow to brown particles, often of woody consistency; once even a head of a *Dolichoderus* ant was used as substrate. Once a worker of *Prionopelta punctulata* was found inside a nest, preying perhaps on the larvae of *C. bigibbosus*. The finding of an dealate queen in a tiny fungus garden, with a full grown worker, suggests splitting as a possible means of colony foundation.

6. *Cyphomyrmex faunulus* Wheeler, n. stat.

(Figs. 5, 15, 31, 47)

Cyphomyrmex bigibbosus faunulus Wheeler, 1925: 44-45 (Worker, female; British Guiana: Kartabo, Camaria; Bion.). — Weber, 1938: 187 (British Guiana: Forest Settlement, Mazaruni River). — Weber, 1946: 124-126, pls. 2, 8 (British Guiana; Bion.).

Cyphomyrmex bigibbosus: Weber, 1938 (*nec* Emery, 1894): 203 (Bolivia: Convento, Huachi, Lower Rio Madidi, Cachueta Esperanza, Ivon, Riberalta). — Weber, 1940: 413 (Key). — Weber, 1945: 14-16 (British Guiana, Trinidad; Bion.). — Weber, 1946: 122-124, Pl. 1 (British Guiana: Oronoque River; Bion.).

Cyphomyrmex bigibbosus petiolatus Weber, 1938: 187-188 (Worker, female; Bolivia: Lower Madidi River, Cavinás). — NOV. SYN.

Types. — Workers and female of *faunulus* (MCZ) from Kartabo (type locality) and Camaria, British Guiana, and a worker of *petiolatus* (NAW) from Lower Rio Madidi, Bolivia, examined.

Worker. — Total length 3.4-4.0 mm; head length 0.80-0.98 mm; head width 0.75-0.85 mm; thorax length 1.01-1.20 mm; hind femur length 0.96-1.20 mm. Yellowish-brown to fuscous-ferruginous; opaque. Very close to *bigibbosus* with the following differences: 1. Color more uniform, and averaging larger in size. 2. Occipital corners auriculate and projecting (Figs. 5, 47). 3. Thorax: midpronotal tubercle low; anterior mesonotal tubercles very strong and conical, posterior tubercles low and feeble; antero-inferior corner of pronotum less acute; mesoepinotal constriction deeper (Fig. 15). 4. Petiole slightly broader, anterior corners angular in dorsal view. Postpetiole deeper, the posterior border not excised mesially nor flanked by prominent tubercles (Fig. 31).

Female. — Total length 4.2-4.8 mm; head length 0.96-1.07 mm; head width 0.83-0.93 mm; thorax length 1.25-1.41 mm; hind femur length 1.07-1.28 mm. Resembling the worker with the differences of the caste. Quite close to *auritus*, with the following distinctive features: Carinae flanking frontal area obsolete, carinae of vertex extremely weak. Sides of head lacking a subcarinate ridge connecting low supraocular tubercle with inferior occipital corner. Pronotum with low and blunt lateral tubercle, midpronotal tubercle obsolete. Scutum with only shallowly impressed Mayrian furrows. Paraptera postero-laterally strongly and acutely dentate, teeth facing caudad. Scutellar teeth longer than their width at base. Epinotal teeth minute to nearly obsolete. Postpetiole not strikingly transverse, middorsal longitudinal impression shallow. Tergum I of gaster lacking lateral and mesial paired longitudinal ridges. Appressed hairs minute and highly inconspicuous.

Distribution. — This species ranges from Trinidad over the Guianas through the Amazon river valley to the Beni river valley in western Bolivia.

Specimens examined: British Guiana: Kartabo (W. M. Wheeler) 2 workers, 1 female (lectotype and paratypes of *faunulus*) (MCZ); Camaria, 1 worker (paratype) (MCZ); Oronoque River (N. A. Weber) 1 worker, 1 female (NAW); Forest Settlement, Mazaruni River (N. A. Weber) 2 workers (WWK). — Brazil, Amazonas State: Manaus (K. Lenko) several nest series with many workers, several females and males (DZSP, WWK), Benjamim Constant (K. Lenko) 1 nest series with many workers and 1 female (DZSP, WWK). — Bolivia: Covendo (W. M. Mann) 1 worker (WWK); Ivon, Beni River (W. M. Mann) 3 workers (WWK); Lower Madidi River (W. M. Mann) 1 worker (syntype of *petiolatus*) (NAW).

Discussion. — It was shown above that the typical *bigibbosus* is identical with the race later described by Weber as *tumulus*. It remains here to decide the fate of the other forms hitherto recognized in the tightly knit complex: "*bigibbosus*" (of authors, not of Emery), *faunulus* and *petiolatus*, neatly differentiated in Weber's (1940: 413) key. From the material which I was able to gather, I reached the conclusion that they are not separable, but constitute a single species, that takes the oldest available name *viz. faunulus*.

C. faunulus was thought to be a rather small race of what had wrongly been taken as the typical *bigibbosus*. The type series of the former is indeed on the lower range of the measurements for the species in the presently accepted sense, but this alone is not significant. The additional character given by Weber (1940: 413), *viz. length-width*

proportion of the postpetiole (*faunulus* and *petiolatus* with the postpetiole broader than long, "*bigibbosus*" with the postpetiole as long as broad), likewise does not seem to work. Moreover, *petiolatus* workers, as Weber (1938: 188) himself confesses, "are unsatisfactorily separated from the typical form" (= "*bigibbosus*"), the scape character given in his key (1940: 413) both contradicts the original description and a syntype specimen. The female of *petiolatus*, which unfortunately I did not see, is surely more distinct by its broader petiole and postpetiole. However, the evidence is not enough for recognizing a discrete form and I rather place *petiolatus* into synonymy of *faunulus*.

Variation. — Besides the differences in the female caste, as given for the race *petiolatus*, I have an even more striking variant from Manaus (DZSP n. 2198) which shows both in the worker and in the female caste a conspicuous pair of gibbosities on the anterior third of tergum I of gaster. This nest series agrees however with all other essential features of *faunulus*.

Bionomics. — Following is a brief digest of observations on *faunulus* by Wheeler (1925: 45) and Weber (1946: 124-126), and on "*bigibbosus*" (= *faunulus*!) by Weber (1945: 14-16; 1946: 122-124), made in British Guiana and Trinidad.

C. faunulus is a rain-forest species. Its colonies are small, and the nests are usually found in rotted wood, but also in tangles of epiphytic roots, abandoned termite mounds and in the soil (clay stratum of an *Atta* mound!). The cavity size is variable, the volume varying approximately between 5-50 cc. The fungus garden is either sessile with lateral attachments to the wall, or pendant. The substrate consists of insect excrements, vegetable debris, seeds, woody fibers; it often includes parts of skeleton of ants (Ponerinae, Cephalotini), presumably used as framework. The bromatia are variable in aspect, their consistency transitional between those of *Trachymyrmex* and *C. rimosus*.

