

No. 7.— *The Ants of the Genus Opisthopsis Emery.*

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THE species of the singular Camponotine genus *Opisthopsis* are confined to the Australian and Papuan regions and are readily distinguished from other ants by their usually striking coloration and very large and prominent eyes, situated at the posterior corners of the head. The first, or type-species was described in 1864 by Frederick Smith, under the name *Formica* (*Myrmecopsis*) *respiciens* from New Guinea. As Guérin had given the name *Myrmecopsis* in 1830 to a genus of Mutillidae Emery in 1893 saw fit to change that of the ant-genus to *Opisthopsis*. This was hardly justified by the rules of nomenclature, because Smith's and Guérin's names differed by a letter. Forel, however, discovered that *Myrmecopsis* had been used by Newman as early as 1850 for a genus of Lepidoptera, so that Emery's name became valid.

Our knowledge of the species of *Opisthopsis* has grown very slowly. Up to the present time five species and a subspecies have been added to the genus by Emery and Forel. The material on which these were based seems to have been rather meager. Several of the described forms were evidently known to Mayr in 1876 but he regarded them merely as color varieties of the typical *respiciens*. Emery and Forel, however, believe that these color forms are relatively constant and therefore regard them as distinct species. While in Australia during the winter of 1914 to 1915 I collected a considerable number of *Opisthopsis* and have since received a series of specimens from the Museum of South Australia and a species collected in the British Solomon Islands by Dr. W. M. Mann. A study of this material, comprising, in addition to all but one of the previously known forms, five undescribed species and as many varieties, shows that the genus is very homogeneous. The various forms differ from one another by slight peculiarities in the structure of the head and thorax, sculpture and pilosity, correlated with more conspicuous differences in coloration. A consistent "lumper" would probably regard all the forms as merely so many varieties or subspecies of a single variable species, but as

the color differences are constant within certain easily discernible limits, I follow the example of Emery and Forel and recognize eleven species. Two of these, *pictus* Emery and *rufithorax* Emery, should probably be united, as the former is unusually variable in color and has one variety that is transitional to *rufithorax*. I may add that although I have examined more specimens of *Opisthopsis* than any previous worker, the final decision as to the limits of the species, subspecies, and varieties must be left to the resident Australian entomologist who can make an intensive study of the geographical distribution of the group. My account of these insects will, I trust, show that both their habits and taxonomy merit closer investigation.

The genus *Opisthopsis* is evidently very largely confined to Australia, as only one species (*O. linnaei*) is known from the Bismarck Archipelago, one (*O. respiciens*) from New Guinea and one (*O. manni*) from the Solomon Islands. *Opisthopsis respiciens*, moreover, is common also in Northern Australia and *O. haddoni* may occur in New Guinea. The precise ranges of the various Australian species cannot be given at the present time. Forel's statement that *O. respiciens* is "in ganz Australien verbreitet," is, I am sure, erroneous. I failed to find any *Opisthopsis* in Eastern Australia south of Brisbane, Queensland (27° 30' S.), and with the exception of some specimens of *O. rufithorax*, I have seen none taken in a more southern latitude. Froggatt does indeed record *O. respiciens* from New South Wales and Mayr cites it from Sydney, but Froggatt's specimens may have been collected near the Queensland border and Mayr's may have been specimens of *rufithorax*. All the species I have seen in the field were living at low elevations in the dense "scrub" (tropical rain forest) or dry, open "forest" of Queensland. *Opisthopsis respiciens* seems to prefer the former, the paler, yellow species (*haddoni*, *major*, *jocosus*, *rufithorax*, etc.) the latter situations.

The workers are usually seen running in the bright sun-light up and down the trunks of large trees, especially of the genera *Eucalyptus* and *Melaleuca*, with rapid, jerky movements like those of our large-eyed, neotropical *Pseudomyrmas*. They have extremely acute vision, as would be inferred from the large size, very fine facetting and peculiar position of the eyes, and are therefore very difficult to catch, as they look backward as well as sidewise and forward and dodge about with such adroit zigzag movements that it is almost impossible to seize them with the tweezers or fingers. I finally resorted with greater success to slapping them with the hand, but this is apt to crush them or to make them fall from perpendicular surfaces.

The interesting resemblance of these ants to the large-eyed, arboreal and bright-colored species of *Pseudomyrma* in the Neotropical and of *Sima* in the Palaeotropical region led me to look for their nests in the trees, but I failed in this quest and concluded that the nests must be at inaccessible heights in the trunks or branches. Through a fortunate accident, however, at Koah, near Kuranda, Queensland, I discovered the nests of one species, *O. haddoni*. In this arid forest region there are innumerable termite nests of all sizes from a foot or two to six or seven feet in height. I found that the smaller nests could be easily broken off at the base and turned over by a sharp kick with the foot. This exposed the galleries in the base of the termitarium and to my surprise I found them in nearly every nest inhabited by a colony of the beautiful orange and black *haddoni*. Such study as I could make in the field showed that the ants take possession of the galleries by replacing the termites, which retreat to the upper portion of the nest-cone. Perhaps the ants feed very largely on the soft-bodied termites, although the latter were not molested when they happened to creep into galleries inhabited by the ants. From this and the further fact that I found *haddoni* nesting by itself under stones only on one occasion, I infer that this ant is regularly termitophilous. Later I again found *haddoni* nesting in precisely the same manner in termitaria near Townsville, Queensland.

On my return to the United States I learned that Dr. E. Mjöberg (in *Forel, Ark. f. zool.*, 1915, 9, p. 95) had recently made similar observations on *O. haddoni* in the Kimberley District of North West Australia and at Laura, Cape York and Colosseum, Queensland. He also succeeded in finding the nests of *O. rufithorax* "in clay about the roots of trees." Nevertheless this terrestrial method of nesting is by no means universal in the genus. Dahl discovered the nests of *O. linnæi* in tree-trunks in the Bismarck Archipelago, and Mann recently found a nest of *O. manni* in a similar situation in the Solomon Islands. In all probability *O. respiciens* will be found to have similar habits.

