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COLLECTION

**A Review of the Neotropical
Ant Genus *Oxyepoecus*
Santschi (Hym., Formicidae)**

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A Review of the Neotropical Ant Genus *Oxyepoecus* Santschi
(Hymenoptera: Formicidae)

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(With 46 text-figures)

Summary

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Oxyepoecus bruchi Santschi, 1926 ♀ ♂= *O. minutus* (Kusnezov, 1952), nov. syn.*O. crassinodus* sp. n. ♀*O. daguerrei* (Santschi, 1936) ♀*O. inquilinus* (Kusnezov, 1952) ♀ ?♂= *O. turgidus* Kempf, 1969, nov. syn.*O. mandibularis* (Emery, 1913) ♀*O. plaumanni* sp. n. ♀ ♀*O. punctifrons* (Borgmeier, 1928a) ♀*O. rastratus* (Mayr, 1887) ♀ ♀ ♂= *O. rastratus* var. *luederwaldti* (Forel, 1913), nov. syn.*O. reticulatus* sp. n. ♀ ♀*O. vezenyii* (Forel, 1907) ♀ ♀*O. vivax* sp. n. ♀

Key to the species for workers

Key to the species for females

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Introduction

The genus *Oxyepoecus*, as presently accepted, is a small group of cryptobiotic ant species native to middle South America. Although separate by clear-cut characters, *Oxyepoecus* is closely related with the protean genus *Solenopsis*, which contains the well known «fire ants», and with which it forms the «*Solenopsis* Genus Group» within the former tribes Solenopsidini and Pheidologetini, according to the recent generic revision by Ettershank (1966).

Heretofore, *Oxyepoecus* ants were known from very few specimens, representing a total of nine species and one variety. Material accumulated over the years in my collection (WWK), comprising about 500 specimens, and containing several new, undescribed forms, led me to undertake the present species-level

review which resulted in the proposition of four new species, three new synonyms, and the description of the first known male in the genus. No infraspecific forms are recognized. The types of eight of the species considered as valid and of the three newly proposed synonyms were available for examination during this study.

Since even now all the known specimens were obtained either by chance discoveries or specialized collecting techniques (berlesates) applied sporadically in a very few and scattered localities, there is a well founded presumption that more species will eventually be detected in the genus.

The group is also of a more generalized interest, inasmuch as at least some of the species, temporarily or permanently, establish a symbiotic relationship with other ant species. The exact nature of this symbiosis is still unknown.

Acknowledgments. Most of the material at hand is from my private collection (WWK), which also contains the Borgmeier collection of ants (TB). The specimens in question were collected principally by Mr. Fritz Plaumann, of Nova Teutônia, Santa Catarina, Brazil, but also by Fr. Columbano Gilbert, O.F.M., Fr. Libório Schmitt, O.F.M., Mr. Karol Lenko, Lt.-Cel. Moacyr Alvarenga, Dr. C. A. Campos Seabra, and by myself. Dr. Abraham Willink, of the «Instituto Miguel Lillo», Tucumán, Argentina, kindly arranged for the loan of the Kusnezov types (IML), and Dr. C. Baroni-Urbani took care of the loan of a specimen from the Santschi collection in the «Naturhistorisches Museum», Basel, Switzerland (NHMB). I also had free access to the collection of the «Museu de Zoologia da Universidade de São Paulo» (MZUSP), where the collections gathered by Luederwaldt and Lenko are stored. My special gratitude goes to the «Conselho Nacional de Pesquisas» of Brazil for the continuance of the fellowship under which this research was carried out, and likewise to the «Fundação de Amparo à Pesquisa do Estado de São Paulo» (FAPESP) for the gift of a stereoscopic Zeiss-Zoom IV microscope.

Genus *Oxyepoecus* Santschi

Monomorium (in part): Mayr, 1887: 615.

Monomorium subgen. *Martia* Forel, 1907: 21 (preoc. by Ragonot, 1887), type of the subgenus: *M. (M.) vezenyiti* Forel, 1907, monobasic. Forel, 1911: 396. Emery, 1922: 182-3 (generic characters). Wheeler, 1922: 676 (key to the genera). Borgmeier, 1928b: 65 (key to the species).

Oxyepoecus Santschi, 1926: 6, type of the genus: *O. bruchi* Santschi, 1926, monobasic. Brown, 1955: 68 (syn.). Ettershank, 1966: 144-6 (generic revision).

Mitara (in part): Santschi, 1927: 246 (error for *Martia*!).

Martia: Santschi, 1929: 295. Kusnezov, 1952: 720-2 (key to the Argentine species). Kusnezov, 1957: 269 (generic characters).

Forelifidis M. R. Smith, 1954: 17 (new name).

Generic Diagnosis

(partly after Ettershank, 1966: 144-5)

Worker. Monomorphic. Total length 1.9-3.4 mm. Mandibles triangular, short to conspicuously elongate; chewing border with 4 teeth (dental formula 1+3). Palpal formula 2, 2. Clypeus with the median apron elevated, projecting, bicarinate, anteriorly bidentate, the teeth each laterally with another small denticle; clypeal setae as in *Solenopsis*: median seta, first paracarinial setae and lateral setae always well developed. Anterior tentorial pits closer to frontal carinae than to cheeks, but not quite as close as in *Solenopsis*. Antennae 11-segmented with a distinct 3-segmented apical club, the apical segment always longer than the two immediately preceding ones combined. Eyes small to medium-sized, 8-50 ommatidia. Promesonotal suture absent on dorsum of thorax, promesonotum continuous. Metanotal groove gently to scarcely impressed. Propodeum with the basal face usually transversely costulate, the posterior corners sharply angulate to dentate, the latter connected with the rounded and prominent inferior propodeal plates by the propodeal carinae that margin each side of the declivous face. Propodeal spiracle round, vestibulate and obliquely directed caudad. Petiole strongly pedunculate, node high, rounded above, often antero-posteriorly compressed and laterally expanded in a scalelike fashion; subpetiolar process either simply dentiform or prolonged posteriorly into a sharp, longitudinal, sometimes somewhat elaborate, ridge. Postpetiole nodiform, not as high as petiole, always broader than the petiolar node, laterally produced into bulky to subconical lobes, posteriorly constricted, not broadly attached to the gaster; both anterior and posterior subpostpetiolar processes well developed in the form of pronounced transverse ridges.

Female. Total length 2.4-3.8 mm; not conspicuously longer than the respective worker, sharing with the latter the same general features: shape and dentition of mandibles, the carinate, dentate and projecting median apron of clypeus, the 11-segmented antennae with a 3-segmented apical club, the shape of the petiole and postpetiole; the latter also constricted behind just in front of the gastric insertion, to which it is not broadly attached. Wing venation of the *Solenopsis*-type: fore wing with an elongate, open radial cell (*Rs* not reaching the anterior margin), a large cubital cell and usually a well formed discoidal cell

(cross-vein *m-cu* present). Basal face of propodeum posteriorly dentate, usually transversely costulate.

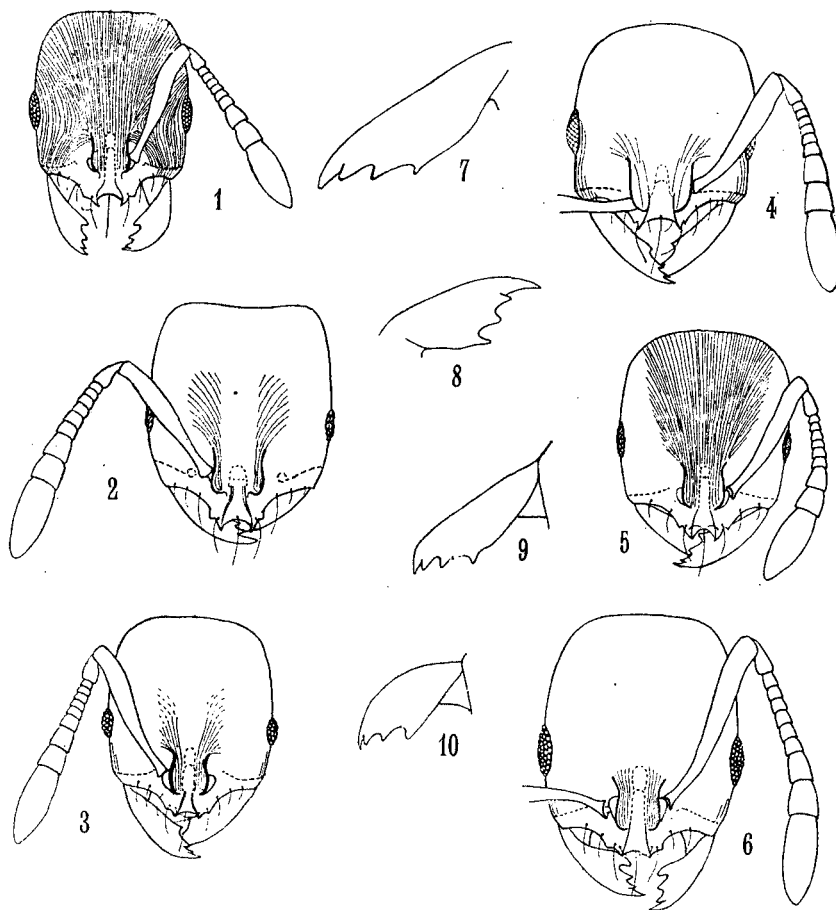
Male. Total length about 3 mm. Mandibles well developed, elongate triangular, capable of being closed together; chewing border with four distinct teeth (dental formula 1+3). Palpal formula 2, 2; labial palpus geniculate. Clypeus rounded and swollen, only shallowly inserted between the antennal sockets; clypeal setae approximately in the same pattern as in workers and females. Antennae 13-segmented; scape as long as funicular segment II; first funicular segment (pedicellus) not globular, but normal, shorter than segment II; segments II-XI nearly twice as long as broad, of approximately identical length. Mesonotal scutum without Mayrian furrows (notaulices); parapsidal furrows very faint. Middle and hind tibiae without apical spurs. Petiole either claviform or pedunculate with a differentiated and laterally expanded node. Postpetiole distinctly constricted in front of gaster, not broadly attached to the latter. Wings as in female.

Discussion. As presently defined, the genus *Oxyepoecus* is a small, highly homogeneous and clearly delimited group of ant species that bear a great resemblance with *Solenopsis*, but differ at once by the 3-segmented antennal club. In addition, the dentate propodeum and the more extensively sculptured integument of the body, especially on the thoracic pleura, separate *Oxyepoecus* workers and females from the same castes of nearly all *Solenopsis* species. The female is also distinct by her small size, scarcely exceeding that of the worker.

The hitherto unknown male, described in this paper, by using Emery's keys (1922: 16-18, 161-162), runs to *Megalomyrmex*, from which it differs in the lesser number of mandibular teeth (4), and the much shorter antennal scape, which is subequal to funicular segment II.

On the other hand, the male sex makes the placement of *Oxyepoecus* in the «*Solenopsis* Genus Group» (Ettershank, 1966: 134) somewhat doubtful, inasmuch as the existing similarities rather point towards *Megalomyrmex* (and *Nothidris*) of the «*Megalomyrmex* Genus Group». Incidentally, it seems that Ettershank's «informal genus groups» (1966: 73), which replace the former tribes Solenopsidini and Pheidologetini, are still too loosely defined, most of the diagnostic characters not being sufficiently exclusive.

Distribution and Biology. Our knowledge of *Oxyepoecus* ants still rests exclusively on chance discoveries. In Brazil, these ants have been found in all southeastern States (Rio Grande do Sul, Santa Catarina, Paraná, São Paulo and Rio de Janeiro, their northernmost known limit being in Goiás State (Anápolis) and northeastern Minas Gerais State (Pedra Azul), at Lat. 16°S. In Bolivia, in spite of only very few records, the genus occurs as far north as Guayaramerin (olim: Puerto Sucre, opposite to the Brazilian Guajará-Mirim, Rondônia Territory) in the northern tip of the Beni province, at Lat. 11°S. In the Argentine, the collections range from the Buenos Aires Province



Figs. 1-6. Head of workers in full-face view: 1. *rastratum* (Mayr). 2. *crassinodus* sp. n. 3. *vezenyii* (Forel). 4. *inquilinus* (Kusnezov). 5. *daguerrei* (Santschi). 6. *punctifrons* (Borgmeier). — Figs. 7-10. Mandibles of workers: 7. *inquilinus*. 8. *crassinodus*. 9. *vezenyii*. 10. *rastratus*. (Kempf del.).

over Córdoba to Tucumán, giving the southern limit at Lat. 36°S, and the western limit at Long. 68°W of their presently known territory. The most widespread species is actually *O. inquilinus*, which occurs in northwestern Argentina, northeastern Bolivia, central and southeastern Brazil.

Since about 95% of the known specimens were taken as strays in berlesates of forest floor cover, very little may be said about the biology of *Oxyepoecus* species except for being denizens or at least foragers in this particular habitat.

Independent colonies seem to be vouched for by *punctifrons* and *rastratus*. The types of the former, collected at Rio Negro, Paraná State, Brazil, came from a nest that had over 60 workers living by themselves, but no further information is available. I have found a few

workers of the same species, at Campos do Jordão, São Paulo State, Brazil, on a dead twig, between the bark and an overgrown cover consisting of lichens and mosses. The types of the var. *luederwaldti* (= *rastratus*) are from a very small colony nesting under the bark in a simple cavity within the alburnum of a tree (Luederwaldt, 1926: 275). Lenko's *rastratus* specimens from Caraça, Minas Gerais State, had their nest within a decaying log on the ground in a forest.