In captivity, *C. faunulus* specimens rejected dry chemical food such as hemoglobin, blood fibrin, egg albumen, dextrin, gelatin, peptose, maltose, diastase, but accepted bromatia from *C. rimosus* gardens grown on farine. Workers also lapped up eagerly the body juices of a crushed mosquito. They feign death when disturbed. Among inquilines have been registered a small milliped and an attophilous thysanuran.

Note. — The figures of the worker have been made from a very large worker taken by Mann at Covendo, Bolivia.

7. *Cyphomyrmex morschi* Emery

(Figs. 11, 24, 29, 54)

Cyphomyrmex morschi Emery, 1887: 360 (Worker; Brazil, Rio Grande do Sul: São Lourenço). — v. Jhering, 1894: 360, 385 (Worker; Bion.). — Kempf, 1962: 34, figs. 32-34 (Worker; se. Brazil).

Cyphomyrmex sp. (= *morschi* Emery), Mayr, 1887: 556 (Key).

Cyphomyrmex (Mycetosoritis) personatus Santschi, 1923: 268-269 (Female; Argentina, Buenos Aires: Monte Hermoso). — NOV. SYN.

Cyphomyrmex personatus Santschi, 1925: 164.

Types. — Workers from São Lourenço do Sul, Rio Grande do Sul State, Brazil, collected by Prof. Hermann von Jhering, in the Emery collection at Genova; not seen. A single

specimen from the same locality, belonging to the H. v. Jhering collection (now DZSP), is presumably a syntype or at least a topotype. A slightly damaged and alate female from Monte Hermoso, Buenos Aires; holotype of *personatus* Santschi (NHMB).

Worker (syntype?). — Total length 3.0 mm; head length 0.72 mm; head width 0.64 mm; thorax length 0.93 mm; hind femur length 0.80 mm. Medium brown; front, vertex and gaster darker; opaque. Antennal scrobe reticulate-punctate; slightly shining.

Head as shown in Fig. 11. Mandibles finely striate, serially dentate, with 8-9 small teeth. Clypeal border not conspicuously excised in middle. Clypeal apron lacking small teeth next to origin of frontal carinae. The latter little expanded in front, moderately constricted at level of eyes, then gently diverging caudad and becoming more or less vestigial before reaching occipital corner. Preocular carina fading out at some distance behind eyes; posterior end of scrobe vestigially delimited. Paired carinules of vertex present. Supraocular tubercle marked by a low, very blunt tuberosity. Occipital corners (Fig. 54) narrowly rounded. Occiput excised. Scapes in repose surpassing the occipital border by a distance which approximates its maximum width. Funicular segments 2-6 longer than broad.

Thorax as shown in Fig. 24. Three pronotal tubercles present, the median one very weak, vestigial; antero-inferior corner of pronotum acutely dentate. Two pairs of mesonotal tubercles, the anterior pair more prominent but low, the posterior pair much feebler. Basal face of epinotum without anterior tubercles or longitudinal ridges, lacking a well-defined longitudinal furrow: posterior corners minutely dentate. Femora and tibiae: not prismatic, rather slender; hind femora not dilated nor ventrally carinate and angulate at basal third.

Petiolar node (Figs. 24, 29) trapezoidal in dorsal view, broader in front than behind, anterior corners rounded; postero-dorsal border with a distinct, obliquely raised, short, transverse laminule. Postpetiole about as long as broad, with subparallel sides, lacking dorsal ridges and tubercles; tergum completely appressed to sternum; disc with a shallow postero-median pit. Gaster with sides of tergum I scarcely marginate, lacking an anteromedian short furrow.

Appressed hairs small, fine, glittering, sparse; denser and more evident on head, gaster and appendages.

Female. — Total length 3.5-3.8 mm; head length 0.80-0.83 mm; head width 0.69-0.72 mm; thorax length 1.07-1.15 mm; fore wing 3.2 mm; hind femur length 0.85-0.98 mm. Resembling the worker, except for the differences of the caste. Posterior portion of antennal scrobe usually more distinctly *carinate* behind. Carinae of vertex prominent, bearing on lateral face the small posterior ocelli. Midpronotal tubercle obsolete; lateral teeth prominent, antero-inferior corners of pronotum conspicuously dentate. Mesonotal scutum flat, with shallow Mayrian furrows; antero-median area between arms of furrows laterally subcarinate, with a weak median longitudinal furrow. Scutellum flat, posteriorly feebly dentate. Basal face of epinotum short, scarcely distinguishable from declivous face, epinotal teeth small or obsolete. Postpetiole relatively shorter and broader, paired tubercles on posterior border more conspicuous.

Distribution. — *C. morschi* occurs on the Atlantic shore from Buenos Aires in the Argentine to southeastern Brazil, from Rio Grande do Sul State to Cabo Frio, Rio de Janeiro State.

Specimens examined: Argentina, Buenos Aires: Monte Hermoso (E. Carette) 1 female (holotype of *personatus* Santschi) (NHMB). — Brazil, Rio Grande do Sul State: São Lourenço do Sul (H. v. Jhering) 1 worker (syntype?) (DZSP); São Paulo State: Itanhaem (H. Luederwaldt, H. Guedes and F. Grossmann) 10 workers, 1 female (DZSP, WWK), Mongaguá (W. W. Kempf) 1 worker (WWK), Boqueirão (W. W. Kempf) 2 workers (WWK), São Sebastião (I. Krebsbach, B. Fleddermann) 5 workers, 2 males (WWK), Caraguatatuba (K. Lenko) 1 worker, 2 females (DZSP); Rio de Janeiro State: Cabo Frio (T. Borgmeier) 1 worker (WWK).

Variation. — The worker measurements vary as follows: Total length 2.5-3.0 mm; head length 0.64-0.72 mm; head width 0.52-0.64 mm; thorax length 0.75-0.93 mm; hind femur length 0.61-0.80 mm. Body color variable from light brown to fuscous brown. A small but rather indistinct tooth on clypeus next to the origin of frontal carinae, present in a few larger specimens. Carinules of vertex occasionally very weak. Supraocular tumulus indistinct in smaller specimens. Median pronotal tubercle often weak to obsolete. Anterior pair of mesonotal tubercles sometimes connected by a transverse and semicircular welt. Postero-dorsal laminule of petiolar node vestigial in smaller specimens. Postpetiole usually about as long as broad.