The colonies of *O. haddoni* are rather small, comprising only about 100 to 200 workers with a single or several dealated queens. The larvae are white and plump and covered with short, simple hairs. They spin pale buff-colored cocoons like most Camponotinae. It is easy to capture the ants in their nest as they seem to be dazed when the termitarium is suddenly broken in two and the light let into their galleries. In this connection I may state that numerous other ants are quite as regularly found nesting in termitaria at Koah and Townsville, Queensland. In both localities the very pugnacious *Iridomyr-*

mex sanguineus was found only in termitaria, usually in the upper portions, but often throughout the structure. At Koah I found also three species of *Polyrhachis* of the subgenus *Chariomyrma* (*cyrus*, *senilis*, and *comata*) and *Camponotus* (*Myrmogonia*) *rubiginosus* in the smaller termite nests, the former frequently, the latter as a regular inquiline. It builds on the surface of the termitarium a small, chimney-like entrance, which is guarded by one of the large-headed major workers. *Euponera* (*Brachyponera*) *lutea* and two forms of *Camponotus* (*Myrmoturba*) *maculatus* are also occasionally found in termitaria but nest much more frequently under stones and logs.

Not only is *O. haddoni* a regular inquiline in the nests of another insect, but it seems to be itself the host of other species of *Opisthopsis*! In several of the nests at Koah I found from one to six very dark brown or black workers among the bright yellow *haddoni*. In my opinion they belong to two distinct species, which are described below as *O. maurus* and *lienosus*. The fact that they occurred in *haddoni* colonies in which males and females were hatching, would seem to be fatal to the view that they are true parasites. That they are very aberrant or diseased workers of *haddoni* seems to me improbable, because the workers of this species are very constant in coloration and because the dark individuals exhibit peculiarities of form and sculpture as well as of color. I believe that *haddoni*, like many other ants, may occasionally kidnap the brood of alien species and that the dark individuals may have been reared from cocoons thus procured.

The males of *Opisthopsis* seem not to have been seen by previous observers and the females of only a few of the species have been described. The males are of the same size as the workers and very much like the males of *Camponotus*, with which genus *Opisthopsis* is evidently very closely related. Forel, in a recent classification of the subfamily Camponotinae, places *Opisthopsis* in the tribe Camponotini and shows that its proventriculus ("gizzard") has essentially the same structure as in *Camponotus*, being long and slender, with a straight, *i. e.* nonreflected calyx (Plate 3, fig. 29). *Opisthopsis* cannot, however, be regarded as an offshoot of the genus *Camponotus*, owing to the fact that the former has a discal cell in the fore wing. This represents a more primitive condition than in *Camponotus*, where the discal cell is always absent. We must conclude, therefore, that both *Opisthopsis* and *Camponotus* have had a common origin from some more ancient, extinct genus with a venation more like that of *Formica*. Attentive examination of the workers of *Opisthopsis* shows that they have a feeble tendency to dimorphism in the shape

of the head, the larger individuals having the region in front of the eyes more convex on the sides than the smaller individuals. In one specios (*O. jocosus*) the dimorphism is very distinct.

In the figures accompanying this article I have endeavored to indicate the extent of the black or dark brown markings by stippling. The color of the eyes is peculiar. The retinal pigments are either very unstable and fugitive, so that they disappear in alcohol, or the eyes are in many of the species of an unusual pale gray or whitish color in life. Unfortunately I failed to note the eye-color in living individuals. In the descriptions I have recorded it as it appears in the dried specimens.

OPISTHOPSIS Emery.

Worker. Small, monomorphic or slightly dimorphic; thorax, petiole, and gaster resembling the corresponding parts in *Camponotus*. Anterior femora incrassated. Head elongate, subtrapezoidal, with long, straight or more or less convex or inflated cheeks. Eyes very large, prominent, elliptical and finely faceted, at the posterior corners of the head. Ocelli usually absent, the anterior ocellus sometimes present. Mandibles small, triangular, 5-toothed. Maxillary palpi 6-jointed, labial palpi 4-jointed. Clypeus well-developed, more or less carinate or subcarinate, its anterior border entire, projecting over the base of the mandibles as a broad, rather rounded lobe. Antennae 12-jointed, inserted at the sides of the frontal carinae some distance behind the posterior clypeal suture, so that the antennal and clypeal fossae are distinctly separated. Antennal funiculi nonclavate, all the joints distinctly longer than broad. Frontal area large, indistinct, subtriangular or trapezoidal; frontal carinae moderately long, rather far apart, diverging posteriorly. Epinotum unarmed, more or less angular. Petiolar scale thin and anteroposteriorly compressed. Proventriculus long and slender, the calyx straight, with non-reflected sepals. Body smooth, more or less shining, finely shagreened. Pilosity and pubescence feebly developed.

Female. Larger than the worker, with broader head and usually 6-toothed mandibles. Eyes and ocelli well-developed, the former much as in the worker. Thorax, petiole, and gaster as in *Camponotus*, the thorax elongate elliptical, the petiole anteroposteriorly compressed. Wings also similar but with small but distinct, triangular discal cell.

Male. Not larger than the worker, very similar to the male of *Camponotus*. Maxillary palpi 6-jointed, labial palpi 4-jointed. Mandibles well-developed, pointed, usually edentate. Eyes and

ocelli large, the former nearly half as long as the head; cheeks long and straight. Antennae 13-jointed, scapes fully $\frac{2}{3}$ as long as the funiculi; first joint of the latter cylindrical, scarcely longer but distinctly thicker than the second. Thorax, petiole, and gaster much as in *Camponotus*; the external genitalia also very similar, their valves slender and exerted. Wings with the discal cell very small and triangular, sometimes wanting.