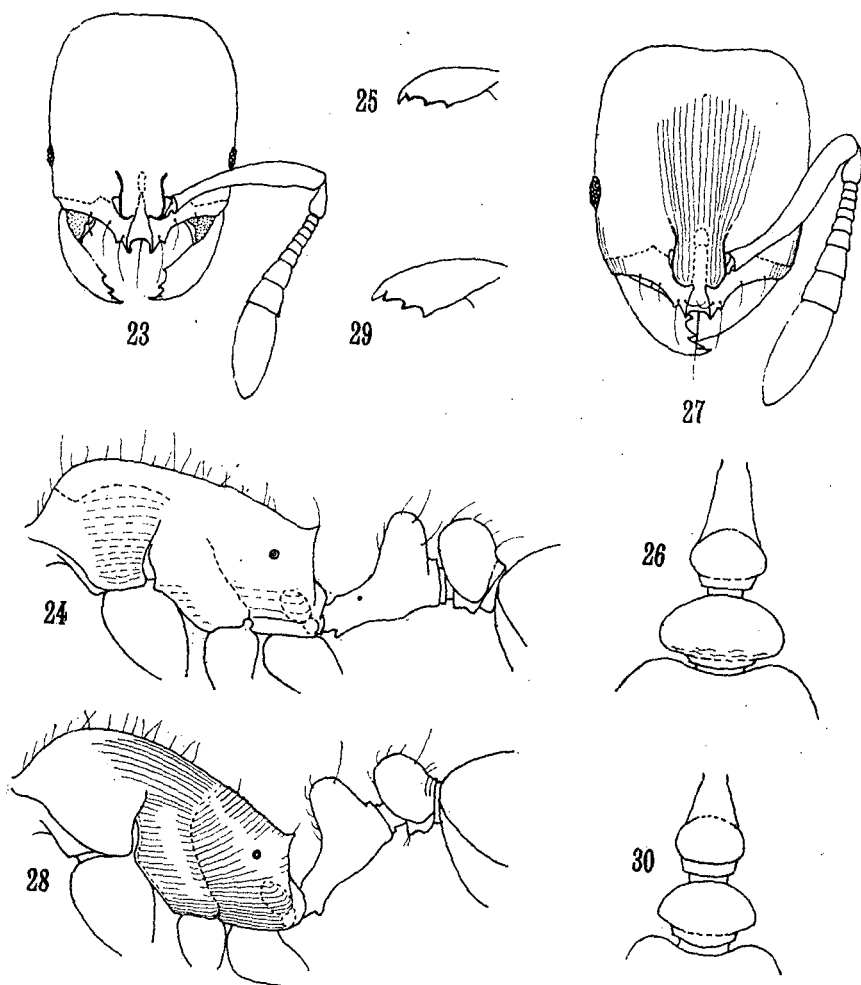
A symbiotic relationship, the nature of which is completely unknown, is indicated at least for *bruchi*, *daguerrei* and *inquilinus* upon the following evidence:

1. *bruchi*. This species was collected once or twice in nests of *Pheidole obtusopilosa* Mayr at Alta Gracia and La Granja, Córdoba, Argentina. Directly observed were several dealated females. Later, among alcohol material of the same *Pheidole* species (same colony?) the worker was also discovered (Santschi, 1926: 7, 1929: 295). The infiltration of *Ph. obtusopilosa* colonies with *O. bruchi* does not seem to be common. Kusnezov examined 21 colonies of *Ph. obtusopilosa* without finding any *O. bruchi* or other species of *Oxyepoecus* (Kusnezov, 1952: 718). Yet while examining three nests of *Pheidole silvestrii* at Tafi Viejo, Tucumán, Argentina, he found in one of them several workers of an *Oxyepoecus* which he described as a new species under the name of *O. minutus* but is a straight synonym of *bruchi*. The infested *Pheidole* colony with their guests was placed in an artificial nest and kept under observation. No hostility was observed between *Ph. silvestrii* and *O. «minutus»* (= *bruchi*), a fact which Kusnezov tries to explain by the great «similarity» between the workers of both species.

2. *daguerrei*. Here the evidence is very slim and rests solely upon the fact that the *daguerrei* workers were received by Santschi already mounted on the same pin with *Solenopsis metanotalis* var. *picturata* Santschi and *S. tetraçantha* Emery, collected at Rosas, B. A., Argentina. The association between *daguerrei* and the two *Solenopsis* species, though possible, is only a surmise. *O. daguerrei* is known solely from the three type specimens.

3. *inquilinus*. The types and subsequent Argentine material (workers only) were invariably discovered in nests of *Pheidole radoszkowskii*. Yet *inquilinus* infestation is not common, since it was found only in 2 of 41 *radoszkowskii* colonies, prior to the description of the former. Placed together in the glass container of an aspirator, *Pheidole radoszkowskii* soldiers showed themselves very hostile toward the *inquilinus* workers by endeavoring to cut them up into pieces with their heavy mandibles (Kusnezov, 1952: 718). My own field experience, based on the hitherto known Brazilian material, suggests a similar relationship, inasmuch as several stray *inquilinus* workers (described under the name of «*turgidus*», a straight synonym of the former species) were collected with *Pheidole schwarzaieri* and *Ph. claviscapa* workers swarming out of their disturbed nests, at Anápolis, Goiás State. A definite association, however, was not observed in nature (Kemp f, 1969: 281).

Note on measurements. *Head length* is the maximum measurable length of head proper, between two parallels drawn through the tip of the clypeal spines and the posteriormost part of occiput in full-face view. *Head width* is the maximum width of the head capsule measured in the same view as head length, behind eyes. (In the male, the



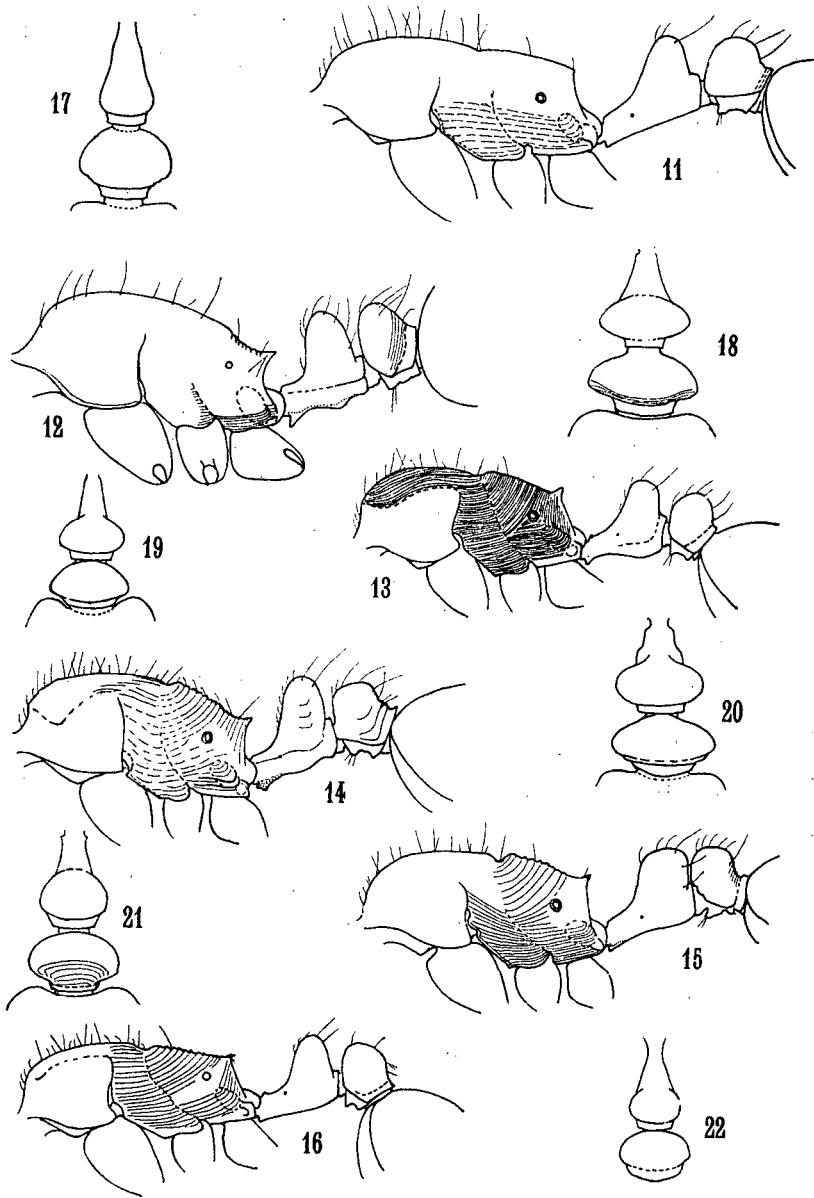
Figs. 23-26. *Oxyepoecus reticulatus* sp. n., worker: 23. head in full-face view. 24. thorax and pedicel in profile. 25. mandible. 26. pedicel in dorsal view. — Figs. 27-30. *Oxyepoecus plaumanni* sp. n., worker: 27. head in full-face view. 28. thorax and pedicel in profile. 29. mandible. 30. pedicel in dorsal view. (Kempf det.).

Mandibles subtriangular; chewing border subequal in length to basal border; basal tooth as strong as subbasal tooth, not separated from the latter by a deep cleft nor by an exceptionally broad diastema. Median apron of clypeus raised and protruding in front, laterally margined by a pair of carinae that converge caudad and terminate cephalad in the form of a prominent pointed

tooth, flanked laterally by a small and rather blunt denticle. Frontal area impressed, smooth and shining. Frontal carinae mostly subparallel, short, terminating posteriorly at level of anterior orbit of eyes; the distance between their outer edges distinctly less than one third of head width as measured behind eyes. Compound eyes slightly convex, with over 10 facets (11-12) in a row across the greatest diameter of the eye and a total of approximately 50 ommatidia. Ocelli very small, their diameter equalling the minimum thickness of the antennal scapes. The latter, when laid back over the head as much as possible, failing to attain the occipital corner by a distance exceeding their own thickness. Funicular segment I as long as II-V combined; segments II-VII distinctly broader than long, VIII and IX about as broad as long.

Thorax (Fig. 35) with marked shoulders; pronotum entirely declivous in the middle, its dorsal face anteriorly and laterally submarginate. Lateral borders of basal face and declivous face of propodeum rather sharply marginate yet not carinate. Propodeal spines horizontal, slightly diverging caudad, the distance between their apices subequal to the maximum width of the petiolar scale. Petiole (Figs. 35, 36) strongly pedunculate in front, with a keellike, anteriorly dentate, subpetiolar tooth; node strongly compressed antero-posteriorly, strongly expanded laterad. Postpetiole likewise compressed antero-posteriorly, slightly lower than petiole, the sides projecting laterad and downward as blunt cones; posterior face with very distinct transverse costulae; anterior subpostpetiolar process very prominent and bidentate. Gaster slightly excised in front at the postpetiolar insertion. Wings lost.

Worker (nidotype or paralectotype?). Total length 2.3 mm; head length 0.57 mm; head width 0.47 mm (cephalic index 81); scape length 0.35 mm; maximum diameter of eyes 0.09 mm; Weber's length of thorax 0.63 mm; maximum width of pronotum 0.36 mm; hind femur length 0.36 mm; petiole width 0.20 mm; postpetiole width 0.28 mm. Extremely close to *vezenyii* (q. v.) differing substantially only in the shorter, subtriangular mandibles (Fig. 44), the more extensively sculptured head (Fig. 43), the slightly smaller eyes with approximately 15 ommatidia, the slightly narrower petiolar node (Fig. 46), and above all, the very prominent, bifid anterior subpostpetiolar process (Fig. 45).



Oxyepoecus Santschi
 Figs. 11-16. Thorax and pedicel of worker in profile. 11. *punctifrons* (Borgmeier). 12. *inquillus* (Kusnezov). 13. *rastratus* (Mayr). 14. *vezenyii* (Forel). 15. *crassinodus* sp. n. 16. *daguerrei* (Santschi). — Figs. 17-22. Pedicel in dorsal view: 17. *punctifrons*. 18. *inquillus*. 19. *rastratus*. 20. *vezenyii*. 21. *crassinodus*. 22. *daguerrei*. (Kempt det.).

head width includes the prominent eyes). *Scape length* is the chord length of the antennal scapes, excluding the basal condyle and its neck, partly in the antennal socket. *Weber's length of thorax* is the oblique length of thorax from side-view, measuring from the base of the anterior pronotal declivity to metasternal extremity. *Hind femur length* is the chord length of the hind femur, excluding, of course, the trochanter. *Total length* of the body is the summed length of head plus closed mandibles, thorax length, axial lengths of petiole, postpetiole and gaster, measured separately.

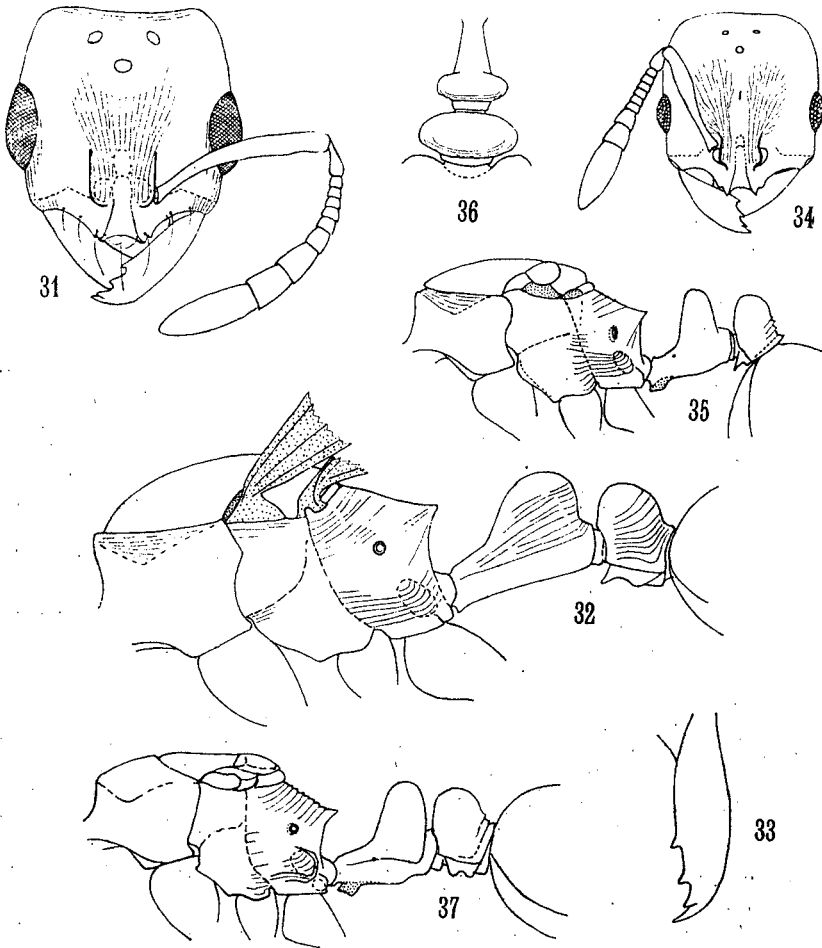
Oxyepoecus bruchi Santschi

(Figs. 34, 35, 36, 43, 44, 45, 46)

Oxyepoecus bruchi Santschi, 1926: 6-7, figs. a-d (female; Argentina, Córdoba: Alta Gracia). Ettershank, 1966: 146. Kempf, 1972: 173.
Mitara bruchi: Santschi, 1927: 246 (n. comb., error for *Martia*).
Martia bruchi: Santschi, 1929: 295 (worker; Argentina, Córdoba: Alta Gracia). Kusnezov, 1952: 717, 720 (biology; key to Argentine species).
Martia minuta Kusnezov, 1952: 718, 720-21 (worker; Argentina, Tucumán: Quebrada Calzo). Kusnezov, 1953: 337 (Argentina: Tucumán). Nov. Syn.
Oxyepoecus minutus: Ettershank, 1966: 146. Kempf, 1972: 173.