Discussion. — Due to the feebly developed, yet complete, antennal scrobe, which is only feebly to vestigially delimited on posterior third of head, this species is quite distinct from all other forms of the genus and resembles somewhat *Mycetophylax conformis* (Mayr). But in

the latter (worker and female), the frontal lobes are short, strongly constricted behind, and do not continue obliquely caudad as distinct carinae (or, if they do, then only as a feeble margination for a very short distance); the preocular carina disappears at the level of the posterior orbit of the eyes. Furthermore, *Mycetophylax conformis* does not show a distinct antennal scrobe reaching back to the occipital corner.

Synonymy. — Santschi's *personatus*, based on a callow and alate female, was at first erroneously placed in subgenus (now genus) *Mycetosoritis*. Upon direct comparison of the type with authentic females of *morschi*, it proved to be a synonym of the latter.

Bionomics. — According to H. von Jhering (1894: 385), the nest of *C. morschi* consists of a cavity in the soil, the small opening at the surface being surrounded by a crater-like well of loosely heaped-up earth crumps. The fungus-garden has the size of a small orange and is made up of mould-covered vegetable debris, as in most Attini.

So far, this species has been found only at sea level along the Atlantic shore line. On the long beach "Praia Grande", southwest of the city of Santos (Boqueirão, Mongaguá, Itanhaem), *morschi* is seemingly quite common in the sand dunes along the shore, although no intensive collections have yet been made.

8. *Cyphomyrmex daguerrei* Santschi

(Figs. 8, 22, 34, 50)

Cyphomyrmex daguerrei Santschi, 1933: 118-119 (Worker; Argentina, Buenos Aires: Rosas, F. C. Sud). — Weber, 1940: 413 (Key). — Kusnezov, 1949: 437, 449-450 (Key).

Types. — 3 workers collected by J. B. Daguerre, n. 1903-667. Two workers examined (lectotype and paratype NHMB and WWK) received from Santschi collection.

Worker. (Lectotype). — Total length 3.4 mm; head length 0.80 mm; head width 0.75 mm; maximum diameter of eyes 0.13 mm; scape length 0.67 mm; thorax length 1.01 mm; hind femur length 0.85 mm. Medium brown; dorsum of head, postpetiole and gaster infuscated. Opaque; finely reticulate-punctate; antennal scrobe reticulate-punctate, slightly shining; front reticulate-rugose; postpetiole and gaster with dense larger shallow foveolae. The whole insect covered with whitish, fine, decumbent, scattered and glittering hairs, becoming subdecumbent or recurved on head and gaster. Tip of gaster with the usual dense fringe of short erect hairs.

Head as shown in Fig. 8. Mandibles finely punctate and vestigially striolate; chewing border with 8 teeth, gradually diminishing in size toward base. Clypeus with anterior border convex and projecting, noticeably excised in middle; lateral denticle at origin of frontal carinae at best vestigial. Frontal

area distinct, longer than broad. Frontal carinae with moderately expanded frontal lobes, somewhat diverging caudad and feebly sinuous after constriction. Preocular carinae reaching occipital corner (Fig. 50), completely closing the antennal scrobe. Occiput broadly and shallowly excised with another narrower and deeper median excision, between distinct carinae of vertex. Supraocular tumulus blunt but prominent. Scapes in repose surpassing marked occipital corners by a distance equalling their apical width. Funicular segments II-IV a little longer than broad, V-VII about as broad as long.

Thorax as shown in Fig. 22. Pronotum with a pair of projecting and conical tubercles on each side; midpronotal tubercle well-developed but rather blunt; antero-inferior corner with an obliquely truncate foliaceous tooth. Mesonotum with 2 pairs of longitudinal ridges, appearing in side view as obtuse, low triangular teeth; area between ridges flattened to slightly excavate. Mesoepinotal groove deeply impressed. Basal face of epinotum laterally weakly marginate, posteriorly with a pair of small pointed teeth. Hind femora simple, not dilated nor longitudinally crested ventrally on basal third.

Pedicle as shown in Figs. 22 and 34. Petiolar node broader than long, slightly broader with rounded corners in front; anterior face distinct from dorsal face, the latter delimited laterally by longitudinal carinules and posteriorly by a slightly raised transverse laminule. Postpetiole subtrapezoidal, somewhat broader than long, (11:9), dorsum with a deep longitudinal furrow, postero-lateral corners narrowly foliaceous and not appressed to sternum. First tergite of gaster with shallow, mid-dorsal longitudinal furrow in front; lateral borders submarginate on anterior two thirds.

The paratype worker has the following measurements; head length 0.83 mm; head width 0.75 mm; scape length 0.72 mm; thorax length 1.07 mm; hind femur length 0.85 mm. It is otherwise completely identical with lectotype. The denticle at origin of frontal carinae is still weaker, nearly obsolete. Figures based on paratype specimen, deposited in my collection (WWK).

No other specimens known.

Discussion. — When describing *daguerrei*, Santschi compared it with *morschi*. There is, indeed, a certain resemblance, evident principally in the following characters: Scape long, well projecting beyond occipital lobes or corners; hind femora slender, not dilated nor visibly carinate ventrally at basal third, their length exceeding the head length; clypeal

teeth feebly if at all developed. These characters likewise separate *daguerrei* from the remaining forms of the *olitor*-subgroup. A few stray specimens from southeastern Brazil, which I provisionally associate with *olitor* (cf. below) approach *daguerrei* rather closely, except for the just mentioned critical characters, and the evenly rounded frontal lobes, the subparallel frontal carinae.

On the other hand, the deeply notched anterior border of clypeus, the more distinctly circumscribed antennal scrobe, the marked occipital angles, the better developed thoracic tubercles, the steeper face of epinotum, the shorter and broader postpetiole with more strongly diverging sides in full-face view, are useful features for distinguishing *daguerrei* from *morschi*.

9. *Cyphomyrmex olitor* Forel

(Figs. 7, 9, 19, 23, 33, 35, 51, 52)

Cyphomyrmex olitor Forel, 1893: 605-606 (Worker, female; Brazil, Santa Catarina: Blumenau).

Cyphomyrmex quebradae Kusnezov, 1949: 445-448, Pl. 2, figs. 6-8 (Worker, female, male; Argentina, Tucumán: Quebrada Cainzo nr. Tafi Viejo). — NOV. SYN.

Types. — 3 Workers (lectotype and paratypes) and 2 females (paratypes), collected by Dr. A. Moeller near Blumenau, Santa Catarina State, Brazil, received on loan from the Forel collection (MHNG). 6 workers and 1 female, syntypes of *quebradae* Kusnezov, received as a gift from Miguel Lillo Institute (WWK).