Table for the identification of the workers.

1. Head largely black or dark brown.....2
Head entirely yellow or with only the vertex and occiput black. 10
2. Thorax black or dark brown, without yellow markings.....3
Thorax wholly or in part yellow.....5
3. Head and body very slender, subopaque, and sharply shagreened.
Length 6 mm.....*maurus*, sp. nov.
Head and body shorter, shining. Length 3-5 mm.....4
4. Thorax and first gastric segment brown.....*lienosus*, sp. nov.
Upper portion of first gastric segment ivory yellow.
respiciens Sm. var. *moestus*, sp. nov.
5. Thorax and legs partly black.....6
Thorax and legs entirely yellow.....*rufithorax* Emery.
6. Yellow of thorax of a whitish or ivory tint....*respiciens* Smith.
Pale portions of thorax orange-yellow.....7
7. Epinotum more or less yellow above.....8
Epinotum black.....9
8. Pro- and mesoëpinotum yellow above an oblique line running
from the ventral border of the pronotum to the epinotal angle.
pictus Emery.
Only the ventral portion of the meso- and epinotum black.
pictus var. *palliatum*, var. nov.
9. Only the pronotum yellow....*pictus* var. *bimaculatus*, var. nov.
Both the pro- and mesonotum yellow above.
pictus var. *lepidus*, var. nov.
10. Pronotum with a conspicuous arc of erect hairs; epinotum low
and bluntly angular.....*major* Forel.
Pronotum without erect hairs; epinotum higher and more
sharply angular.....11
11. Gaster entirely black.....*haddonii* subsp. *rufoniger* Forel.
Gaster more or less yellow.....12

12. Gaster entirely or almost entirely yellow.....15
 Gaster black at least behind the second segment.....13
13. Head entirely yellow.....*haddonii* Emery.
 Vertex and occiput black.....14
14. Second gastric segment yellow only at the base.
diadematus, sp. nov.
 Second gastric segment entirely yellow.
diadematus var. *dubius*, var. nov.
15. Third and fourth gastric segments with black markings on the
 sides; workers dimorphic, minor worker with infuscated
 vertex and occiput.....*jocosus*, sp. nov.
 Gaster entirely yellow or with only the anal segment blackened;
 workers monomorphic, head of small workers not infuscated
 behind.....16
16. Body shining, very indistinctly shagreened. Length 3-4.5 mm.
manni, sp. nov.
 Body opaque, sharply shagreened. Length 5.8 mm.
linnaei Forel.

1. OPISTHOPSIS RESPICIENS (F. Smith).

Plate 1, fig. 1, 2.

Formica (*Myrmecopsis*) *respiciens* F. Smith, Journ. Linn. soc. Zool.,
 1864, 8, p. 68, ♀, pl. 4, fig. 3, 3a.

Myrmecopsis respiciens Mayr, Journ. Mus. Godeffroy, 1876, 12, p. 76,
 ♀.

Opisthopsis (*Myrmecopsis*) *respiciens* Forel, Ann. Soc. ent. Belg., 1893,
 37, p. 461, ♀ ♀.

Opisthopsis respiciens Emery, in Dalla Torre, Cat. Hymen., 1893, 7,
 p. 219, ♀; Emery, Ann. Soc. ent. Belg., 1895, 39, p. 353; Emery,
 Mem. R. accad. sci., ist. Bologna, 1896, ser. 5, 5, p. 776; Froggatt,
 Agric. gaz. N. S. W., 1905, p. 28, ♀; Forel, Ergeb. Hamb. S. W.
 Austr. Forschungsreise, 1907, 1, p. 229, ♀; Viehmeyer, Abh.
 ber. K. zool. anthr. ethn. mus. Dresden, 1912, 14, p. 23.

Worker. Length 3-4.5 mm.

Head evenly convex dorsally and ventrally, with straight posterior
 margin and evenly convex sides, which converge anteriorly in the region
 of the cheeks. Eyes large and prominent, rather close together.
 Mandibles 5-toothed, with convex external borders. Clypeus dis-

tinctly carinate. Profile outline of mesonotum and base of epinotum forming a straight horizontal line, scarcely interrupted at the meso-epinotal suture. Base and declivity of epinotum subequal, the latter sloping and concave, forming a well-defined obtuse angle with the base. Petiole oval, broader above than below, a little higher than broad, with broadly rounded, entire and sharp superior border, in profile thin and anteroposteriorly compressed, convex in front above, flat behind, nearly or quite as high as the epinotal angle.

Shining; head and thorax sharply and finely, gaster and legs more indistinctly and more superficially shagreened. Mandibles and clypeus subopaque, the former also sparsely punctate.

Hairs pale yellow, very sparse, erect, present only on the head and gaster, tips of the femora and antennal scapes. Pubescence absent, except on the antennae, where it is extremely fine.

Black; upper portion of pronotum and first gastric segment and extreme base of second gastric segment, sometimes as two blotches, ivory-yellow; mandibles, cheeks, more or less of the anterior portion of the clypeus, the antennal scapes, tibiae, tarsi, tips of femora, and base of petiole brownish yellow. Palpi, first funicular joint, articulations of thorax, borders of gastric segments and sometimes also the mesonotum brown. Eyes pearl-gray.

NEW GUINEA, type-locality (F. Smith). QUEENSLAND: Rockhampton and Peak Downs (Museum Godeffroy); Cairns and Kuranda (Wheeler). N. W. AUSTRALIA: Adelaide River and Baudin Islands (J. J. Walker). NEW SOUTH WALES: Sydney (Museum Godeffroy).