Female (lectotype). Total length 2.5 (2.4) mm; head length 0.60 (0.59) mm; head width 0.48 (0.51) mm; scape length 0.35 mm; maximum diameter of eyes 0.13 (0.12) mm; Weber's length of thorax 0.76 (0.73) mm; maximum width of pronotum 0.42 (0.44) mm; hind femur length 0.40; petiole width 0.23 (0.24) mm; postpetiole width 0.29 (0.32) mm; cephalic index 80 (87). Color (specimens faded) reddish brown, anterior portion of head, mandibles, sides of thorax lighter; antennae and legs ochraceous. Integument smooth and shining except for the following: frons with a narrow smooth stripe separating two patches of fine, longitudinal rugulae which fade out at level of ocelli, not attaining posteriorly the occipital border in full-face view, nor laterally the upper orbit of eyes; cheeks finely costate rugose, rugae attaining anterior orbit of eyes. Pronotum shining, the dorsum finely yet indistinctly and obliquely costulate, the sides smooth. Scutum smooth and shining. Scutellum shining with superficial and weak longitudinal costulae. Basal face of propodeum shining and rather smooth, transverse costulae widely spaced and at best vestigial, practically absent. Upper posterior corner of catapisternum of mesothorax with a few horizontal costulae that continue caudad on sides of metapleura over the bulla of metasternal gland. Hairs abundant, standing on dorsum of thorax, on petiole, postpetiole and on gaster, shorter and inclined on head and appendages.

Head in full-face view (Fig. 34) with lateral and occipital borders scarcely convex, occipital corners broadly rounded.



Figs. 31-33. *Oxyepoecus vivax* sp. n., female: 31. head in full-face view. 32. thorax and pedicel in profile. 33. mandible. — Figs. 34-36. *Oxyepoecus bruchi* Santschi, female: 34. head in full-face view. 35. thorax and pedicel in profile. 36. pedicel in profile. — Fig. 37. *Oxyepoecus vezenyii* (Forel), female: thorax and pedicel in profile. (Kempf del.).

Material examined. Argentina, Córdoba: La Granja, C. Bruch leg. 3 dealate females, taken from a nest of *Pheidole obtusopilosa* Mayr (lectotype and 2 paralectotypes, CTB; more specimens presumably in the Santschi and Bruch collections, at Basel respectively at Buenos Aires); Córdoba: Alta Gracia, C. Bruch leg. 1 worker, from a nest of *Pheidole obtusopilosa* Mayr

(«type», Santschi collection, NHMB); Tucumán: Quebrada Cainzo, 8-IV-1948, N. Kusnezov leg. 7 workers (holotype and paratypes of *Martia minuta* Kusn., IML n. 1590), found as inquilines in a nest of *Pheidole silvestrii* Emery.

Discussion. This species was originally proposed on a series of dealate females found in a nest of *Pheidole obtusopilosa*. Only later, Santschi discovered among alcohol material of the same *Pheidole* (whether or not from the same colony that had yielded the females, is not stated) the worker, represented by a single specimen which is redescribed above. This specimen confirmed my previous suspicion that *minutus* Kusnezov (nov. syn.) is its juniors synonym.

In fact, the workers of the type series of *minutus* are likewise extremely close to *vezenyii*, as already pointed out for the *bruchi* worker by Santschi (1929: 295), being distinctive by precisely the same characters already mentioned in the preceding worker diagnosis of *bruchi*. The *minutus*-series is of slightly, yet not significantly smaller size, as indicated by their critical measurements: Total length 2.1-2.2 mm; head length 0.33-0.36 mm; head width 0.43-0.44 mm; scape length 0.31-0.32 mm; maximum diameter of eyes 0.08 mm; Weber's length of thorax 0.57-0.61 mm; maximum width of pronotum 0.29-0.32 mm; hind femur length 0.33-0.36 mm; petiole width 0.17-0.19 mm; postpetiole width 0.24-0.25 mm.

Although the only known queen of *vezenyii* is remarkably distinct from that of *bruchi*, it must be said that the more striking differences consist in features (small eyes, a workerlike pronotum which is not entirely declivous in the middle, the relatively small mesonotum, the complete lack of wings) derived from the fact that the former is partly ergatomorphic, in short an ergatogyne. (Wilson, 1971: 138). Aside from these characters based on caste development, the real specific character differences are very subtle and consist, for *bruchi*, in the shorter, subtriangular mandibles, the more extensively sculptured frons and vertex of head, the costulate patches being only narrowly separate, the narrower petiolar node whose width does not exceed the distance between the tips of the propodeal teeth, the anterior subpostpetiolar process which is unusually prominent and bidentate.

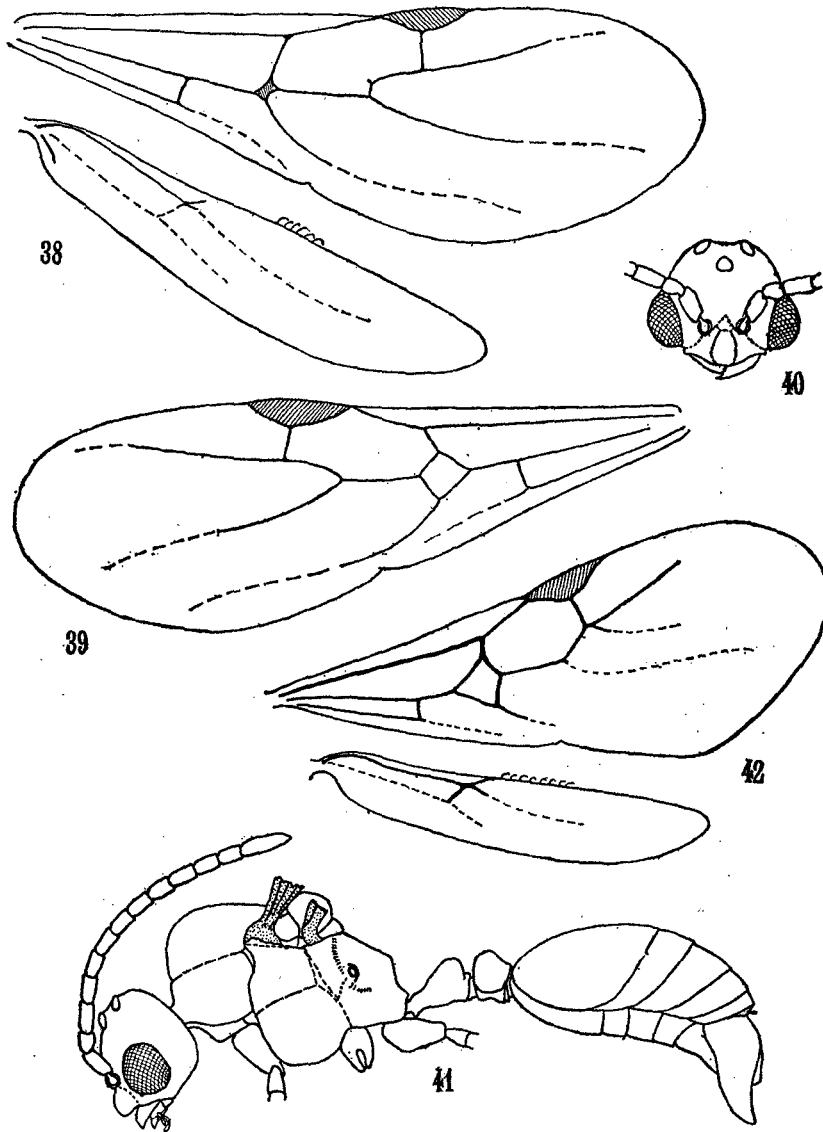
The *bruchi* queen, according to size and general aspect, is also close to *plaumanni* (a new species described below), differing principally in the smooth sagittal stripe across the sculptured vertex of head, the extremely feebly developed transverse costulae on basal face of propodeum, the much more antero-posteriorly compressed and laterally expanded petiolar node, the transversely costulate posterior face of postpetiole, and the prominent, bidentate subpostpetiolar process.

The newly proposed synonymy shows that *bruchi*, as an inquiline ant, is not host-specific, having been found with both *Pheidole obtusopilosa* and *Ph. silvestrii*, two quite discrepant species.

***Oxyepocus crassinodus* sp. n.**

(Figs. 2, 8, 15, 21)

Worker (holotype). Total length 2.7 (2.6) mm; head length 0.68 (0.64) mm; head width 0.55 (0.52) mm; scape

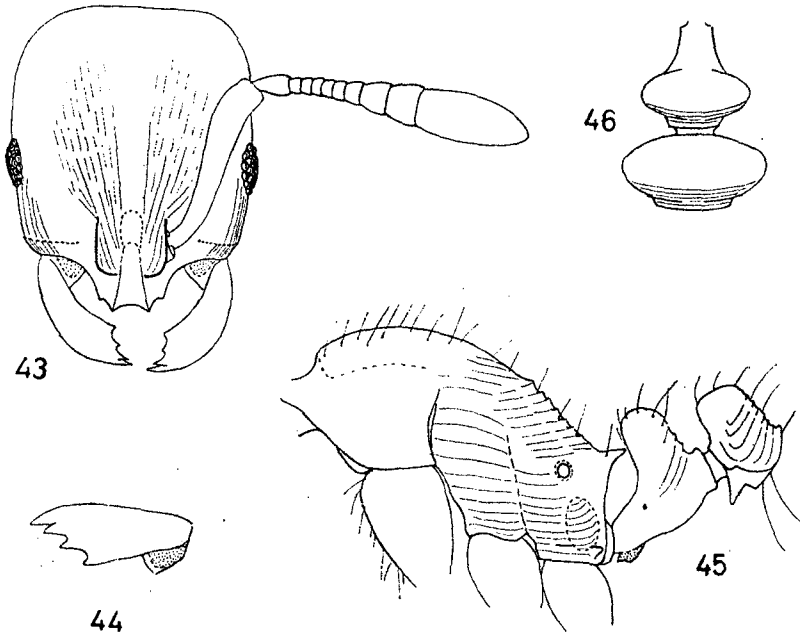


Figs. 38-39. *Oxyepoecus vivax* sp. n., female: 38. left fore and hind wing. 39. right fore wing. — Figs. 40-42. *Oxyepoecus rastratus* (Mayr), male: 40. head in full-face view. 41. body in profile. 42. fore and hind wing. (Kempf del.).

length 0.41 (0.39) mm; maximum diameter of eyes 0.09 (0.08) mm; Weber's length of thorax 0.76 (0.70) mm; maximum width of pronotum 0.40 (0.37) mm; hind femur length 0.44 (0.43) mm; petiole width 0.20; postpetiole width 0.28 (0.31) mm; cephalic index 80 (82). Reddish brown; mandibles, legs, antennal club lighter, yellowish brown. Integument smooth and shining except for certain finely costulate portion on frons of head, basal face of propodeum and sides of thorax to be pointed out below. Hairs moderately abundant, standing on body, oblique on mandibles, antennae and legs; on head, besides the erect hairs on dorsum, also shorter, reclined hairs, curved obliquely mesad on front and vertex, forward on sides; fine pubescence present only on antennal club, coxae and tarsomeres.

Head as shown in Fig. 2. Mandibles (Fig. 8) triangular, not strikingly elongate, basal border scarcely longer than chewing border, basal tooth separated from the remaining teeth by a deeper cleft. Median apron of clypeus very strongly projecting forward between two strong (but weaker than in *inquilinus*) carinae, which form anteriorly a protruding and pointed tooth, each flanked laterally and somewhat below by another small, somewhat lobate denticle. Frontal area impressed, indistinctly delimited. Frontal carinae short, moderately expanded laterad, straight, parallel, terminating in front of level of anterior orbit of eyes, the distance between their outer edges (interfrontal width) conspicuously less than one third of head width, bearing dorsally a few fine costulae which diverge obliquely laterad above eyes and extend caudad beyond the level of the posterior orbit of eyes, but do not attain the occiput, as shown in Fig. 2; the two patches of costulae separated by a smooth median stripe on frons and vertex. Cheeks longitudinally costulate in front of eyes. The latter comparatively small, moderately convex, with about 5-6 facets in a row across the greatest diameter, the total number of ommatidia not exceeding 20. Antennal scape not reaching the occipital corner by a distance which surpasses its maximum width, when laid back over the head. Funicular segment I longer than both VIII and IX taken individually, as long as II-V combined; segments II-VII distinctly broader than long, VIII and IX not longer than broad.