Worker (lectotype). — Total length 2.6 mm; head length 0.64 mm; head width 0.56 mm; thorax length 0.78 mm; hind femur length 0.59 mm. Yellowish brown, vertex of head more reddish brown. Integument opaque, densely and minutely granulate. Dorsum of head between frontal carinae and tergum I of gaster with small piligerous tubercles.

Head as shown in Fig. 7. Mandibles finely reticulate-punctate and somewhat longitudinally rugulose; chewing border with 7-8 teeth, gradually diminishing in size towards base. Anterior clypeal border scarcely notched in the middle, laterally with a small tooth on each side. Frontal area distinct and impressed. Frontal lobes oblique, rectangular, moderately expanded laterad, not reaching in full-face view the preocular carinae, covering only in part the antennal scrobe; lateral borders somewhat diverging and sinuous, posterior prolongation of frontal carinae nearly straight and gently diverging caudad. Occipital corners (Fig. 51) slightly produced. Occiput broadly and shallowly excised, with another somewhat deeper excision in the middle between the short, but prominent carinae of vertex. Supra-ocular tumulus feeble and indistinct. Postero-inferior corner of

head without a foliaceous carinule. Scapes in repose attaining but not surpassing the occipital corner. Funicular segments II-VII scarcely longer than broad.

Thorax as shown in Fig. 19. The single midpronotal tubercle low, often indistinct; lateral teeth much more prominent; antero-inferior corner of pronotum forming a slightly protruding yet subrectangular tooth. Mesonotum flat to slightly excavate, with the customary two pairs of tubercles, one tubercle to each corner; anterior tubercles in profile broadly rounded, tumuliform, posterior tubercles subconical with broadly rounded apex. Mesoepinotal constriction pronounced. Basal face of epinotum nearly as long as declivous face, with a pair of blunt tubercles at anterior border, another faintly marked pair posteriorly, marking the limit of the declivous face. Femora very lightly crested beneath. Hind femora only gently dilated at basal third, the postero-ventral crest not forming at this place a prominent foliaceous flange.

Pedice! as shown in Figs. 19 and 33. Note the narrow postero-median laminule flanked by very faint longitudinal carinules. Lateral lobes solid, only shallowly excavated beneath. Postpetiole cupuliform, dorsally broadly impressed, the impression flanked by a low and blunt ridge which terminates posteriorly in a low, scarcely raised tubercle. Lateral lobes completely appressed to sternum, not excavated beneath nor foliaceous. Tergum I of gaster with a faint longitudinal furrow on anterior half, the lateral borders distinctly marginate, especially on anterior half.

Hairs on thorax and pedicel minute appressed, indistinct; head, gaster and appendages with small recurved and decumbent hairs.

Female (paratypes). — Total length 3.3-3.4 mm; head length 0.75-0.77 mm; head width 0.67-0.68 mm; thorax length 0.96-0.98 mm; hind femur length 0.72-0.75 mm. Ferruginous; decidedly darker than the workers of the type series. Head as in worker, including shape of frontal carinae, slightly protruding occipital lobes. Ocelli very small. Mandibles with 7-8 teeth. Pronotum laterally immarginate, with a strong conical tooth on each side. Midpronotal tooth absent. Antero-inferior corner of latero-tergite of pronotum with a prominent tooth. Scutum flat throughout; anteriorly with a pair of faint tumuli just inside the anterior extremity of the arms of the vestigial and scarcely impressed Mayrian furrows. Scutellum posteriorly distinctly bidentate, a semicircular excision separating the two teeth. Basal

face of epinotum continuous with declivous face, i. e. dropping down steeply to petiolar insertion just behind the meta-epinotal suture. Epinotal teeth small, much as in *nemei*. All femora with the postero-ventral border marginate and finely carinulate; hind femora very gently thickened at basal third, without a projecting foliaceous flange. Postpetiole broader and stouter than in worker, with a deep and large dorsal impression, flanked by a pair of longitudinal and slightly carinulate welts; postero-lateral impressions also present; lateral lobes of tergum completely appressed to sternum. Tergum I of gaster covered with abundant piligerous tubercles, its anterior half carinate laterally, mesially with a shallow and rather indistinct longitudinal furrow. Wings unknown. Pilosity as in worker.

Male described by Kusnezov (1949), as that of *quebradae*.

Distribution. — The species, as presently defined, is known to occur in northwestern Argentine (Tucumán) and southeastern Brazil, from Rio Grande do Sul to Rio de Janeiro States.

Specimens examined: 87 workers, 14 females and 1 male, as follows: Argentina, Tucumán: Quebrada Cainzo nr. Tafi Viejo (N. Kusnezov) 6 workers, 1 female (syntypes of *quebradae* Kusnezov). — Brazil, Rio Grande do Sul State, stray workers and 1 female, collected by Fritz Plaumann at the following localities: Barão de Cotegipe, Barros-Cassal, Bom Jesus, Erechim, Nova Petrópolis (1 female), Pardino, Tainhas; Santa Catarina State: Blumenau (A. Moeller) 3 workers and 2 females (MHNG, lectotype and paratypes of *olitor*), and many workers and several females taken by Fritz Plaumann at the following localities: Chapecó (1 female), Ibicaré, L. Facão, Nova Teutônia (3 females), P. Bormann (1 female), Serra Geral (2 females), Xaxim; Paraná State: several stray workers and 1 female taken by Fritz Plaumann at the following localities: Bocaiuva do Sul (1 female), Pôrto Vitória, Rio Azul; São Paulo State: Agudos (C. Gilbert, W. W. Kempf) 2 workers; Campos do Jordão (W. W. Kempf) 1 worker; Rio de Janeiro State: Ilha de Marambaia (R. Mueller) 1 worker, Petrópolis (A. Wiltuschnig) 1 worker. All specimens, with the exception of the *olitor* types in my collection (WWK).

Discussion. — The numerous specimens from southern Brazil just mentioned, unfortunately all strays from berlesate collections, show an unusual range of variation. Only the lone workers from Petrópolis and Marambaia, Rio de Janeiro State, agree almost completely with the types. All others present a variable amount of discordant features. I have

tried to separate the principal variants with the intention of discovering the existence of two or more so-called sibling species. But so far, all my attempts have been unsuccessful. Therefore I limit myself to an account of the chief variable characters for the worker caste.

1. Size: The types are near the lower end of the range. The largest specimen had the following measurements: Total length 3.5 mm; head length 0.85 mm; head width 0.77 mm; thorax length 1.09 mm; hind femora length 0.83 mm.