I have been unable to find this ant in New South Wales so that I doubt its occurrence at Sydney. Mayr applied the name *respicens* to several species of *Opisthopsis*, so that even his localities Rockhampton and Peak Downs, Queensland, may refer to some other species. In the neighborhood of Cairns and Kuranda, the typical *respicens* is not uncommon, running on the trunks of large *Eucalyptus* and *Melaleuca* trees along paths and in clearings in the tropical "scrub," in company with workers of various species of *Camponotus*, *Calomyrmex*, *Polyrhachis*, and *Podomyrma*. I was unable to find its nests or to secure male and female specimens.

2. *OPISTHOPSIS RESPICIENS* var. *MOESTUS*, var. nov.

Worker. Differing from the typical *respicens* in having the pronotum entirely black or dark brown above and the dark dorsal portion of the petiole and of the cheeks more extensive. The pale ivory-yellow area at the base of the second gastric segment is also more

restricted. The epinotal angle seems to be somewhat more acute in profile than in the typical form.

Female (deälated). Length 10 mm.

Head a little longer than broad, with straight, anteriorly converging sides and slightly convex posterior border. Eyes proportionally smaller than in the worker. Ocelli small. Thorax elongate elliptical, a little narrower through the wing-insertions than the head through the eyes. Epinotum in profile with very short, convex base and long, abruptly sloping declivity, concave below. Petiolar border feebly emarginate in the middle. Gaster large, broadly elliptical, somewhat flattened dorsoventrally.

Pilosity and sculpture as in the worker.

Black; apical half of mandibles, antennal scapes, wing-insertions, and tarsi dark brown; tibiae and apical fourth of femora brownish red. Eyes black.

Male. Length nearly 5 mm.

Slender; head through the eyes as broad as long; eyes large, convex, nearly circular, as long as the cheeks, which are straight and converge anteriorly. Mandibles small, edentate, with acute tips. Clypeus convex, carinate. Antennae slender; scapes as long as the basal seven joints of the funiculus; first funicular joint as long as the second but broader, remaining joints subequal, more than twice as long as broad. Thorax not broader than the head through the eyes; mesonotum as long as broad, convex in front and overarchng the pronotum. Epinotum with subequal base and declivity, the former convex, the latter straight and vertical in profile. Petiole cuneate in profile, with concave posterior surface, its superior margin sharp and distinctly and rather broadly notched in the middle. Gaster slender, elongate elliptical, with small genital appendages. Legs slender. Wings without a discal cell.

Sculpture as in the worker.

Hairs short, delicate, pale, more abundant than in the worker and as numerous on the thorax as on the gaster.

Black; knees, tips of tibiae, and tarsi piceous. Wings yellowish hyaline, with pale yellow veins and pterostigma. Eyes dark brown.

QUEENSLAND: Townsville, type-locality (F. P. Dodd); Cairns (Wheeler).

Described from one female, one male, and four workers taken by F. P. Dodd and belonging to the Museum of South Australia. The workers of this series agree perfectly with numerous specimens taken by myself at Cairns, running on tree-trunks with the typical *respiciens*.

3. *OPISTHOPSIS MAURUS*, sp. nov.

Plate 3, fig. 18, 19.

Worker. Length 6 mm.

Body long and slender; head $\frac{1}{4}$ longer than broad, flattened dorsally and ventrally, with long, straight, anteriorly converging sides and distinctly concave posterior border. Eyes large and prominent. Mandibles 5-toothed, their external borders rather straight. Clypeus distinctly carinate. Antennal scapes extending only a short distance beyond the posterior orbits. Thorax slender and low, its dorsal outline in profile straight and horizontal, very feebly interrupted at the promesonotal and mesoëpinotal sutures. Epinotum with distinct but rounded obtuse angle between the subequal base and declivity. Petiole with semicircular, entire superior border, compressed anteroposteriorly, feebly convex in front, flat behind. Gaster long and narrow, with pointed tip and the anterior surface of the basal segment scarcely truncated.

Subopaque; densely and sharply shagreened; head and gaster with small, scattered, piligerous punctures; mandibles more densely and more coarsely punctate; surface of clypeus uneven.

Hairs pale grayish, sparse, present only on the head and gaster and on the tips of the femora and antennal scapes.

Black; knees, tips of tibiae, bases of mandibles, and eyes dark brown.

Described from a single specimen taken at Koah, Queensland, in a nest of *O. haddoni* occupying the basal galleries of a conical termitarium. The specimen is so different in shape, sculpture, and color from the workers of *haddoni* and from all of the other members of the genus that I believe it must represent a distinct species. It had probably been reared from a larva or pupa kidnapped and brought into the nest by the *haddoni* workers.

4. *OPISTHOPSIS PICTUS* Emery.

Plate 3, fig. 27.

Opisthopsis pictus Emery, Ann. Soc. ent. Belg., 1895, **39**, p. 354, ♀ fig. 3B.; Emery, Mem. R. accad. sci. ist. Bologna, 1896, ser. 5, **5**, p. 776; Froggatt, Agric. gaz. N. S. W., 1905, p. 28.

Worker. Length 4-5 mm.

Head rather flat dorsally and ventrally, twice as long as high, with

large, prominent eyes and feebly concave posterior border, its sides feebly convex in large workers, straight in small individuals. Mandibles 5-toothed, with rather straight external borders. Clypeus distinctly carinate behind. Thorax evenly compressed laterally in the epinotal region, base of the latter in profile straight and horizontal, scarcely impressed at the mesoëpinotal suture; base and declivity meeting at a sharp obtuse angle, the declivity abruptly sloping and concave. Petiolar scale slightly thinner and lower than in *respiciens*, its anterior and posterior surfaces flat, the former convex above where it meets the rounded, entire and rather sharp superior border. Gaster elongate elliptical, of the usual shape, with the anterior surface of the first segment truncated.