Thorax as shown in Fig. 15. Promesonotum immarginate in front, dorsal disc transversely gently vaulted, passing through a narrow curvature to the slightly excavate laterotergite of pronotum; shoulders scarcely marked, neither subdentate nor



Figs. 43-46. *Oxyepoecus bruchi* Santschi, worker: 43. head in full-face view. 44. mandible. 45. thorax and pedicel in profile. 46. pedicel in dorsal view. (Kempf *del.*).

tuberculate. Metanotal groove deeply impressed, forming a visible notch in profile, metanotal suture indicated. Promesonotum entirely smooth, with a few short longitudinal costulae on posterior half of mesonotum, starting from the metanotal suture forward. Mesopleura covered with fine, horizontal costulae, slanting downward posteriorly. Basal face of propodeum transversely costulate, 10-15 costulae fine, continuing obliquely downward and forward on sides of propodeum; the last dorsal costa between the small propodeal teeth not particularly prominent; declivous face smooth and shining, laterally sharply marginate, with at least two vestigial transverse costulae on upper half. Lower half of thorax posteriorly densely and horizontally costulate, the costulae extending over the bulla of the metasternal gland.

Petiole (Figs. 15 and 21) strongly pedunculate, node thick and dorsally convex in both directions, antero-posteriorly scarcely compressed, much narrower than postpetiole in dorsal view; subpetiolar process low, forming a sagittal keel terminating in

front in a small tooth. Postpetiole very broad and scalelike, antero-posteriorly compressed, not as high as petiole, its posterior face with a few faint transverse costulae. Gaster slightly excised, smooth and shining above and below.

Types. 6 workers, as follows: Brazil, Paraná State, Bocaiuva do Sul, XII-1963, F. Plaumann leg. 5 workers (WWK 8108, holotype and paratypes); Santa Catarina State, Nova Teutônia, Município de Seara, XII-1958, F. Plaumann leg. 1 worker (WWK 8308, paratype). All specimens taken as strays in sifted leaf-mold.

Discussion. *O. crassinodus* is at once distinct by the deeply impressed metanotal groove and the thick, laterally scarcely expanded nor antero-posteriorly compressed petiolar node.

It differs from *inquilinus* in the shorter, triangular mandibles, the more abundant costulae on frons and vertex, the much smaller eyes with lesser number of ommatidia, the greater distance between mandibular insertion and anterior orbit of eyes, which exceeds noticeably the maximum diameter of the latter, the entirely sculptured mesopleura, the deeply impressed metanotal groove, the thick petiolar node which is not scalelike nor antero-posteriorly compressed.

The differences from the even closer *daguerrei* consist in the mostly smooth cephalic dorsum, the costulae on vertex being separated into two patches by a median, smooth longitudinal stripe, and do not attain posteriorly the occiput; in the smaller eyes with a lesser number of facets.

The following characters separate *crassinodus* from *plaumanni* (described below): costulae on vertex and frons divided by a median smooth stripe; shoulders of thorax nearly completely rounded, not marked; promesonotum entirely smooth on disc; metanotal groove much more deeply impressed; transverse costulae on basal face of propodeum less dense and fewer in number (less than 15).

***Oxyepoecus daguerrei* (Santschi)**

(Figs. 5, 16, 22)

Martia daguerrei Santschi, 1933: 111 (worker; Argentina, Buenos Aires: Rosas, F. C. Sur). Kusnezov, 1952: 717-8, 720 (biology, key to the Argentine species).
Oxyepoecus daguerrei: Ettershank, 1966: 146. Kempf, 1972: 173.

Worker (lectotype). Total length 2.6 mm; head length 0.63 mm; head width 0.52 mm; scape length 0.40 mm; maximum diameter of eyes 0.12 mm; Weber's length of thorax 0.72 mm; maximum width of pronotum 0.36 mm; hind femur length 0.45 mm; petiole width 0.17 mm; postpetiole width 0.23 mm; cephalic index 83. Fuscous brown to black; antennal scapes, thorax and pedicelar segments a bit lighter; mandibles and legs reddish brown. Mandibles, scapes, sides and gular face of head, pro-

notum, part of mesonotum, legs, petiole and most of the post-petiole, gaster smooth and shining throughout. Front and vertex densely longitudinally costate-striate, but the sculpture does not attain laterally the upper margin of the eyes, yet attains posteriorly the occipital border when head is seen in full-face view; costulae gently diverging caudad, the lateralmost costulae attaining the occipital corner; strong piligerous punctures both on sculptured and smooth parts of the cephalic dorsum. Mesonotum laterally longitudinally costulate, discally smooth except for a few weak and extremely short costulae arising from the metanotal groove. Propodeum densely and finely transversely striato-costulate. Meso- and metapleura horizontally costulate, the intervals practically smooth. Abundant erect or suberect hairs of variable length on thorax, pedicelar segments and gaster; on head, except for the long clypeal hairs, they are shorter, inclined mesad dorsally on disc, forward on sides. Scapes and legs with short, inclined to subappressed hairs.

Head (Fig. 5) a little elongate, the sides in full-face view very gently convex, the occipital corners rounded, the occiput straight. Mandibles subtriangular, the basal border not longer than the chewing border, the basal tooth strong, separated from the subbasal tooth by a deeply concave excision, the diastema rather broad. Median apron of clypeus projecting forward over the mandibles, clypeal carinae strong, slightly diverging cephalad, forming a pointed tooth which is flanked laterally and below by another small denticle. Frontal area smooth, scarcely impressed, ill-separated from the clypeus. Frontal carinae very short, closely approximated, the distance between their outer edges (interfrontal width) distinctly less than one third of head width, subparallel in front, slightly diverging behind, terminating at level of anterior orbit of eyes. Cheeks feebly costulate, costulae not attaining eyes. Eyes relatively larger, with about 8-9 facets in a row across the greatest diameter, and a total of nearly 30 ommatidia. Distance between anterior orbit of eyes and mandibular insertion subequal to maximum diameter of eyes. Antennal scape failing to attain the occipital corner by a distance equalling its maximum width. Funicular segment I longer than VIII and IX taken individually, as long as II-V combined; segments II-VII broader than long, VIII and IX as long as broad, subequal in length.

Thorax (Fig. 16) without marked shoulders, the pronotum gently convex in both directions, anteriorly and laterally im-

marginate; shoulders not marked. Metanotal groove very gently impressed but distinguishable in profile. Basal face of propodeum nearly twice as long as broad, the sides submarginate, slightly divergent caudad, posterior corners dentate, the propodeal teeth rectangular in profile. Declivous face of propodeum laterally marginate yet not carinate.

Petiole (Figs. 16 and 22) strongly pedunculate, subpetiolar tooth well developed, node high, antero-posteriorly compressed yet not strongly expanded laterad, not forming in dorsal aspect a broad scale. Postpetiole lower but much broader than petiole due to the laterally projecting blunt cones, the posterior surface with feeble transverse costulae.

Types. Three workers, taken at Rosas, F.C. Sur, Buenos Aires province, Argentina, by Juan B. Daguerre, nn. 1904 and 666. One worker (n. 1904, lectotype) seen, received from the Borgmeier collection (TB). The workers of collection n. 1904 were originally mounted on the same pin with *Solenopsis metanotalis* var. *picturata* Santschi, and the single worker of collection n. 666 with *Solenopsis tetracantha* Emery, a fact which suggested to Santschi that they were taken together and living in a symbiotic relationship of some sorts.

Discussion. The species still seems to be known only from the specimens referred to above. It is quite distinct in its own right and easily recognizable by the combination of the heavily striato-costulate vertex and frons and the relatively large eyes.

O. daguerrei differs from *crassinodus* in the sculpture of the cephalic dorsum where the costulae attain posteriorly the occiput and are not separated into two patches by a median smooth stripe; the larger eyes with over 20 ommatidia in all and about 8 in a row across the greatest diameter; the more gently impressed metanotal groove; the rather inconspicuous propodeal armature, the teeth being rectangular and not obliquely raised upward when seen in profile; the weakly marginate and ecarinate lateral borders of declivous face of propodeum; the more compressed petiolar node.

The differences from *rastratus* are as follows: Sculpture on cephalic disc not attaining laterally the upper orbit of eyes which is separated from the sculptured area by a smooth stripe; shoulders scarcely marked; pronotum nearly continuously rounded in both directions; promesonotal disc smooth and shining; petiolar node not expanded laterad, decidedly narrower than postpetiole; the latter with weak transverse costulae on posterior surface of node.

Oxyepoecus inquilinus (Kusnezov)

(Figs. 4, 7, 12, 18)

Martia inquilina Kusnezov, 1952: 720 (worker; Argentina, Tucumán: Jardín del Instituto Miguel Lillo). Kusnezov, 1953: 337 (Argentina: Tucumán).
Oxyepoecus inquilinus: Ettershank, 1966: 146. Kempf, 1972: 278.
Oxyepoecus turgidus Kempf, 1969: 278-80 (worker; Brazil, São Paulo: Agudos; Goiás: Anápolis). Nov. Syn.

Worker (holotype). Total length 2.7 (2.5-2.9) mm; head length 0.60 (0.53-0.64) mm; head width 0.51 (0.46-0.53) mm; scape length 0.41 (0.35-0.44) mm; maximum diameter of eyes 0.16 (0.12-0.16) mm; Weber's length of thorax 0.80 (0.68-0.80) mm; maximum width of pronotum 0.44 (0.38-0.44) mm; hind femur length 0.48 (0.43-0.51) mm; petiole width 0.27 (0.22-0.28) mm; postpetiole width 0.33 (0.27-0.36) mm; cephalic index 83-91. Chestnut brown; gaster fuscous brown to black; mandibles, scapes and legs yellowish brown; occiput somewhat infuscated. Integument smooth and shining; piligerous punctures on cephalic dorsum conspicuous. Hairs abundant, erect on body, oblique on mandibles, antennae and legs; on head, most hairs are oblique, curved mesad dorsally on disc, the remaining ones curved forward; fine pubescence present only on antennal club, coxae and tarsomeres.

Head as shown in Fig. 4. Mandibles (Fig. 7) sublinear, strikingly elongate, basal border much longer than chewing border, the small basal tooth separated from the stronger subbasal tooth by a broad and shallow diastema. Median apron of clypeus very strongly and sharply carinate on both sides, the anterior teeth and accessory denticles well developed. Frontal area impressed, indistinctly delimited. Frontal carinae short, moderately expanded laterad, terminating at level of anterior orbit of eyes, bearing dorsally a few fine longitudinal costulae which curve obliquely laterad above eyes without reaching them and do not extend caudad beyond level of posterior orbit of eyes; maximum distance between outer edges of frontal carinae at least one third of maximum head width. Cheeks longitudinally striate in front and above eyes. The latter comparatively very large, moderately convex, with about 10 facets in a row across the greatest diameter, the total number of ommatidia being about 50 in all. Antennal scape relatively long but not quite reaching the occipital corner when laid back over the head. Funicular segment I longer than VIII and IX taken individually, as long as II-V combined; segments II-VII visibly broader than long; segments VIII and IX subequal in length, about as long as broad.

Thorax as shown in Fig. 12, stout and heavy-set. Promesonotum continuously vaulted in both directions, immarginate in front and on sides; shoulders completely rounded, not angular nor subdentate. Metanotal groove scarcely to not at all impressed; no metanotal suture present. Basal face of propodeum transversely costulate, the 10 or more fine costae fading out on sides of propodeum; the last costa between the comparatively prominent and acute propodeal spines separating the basal from the declivous face; the latter smooth and shining, laterally sharply marginate. Metasternal lobes rounded. Sides of thorax on postero-inferior corner with a few strong costulae, curved around the bulla of the metasternal gland; mesopleura also with a narrow band of short, faint, horizontal costulae along the posterior border.

Petiole (Figs. 12 and 18) strongly pedunculate, node high and rounded above, antero-posteriorly compressed, scalelike, nearly as broad as postpetiole; subpetiolar process in the form of a sharp sagittal crest terminating in front in a very prominent tooth. Postpetiole very broad, scalelike, not as high as petiole, its posterior surface with a few faint, transverse costulae. Gaster smooth and shining throughout.

Specimens examined: 50 workers, as follows: Argentina, Tucumán, Jardín del Instituto Miguel Lillo, 2-V-1948, N. Kusnezov leg. 2 workers (IML n. 1832, holotype and paratype); same locality and collector, 6-I-1948, 7 workers (IML n. 111, paratypes); same locality and collector, 5-IV-1952, 27-II-1953, 23-XI-1953, 24-XI-1953, 34 workers (IML n. 8006, 9133, 9146, 9185). Brazil, São Paulo State: Agudos, Fazenda Santo Antônio, 23-IX-1954, W. W. Kempf leg. 1 worker (WWK s/n, holotype of *turgidus*), same locality and collector, 25-I-1953, 1 worker (WWK n. 740, paratype of *turgidus*), same locality and collector, 6-I-1971, 1 worker (WWK n. 6166); Goiás State: Anápolis, savanna near the Franciscan Seminary Regina Minorum, 18-III-1966, 7-I-1966, W. W. Kempf leg. 4 workers (WWK n. 3852, 4225, 4300, paratypes of *turgidus*). Bolívia, Beni territory, Guayaramerin, 5-II-1954, N. Kusnezov leg. 2 workers (IML).

Discussion. When originally proposed (Kusnezov, 1952: 720), *inquilinus* was not given any formal description, but only a few, in part worthless differential characters were pointed out both in the text and in the key to the Argentine of the genus. A direct comparison between the holotypes of *inquilinus* and *turgidus* (nov. syn.) proved that both are conspecific, the latter being a straight synonym of the former.

This heavy-set species is striking by its elongate, sublinear mandibles which it shares with *vivax* and to some extent also with *vezenyii*, in which they are already a bit shorter and somewhat variable. *Inquilinus* differs from *vezenyii* in the slightly broader head, the more expanded frontal carinae which cover at least one third of the head width, the much larger eyes with over 50 ommatidia, the lack of margination in front and on sides of pronotum, the lack of a humeral angle, the stronger propodeal spines, the dentate, not lobate subpetiolar process.