2. Head: Mandibular teeth 7-10, frontal lobes more often evenly rounded (cf. Fig. 9) rather than rectangular (Fig. 7); frontal carinae subparallel in the largest specimens; occipital lobes sometimes less distinctly set off in full face view.

3. Thorax: midpronotal tubercles strong to almost obsolete; lateral pronotal and both pairs of mesonotal tubercles usually lower than in types (Fig. 23); mesoepinotal constriction variable; epinotal teeth either vestigial (Fig. 19) or well developed, with all kinds of intermediate conditions; hind femora moderately to conspicuously dilated and ventrally angulate at basal third, postero-ventral border always carinate, sometimes with a prominent foliaceous flange at angle.

4. Pedicel and gaster: lateral lobes of petiole, in ventral view, weakly to moderately longitudinally furrowed, the lateral border, especially on the posterior half carinate; in profile, the petiole is either completely depressed or shows an ascending anterior face distinct from a horizontal dorsal face (as in *daguerrei*, cf. Fig. 22), especially in larger specimens; in larger specimens the postero-dorsal transverse laminae forms sometimes a prominent semicircular apron; shape of postpetiole extremely variable in dorsal view, with all possible intergrades between extremes shown in Figs. 33 and 35; lateral borders of tergum of postpetiole either completely appressed to sternum as in *olitor* types, or salient with more or less developed foliaceous margin; lateral borders of tergum I of gaster varying between sharply and indistinctly marginate.

As said before, I am reluctant to lump this variable array of forms under one species, but I cannot see another solution under the present circumstances. Later on, when good series from many colonies will be available, one might be tempted again to try for more satisfactory results.

Synonymy. — The variation shown in the preceding paragraphs, casts serious doubts upon the validity of several Argentine species. I believe that both *daguerrei* and *bruchi*, although known from very few specimens, are still sufficiently distinct to be retained as good species. The case against *nemei* is already stronger, although I let it stand for the time being. However, *quebradae*, although quite distinct from the *olitor* types, seems untenable under the weight of the many variable *olitor* specimens mentioned before.

The measurements of the syntype workers of *quebradae* are the following: total length 2.9-3.0 mm; head length 0.71-0.73 mm; head width 0.64-0.67 mm; thorax length 0.90-0.93 mm; hind femur length 0.67-0.69 mm. They differ from the *olitor* types as follows: mandibles with 9-10 teeth; frontal lobes (Fig. 9) rounded; thoracic tubercles generally lower, especially the mesonotal ones (Fig. 23); epinotal teeth more prominent; ventro-lateral furrows of petiolar node deeper; postpetiole (Fig. 35) much broader, the lateral lobes foliaceous and not appressed to sternum.

The female (syntype) measurements are as follows: total length 3.5 mm; head length 0.80 mm; head width 0.72 mm; thorax length 1.07 mm; hind femur length 0.75 mm. Mandibular teeth, frontal lobes and shape of postpetiole as in worker.

For all these characters exist all kinds of intergrades among the *olitor* material from southeastern Brazil, so that *quebradae* is no longer tenable.

Bionomics. — There are no pertinent data, except for the fact that all collections of *olitor* and *quebradae*, its synonym, were made in mesophilous subtropical woods, in rather moist surroundings.

10. *Cyphomyrmex vallensis* Kusnezov

Cyphomyrmex daguerrei vallense (sic!) Kusnezov, 1949: 437, 450-451, Pl. 2, figs. 12-15 (Worker; Argentina, Tucumán: Tafi del Valle).
Cyphomyrmex vallense Kusnezov, 1957: 11 (Key).

Types. — Seven workers, taken in Tafi del Valle, on the road to Santa Maria, Tucumán Province. The type locality is 2000 m above sea-level, its climate is temperate and relatively humid. The types appear to be lost, as stated above in the introduction.

Discussion. — The status of the present form is beset with problems that have no easy solution, without recourse to the types, if still available. I believe that Kusnezov was right when promoting *vallensis* (Kusnezov constantly spells *vallense*!) to full species level. As a matter of fact, *daguerrei* is a significantly larger species with more undulated, mutually more approximated frontal carinae, scarcely prominent occipital lobe, longer scapes, armed epinotum, to mention just a few of the more obvious characters (cf. figs. 8 and 22). *C. vallensis* is of smaller size, has more prominent occipital lobes, more broadly expanded frontal carinae which are scarcely constricted behind the frontal lobes. Its epinotum is unarmed and the scape does not project beyond the occipital lobes. It might be closely related with *nemei*, but in this form the postpetiole is extremely broad. The aberrant form, mentioned under *lectus* on a following page, might fall under this name. Indeed, this form includes a specimen from Tucumán (Kusnezov leg., n. 2339), which agrees in general characters with *vallensis*, but its lateral pronotal teeth are very low and the postpetiole is not cupuliform but broader. Short of settling all these doubts, I leave *vallensis* as a *species inquirenda*.

11. *Cyphomyrmex bruchi* Santschi

(Figs. 10, 21, 32, 53)

Cyphomyrmex bruchi Santschi, 1917: 282 (Worker; Argentina: La Plata). — Santschi, 1931: 281, figs. 5, 6 (Worker; Argentina: La Plata, Buenos Aires). — Weber, 1940: 408 (Key). — Kusnezov, 1949: 436, 438. — Kusnezov, 1957: 10-11 (Key).

Types. — 3 workers, collected by C. Bruch at La Plata, Buenos Aires Province, Argentina, n. 631; 2 specimens, lectotype (Coll. Santschi, NHMB) and paratype (WWK) seen.

Worker (lectotype) — Total length 3.0 mm; head length 0.72 mm; head width 0.72 mm; maximum diameter of eyes 0.11 mm; scape length 0.56 mm; thorax length 0.93 mm; hind femur

length 0.67 mm. Brown; head fuscous reddish brown. Opaque; finely reticulate-punctate; dorsum of head between frontal carinae and less conspicuously dorsum of gaster rather finely and somewhat irregularly reticulate-rugose. Tergum I of gaster without evident small, piligerous tubercles. The whole insect covered with fine, appressed, scattered and glittering short hairs. Tip of gaster (terga and sterna II-IV) with short and erect hairs.

Head as shown in Fig. 10; as broad as long. Mandibles finely punctate and vestigially striolate; chewing border with more than 7 vestigial to indistinct teeth (sign of wear?); sides sharply carinate at base; apical tooth prominent. Anterior clypeal border shallowly emarginate in middle, laterally with a small tooth. Frontal area distinct. Frontal carinae anteriorly expanded into prominent subcircular lobes, posteriorly greatly removed from each other and slightly diverging and sinuous, confluent with preocular carina on occipital corner. Vertex without paired carinules. Occiput broadly and shallowly excised between prominent occipital corner (Fig. 53), with another deeper and narrower excision in the middle. Supraocular tumulus very broad, low and blunt. Scapes in repose not surpassing the occipital corners. Funicular segments II-VIII about as broad as long.