Rather shining; head more opaque and more sharply shagreened; gaster very finely and transversely striolate, with silky luster; mandibles coarsely punctate and somewhat striate near their apical borders.

Hairs sparse, whitish, erect, blunt, most numerous on the head and gaster; thorax and petiole without hairs, except a few on the dorsal surface of the pronotum.

Head black, with the mandibles and anterior border of the cheeks and clypeus lemon-yellow. Antennal scapes orange-yellow; funiculi black, in some specimens with the first joint brown or yellowish. Palpi black. Pronotum and dorsal portions of mesonotum and epinotum above an oblique line on each side running from the inferior border of the pronotum to the epinotal angle, orange-yellow; below this line and including the prosternum, black. Scale of petiole brown or blackish, its basal portion yellow. Gaster black, first and second segments orange-yellow, with the sides more or less infuscated or black. Coxae, trochanters, and basal $\frac{2}{3}$ of femora black, remainder of femora and tibiae orange-yellow; tarsi more brownish. The yellow of the legs and gaster is distinctly paler than that of the thorax. Eyes black in some specimens, in others pearl-gray.

QUEENSLAND: Kamerunga, type-locality (Podenzana); Townsville (F. P. Dodd); Nelson (A. A. Girault).

I have redescribed this form from four workers taken by F. P. Dodd and belonging to the Museum of South Australia. With the exception of a single worker taken by Girault at Nelson, all the other specimens of the species in my collection belong to the three following undescribed varieties.

5. *OPISTHOPSIS PICTUS* var. *PALLIATUS*, var. nov.

Plate 3, fig. 28.

Worker. Differing from the typical *pictus* in color, the black of the thorax being restricted to the lowermost portions of the meso- and epinotum. Some specimens have the prosterna black. The black of the femora does not extend beyond their basal third or half. The petiolar scale is only slightly infuscated at the superior border. The first two gastric segments are orange-yellow, only a little paler than the thoracic dorsum and there is a large brown spot on each side of the second segment. Eyes pearl-gray.

QUEENSLAND: Sunnybank, near Brisbane, type-locality (Wheeler); Mungar Junction (A. M. Lea).

This variety is distinctly transitional to *O. rufithorax* Emery.

6. *OPISTHOPSIS PICTUS* var. *LEPIDUS*, var. nov.

Plate 1, fig. 3, 4.

Worker. Differing from the preceding forms in the color of the thorax. Only the pronotum and dorsal portion of the mesonotum are orange-yellow, the remainder black. Even the lower border of the pronotum is black in some specimens. Legs and gaster as in the typical *pictus*, though some specimens have the posterior portion of the second segment black or the yellow reduced to a large bilobed spot at the anterior border of the segment. First funicular joint as black as the succeeding joints. Eyes pearl-gray. The epinotal angle is very sharp in many specimens and the concavity of the declivity even more abrupt than in the figure 3.

QUEENSLAND: Townsville, type-locality, Kuranda, Koah, and Sunnybank, near Brisbane (Wheeler); Mackay (Turner).

7. *OPISTHOPSIS PICTUS* var. *BIMACULATUS*, var. nov.

Worker. Length 5 mm.

Larger and more robust than the preceding forms, with the sides of the head distinctly more convex. The orange-yellow color is still further restricted on the thorax and confined to the dorsal portion of the pronotum. Petiole entirely black. Only the dorsal portion of the first gastric segment and two large, sharply defined, elliptical spots

on the base of the second segment are orange-yellow, just perceptibly paler than the pronotum. The femora are black, with only their tips reddish, the tibiae reddish brown. Mandibles and anterior corners of cheeks red. Eyes pearl-gray.

Described from a single specimen found running on one of the white-trunked Eucalyptus trees on the mountain west of Townsville, Queensland.

8. OPISTHOPSIS RUFITHORAX Emery.

Plate 1, fig. 5, 6.

Opisthopsis rufithorax Emery, Ann. Soc. ent. Belg., 1895, **39**, p. 354, ♀, fig. 3A.; Emery, Mem. R. accad. sci. ist. Bologna, 1896, ser. 5, **5**, p. 776; Froggatt, Agric. gaz. N. S. W., 1905, p. 28, ♀; Forel, Ark. f. zool., 1915, **9**, p. 95, ♀ ♀.

Worker. Length 4–5 mm.

Very similar to *pictus* in structure, but with the dorsal outline of the thorax in profile a little more rounded and the epinotum slightly lower and with a somewhat more rounded angle.

Sculpture and pilosity as in *pictus*.

Color of head and antennae as in *pictus*; thorax, legs, and petiole orange-yellow throughout, last tarsal joint blackish or dark brown. Gaster black, with the first two segments either entirely orange-yellow, of a slightly paler tint than the thorax, or with the sides of these segments and the posterior portion of the second blackish.

Female. Length 7–10 mm.

“Head behind broader than in the worker, cheeks not convex. Thorax as broad as the head. Occiput, vertex and funiculus brown. Scutellum and a narrow but clearly defined transverse band on each gastric segment black. All the remainder of the body yellowish red, only the middle of the pronotum infuscated. Wings lacking. In all other respects like the worker.” (Forel).

QUEENSLAND: Peak Downs, type-locality (Museum Godeffroy); Atherton and Cedar Creek (E. Mjöberg); Enoggera and Sunnybank, near Brisbane (Wheeler); Gayndah, Bundaberg, and Mungar Junction (A. M. Lea); Cairns (F. P. Dodd). NEW SOUTH WALES: Manilla (W. W. Froggatt). SOUTH AUSTRALIA: Moorooloo, Flinders Range (S. A. White). WEST AUSTRALIA: Mullewa (Miss F. May); Clarence River (A. and F. Zietz).