The worker of *vivax* is unknown, but to judge from the queen, the shape of the petiole and the postpetiole readily separates both species (cf. Figs. 12 and 32).

All the Argentine material was found within the nests of *Pheidole radoszkowskii* Mayr, as already pointed out in the introduction of this paper. For the remaining specimens from Brazil and Bolivia, we have no such evidence.

Note. Three stray males, taken on December 15, 18 and 19, 1957 at Tucumán, Argentina (IML) definitely belong to *Oxyepoecus* and probably represent the male sex of the present species, *inquilinus*. They differ from the male of *rastratus*, diagnosed further below, in the following details:

Slightly larger in size, thorax heavier; frons with a smooth, impressed, longitudinal stripe between clypeus and anterior ocellus; scutum entirely smooth and shining; scutellum mostly smooth, lightly sculptured on sides; mesopleura mostly costate-rugose; basal face of propodeum with heavy, coarse transverse rugae; petiolar node more distinctly set off from the peduncle, its peak narrowly rounded in side-view.

Two other specimens, taken on December 15 and 19, 1957 at the same place belong to a different species and are not diagnosed here.

Oxyepoecus mandibularis (Emery)

Monomorium (*Martia*) *mandibulare* Emery, 1913: 261-2, fig. 12 (worker; Bolivia: Songo). Emery, 1922: 183. Borgmeier, 1928b: 65 (key).
Martia mandibularis: Kusnezov, 1952: 722.
Oxyepoecus mandibularis: Ettershank, 1966: 146. Kempf, 1972: 173.

The present species is known only from the single holotype, a worker specimen, probably kept in the Emery collection at Genova. It was not seen during this investigation. The original diagnosis is as follows:

«Ouvrière. — Brun ferrugineux, membres plus clairs, tête, excepté les mandibules, et segment basal du gastre brun noirâtre. Tête mate, très finement réticulée, sur le front, le réticule se résout en fines stries et, sur les joues, le fond se montre luisant; épistome et mandibules luisants; corselet strié, le promésonotum en long, mais assez irrégulièrement, l'épinotum transversalement et régulièrement. Poils longs et fins, pubescence presque nulle.

La tête est de peu plus longue que large, si on ne compte pas la saillie que forme l'épistome avec ses dents; mais si on en tient compte, la tête est alors presque une fois et demi aussi longue que large. Les mandibules sont longues et armées de 4 grandes dents dont la basal est épaissée et séparée des autres. L'épistome est bicaréné et armé, comme dans *M. vezenyii* et *rastratum*. Le scape atteint presque le bord occipital; massue de 3 articles, le dernier plus long que les

deux autres, ceux-ci presque égaux. Pas de suture promésotale, le profil du corselet n'est presque pas impressionné dans la suture méso-épinotale; l'épinotum a la face descendante beaucoup plus courte que la face basale; cette dernière est droite, presque verticale, bordée d'une arrête sur les côtés, qui se termine en haut par une petite saillie mousse. Vu par-dessus, le pétiole paraît claviforme; de profil, il est pédonculé et surmonté d'un noeud près de deux fois aussi haut que long; par-dessus, le noeud est un peu plus large que long; postpétiole ovale, à peine de moitié plus large que le noeud du pétiole. — L. 3 mill.

Bolivie: Songo; Staudinger et Bang-Haas, un exemplaire.

Cette curieuse espèce se rapproche de *vezenyii* et surtout de *rastratum*. Ce dernier (dont je possède un type) a les mandibules à 4 grosses dents, comme dans la nouvelle espèce; mais la dent basal n'est pas détachée comme chez *mandibulare*. L'épistome de *rastratum* a les dents médiales plus longues et les latérales moins prononcées que chez *mandibulare*.

Discussion. According to the original description and figure, *mandibularis* is quite distinctive by larger size (single-spread measurement giving a total length of 3.0 mm!); larger, triangular mandibles which have the broad basal tooth neatly separated from the subbasal tooth by a deep cleft (as in *punctifrons*, cf. Fig. 6); long antennal scapes, the tip of which nearly attains the occipital border when in repose. In addition the entire dorsal surface of the head is sculptured and opaque, except for the smooth clypeal apron, finely reticulate-striate on frons, and finely striate with smooth intervals on cheeks; the promesonotal dorsum is somewhat irregularly but predominantly longitudinally striato-rugose, the basal face of the propodeum is regularly transversely striate; the metanotal groove is scarcely impressed, the propodeal armature consists of scarcely protruding, blunt, paired tubercles; the petiolar node is not noticeably incrassate in profile nor conspicuously dilated laterad in dorsal view; the postpetiole is only one and a half times as broad as long.

The particular mandibular dentition and the long antennal scapes remind one of *punctifrons* which, however, is very light in color and scarcely sculptured at all. The closest species seems indeed to be *rastratus*, from which *mandibularis* differs in larger size, different mandibular dentition, longer scapes, more irregular sculpture on promesonotum, inconspicuous and blunt propodeal armature, and less antero-posteriorly compressed and laterally scarcely expanded petiolar and postpetiolar nodes. In the appended key, *mandibularis* would probably run to *rastratus* from which it is easily separated by the already mentioned characters.

Oxyepoecus plaumanni sp. n.

(Figs. 27, 28, 29, 30)

Worker (holotype). Total length 2.1 (1.9-2.2) mm; head length 0.53 (0.48-0.55) mm; head width 0.43 (0.39-0.43) mm; scape length 0.33 (0.31-0.33) mm; maximum diameter of eyes 0.07 (0.06-0.08) mm; Weber's length of thorax 0.61 (0.55-0.61) mm; maximum width of pronotum 0.31 (0.27-0.31) mm; hind femur length 0.36 (0.35-0.37) mm; petiole width 0.14 (0.12-

0.14) mm; postpetiole width 0.18 (0.16-0.18) mm; cephalic index 80 (77-81). Chestnut brown; mandibles, antennae and legs lighter, yellowish brown. Smooth and shining throughout except on frons, vertex, promesonotal dorsum and sides of thorax (excluding smooth laterotergite of pronotum), which are longitudinally costulate, and the basal face of propodeum which is very densely transversely costulate. Hairs moderately abundant; standing on body, inclined to subappressed on antennae, mandibles and legs; on cephalic dorsum and on gaster, besides the rather scarce standing hairs are other, shorter and more numerous ones inclined or curved mesad on cephalic disc, forward on cheeks, caudad on gaster.

Head as shown in Fig. 27. Mandibles (Fig. 29) subtriangular, not strikingly elongate; basal border subequal in length to chewing border, basal tooth not separated from subbasal by a broad diastema nor by a deep cleft. Median apron of clypeus projecting forward between the two strong, anteriorly diverging carinae, forming anteriorly a pointed prominent tooth, flanked laterally and below by another small denticle. Frontal area impressed, smooth and shining, distinctly delimited. Frontal carinae short, subparallel, terminating at level of anterior orbit of eyes, moderately expanded laterad, the maximum width between their outer edges being less than one third of maximum head width. Frontal carinae, frons, and vertex finely, longitudinally costulate, the sculptured area continuous, not attaining laterally the upper orbit of eyes nor caudally the occiput in full-face view. Cheeks longitudinally striate in front of eyes. The latter comparatively small, very little convex, with about 5 (6) facets in a row across the greatest diameter, the total number of ommatidia not exceeding 20. Antennal scape failing to reach the occipital corner by a distance which exceeds the maximum thickness of scape. Funicular segment I longer than VIII and IX taken individually, as long as II-V combined; segment II-VII decidedly broader than long, VIII and IX subequal in length and about as long as broad.

Thorax as shown in Fig. 28. Promesonotum convex in both directions, immarginate in front; shoulders faintly marked, sides of pronotal dorsum indistinctly marginate. Promesonotal dorsum finely, regularly, and superficially longitudinally costulate, but somewhat shining, especially on pronotum. Metanotal groove not impressed, metanotal suture indicated. Basal face of propodeum densely transversely costulate-rugose, with more than 15 costulae, the last costa between the small but pointed propodeal teeth

not particularly prominent; declivous face of propodeum smooth and shining, with a few vestigial transverse costulae near upper limit, its sides carinate. Sides of thorax, except the smooth and shining laterotergite of pronotum, more or less regularly horizontally costulate, the costulae extending also over the prominent bulla of the metasternal gland.

Petiole (Figs. 28 and 30) strongly pedunculate, node high and rounded, not particularly compressed antero-posteriorly nor laterally expanded; subpetiolar process in the form of a small denticle. Postpetiole much broader than petiole, the node proper somewhat compressed antero-posteriorly, its posterior surface without distinct transverse costulae. Gaster smooth and shining above and below, faintly excised at postpetiolar insertion.

Female (paratypes). Total length 2.6-2.7 mm; head length 0.56-0.60 mm; head width 0.45-0.47 mm; scape length 0.35-0.37 mm; maximum diameter of eyes 0.12 mm; Weber's length of thorax 0.75-0.78 mm; maximum width of pronotum 0.40-0.41 mm; hind femur length 0.40-0.43 mm; fore wing length 2.30 mm; hind wing length 1.54 mm; cephalic index 79-83. Color and pilosity as in worker, gaster occasionally somewhat infuscated. Cephalic dorsum with the same continuous patch of longitudinal costulae which do not attain laterally the upper orbit of eyes nor posteriorly the occiput. Pronotum dorsally weakly obliquely costulate, completely declivous in the middle. Mesonotal scutum smooth, scutellum longitudinally costulate; basal face of propodeum with about 10 transverse costulae; anepisternum and catepisternum of mesothorax mostly smooth and shining, at least discally; sides of metanotum and propodeum entirely costulate, the costulae being horizontal at bottom, oblique and slanting downward and forward above. Postpetiole without transverse costulae on posterior face of node. Fore wing with an open radial cell (*Rs* not attaining the anterior margin), a very small discoidal cell; the free abscissa of *M* entirely lacking in the apical field. Ocelli with the same diameter as the thinnest part of the antennal scape. Remaining characters as in worker.

Types. 40 workers and 6 females as follows: Brazil, *Rio Grande do Sul State*: Erechim, VII-1960, F. Plaumann leg. 18 workers (WWK n. 8097, holotype and paratypes); Barão de Cotejipe, VII-1960, F. Plaumann leg. 1 worker (WWK n. 3765, paratype); Boqueirão, IX-1960, F. Plaumann leg. 1 worker

(WWK n. 3611, paratype); Tainhas, IV-1959, F. Plaumann leg. 1 worker (WWK n. 3247, paratype); *Santa Catarina State*: Chapecó, VI-1960, VII-1960, VIII-1960, F. Plaumann leg. 9 workers, 2 females (WWK n. 8331, 9883, 9911, paratypes); Ibicaré, IX-1960, F. Plaumann leg. 2 workers (WWK n. 8178, paratypes); Nova Teutônia, VI-1960, XII-1972, F. Plaumann leg. 2 workers, 3 females (WWK n. 8091, 8383, 8557, 8562, paratypes); Passo Bormann, XII-1957, F. Plaumann leg. 1 female (WWK s/n, paratype); *Paraná State*: Porto Vitória, X-1959, F. Plaumann leg. 1 worker, 1 female (WWK n. 3207, 3209, paratypes); Rio Azul, X-1959, F. Plaumann leg. 4 workers (WWK n. 3189, paratypes).

Discussion. The present species, named after its discoverer, Mr. Fritz Plaumann, is closest to the sympatric *rastratus*. The worker exhibits the following diagnostic features: costulae on disc of cephalic dorsum not attaining laterally the upper orbit of eyes nor posteriorly the occipital border in full-face view; eyes smaller, with only 5-6 facets in a row across the greatest diameter and less than 20 ommatidia in all. Petiolar node not compressed nor expanded laterad. The same differences, except the eye character, hold for the females of both species, while *plaumanni*, in addition, has the mesonotal scutum entirely smooth and shining.

All the known material comes from Berlesate collections of forest leaf-mold, so nothing is known about the habits of this species, which seems to be confined to the floor cover of *Araucaria* forests in southern Brazil.

***Oxyepoecus punctifrons* (Borgmeier)**

(Figs. 6, 11, 17)

Monomorium (Martia) punctifrons Borgmeier, 1928a: 39 (worker; Brazil, Paraná: Rio Negro). Borgmeier, 1928b: 63-65 (worker; Brazil, Paraná: Rio Negro).
Martia punctifrons: Kusnezov, 1952: 722.
Oxyepoecus punctifrons: Ettershank, 1966: 146. Kempf, 1972: 173.

Worker (lectotype). Total length 3.2 (2.7-3.4) mm; head length 0.73 (0.64-0.79) mm; head width 0.59 (0.49-0.67) mm; scape length 0.53 (0.48-0.57) mm; maximum diameter of eyes 0.14 (0.11-0.15) mm; Weber's length of thorax 0.89 (0.77-0.98) mm; maximum width of pronotum 0.40 (0.36-0.47) mm; hind femur length 0.63 (0.55-0.68) mm; petiole width 0.20 (0.16-0.21) mm; postpetiole width 0.27 (0.23-0.32) mm; cephalic index 80 (77-85). Color reddish yellow. Integument smooth and shining with the following exceptions: frontal carinae laterad of postero-median extension of clypeus finally costulate, the ostulae not extending posteriorly beyond the frontal carinae; cheeks finely

costulate, the costulae not attaining the anterior border of the eyes; mesopleura and inferior half of metapleura finely and superficially horizontally costulate; basal face of propodeum superficially, nearly indistinctly, transversely costulate. Piligerous punctures quite conspicuous on dorsum of head. Hairs abundant, long standing hairs on dorsum of head, thorax, petiole, postpetiole and on gaster; shorter, inclined hairs interspersed with the long hairs principally on head and on gaster; short, oblique hairs on sides of head, on antennae and legs.