Thorax as shown in Fig. 21. Pronotum with a pair of low and stout lateral tubercles, midpronotal tubercle practically absent; antero-inferior corner angulate and subdentate. Mesonotum without marked anterior tubercles, posterior tubercles indicated by the sharply marginate, in profile weakly raised, posterior corners. Mesoepinotal groove in the middle very shallow, laterally more deeply impressed. Sides of basal face of epinotum bluntly marginate. Epinotal teeth short and pointed. Dorsum of thorax between pronotal tubercles and epinotal spines flattened to slightly excavated on posterior half of basal face of epinotum. Hind femora ventrally dilated at basal third, the posterior border bearing there a prominent foliaceous flange.

Pedicel as shown in Figs. 21 and 32. Petiolar node subtrapezoidal in dorsal aspect, broader in front than in back, anterior corners rounded, posterior border dorsally with a distinct, obliquely raised, short transverse laminule, flanked by a short, longitudinal carinule. Anterior face distinct from dorsum. Postpetiole a little more than twice as broad as long (31: 15), with laterally prominent rounded lobes. Tergal portions of both pedicelar segments ventro-laterally excavate with foliaceous margins, that are not appressed on sternites. Postpetiole posteriorly

with a median and two lateral impressions. First gastric tergite antero-laterally submarginate.

The present species is only known from the few type specimens.

Discussion. — *C. bruchi*, although the mandibles bear in the types scarcely distinguishable teeth, except the apical one, belongs doubtless to the *strigatus*-group, as shown by the arrangement of the frontal carinae and preocular carinae. It is misplaced both in Weber's (1940) and especially in Kusnezov's (1949 and 1957) keys. According to the latter, it would fall into the *rimosus*-group.

The closest relatives are found in the difficult *olitor*-subgroup. Following are the most outstanding differences from the better known species of this assembly.

It differs from *lectus* Forel in larger size; in the shape of the frontal lobes, which are less expanded laterad and distinctly subcircular in outline; in the indistinct dentition of the mandibles; in the lack of paired carinae on vertex, in the antero-inferior tooth of pronotum which is not greatly produced; in the ill-defined anterior mesonotal tubercles; in the feebly impressed mesoepinotal groove; in the long basal face of epinotum, which is about as long the declivous face; in the extremely broad postpetiole of different shape.

C. daguerrei Santschi is even more remote, from which *bruchi* workers may be distinguished at once by the less produced clypeus, by the better developed frontal lobes, the smoother head sculpture, the lack of vertical carinae, the length of the antennal scapes, which do not surpass in repose the occipital lobe, by the sharply carinate posterior borders of the antennal scrobe, by the absence of a midpronotal tubercle and the weak lateral ones, by the absence of anterior and the ill-developed posterior mesonotal tubercles, by the shallowly impressed mesoepinotal groove, by the ventrally angulate and carinate hind femora, by the extremely transverse postpetiole, by the lack of piligerous tubercles on first gastric tergite.

On account of the broadly transverse postpetiole it resembles somewhat *quebradae*, which I have synonymized with *olitor* on a preceding page. The shape of the head in full-face view (especially the broadly expanded frontal lobes and widely separated frontal carinae, the absence of carinules on vertex, and the vestigially dentate mandibles), the dorsally flattened thorax with obsolete antero-lateral mesonotal tubercles, the broadly expanded petiole, with the lateral lobes deeply excavate from underneath and foliaceous, the absence of piligerous tubercles on gastric tergum I, separate *bruchi* from the highly variable *olitor*.

12. *Cyphomyrmex lectus* (Forel) nov. stat.

(Figs. 12, 14, 36, 55)

Atta (*Cyphomyrmex*) *olitrix lecta* Forel, 1911: 295 (Worker; Brazil, São Paulo City: Ipiranga).

Cyphomyrmex olitor lectus: Santschi, 1925: 164 (Argentina, Santa Fé: Fives Lille).

— Luederwaldt, 1926: 267 (Bion.). — Weber, 1940: 410 (Key).

Cyphomyrmex olitor: Kusnezov, 1957: 9 (Key).

Types. — 14 workers taken by H. Luederwaldt in the borough of Ipiranga in São Paulo City, in 1909 (MHNG, DZSP, WWK).

Worker (lectotype and paratypes). — Total length 2.7-2.8 mm; head length 0.64-0.67 mm; head width 0.59-0.61 mm; thorax length 0.80-0.83 mm; hind femur length 0.59-0.61 mm. Yellowish brown; front of head ferruginous; legs rather pale.

Head as shown in Fig. 12. Mandibles finely reticulate-punctate and vestigially striolate; chewing border with 7 teeth; apical tooth prominent. Anterior clypeal border slightly notched in the middle, laterally with a small tooth. Frontal area more or less distinct and impressed. Frontal lobes greatly expanded laterad, covering in full-face view part of the eyes, anteriorly rounded, then diverging caudad and somewhat sinuous, rounded behind before the gentle constriction; frontal carinae prolonged caudad, slightly diverging, joining the narrowly crested preocular carina to close the antennal scrobe at the scarcely drawn-out occipital corner. Occiput broadly but gently emarginate, with another median and deeper emargination between the short and inconspicuous carinae of the vertex. Supraocular tumulus feeble and indistinct. Inferior border of cheeks immarginate, except for a short and low foliaceous carina in front of the inferior occipital corner (Fig. 53). Scapes in repose not surpassing the occipital corner. Funicular segments II-VIII not longer than broad.

Thorax as shown in Fig. 14. Midpronotal tooth feeble and indistinct, lateral teeth low and subconical, antero-inferior corner with a very long tooth pointing forward. Mesonotum flat to slightly excavate, flanked by the anterior and posterior pair of very low tubercles, which clearly separate the dorsum from the sides. Mesoepinotal suture distinct, but only gently impressed. Basal face of epinotum much shorter than the laterally immarginate declivous face, posteriorly unarmed. Inferior borders of femora faintly crested; hind femora gradually increasing in depth toward basal third, forming ventrally an angle, the postero-inferior border being armed at this place with a prominent foliaceous flange.

Pedice! as shown in Figs. 14 and 36. Note the narrow postero-median laminule flanked by short longitudinal carinules. Postpetiole cupuliform, dorsally flattened; lateral lobes with foliaceous margin, not appressed. Tergum I of gaster with marginate anterior border, laterally immarginate, mesially not impressed.