This form is so close to *pictus* that it might properly be regarded as a subspecies or variety of that species. The specimens which I took at Enoggera and Sunnybank were running about on Eucalyptus trunks and on the ground. Mjöberg found the species nesting in clay about the roots of trees at Atherton and Cedar Creek.

9. *OPISTHOPSIS HADDONI* Emery.

Plate 2, fig. 11-16; Plate 3, fig. 29.

Opisthopsis haddoni Emery, Rev. Suisse zool., 1893, 1, p. 226, ♂ ; Emery, Mem. R. accad. sci. ist. Bologna, 1896, ser. 5, 5, p. 776; Froggatt, Agric. gaz. N. S. W., 1905, p. 28; Viehmeyer, Abh. ber. K. zool. anthr. ethn. mus. Dresden, 1912, 14, p. 23; Forel, Ark. f. zool., 1915, 9, p. 95, ♂ ; Crawley, Ann. mag. nat. hist., 15, 1915, ser. 8, 15, p. 135, ♂ .

Worker. Length 3-5.5 mm.

Head evenly convex dorsally and ventrally, with straight posterior border, in large workers with very feebly convex, in small workers with straight sides. Mandibles 5-toothed, their external borders rather straight. Clypeus carinate at the base. Thorax and petiole shaped much as in *rufithorax*, the former rather short, with blunt epinotal angle.

Shining; head and thorax more opaque than the gaster and more distinctly shagreened. Mandibles shining, sparsely punctate.

Hairs whitish, sparse, erect, blunt, absent on the thorax and petiole.

Clear orange-yellow, vertex and occiput of head a little darker, cheeks, clypeus, and mandibles more lemon-yellow, the teeth of the mandibles brown. Gastric segments behind the second, palpi, and funicular joints, except the first, black. Terminal tarsal joints brown or reddish. Eyes black.

Female. Length 8-9 mm.

Head shaped like that of the worker but a little broader, a little narrower than the thorax through the wing-insertions, with nearly straight sides. Mandibles 6-toothed. Mesonotum as broad as long, epinotum with distinct base and declivity, the former short and convex, the latter vertical and concave in profile. Petiole as in the worker, but with its superior border feebly notched in the middle. Gaster rather large, elongate elliptical. Wings moderately long, with well-developed, triangular discal cell.

Sculpture and pilosity as in the worker, except that the head and thorax are as smooth and shining as the gaster.

Color like that of the worker, but with the scutellum and metanotal sclerite black and the wing-insertions dark brown. Wings yellowish hyaline, with pale brown veins and pterostigma. Eyes black.

Male. Length 4–4.5 mm.

Head through the eyes as broad as long, with straight, anteriorly converging cheeks as long as the eyes. Mandibles small, with acute tips and oblique, edentate apical borders. Clypeus ecarinate. Frontal carinae short. Antennae slender; scapes as long as the seven basal joints of the funiculus; first funicular joint as long as the second but thicker; all the funicular joints subequal, more than twice as long as broad. Thorax through the mesonotum a little broader than the head through the eyes, convex and prominent in front. Epinotum very convex, sloping, without distinct base and declivity. Petiole lower and thicker than in the worker, cuneate in profile, its superior border rather blunt and rather deeply and angularly notched in the middle. Gaster slender, with small, slender, exerted genitalia. Legs slender. Wings with small, triangular discal cell.

Shining and distinctly shagreened; head rather opaque above; mesonotum sparsely and coarsely punctate.

Pilosity as in the worker, but with short, sparse erect hairs also on the mesonotum.

Black; antennae piceous brown; mandibles, corners of the cheeks, mouthparts, legs, and wing-insertions yellowish brown, the middle portions of the femora darker. Wings grayish hyaline, with pale brown veins and pterostigma. Eyes pearl-gray.

MURRAY ISLANDS: Torres Strait, type-locality (A. C. Haddon). QUEENSLAND: Townsville (W. W. Froggatt); Laura, Cape York, and Colosseum (E. Mjöberg); Koah, Kuranda, and Townsville (Wheeler); Cairns (A. M. Lea). NORTHERN TERRITORY: Point Charles (G. F. Hill); Daly River (H. Wesselmann); Melville Island (F. P. Dodd). CENTRAL AUSTRALIA: Tennant's Creek (J. F. Field). NORTH WEST AUSTRALIA: Broome, Kimberley District (E. Mjöberg).

Redescribed from a worker cotype and numerous specimens of all three phases taken by myself in termite nests at Koah, Kuranda, and Townsville. Dr. E. Mjöberg had previously observed its occurrence in these structures. More rarely it nests under stones without relations to termites. The winged sexual phases were found in the nests October 31 to November 6. The species is evidently widely distributed over tropical Australia and will probably be found in New Guinea.

10. *OPISTHOPSIS HADDONI* subsp. *RUFONIGER* Forel.

Plate 2, fig. 17.

Opisthopsis haddoni race *rufoniger* Forel, Rev. Suisse zool., 1910, **18**, p. 70, ♀.

Worker. Length 3–7 mm.

Differing from the worker of the typical *haddoni* in the more acutely angular epinotum, in having the superior border of the petiolar scale feebly emarginate in the middle, in the color of the gaster, which is entirely black, and of the antennal funiculi, the basal third or half of which is brownish or yellowish. Eyes pearl-gray, brown or black.

Female (deälated). Length 8 mm.

Differing from the female *haddoni* in having the entire gaster black and the base of the funiculus brown, but the metanotum and scutellum are orange-yellow, the latter with brown spots. Eyes pearl-gray.

Male. Length 3 mm.

Smaller than the male of *haddoni* and with the body dark brown instead of black (possibly due to immaturity or prolonged immersion in alcohol). The head seems to be shorter, the wings are more opaque. Eyes pale brown.

CENTRAL AUSTRALIA: Tennant's Creek, type-locality (J. F. Field).