Head as shown in Fig. 6. Mandibles subtriangular, the basal border as long as chewing border; basal tooth stout, separated from the subbasal tooth by a deep cleft. Antero-median apron of clypeus protruding, laterally carinate, the carinae diverging cephalad, terminating in front in a short, relatively little projecting tooth which is flanked laterally by a minute, obtuse, lobelike denticle. Frontal area impressed, smooth and shining, well delimited from clypeus. Frontal carinae little expanded laterad, short, terminating at level of anterior orbit of eyes, the distance between the subparallel outer edges subequal to one fourth of the maximum head width. Eyes relatively large, moderately convex, their distance from the mandibular insertion equal to their greatest diameter which has approximately 11 facets in a row, the total number being about 50 ommatidia in all. Antennal scapes relatively long, their apex attaining the occipital corner when laid back over the head as much as possible. Funicular segment I longer than VIII and IX taken individually, as long as II-IV combined, segment II as long as broad, segment III-VII nearly as long as broad, segments VIII and IX slightly longer than broad.

Thorax as shown in Fig. II. Shoulders absolutely rounded, not marked, dorsum of pronotum not marginate on sides, pro-mesonotal suture absent. Metanotal groove slightly impressed in profile, metanotal suture present. Basal face of propodeum about twice as long as broad, laterally immarginate, posterior corner with a small, not prominent, rectangular tooth; sides of declivous face submarginate, not carinate. The costulae and striae on metapleura extend over the distinct bulla of the metasternal gland.

Petiole and postpetiole as shown in Figs. 11 and 17. Petiole briefly pedunculate, club-shaped in dorsal view, the node proper not compressed antero-posteriorly nor laterally expanded, anterior surface of node strictly oblique in profile. Subpetiolar carina sharp, terminating in front in a small tooth. Postpetiole likewise

scarcely compressed antero-posteriorly and little expanded laterad, the lateral projections short, blunt and bulky, the posterior surface nearly devoid of transverse costulae or rugae, except for one or two vestigial ones just above the articular collar. Gaster scarcely excised in front.

Types. 64 workers from the same colony, taken by the late Father Miguel Witte, O.F.M., at Rio Negro, Paraná State, Brazil, in April 1925 (TB n. 424, lectotype and paratypes).

Material examined: 162 workers, as follows: BRAZIL, *Rio Grande do Sul State*: Bom Jesus, XII-1962, F. Plaumann leg. 2 workers (WWK n. 3485); Nova Petrópolis, IX-1959, F. Plaumann leg. 7 workers (WWK n. 3228); Tainhas, IV-1959, F. Plaumann leg. 3 workers (WWK n. 3248); *Santa Catarina State*: Chapecó, XII-1957, VI-1960, VIII-1960, XI-1962, F. Plaumann leg. 8 workers (WWK n. 8334, 9880); Ibicaré, VII-1959, F. Plaumann leg. 6 workers (WWK n. 3127); Nova Teutônia, several collections between VIII-1952 and VI-1963, in the months of May to November, F. Plaumann leg. 44 workers (CTB s/n, WWK n. 8089, 8164, 8325, 8341, 8384, 3712); Seara, VII-1958, F. Plaumann leg. 2 workers (WWK n. 2705); Serra Geral, XII-1958, F. Plaumann leg. 1 worker (WWK n. 3024); *Paraná State*: Bocaiuva do Sul, V-1963, XII-1963, F. Plaumann leg. 8 workers (WWK n. 4978, 8107); Rio Azul, X-1959, F. Plaumann leg. 2 workers (WWK n. 3182); Rio Negro, IV-1925, M. Witte leg. 64 workers (TB n. 424, the type series already mentioned); Porto Vitória, X-1959, F. Plaumann leg. 1 worker (WWK n. 3197); *São Paulo State*: Campos do Jordão, 5-III-1957, W. W. Kempf leg. 4 workers (WWK n. 1812).

Variation. The divergence in size is noticeable as borne out by the measurements of the type series already given above. The additional specimens keep themselves more or less within the same limits, as shown by the range of the following measurements: head length 0.60-0.81 mm; head width 0.48-0.67 mm; scape length 0.44-0.55 mm; thorax length 0.76-0.96 mm; hind femur length 0.49-0.63 mm.

The development of the propodeal armature varies from merely obtuse or feebly tuberculate propodeal corners (smaller specimens) to neatly denticulate ones (larger specimens). The longitudinal costulae inside of the frontal carinae are quite constant with the exception of the Campos do Jordão (São Paulo State) specimens, which have them extended further back, in the fashion of *crassinodus*. The sculpture on the sides of thorax may be nearly absent (especially on mesopleura), or as in the description, or even stronger, as in the Campos do Jordão series. The same applies to the transverse costulae on basal face of propodeum, which vary between sharply expressed and nearly absent, the condition being to some extent dependent on overall size.

Discussion. As regards mandibular shape, i. e. the basal tooth stout and separated from the remaining teeth by a deep cleft, *punctifrons* resembles *mandibularis*, which differs in having the entire cephalic and thoracic dorsum sculptured and opaque. The predominantly smooth and shining integument and the large eyes remind of *inquillinus*, the latter having, however, long, subfalcate mandibles, more sharply denticulate clypeus, a heavier, thick-set thorax, a well developed propodeal armature with prominent spines, strongly antero-posteriorly compressed and laterally expanded petiolar node, and the posterior surface of postpetiole heavily transversely costulate.

Finally, *punctifrons* diverges from *crassinodus* by lighter color, larger eyes, longer scape, the only shallowly impressed metanotal groove, the weak to often obsolete sculpture on sides of thorax and basal face of propodeum, the lack of transverse costulae on posterior surface of postpetiole.

The scanty information on the biology of the species has already been mentioned above in the discussion of the genus.

Oxyepoecus rastratus (Mayr)

(Figs. 1, 10, 13, 19, 40, 41, 42)

- Monomorium rastratum* Mayr, 1887: 615-6 (worker; Brazil, Santa Catarina State).
Monomorium (Martia) rastratum: Forel, 1912: 3 (Brazil, Rio de Janeiro State).
 Borgmeier, 1928b: 65 (key).
Martia rastrata: Kusnezov, 1952: 722.
Oxyepoecus rastratus: Ettershank, 1966: 146. Kempf, 1972: 173.
Monomorium (Martia) rastratum var. *luederwaldti* Forel, 1913: 219 (worker; Brazil, São Paulo: Salto Grande). Luederwaldt, 1918: 43. Luederwaldt, 1926: 275 (biol.). Nov. Syn.
Martia rastrata var. *luederwaldti*: Kusnezov, 1952: 722.
Oxyepoecus rastratus var. *luederwaldti*: Ettershank, 1966: 146. Kempf, 1972: 173.

Worker. Total length 2.2-2.8 mm; head length 0.52-0.65 mm; head width 0.43-0.55 mm; scape length 0.30-0.40 mm; maximum diameter of eyes 0.09-0.13 mm; Weber's length of thorax 0.60-0.80 mm; maximum width of pronotum 0.32-0.40 mm; hind femur length 0.36-0.48 mm; petiole width 0.18-0.25 mm; postpetiole width 0.21-0.32 mm; cephalic index 76-84. Color reddish yellow to chestnut brown; mandibles, antennae, legs and tip of gaster always lighter; in darker specimens the gaster is usually infuscated. Integument smooth and shining with the ensuing exceptions: dorsum of head capsule with the exclusion of the smooth median apron of clypeus very finely and densely striato-costulate, the sculpture very regular with a silky sheen, due to minute punctulae between the costulae which attain laterally the eyes and posteriorly the occiput; dorsum of pronotum and mesonotum regularly, densely, longitudinally costulate, the interstices practically without punctulae; hence the integument appears shining, especially anteriorly on pronotum where often the costulae become very superficial or fade out completely, being visible

only in certain lights and angles; basal face of propodeum densely, finely, transversely costulate, with about 20 costulae; mesopleura, metapleura and sides of propodeum mostly horizontally, the latter obliquely, costulate; a few (1-2) transverse, very faint costulae on top of declivous face of propodeum; peduncle of petiole finely and superficially punctulate above and on sides; posterior surface of postpetiole practically lacking transverse costulae or rugae. Hairs abundant, standing on dorsum of head, thorax, petiolar and postpetiolar nodes, and on gaster; on head, also more numerous and shorter hairs inclined mesad on disc and forward on sides; gaster practically without short, inclined hairs; antennae and legs with abundant, short, oblique to sub-decumbent hairs.

Head as shown in Fig. 1. Mandibles short, subtriangular (Fig. 10); between basal and subbasal tooth a deep yet broad incision. Posteriorly converging clypeal carinae and anterior teeth well developed, the lateral denticles subobtuse and lobelike. Frontal carinae short, subparallel, terminating at level of anterior orbit of eyes, the distance between their outer edges distinctly less than one third of head width. Eyes intermediate, feebly convex, with 7-9 facets in a row across the greatest diameter which is subequal to the distance between the anterior orbit and the mandibular insertion, total number of ommatidia well over 20. Antennal scape failing to reach occipital corner when laid back over the head by a distance that equals its maximum thickness. Funicular segment I equal to sum of II-V; segments II-VII broader than long, VIII and IX as long as broad.

Thorax as shown in Fig. 13. Shoulders faintly marked. Pronotum immarginate on sides of dorsal surface. Metanotal groove very faintly impressed, metanotal suture distinct. Basal face of propodeum immarginate laterally, its posterior corners with strong teeth, the tips of which point obliquely upward; the distance between the tips of the propodeal teeth less than maximum width of petiolar node. Lateral borders of declivous face sharply marginate and faintly carinate.

Petiole and postpetiole as shown in Figs. 13 and 19. The former strongly pedunculate, with the subpetiolar process in the form of a small tooth; node antero-posteriorly compressed and scalelike, laterally expanded. Postpetiole much broader than long, somewhat compressed antero-posteriorly, the sides drawn out into bulky lobes. Gaster faintly excised at postpetiolar insertion.

Female (undescribed). Total length 2.7-3.2 mm; head length 0.60-0.67 mm; head width 0.51-0.56 mm; scape length 0.37-0.41 mm; maximum diameter of eyes 0.13-0.18 mm; Weber's length of thorax 0.80-0.91 mm; maximum width of pronotum 0.43-0.52 mm; hind femur length 0.45-0.53 mm; fore wing length 2.6 mm; hind wing length 1.7 mm; petiole width 0.24 mm; postpetiole width 0.29-0.32 mm. Similar to the worker with the usual differences of the caste. Eyes larger, the maximum diameter with 11-13 facets in a row exceeds the distance between the anterior orbit and the mandibular insertion; the total number of ommatidia from 60 to 100. Ocelli small, their diameter equal to thinnest cross-section of the antennal scape. Pronotum with marked yet not tuberculate shoulders, entirely declivous in the middle, dorso-laterally obliquely, densely striato-costate. Mesonotal scutum and scutellum finely, densely and regularly longitudinally costulate. Basal face of propodeum transversely costulate, with about 16 costae; sides immarginate; propodeal teeth stout and prominent. Laterotergite of pronotum smooth and shining. Posterior third of mesopleura, the metapleura and sides of propodeum horizontally to obliquely costulate. Wings only slightly infuscated, venation as usual in the genus. The only winged specimen seen has a small discoidal cell, and an extra-vein arising from the junction of *r-m* with *Rs* and extending apicad between *Rs* and *M*, as shown in the wing of the male (Fig. 42).

Male (undescribed). Total length 2.9 mm; head length 0.51 mm; head width (eyes included) 0.60 mm; scape length 0.12 mm; maximum diameter of eyes 0.24 mm; Weber's length of thorax 0.93 mm; maximum width of pronotum 0.60 mm; hind femur length 0.58 mm; fore wing length 2.3 mm; hind wing length 1.5 mm; petiole width 0.19 mm; postpetiole width 0.24 mm. Color fuscous brown; mandibles, antennae, apical half of tibiae, tarsomeres, tip of gaster much lighter, testaceous.

Head as shown in Fig. 40 and 41. Mandibles with 4 well developed teeth. Clypeus transversely strongly convex, little protruding anteriorly. Frontal carinae absent. Integument finely yet sharply reticulate-punctate, opaque. Thorax as shown in Fig. 41. Sides of pronotum and mesopleura smooth and shining, the latter vestigially costulate on posterior border. Metapleura and sides of propodeum horizontally costulate. Mesonotal scutum nearly smooth and somewhat shining, indistinctly sculptured. Scutellum superficially, finely, longitudinally costulate-striate. Basal

face of propodeum superficially reticulate-rugose, the posterior corners bluntly tuberculate, not dentate. Declivous face superficially reticulate-rugose, quite shining. Petiole, postpetiole and gaster smooth and shining. Legs, especially tibiae and tarsomeres, as well as antennae sharply punctured and opaque. Wings as shown in Fig. 42.

Specimens examined: 60 workers, 3 females, and 1 male, as follows: BRAZIL, *Minas Gerais State*: Serra Caraça, 1380 m, XI-1961, K. Lenko leg. 2 workers, 1 female, 1 male (MZUSP n. 2390, in WWK; more specimens in MZUSP); *Rio de Janeiro State*: Itatiaia, I-1956, T. Borgmeier leg. 1 worker (TB); *São Paulo State*: Rodovia S. Paulo-Curitiba, km. 40 near São Lourenço, V-1960, W. W. Kempf leg. 2 workers (WWK); Salesópolis, Estação Biológica Boracéia, 2-VI-1961, K. Lenko leg. 4 workers (MZUSP n. 1461, in WWK); same locality, V-1971, W. L. Brown, Jr. leg. 16 workers (WWK n. 6532); Salto Grande, XI-1911, H. Luederwaldt leg. 9 workers (TB n. 2687, syntypes of *rastratus* var. *luederwaldti* For.); Serra Cantareira, 1-III-1959, W. W. Kempf & Vitor dos Santos leg. 7 workers (WWK n. 2990); *Santa Catarina State*: Nova Teutônia, Mun. de Seara, many collections, IV-1954, VI-1960, VII-1960, VI-1972, F. Plaumann leg. 20 workers, 2 females (WWK n. 8081, 8327, 8337, 8165, 3543, 3549, 8081). The material taken by Plaumann and by myself is from berlesates of leaf-mold; the colony collected by Lenko at Serra Caraça, Minas Gerais, was nesting in a decaying log on the forest floor, in the vicinity of *Hypoponera jheringi* Forel and *Brachymyrmex* sp.