Integument densely granulate, opaque, with sparser small setigerous pits. Hairs minute, completely appressed. Gular face of head and sternum I of gaster with curved subdecumbent hairs.

Female and male unknown.

Distribution. — Aside from the type series, this species has also been recorded by Santschi (1925: 164) from Fives Lille, in Santa Fé Province, Argentina. I have not seen these specimens.

Discussion. — The broadly expanded frontal carinae, the foliaceous carina on postero-inferior corner of head, the huge inferior pronotal spine, the unarmed epinotum, vouch for specific distinction from *olitor*. The species seems more closely related with *nemei* and perhaps *vallensis*.

Bionomics. — According to Luederwaldt (1926: 267) the nest of this species was found in an open field (same habitat as *Mycocepurus goeldii*). The cavities were subspherical. The fungus garden is sessile.

Note. — I have a few stray workers and a female from several widely separated localities, that are very close to *lectus*, but offer at the other hand several distinctive features, which make their association with *lectus* somewhat doubtful. I am not proposing, at this stage, a new name for these specimens, but limit myself to point out their diverging characters.

Workers. — Occipital lobes more prominent, usually a little set off. Frontal carinae somewhat less expanded, not covering part of the eye in full-face view. Inferior occipital corner without a foliaceous carina. Inferior pronotal tooth rectangular. Petiole broader, more constricted behind. Postpetiole usually broader, often dorsally impressed. In addition, in some specimens there is a tendency toward fading of the microsculpture, especially on sides of head and on the thorax.

The single female is quite close to that of *nemei*, differing principally in the complete lack of epinotal tubercles, narrower and longer post-petiole, and in the lack of a broad, deeply impressed longitudinal furrow on anterior half of tergum I of gaster.

The specimens came from the following localities: Argentina, Tucumán (N. Kusnezov) 1 worker (WWK). — Brazil, Mato Grosso State: Dourados (R. Mueller) 1 worker (WWK), São Paulo State: Agudos (R. Mueller) 1 worker (WWK), Pará State: Capanema (C. R. Gonçalves) 1 female (WWK). — Surinam: Lelydorp (Geijskes) 6 workers (WWK).

According to Kusnezov's description of the only known worker of *nemei*, the latter differs from the afore mentioned workers principally in the configuration of the mesonotum, which lacks the two pairs of tubercles, having the sides immarginate and the disc convex; the post-petiole much broader, similar to that of *quebradae*. We need more specimens to settle this problem.

The possible identity of these specimens with *vallensis* has already been mentioned on a foregoing page.

13. *Cyphomyrmex nemei* Kusnezov

(Figs. 40-43)

Cyphomyrmex nemei Kusnezov, 1957: 7-9, 11 (Worker, female, male; Argentina, Salta: El Rey).

T y p e s. — 8 females and 107 males, taken in nuptial flight on February 17, 1953, in the subtropical forest of the valley Soco Hondo, Reserva Nacional Estancia El Rey, Salta Province, Argentina; a lone worker taken separately at the same locality. The types in the Miguel Lillo Museum are either mislaid or lost except for a slide containing 2 males and 2 females. 8 males and 1 female (lectotype) in my collection (WWK).

W o r k e r. — According to the original description, this caste resembles rather closely that of *quebradae* (= *olitor*), differing principally in the lack of a pronotal tubercle, in the laterally immarginate and discally convex mesonotum that lacks the two pairs of tubercles, in the unarmed epinotum that has a very short basal face, in the postero-dorsal contours of the postpetiole, which is less sinuous.

It seems even closer to *lectus* from which it is separated by the following differences: frontal lobes less expanded, not covering part of the eyes in full-face view; inferior pronotal spine not drawn out; mesonotum as described above; petiole nearly twice as broad as long with conspicuously convex sides; postpetiole more than twice as broad as long, similar to that of "*quebradae*"; pilosity on tergum of gaster curved and subappressed.

F e m a l e (lectotype). — Total length 3.5 mm; head length 0.80 mm; head width 0.69 mm; thorax length 1.04 mm; hind femur length 0.75 mm. Light ferruginous; front and vertex darker. Integument opaque; sharply and finely reticulate-punctate, with sparser and larger punctures all over body and appendages; dorsum of head, scutum and scutellum, dorsum of gaster with superimposed reticula of coarser and intertwined rugulae, predominantly longitudinal on front and vertex and on tergum I of gaster.

Head as shown in Fig. 42. Mandibles with 9 teeth. Frontal lobes converging cephalad, lateral borders straight to feebly impressed. Occipital lobes slightly prominent and set off. Thorax as shown in Fig. 40. Midpronotal tubercle absent, lateral ones low but distinct and subconical. Scutellum bluntly bidentate behind, a shallow excision between the teeth. Epinotal teeth weak, basal face of epinotum scarcely distinct from declivous face. Femora carinate and narrowly crested on flexor face, hind femora forming

ventrally an angle on basal third, with a low foliaceous crest projecting from posterior border of femora on angle. Fore wing as shown in Fig. 43. Pedicel shown in Figs. 40 and 41. Post-petiole unusually broad as in *bruchi* and "*quebradae*", with a middorsal longitudinal shallow impression, and postero-laterally more deeply impressed. Tergum I of gaster anteriorly marginate, anterior half with a broad and deeply impressed longitudinal furrow, which is traversed by a series of irregular rugulae. Pilosity rather fine, curved and subappressed, subdecumbent on gular face of head and sternum of gaster.

Male as described by Kusnezov (1957).

Discussion. — Since the only known worker of the present species has been collected separately and is to all appearances lost, I select the above diagnosed female as the lectotype. The differential characters for the worker have already been pointed out in the preceding description. The female differs from that of *quebradae* (previously synonymized with *olitor*!) in the following characters: frontal lobes not evenly rounded, but forming a blunt angle, converging cephalad in front of angle, straight and slightly impressed. Epinotal teeth extremely feeble. Tergum I of gaster with the deeply impressed sagittal furrow on anterior half, traversed by rugosities. The frontal carinae are as in the *olitor* types, and do not possess distinctive value. It is quite possible that *nemei* will eventually end up as synonym of *olitor*, unless we find another way of dealing with the striking variability of the latter species.

14. *Cyphomyrmex lilloanus* Kusnezov

Cyphomyrmex lilloanus Kusnezov, 1949: 437, 442-444, Pl. 2, figs. 1-3 (Worker; Argentina, Formosa: Clorinda; Salta: Rio Saladillo, Ruta 55, km 1442).
Cyphomyrmex (Cyphomannia) lilloanus Kusnezov, 1957: 9 (Key).