Redescribed from numerous workers, a single female and three males belonging to the cotype series and loaned me by the Museum of South Australia.

11. *OPISTHOPSIS LIENOSUS*, sp. nov.

Plate 2, fig. 9, 10.

Worker. Length 4–5 mm.

Closely related to *haddoni*. Sides of head feebly convex, rather strongly converging in front, posterior border straight or very feebly convex. Eyes moderately large. Mandibles 5-toothed, with convex external borders. Clypeus distinctly carinate. Thorax with rather sharp mesoëpinotal angle and the promesonotal and mesoëpinotal sutures slightly but distinctly impressed. Petiolar scale thin, its upper border rounded, straight in the middle and in some specimens feebly impressed. Gaster and legs of the usual structure.

More shining than *haddoni*, very finely shagreened, upper surface of head with a silky luster. Mandibles shining, sparsely punctate.

Pilosity as in *haddoni*, lacking on the thorax and petiole.

Black; sides and anterior portion of head, thorax, coxae, petiole, first gastric segment and in some specimens the extreme base of the second, castaneous brown. Antennal scapes, first funicular joint and legs yellowish brown, femora darker in the middle. Mandibles yellow, with black teeth. Eyes pearl-gray.

Described from eight specimens taken in three colonies of *O. haddoni* at Koah, Queensland, October 29. Like the specimen of *O. maurus*, they had probably been reared from kidnapped larvae or pupae.

12. OPISTHOPSIS DIADEMATUS, sp. nov.

Plate 3, fig. 20, 21.

Worker. Length 4-5 mm.

Head very convex dorsally, ventrally and laterally, so that the cheeks have a swollen appearance. Posterior border straight. Eyes rather small and far apart. Mandibles with slightly convex external borders, the apical borders not very oblique, their five teeth small and subequal. Clypeus broader than long, indistinctly carinate. Thorax rather robust, with well-marked promesonotal and mesoepinotal sutures; the base and declivity of the epinotum subequal, the former slightly concave, the latter abruptly sloping and concave, the angle between them blunt but prominent. Petiolar scale of the usual shape, nearly as high as the epinotal angle. Gaster rather large.

Shining, very finely shagreened and sparsely and finely punctate; mandibles more coarsely punctate.

Hairs pale yellow, sparse, erect; absent on the thorax and petiole.

Orange-yellow, head not paler in front; funiculi, except their basal joint, space between the eyes and including the vertex and occiput, gastric segments behind the second, all but the base of the second above and in some specimens a spot on each side of the first segment, black. Posterior borders of gastric segments pale brown. The yellow of the anterior gastric segments is distinctly paler than that of the legs. Palpi dark brown. Eyes dark brown or black.

Described from seven workers taken at Townsville, Queensland, on the bark of Eucalyptus trees and undoubtedly belonging to several colonies.

13. OPITHOPSIS DIADEMATUS var. DUBIUS, var. nov.

Worker. Length 4.5 mm.

Differing from the typical *diadematus* in having the head more flattened as in *rufithorax* and in having the second gastric segment entirely orange-yellow above.

A single specimen taken by Mr. A. M. Lea at Longreach, Queensland. Perhaps this form should be regarded as a variety of *rufithorax*, and perhaps *diadematus* should be regarded as a subspecies of that form. The head of the new variety is certainly intermediate in shape between the two, though its coloration is that of *diadematus*.

14. OPISTHOPSIS MAJOR Forel.

Plate 1, fig. 7, 8.

Opisthopsis major Forel, Rev. Suisse zool., 1902, **10**, p. 492, ♀; Froggatt, Agric. gaz. N. S. W., 1905, p. 28, ♀; Forel, Rev. Suisse zool., 1910, **18**, p. 70, ♀.

Worker. Length 4.5–7 mm.

Averaging larger than most of the preceding species. Head rather broad, evenly convex above and below, with convex sides, straight posterior border and rather small eyes. External borders of the 5-toothed mandibles convex. Clypeus broader than long, indistinctly carinate. Funicular joints a little shorter than in the preceding species. Thorax with the epinotum decidedly lower, so that the outline of the mesonotum and base of the epinotum, though forming a straight line, slopes backwards; base and declivity of epinotum subequal, forming a rounded and very obtuse angle. Petiole of the usual shape, its scale as high as the epinotal angle. Gaster and legs of the usual shape.

Shining, very finely and indistinctly shagreened and very finely and sparsely punctate. Mandibles coarsely shagreened and punctate.

Hairs yellow, erect, sparse on the head and gaster, absent on the thorax and petiole, except on the pronotum where they form a conspicuous tuft arranged in a semicircle. Pubescence almost absent, very short and dilute on the sides of the head.

Orange-yellow; mandibular teeth brown; antennal funiculi, except their basal joint, gaster behind the second segment, posterior half or two thirds of the second segment and a narrow transverse band near

the posterior margin of the first segment, black or dark brown. Eyes pearl-gray or black.

Female. Length 8–8.5 mm.

Head like that of the worker, but a little shorter. Mandibles 5-toothed. Thorax elongate elliptical, through the wing-insertions not broader than the head through the eyes. Mesonotum distinctly broader than long. Epinotum with distinct base and declivity, the former short and convex, the latter long, abruptly sloping and concave in profile. Petiolar scale with very feebly emarginate superior border. Gaster elliptical, as long as the thorax. Wings rather short (7 mm.), with a well-developed, triangular discal cell.

Sculpture and pilosity as in the worker, but mesonotum and scutellum smoother and more shining, pronotum without hairs and mesonotum sparsely hairy.

Color like that of the worker but with the scutellum and middle of the metanotal sclerite black. Wings distinctly tinged with yellow, especially towards the base, with resin-yellow veins and pterostigma. Eyes black.