Discussion. There are only two known species in the genus that share with *rastratus* the entirely sculptured cephalic dorsum (sculpture attaining laterally the eye and posteriorly the occiput), viz. *mandibularis* and *reticulatus*.

Workers of *rastratus* differ from those of *mandibularis* in smaller size, absence of a narrow and deep cleft between the basal and subbasal tooth of mandibles, shorter antennal scapes that decidedly fall short of reaching the occipital corner when in repose, smaller and less bulging eyes, regular and densely costulate sculpture of head and promesonotum, well developed propodeal armature, broadly expanded and antero-posteriorly compressed nodes of petiole and postpetiole.

The characters that separate *rastratus* workers from the same caste of *reticulatus* are the following: sculpture of head and promesonotum consisting of regular and dense costulae, with the punctulae either absent or feebly developed; eyes larger, with 7-9 facets in a row across the greatest diameter and over 20 ommatidia in all; antennal scape a trifle longer, its apex removed from the occipital corner by just its own maximum thickness; laterotergite of pronotum smooth and shining;

basal face of propodeum sharply and densely transversely costulate; propodeal teeth well developed and protruding; petiolar node scalelike, antero-posteriorly compressed and expanded laterad. In the female caste, more or less the same differences do apply, the queen of *rastratus* being distinct from that of *reticulatus* by the head sculpture, larger eyes, smooth and shining laterotergite of pronotum, densely cross-costulate basal face of propodeum, the laterally expanded and antero-posteriorly compressed petiolar node, the absence of short, curved hairs on gaster, and the presence of well-developed wings.

Synonymy. Although the type of *rastratus* was not seen, Mayr's good description leaves no doubt that it coincides with the presently diagnosed species. There are only two puzzling, though really insignificant details in that description which do not match altogether with any *Oxyepoecus* species so far known: the presence of a distinct promesonotal suture and the erect (not inclined) shorter hairs on cephalic dorsum. As regards the promesonotal suture, I believe that Mayr did rather guess at it (the angle of incidence of light and the position of the specimen could give this illusion) than see it. Concerning the short cephalic hairs, I assume that the description is wrong.

Forel's var. *luederwaldti* (nov. syn.) is based on characters that fall within the normal range of variation of *rastratus* and may not be maintained as a valid form. I have seen several syntypes of this variety.

***Oxyepoecus reticulatus* sp. n.**

(Figs. 23, 24, 25, 26)

Worker (holotype). Total length 1.9 (1.9-2.3) mm; head length 0.51 (0.48-0.56) mm; head width 0.41 (0.38-0.44) mm; scape length 0.31 (0.29-0.35) mm; maximum diameter of eyes 0.07 (0.05-0.07) mm; Weber's length of thorax 0.57 (0.51-0.62) mm; maximum width of pronotum 0.31 (0.27-0.32) mm; hind femur length 0.33 (0.29-0.37) mm; petiole width 0.15 (0.13-0.15) mm; postpetiole width 0.23 (0.16-0.23) mm; cephalic index 82 (77-84). Chestnut brown; mandibles, antennae and legs lighter, yellowish brown. Mandibles, antennae, gular face of head, declivous face of propodeum, legs, petiole, postpetiole and gaster shining, smooth to very superficially and indistinctly sculptured. Remaining parts of the insect opaque with the following sculpture: cephalic dorsum finely, longitudinally costulate with fine, but very distinct and usually more conspicuous interstitial punctulae; the sculptured area attains laterally the eyes and posteriorly the occiput; pronotum longitudinally costulate above and on sides, the interstitial punctulation being weak to obsolescent on sides (laterotergite), strong on dorsum, nearly masking the longitudinal costulae; mesonotum and remaining part of sides of thorax reticulate-punctate; coarser costulae on bottom of meta-

pleura as shown in Fig. 24; basal face of propodeum with the transverse rugulae more evident yet not becoming the marked transverse costulae of the other species; declivous face vestigially transversely costulate on upper half, but quite shining. Hairs very abundant on head, curved mesad dorsally on disc, forward on sides; standing and moderately abundant on dorsum of thorax, petiole and postpetiole, and on gaster, the latter also with shorter, recurved hairs; oblique to subappressed on antennae and legs.

Head as shown in Fig. 23 (sculpture not indicated). Mandibles (Fig. 25) subtriangular, not strikingly elongate, the basal border not much longer than the chewing border, basal tooth separated from the subbasal tooth by a shallow diastema. Median apron of clypeus, as usual in the genus, protruding forward and bicarinate; clypeal teeth and denticles well developed. Frontal area impressed, more or less smooth and shining. Frontal carinae short, subparallel, little expanded laterad, the maximum width between their outer edges less than one third of head width. Eyes very small, scarcely convex, with about 4-5 facets across the greatest diameter, the total number of ommatidia not reaching 20. Antennal scapes failing to reach the occipital corner by a distance which exceeds the maximum thickness of the scape. Funicular segment I longer than VIII and IX taken individually, as long as II-V combined; segments II-VII decidedly broader than long, VIII and IX about as long as broad.

Thorax as shown in Fig. 24 (only the coarser costulae are shown). Promesonotum gently convex in both directions, immarginate in front, shoulders marked, yet not tuberculate, sides of pronotal dorsum indistinctly marginate; antero-inferior angle of pronotum obtuse but rounded. Metanotal groove not impressed, metanotal suture indistinct. Propodeal armature consisting of a pair of small but pointed teeth. Sides of declivous face subcarinate.

Petiole (Figs. 24 and 26) strongly pedunculate, node high and dorsally rounded, somewhat compressed antero-posteriorly yet not conspicuously expanded laterad; subpetiolar process in the form of a small tooth. Postpetiole much broader than petiole, conspicuously expanded laterad, the posterior surface of node without distinct transverse costulae.

Female (paratype). Total length 2.5 mm; head length 0.55 mm; head width 0.45 mm; scape length 0.33 mm; maximum diameter of eyes 0.11 mm; Weber's length of thorax 0.71 mm; maximum width of pronotum 0.40 mm; hind femur length 0.37

mm; petiole width 0.17 mm; postpetiole width 0.27 mm; cephalic index 83. Similar to the worker with the distinctive characters of the caste. Cephalic dorsum finely, longitudinally costulate, with conspicuous interstitial punctures, the sculpture attaining both the occiput and the eyes, as in worker. Eyes with about 10 facets across the greatest diameter. Laterotergite of pronotum, catepisternum of mesonotum and remaining parts of sides of thorax with horizontal costulae, the interstitial microsculpture superficial to obsolete, hence quite shining. Pronotum entirely declivous in the middle, the dorso-lateral portions finely, obliquely costulate. Mesonotal scutum and scutellum longitudinally costulate, opaque. Basal face of propodeum with about 10 transverse rugulae; the interstitial punctulae weak. Propodeal teeth short but pointed; the distance between their tips subequal to width of petiole. Posterior surface of postpetiole with several transverse rugae or costae. Although a completely developed female in all regards, this specimen never had wings.

Types. BRAZIL, *Santa Catarina State*: Nova Teutônia, VIII-1952, F. Plaumann leg. 39 workers (holotype and paratypes; TB n. 5954); Chapecó, V-1957, VI-1960, VII-1960, F. Plaumann leg. 12 workers (WWK; paratypes); Concórdia, VII-1958, F. Plaumann leg. 1 worker (WWK; paratype); Linha Facão, V-1957, F. Plaumann leg. 25 workers (WWK; paratypes); Passo Bormann, XII-1957, F. Plaumann leg. 1 worker (WWK; paratype); *Paraná State*: Guaragi, V-1964, F. Plaumann leg. 2 workers (WWK n. 4008, 4560; paratypes); Rio Azul, 1000 m, X-1959, F. Plaumann leg. 1 worker (WWK n. 3188; paratype); Rolândia, 6-IV-1955, W. W. Kempf leg. 2 workers (WWK n. 1414; paratypes); Mariópolis, without date, F. Plaumann leg. 1 female (TB; paratype); *São Paulo State*: Agudos, 25-III-1955, 17-IV-1955, 4-I-1956, 8-I-1956, W. W. Kempf leg. 15 workers (WWK n. 1405, 1430, 1552, 1560; paratypes); same locality, XI-1959, C. Gilbert leg. 1 worker (WWK n. 3218; paratype); Campos do Jordão, 16-X-1956, W. W. Kempf leg. 1 worker (WWK n. 1601; (paratype); Caminho do Mar, meio da serra (old São Paulo-Santos highway), 8-VIII-1960; W. W. Kempf leg. 3 workers (WWK; paratypes). All specimens were taken in berlesates of forest floor cover.

Discussion. This tiny species is very close to *plaumanni*, the worker differing as follows: head entirely sculptured on dorsum, i. e. the sculptured area touches the eyes and the side of the head and reaches posteriorly the occiput; laterotergite of pronotum horizontally

costulate, not smooth; sides of thorax heavily reticulate-punctate, costae at best vestigial; dorsum of thorax with strong interstitial punctulae, the latter masking in part the longitudinal rugae or costulae on pronotum, eliminate them altogether on mesonotum, and also render the transverse costulae on basal face of propodeum indistinct or absent; petiolar node a little more compressed antero-posteriorly.

The queen differs from that of *plaumanni* in sculpture of the cephalic dorsum and laterotergite of pronotum, as stated for the worker, and in the longitudinally costulate mesonotal scutum.

The differences from *rastratus* (worker and female), another very close species, have already been given while treating this species above.

Variation. Six workers, from sifted leaf mold near halfway down the coastal range on the old São Paulo-Santos road (Caminho do Mar), are lighter, yellowish brown in color, and have slightly larger eyes (6-7 facets across the greatest diameter). Another lot of 2 workers, also from sifted forest floor cover, taken alongside the São Paulo — Curitiba highway (BR-116) near Jucituba, São Paulo State, by myself is even more discrepant and is not listed as type. These specimens have the costulae on cephalic dorsum very feebly developed, the entire thorax, including the laterotergite of pronotum and the declivous face of the propodeum reticulate-punctate with practically no trace of costulae. Also the petiole and postpetiole are superficially reticulate-punctate. They might represent still another not yet recognized species, but we need more material to check up on the constancy of these characters.

Oxyepocus vezenyii (Forel)

(Figs. 3, 9, 14, 20, 37)

Monomorium (*Martia*) *vezenyii* Forel, 1907: 20-21 (worker; Paraguay: Puerto Max). Borgmeier, 1928b: 65 (key).
Martia vezenyii: Kusnezov, 1952: 720, 722.
Oxyepocus vezenyii: Ettershank, 1966: 145, figs. 114-119 (worker). Kempf, 1969: 277-8 (female; Brazil, Rio Grande do Sul: Erechim; Santa Catarina: Luzerna, Nova Teutônia, Seara). Kempf, 1972: 173.

Worker. Total length 2.4-3.0 mm; head length 0.57-0.67 mm; head width 0.47-0.55 mm; scape length 0.36-0.41 mm; maximum diameter of eyes 0.08-0.09 mm; Weber's length of thorax 0.68-0.79 mm; maximum width of pronotum 0.36-0.44 mm; hind femur length 0.39-0.47 mm; petiole width 0.23-0.31 mm; postpetiole width 0.27-0.35 mm; cephalic index 79-84. Color light ferruginous; mandibles, antennae and legs lighter, more yellowish, gaster usually somewhat infuscated. Integument smooth and shining with the following exceptions: frontal carinae longitudinally costulate, the costulae prolonged caudad and obliquely laterad, reaching beyond level of posterior orbit of eyes where they become faint to vestigial; cheeks with a few longitudinal rugae that reach the anterior orbit of eyes; postero-lateral corner of dorsal disc of pronotum, sides and posterior third of mesonotum, mesopleura, metapleura and sides of propodeum with longitudinal costulae, which especially on pronotum,

mesonotum and mesopleura vary in their degree of distinctness, from vestigial to well formed; basal face of propodeum with 10-15 costulae, 6-8 strong ones, the others weak; sides of petiolar node with a few, widely spaced horizontal rugulae; posterior surface of postpetiole with several rows of indistinct to well-expressed transverse rugae. Hairs abundant, long, standing on head, dorsum of thorax, petiole and postpetiole, and on gaster; on head, besides the scarcer standing hairs are inclined and shorter ones, inclined mesad dorsally on disc, forward on sides; gaster without these interspersed shorter and inclined hairs.

Head as shown in Fig. 3. Mandibles rather elongate than subtriangular (Fig. 9), with a broad and relatively shallow diastema between the basal and subbasal tooth. Median apron of clypeus projecting above mandibles, with the usual posterior converging carinae and the anterior teeth; the lateral denticles blunt, lobe-like. Frontal carinae gently convex, slightly constricted posteriorly, the maximum width between their outer edges always less than one third of head width. Frontal area impressed, smooth and shining, ill-delimited. Eyes relatively small, with about 6-7 facets in a row across the greatest diameter which is less than the distance between the anterior orbit and the mandibular insertion: total number of ommatidia about 20. Antennal scapes failing to reach the occipital corner by a distance equalling the maximum thickness of the scape. Funicular segment I as long as II-V combined, segments II-VII distinctly broader than long, VIII and IX as long as broad.

Thorax as shown in Fig. 14. Shoulders marked, somewhat tuberculate, sides of pronotum submarginate. Metanotal groove shallowly impressed, metanotal suture indistinct. Basal face of propodeum immarginate on sides, posteriorly with two small, pointed denticles. Declivous face laterally marginate and weakly carinate.