Types. — The present species was described upon eight workers, four from Clorinda (Formosa) and 4 from Rio Saladillo (Salta) in the Argentine. Unfortunately, the specimens could not be located in the Miguel Lillo collection, after Dr. Kusnezov's untimely death. Unless some specimens were deposited in other collections, the types are apparently lost. Yet recognition of *lilloanus* should not prove difficult on account of the peculiar, completely unarmed, thorax.

Worker (after original description and figures). Color uniformly ochraceous. Integument opaque, finely sculptured. Size of "*quebradae*", but Kusnezov's measurements are decidedly too low in both cases, as I was able to check on "*quebradae*" types. Mandibles with approximately 8 small teeth. Frontal lobes greatly expanded laterad, nearly covering completely the antennal scrobe in full-face view, scarcely constricted behind; frontal carinae subparallel, reaching the little prominent occipital corner where

they join the preocular carinae, and circumscribe completely the antennal scrobe. Scapes in repose reaching, not surpassing the occipital corner. Funicular segments 2-9 broader than long. Occipital border gently emarginate, lacking a median notch; apparently no paired carinae on vertex. Thorax completely unarmed, only posterior corners of basal face of epinotum arc somewhat marked and tooth-like (in his 1957 key, Kusnezov says that epinotum is completely rounded!). Petiolar and post-petiolar nodes broader than long, the latter over twice as broad as long. Tergum I of gaster with a sagittal furrow on anterior third. Pubescence rare and very fine, scarcely visible.

Discussion. — The specific distinction of *lilloanus* is unquestionable and bears no further comment. There is a question about its affinities. By placing it into subgenus *Syphomannia*, Kusnezov seems to point towards *laevigatus* Weber (the type and only species of the subgenus) as the closest relative, although he did not fail in stressing the nearly abysmal differences that separate both species.

As shown elsewhere (Kempf, 1962: 30-31), *Cyphomannia* is untenable as a group-name, *laevigatus* being just a slightly aberrant species of the *rimosus*-group. Moreover, *lilloanus*, due to its multidentate mandibles and configuration of antennal scrobe and preocular carina, belongs clearly to the *strigatus*-group. Although the description does not elucidate the detail, the broad postpetiole of *lilloanus* has presumably the lateral lobes ventrally excavate and salient, i. e. not appressed to the body or sternum of the segment, and the antennal scrobe distinctly reticulate. If this is true, *lilloanus* is a somewhat discrepant member of the *olitor*-subgroup.

15. *Cyphomyrmex occultus* n. sp.

(Figs. 37-39)

Female (holotype). — Total length 4.0 mm; head length 0.88 mm; head width 0.72 mm; scape length 0.77 mm; eye length 0.25 mm; thorax length 1.28 mm; hind femur length 1.06 mm. Ferruginous; funiculi and legs more yellowish-brown; ocellar triangle fuscous. Integument opaque, granular; sides of head and gaster finely and sharply reticulate-punctate; antennal scrobe more coarsely reticulate-punctate and somewhat shining; dorsum of head between frontal carinae and tergum I of gaster with minute piliferous tubercles.

Head as shown in Figs. 37 and 38. Mandibles finely reticulate-punctate and vestigially striolate; chewing border with 7-8 teeth. Clypeus with the anterior border strongly convex in middle, not notched; a small tooth on each side at origin of the moderately expanded, somewhat unevenly and broadly rounded frontal lobes.

Frontal area impressed, reticulate-punctate. Posterior portion of frontal carinae gently diverging and straight. Occipital lobes prominent both in dorsal and lateral view. Preocular carina well developed, reaching the occipital lobe. Supraocular tubercle distinct. Eyes comparatively huge, their greatest diameter nearly one third of head length. Ocelli also large, the posterior ones situated on lateral face of prominent tumuli. Inferior border of head marginate. Scape in repose projecting beyond occipital angle by a distance that exceeds its maximum width. Funicular segments II-VII slightly longer than broad.

Thorax as shown in Fig. 37. Pronotum: midpronotal tubercle absent, lateral borders marginate, anterior corner bluntly tubercular, posterior corner with a prominent stout tooth; laterotergite with a large subcircular impression; antero-inferior corner subdentate. Mesonotum: Scutum dorsally flat, Mayrian furrows very shallow to vestigial in the rear. Scutellum posteriorly bluntly and weakly bidentate. Basal face of epinotum oblique, laterally carinate; epinotal teeth subtriangular, compressed. Legs long: femora slender, not noticeably incrassate towards basal third, ventral borders carinate, lacking a prominent flange on hind femora.

Pedicele as shown in Figs. 37 and 39. Petiole in dorsal view elongate, its anterior corners marked and bluntly dentate; its dorsum posteriorly with a pair of prominent teeth; posterior border without a prominent, thin, transverse laminule. Postpetiole nearly twice as broad as long, subtrapezoidal, longitudinally traversed by two pairs of carinae, the mesial pair sharp, the lateral pair blunt; dorsum deeply impressed between mesial carinae, more shallowly between mesial and lateral carinae. Gaster anterolaterally marginate; tergum I with a median longitudinal furrow, which is rather faint and fades out before reaching the midlength of the segment.

Wings slightly infumated, venation as in the other known species (see Fig. 43).

Body and appendages with very small, strongly curved, subdecumbent hairs.

Male. — I have 14 specimens of this caste, but forego a detailed diagnosis at this time. They are at once recognized by their huge eyes and elongate petiole, similar to that of the female.

Types. — 5 females (holotype and paratypes) and 8 males, taken by Fritz Plaumann at Nova Teutônia, Santa Catarina

State, Brazil, in October 1960 (WWK n. 3918); 6 females (paratypes) and 6 males taken by Karol Lenko at Barueri, São Paulo State, on October 17 and November 14, 1958 (n. 662 and 698), more specimens of the same series in DZSP.

Discussion. — Although I personally dislike the proposition of new species based exclusively on sexual forms, I decided to make an exception in the case of the present species, which is unusually distinct.

On account of the reticulate-punctate and somewhat shining antennal scrobe, *occultus* belongs to the *olitor*-subgroup. The female differs from *olitor* and allies in the large eyes; in the relatively large and prominent ocelli; in the long antennal scape that noticeably surpasses the distinctly drawn out occipital lobes; in the markedly angular anterior corner of pronotum, which is also laterally marginate, its laterotergite bearing a large subcircular impression; in the slender, ventrally ecarinate femora, the hind femora not being ventrally angular nor visibly incrassate at basal third; in the elongate petiolar node that bears dorsally a pair of prominent teeth.

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(Page references to *Cyphomyrmex* in brackets)

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