QUEENSLAND: Mackay, type-locality (Turner); Cape York; Townsville (F. P. Dodd); Rockhampton (A. M. Lea).

I have examined two cotype workers received from Professor Forel, four workers and a female taken by Mr. Dodd and a worker taken by Mr. Lea.

This species is very distinct in its average large size, in the structure of the epinotum of the worker, the conspicuous tuft of hairs on the pronotum and the color of the gaster. In Fig. 7 the epinotal angle is too sharp and the base and declivity should be more nearly equal. The head, represented in Fig. 8, is a little too broad.

15. OPISTHOPSIS JOCOSUS, sp. nov.

Plate 3, fig. 22–24.

Worker. Length 4–6.5 mm.

Head of the largest workers large and very broad through the middle, with very convex sides and feebly concave posterior border, narrowed at the anterior border; in profile evenly convex above and below; in the smallest workers the head is narrow, with straight sides and more concave posterior border and its dorsal and ventral surfaces are less convex. Eyes far apart, relatively larger in the small workers. Mandibles with feebly concave external borders, 5-toothed. Clypeus

broader than long, rather flat, ecarinate. Thorax with the pronotum convex behind, the dorsal outline of the mesonotum and base of epinotum continuous and very straight, the base and declivity of the epinotum subequal, forming a sharp angle. Petiolar scale much compressed anteroposteriorly, not quite as high as the epinotal angle, with sharp, entire and rounded superior border. Gaster and legs of the usual shape.

Only moderately shining, finely shagreened, gaster more sharply and transversely and with a silky luster. Mandibles shining, finely punctate.

Hairs yellow, short, sparse, erect, absent on the thorax and petiole. Pubescence distinct, but very short and dilute on the cheeks and sides of the head.

Dull brownish yellow; palpi brown; funiculi, except the basal joint, and anal segment of gaster black; second, third, and fourth gastric segments with a narrow black spot of variable extent near the ventral margin on each side. Small workers with the space between the eyes dark brown. Sometimes this area is reduced to three ocellus-like spots with vague outlines.

Described from numerous specimens taken in a piece of dry woodland near the Baron Falls at Kuranda, Queensland from a single colony evidently hunting for the brood of an *Iridomyrmex* nest which I had excavated in the soil a few hours previously. *O. jocosus* is a very distinct form not only in the peculiar shape of the head of the larger worker, the shape of the epinotum and the coloration of the gaster but also in having clearly dimorphic workers.

16. OPISTHOPSIS LINNAEI Forel.

Opisthopsis linnaei Forel, Mitth. Zool. mus. Berlin, 1901, 2, p. 26, ♂ ;
Dahl, Leben d. ameisen. Bismarck Archip., 1901, p. 42; Viehmeyer,
Abh. ber. K. zool. anthr. ethn. mus. Dresden, 1912, 14, p. 23.

Worker. Length 5.8 mm.

"Closely related to *O. haddoni*, but entirely opaque, including the mandibles and legs; only the head anteriorly and on the sides, shining. The striated and reticulated sculpture is deeper, sharper and microscopically uneven. The sides of the rather elongated head are less convex (very feebly convex). Gaster entirely yellow (in *haddoni* the posterior half is black). In other respects like *haddoni* but the color is less vivid, more of a dirty, rusty yellow." (Forel).

BISMARCK ARCHIPELAGO: Ralum (Fr. Dahl).

I have not seen this species, which Forel described from two specimens so badly damaged that he could not determine the form of the thorax. According to Dahl, it nests in rotten portions of tree-trunks. It seems to be rather closely related to the following species.

17. OPISTHOPSIS MANNI, sp. nov.

Plate 3, fig. 25, 26.

Worker. Length 3-4.5 mm.

Smaller than the preceding species. Head long, with straight, anteriorly converging sides, straight posterior border and large, prominent eyes. Mandibles 5-toothed, with rather convex external borders. Clypeus broader than long, subcarinate. Thorax shaped much as in *O. haddoni*, the base and declivity of the epinotum subequal, the former straight and horizontal, the latter abruptly sloping and concave, the angle between very distinct but slightly rounded. Petiolar scale apparently a little thicker than in most species of the genus, its superior border not so high as the epinotal angle, straight and transverse in the middle. Gaster and legs of the usual shape.

Smooth and shining, not distinctly shagreened, the head and mandibles slightly more opaque than the thorax and gaster, the mandibles with fine, scattered and indistinct punctures.

Hairs sparse, yellow, erect and rather short, absent on the thorax and petiole. Pubescence absent.

Clear orange-yellow; cheeks, clypeus, and mandibles paler and more lemon-yellow; anal segment, last tarsal joint and funiculi, with the exception of the first joint, black. Palpi yellowish. Eyes pearl-gray.

Female (deälated). Length 6.5 mm.

Very similar to the worker; head a little broader, broader than the elongate elliptical thorax. Petiolar scale with entire, rounded superior border.

Sculpture, pilosity, and color as in the worker, except that the scutellum is black.

Described from several workers and a female from Malapaina (type-locality) and several workers from Malaita and Yandina, British Solomon Islands. These specimens were recently taken by Dr. W. M. Mann, who writes me as follows concerning their habits: "The only note I have on the Malapaina specimens of *Opisthopsis* is that they were nesting beneath bark in a depression on the trunk of a

recently felled tree. The colony was composed of only a couple of dozen workers and one female. The workers made no attempt to save any of the few larvae that were in the nest. The specimens from Malaita and Yandina were found running on tree-trunks. The species is evidently very widely distributed in the Solomons but is rarely seen, probably because of its arboreal habits. It is very active and difficult to catch."



Wheeler, William Morton. 1918. "The ants of the genus *Opisthopsis* Emery." *Bulletin of the Museum of Comparative Zoology at Harvard College* 62, 341–362.

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