Petiole and postpetiole as shown in Figs. 14 and 20; the former strongly pedunculate, subpetiolar process elaborate and foliaceous, node strongly compressed antero-posteriorly and laterally expanded in a scalelike fashion, nearly as broad as postpetiole. The latter unusually broadened due to the drawn out lateral bulky lobes. Gaster shallowly excised at the postpetiolar insertion.

Female (ergatomorphic). Total length 3.1 mm; head length 0.64 mm; head width 0.53 mm; scape length 0.43 mm; maximum diameter of eyes 0.11 mm; Weber's length of thorax 0.84 mm; maximum width of pronotum 0.43 mm; hind femur

length 0.46 mm; petiole width 0.30 mm; postpetiole width 0.35 mm; cephalic index 82. Resembling the worker with the modification proper of the caste Eyes surprisingly small, as in worker, with less than 30 ommatidia. Ocelli minute, their diameter less than the minimum thickness of scape. Thorax (Fig. 37) with bluntly marked shoulders, pronotum not entirely declivous in the middle, nearly one third of the maximum length is horizontal along the sagittal line, on anterior corners a few faint transverse to oblique rugae, the rest smooth and shining. Mesonotum (scutum and scutellum) relatively small, their combined length subequal to one half of Weber's length of thorax; scutum smooth and shining with heavier piligerous punctulae; scutellum entirely smooth. Basal face of propodeum transversely costate, with 8-10 costae, which continue downward and obliquely forward on the sides. Mesopleura smooth and shining. Propodeal spines short but pointed. Petiole and postpetiole as in worker, the subpetiolar process in the form of a small foliaceous lobe. Wings never developed.

Specimens examined: 47 workers and 1 female, as follows: BRAZIL, *Rio Grande do Sul State*: Erechim, VIII-1956, F. Plaumann leg. 1 worker (WWK); *Santa Catarina State*: Ibicaré, IX-1960, F. Plaumann leg. 15 workers (WWK n. 8103); Luzerna, I-1963, Fr. Libório Schmitt leg. 2 workers (WWK); Nova Teutônia, VIII-1952, X-1953, VI-1959, VII-1959, VI-1960, F. Plaumann leg. 22 workers and 1 female (X-1953) (TB n. 5956, WWK n. 8301, 8177, 8163, 8326); Seara, VII-1958, F. Plaumann leg. 2 workers (WWK n. 2706).

Discussion. The lone holotype in the Forel collection was not seen during this study, but the original description is reasonably detailed and fits very well the southeastern Brazilian specimens listed above, except for the following features: promesonotum even more polished, the striae or rugae are very fine and confined to the sides and the posterior third of the mesonotum proper: the transverse costulae on basal face of propodeum, although quite variable in number, are more numerous there being at least 8 instead of 6 strong ones, not counting the incomplete or faint ones. Even so, the specific identity of the specimens seen with the type seems to be reasonably sure.

The closest relative of *vezenyii*, on account of the long, linear mandibles, the smooth integument and the antero-posteriorly compressed petiolar and postpetiolar nodes, is *inquilinus*, from which the worker of the former differs as follows: eyes much smaller, with only 6-7 facets across the greatest diameter which is inferior to the distance that separates the eye from the mandibular insertion, the total number of ommatidia not surpassing 20-25 in all; pronotum submarginate in front and on the sides, shoulders distinctly marked and subdentate; frontal carinae more approximated to each other, the maximum distance

between their outer edges distinctly less than one third of head width; costulate-striate sculpture, although in part very faint and only vestigial, more extensive on frons and on sides of thorax; subpetiolar tooth with a foliaceous appendix.

The female, although conspicuously ergatomorphic on account of the poor development of the eyes, the ocelli and the pterothorax, and the total absence of wings, is nevertheless close to *bruchii* from which it has already been separated on a foregoing page.

***Oxyepoecus vivax* sp. n.**

(Figs. 31, 32, 33, 38, 39)

F e m a l e (holotype). Total length 3.8 mm; head length 0.75 mm; head width 0.67 mm; scape length 0.58 mm; maximum diameter of eyes 0.29 mm; Weber's length of thorax 1.09 mm; maximum width of pronotum 0.61 mm; hind femur length 0.73 mm; fore wing length 2.4 mm; hind wing length 2.0 mm; petiole width 0.27 mm; postpetiole width 0.32 mm; cephalic index 89. Color reddish brown; vertex, occiput, posterior portion of sides of head, and gaster somewhat infuscated; mandibles, legs except coxae, and antennae yellowish brown. Wings slightly infumated, veins light brown. Integument smooth and shining with the following exceptions: cheeks and lateral portions of clypeus finely longitudinally costulate; frontal carinae and frons finely longitudinally costulate, the posterior portions rather indistinct, not reaching laterally the eyes nor posteriorly the ocelli; occiput with transverse costulae; dorsum of pronotum feebly and obliquely costulate; paraptera and scutellum regularly longitudinally costulate; basal face of propodeum with oblique, asymmetrically disposed rugulae or costae; mesopleura, metapleura and sides of propodeum with patches of costulate sculpture as shown in Fig. 32; sides and posterior surface of petiolar and postpetiolar node horizontally, respectively transversely costulate. Hairs abundant, standing on dorsum of head and thorax, oblique on petiole and gaster; shorter, inclined hairs on dorsum of head, sides of head, mandibles, antennae and legs.

Head as shown in Fig. 31. Mandibles elongate, sublinear, the basal border longer than the chewing border with which it scarcely forms an angle; a broad but shallow diastema between the small basal and subbasal tooth (Fig. 33). Median apron of clypeus protruding, with the usual longitudinal, anteriorly diverging carinae, but the anterior teeth are blunt and scarcely prominent, and the lateral denticles minute and inconspicuous. Frontal carinae, except the anterior curvature, absolutely straight

and parallel, the distance between their outer edges slightly less than one third of the head width, as measured behind the eyes. Frontal area smooth, impressed, ill-delimited. Eyes huge, prominent, with several hundred ommatidia, oval in outline. Ocelli small, their arrangement shown in Fig. 31. Antennal scapes nearly reaching the narrowly rounded occipital corner when laid back over the head as much as possible. Funicular segments I, VIII, IX and X much longer than broad, II-VI somewhat broader than long, VII about as long as broad. Occiput in full-face view slightly excavated.

Thorax as shown in Fig. 32. Pronotum entirely declivous in the middle, the sides submarginate, the shoulders practically rounded, scarcely marked. Propodeal armature consisting of short yet pointed spines; in dorsal view their length is less than half the distance between the inner side of their bases. Declivous face of propodeum slightly excavate and laterally carinate. Wings as shown in Figs. 38 and 39: note the variation in the same individual, where the discoidal cell is reduced to a small solid rectangle in the left fore wing, while it is normal in the right fore wing. Hind wing with 6 hamuli.

Petiole and postpetiole shown in Fig. 32. Petiole pedunculate, subpetiolar tooth small, node globose, in dorsal view only slightly shorter than broad, not expanded laterad nor antero-posteriorly compressed: postpetiole likewise little compressed antero-posteriorly and very little expanded laterad, not conspicuously broader than petiolar node; anterior subpostpetiolar process very prominent, but not bidentate. Gaster not excised nor truncate in front.

Type. A single female (holotype, WWK n. 8836), collected by Dr. C. A. C. Seabra & Lt.-Cel. Moacyr Alvarenga at Pedra Azul, altitude 800 m, XI-1972, in the northeast of the State of Minas Gerais, Brazil.

Discussion. The striking features of this specimen and the possibility of incorporating the same in a key for the female caste, prompted me to describe it, although it is the only individual known to date.

The unusually elongate and linear mandibles place *vivax* in the vicinity of *inquilinus* (the female of which is still unknown), differing, however, in the blunt clypeal armature, the entirely sculptured frons, the globose, not scalelike petiolar node, the relatively little expanded postpetiole.

The relatively large size is shared with *mandibularis* (the latter likewise known only in the worker caste, and not seen during this study), which has short, triangular mandibles with a deep cleft between basal and subbasal tooth on the chewing border, and the cephalic dorsum more heavily and extensively sculptured.

From the already known queens in genus *Oxyepoecus*, *vivax* is readily separated by its much larger size, the long, linear mandibles, the irregular sculpture on basal face of propodeum.

Key to the Species in Genus *Oxyepoecus*

1. Workers

(*mandibularis* is omitted)

1. Cephalic dorsum mostly smooth and shining; sculpture, if present, confined to anterior portions of cheeks and inside of frontal carinae, where the costulae may be prolonged caudad into two patches always separated by a smooth median frontal stripe 2
 - Cephalic dorsum either entirely sculptured or, if partly smooth, a median smooth frontal stripe is lacking 6
2. Metanotal groove deeply impressed forming a conspicuous notch when seen in profile (Fig. 15); mesopleura completely horizontally costulate; costulae on frons and vertex prolonged caudad beyond level of posterior orbit of eyes *crassinodus* Kempf
 - Metanotal groove either absent or scarcely impressed, inconspicuous in profile; mesopleura with smooth patches, usually on upper third; costulae on frons and vertex not prolonged caudad beyond level of posterior orbit of eyes, or if so, the petiolar node is strongly compressed antero-posteriorly and expanded laterally 3
3. Petiolar node not antero-posteriorly compressed nor laterally expanded in a scalelike fashion, in dorsal view, the sides diverge nearly evenly caudad to the maximum width of node, in profile, the anterior face of node is slanted forming nearly an angle of 45 degree with the posterior face (Figs. 11 and 17); posterior face of postpetiole without conspicuous transverse costulae *punctifrons* (Borgmeier)
 - Petiolar node antero-posteriorly strongly compressed and laterally expanded in a scale-like fashion, in dorsal view the sides of petiole suddenly curve strongly laterad at level of node, in profile the anterior face is steep, nearly parallel to posterior face (Figs. 12, 14, 18, 20); posterior face of postpetiole with conspicuous and rather coarse transverse costulae 4
4. Eyes large, with over 40 facets in all, with 10 or more facets in a row across the greatest diameter which exceeds the distance between the anterior orbit and the mandibular insertion; shoulders entirely rounded, not marked; sides of pronotal disc completely immarginate *inquilinus* (Kusnezov)
 - Eyes small with no more than 20 facets, with 7 or less facets in a row across the greatest diameter of eye which is slightly less than the distance between the anterior orbit and the mandibular insertion; shoulders marked, subdentate; sides of pronotal disc submarginate 5
5. Mandibles elongate and sublinear (Fig. 9); anterior subpostpetiolar process not prominent nor bidentate (Fig. 1) *vezenyii* (Forel)
 - Mandibles shorter, subtriangular (Fig. 44); anterior subpostpetiolar process prominent and bidentate (Fig. 45) *bruchii* Santschi
6. Anterior declivity of pronotum and «neck» sculptured, reticulate-punctate; laterotergite of pronotum (Fig. 24) finely horizontally costulate; costulae on dorsum of thorax less distinct (or absent) than the reticulate-punctate sculpture *reticulatus* Kempf

- Anterior declivity of pronotum and «neck» smooth and shining; laterotergite of pronotum smooth and shining; costulae on dorsum of thorax much more evident than the punctulate microsculpture ... 7
- 7. Costulae of cephalic/dorsum not attaining posteriorly the occiput nor laterally the upper orbit of eyes (Fig. 27); eyes small with 5 or less facets in a row across the greatest diameter and totalling less than 20 facets in all *plaumanni* Kempf
- Costulae of cephalic dorsum attaining at least posteriorly the occiput (Figs. 1, 5); eyes larger, with 7 or more facets in a row across the greatest diameter and totalling over 20 facets in all 8
- 8. Costulae of cephalic dorsum not attaining laterally the eyes and the sides of head, separated from them by a smooth and shining stripe (Fig. 5); dorsum of pronotum and anterior half of mesonotum smooth and shining (Fig. 16); petiolar node scarcely compressed antero-posteriorly nor laterally expanded in a scalelike fashion (Fig. 22) *daguerrei* (Santschi)
- Costulae of cephalic dorsum attaining laterally the eyes and the sides of head (Fig. 1); dorsum of promesonotum entirely longitudinally costulate (Fig. 13); petiolar node distinctly compressed antero-posteriorly and laterally expanded in a scalelike fashion (Fig. 19) *rastratus* (Mayr)

2. Females

- 1. Costulae of cephalic dorsum attaining posteriorly the occiput and laterally the upper orbit of eyes; mesonotal scutum entirely sculptured and subopaque 2
- Costulae of cephalic dorsum not attaining posteriorly the occiput nor laterally the upper orbit of eyes, separated from both by a smooth and shining stripe; mesonotal scutum smooth and shining 3
- 2. Laterotergite of pronotum superficially transversely or obliquely costulate; petiolar node not conspicuously expanded laterad nor projecting (cf. Fig. 26); eyes with no more than 10 facets across the greatest diameter *reticulatus* Kempf
- Laterotergite of pronotum smooth and shining; petiolar node conspicuously expanded laterad and projecting (cf. Fig. 19); eyes with more than 10 facets across the greatest diameter ... *rastratus* (Mayr)
- 3. Maximum diameter of eyes exceeding one third of head length; hind femur length exceeding head width *vivax* Kempf
- Maximum diameter of eyes not exceeding one fourth of head length; hind femur length not surpassing head width 4
- 4. Disc of cephalic dorsum covered with a continuous patch of longitudinal costulae, not divided into two patches by a median longitudinal smooth stripe; petiolar node scarcely compressed antero-posteriorly nor expanded and projecting laterad *plaumanni* Kempf
- Disc of cephalic dorsum traversed by a longitudinal smooth stripe dividing the costulate area into two separate patches; petiolar node strongly compressed antero-posteriorly and greatly expanded and projecting laterad 5
- 5. Basal face of propodeum sharply transversely costulate; mandibles elongate and sublinear, chewing border greatly oblique; anterior subpostpetiolar process not prominent nor bidentate *vezenyii* (Forel)
- Basal face of propodeum only vestigially transversely costulate, almost entirely smooth; mandibles shorter, subtriangular, chewing border less oblique; anterior subpostpetiolar process prominent and bidentate *bruchii* Santschi

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