

A MONOGRAPH  
OF  
**CHRISTMAS ISLAND**  
(INDIAN OCEAN):

PHYSICAL FEATURES  
AND  
GEOLOGY  
BY  
CHARLES W. ANDREWS, B.A., B.Sc., F.G.S.

WITH DESCRIPTIONS OF  
**THE FAUNA AND FLORA**  
BY  
*NUMEROUS CONTRIBUTORS.*

ILLUSTRATED BY TWENTY-TWO PLATES, A MAP, AND NUMEROUS  
ILLUSTRATIONS IN THE TEXT.

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1900.

along the dorsum below the fold; cilia at the apex ferruginous, below it white tipped with fuscous, around the torus plain white. *Exp. al.* 17 mm. Hind wings pale yellowish brown with a roseate gloss; cilia pale brownish, tipped with dirty whitish towards their apex. Abdomen pale yellowish brown. Legs pale yellowish brown, the terminal four joints of the hind tarsi darker brownish above, with whitish spot at the joints.

*Type*.—♀ Mus. Br.

*Hab.*—Christmas Island; March, 1898; unique. (C. W. Andrews.)

#### Family TINEIDÆ.

#### 9. *Dendroneura punctata*, Wlsm., sp.n.

Antennæ olivaceous ochreous. Palpi divergent; whitish ochreous beneath, streaked with fuscous along their upper side. Head pale olivaceous grey; face flattened, slightly paler. Thorax and fore wings shining pale olivaceous grey, with a greenish iridescent gloss; a small fuscous spot lies a little below the costa at three-fourths from the base, and is preceded by a similar small spot on the dorsum; cilia pale olivaceous greyish. *Exp. al.* 11–12 mm. Hind wings widened near the base, becoming rapidly attenuate beyond the middle to the acute apex; tawny olivaceous greyish, cilia scarcely paler. Abdomen pale cinereous. Legs with the usual flattened femora characteristic of this genus; hind tibiae very hairy above; pale cinereous.

*Co-types* (2), Mus. Br.

*Hab.*—Christmas Island; Dec., 1897; Jan.–Feb., 1898; ten specimens. (C. W. Andrews.)

The species of this genus are said to be attached to sugar-cane and the banana. One has been recorded from the West Indies; others occur in Hawaii and the Society and Marquesas Islands.

## Order 2.—HYMENOPTERA.

By W. F. KIRBY, F.L.S., F.E.S., etc.

(PLATE XIV, Figs. 5-9.)

I HAVE been able to identify eleven species of *Hymenoptera*, obtained by Mr. Andrews on Christmas Island, all but two of which are, as far as yet known, peculiar to the island. Of these, I have described six as new, one of which I have made the type of a new genus. There are also single specimens of three species of Ichneumonidae, which it is not desirable to describe until more specimens are obtained. I have added the descriptions of new species, and any notes of importance from my former paper on the *Hymenoptera* collected by Mr. Lister (P.Z.S., 1888, pp. 551, 552).

## LIST OF SPECIES.

TEREBRANTIA.	FOSSORES.
ENTOMOPHAGA.	CRABRONIDÆ.
PROCTOTRYPIDÆ.	LARIINÆ.
DRYININÆ (?).	<i>Notogonia</i> , Costa.
<i>Mantibarva</i> , g.n.	<i>alecto</i> , Smith (?).
<i>anomala</i> , sp.n.	DIPLOPTERA.
ICHNEUMONIDÆ.	EUMENIDÆ.
OPHIONINÆ.	<i>Odynerus</i> , Latr.
<i>Ophion</i> , Fabr.	<i>polyphemus</i> , Kirb.
<i>flavocephalus</i> , sp.n.	VESPIDÆ.
ACULEATA.	<i>Polistes</i> , Latr.
HETEROGYNA.	<i>balder</i> , Kirb.
FORMICIDÆ.	ANTHOPHILA.
PONERINÆ.	AFIDÆ.
<i>Lobopelta</i> , Mayr.	ANDRENINÆ.
<i>diminuta</i> , Smith.	<i>Halictus</i> , Latr.
FORMICINÆ.	<i>andrewsi</i> , sp.n.
<i>Camponotus</i> , Mayr.	<i>binghami</i> , sp.n.
<i>melichloros</i> , Kirb.	MEGACHILINÆ.
	<i>Megachile</i> , Latr.
	<i>rotundipennis</i> , sp.n.
	<i>nivescens</i> , sp.n.

**MANTIBARIA**, Kirby, gen. nov.

Head very large, oval, as broad as the thorax, and broader than long; ocelli arranged in an equilateral triangle, antennae inserted close together between the eyes, and set with short hairs, scape slightly curved, about four times as long as broad, second joint rather longer than broad, slightly narrowed at the base and truncated at the extremity; flagellum nine-jointed, the joints transverse, closely appressed, a little broader than long, except at the extremities, the last as long as the preceding three, and ending in a fine point; pronotum nearly square, a little rounded in front; scutellum forming an obtuse-angled triangle, truncated behind, and with a slight central carina; abdomen moderately broad, with six dorsal segments visible, of about equal length; legs short, stout, clothed with short hairs, but destitute of spines; tarsi five-jointed, the first joint rather longer than broad, the second, third, and fourth transverse, the fifth as long as all the rest put together, greatly swollen, and followed by large claws, which are, however, more or less damaged in all the specimens before me, and hence cannot be further described. Rudimentary wings visible under the microscope.

Affinities uncertain; I am inclined to refer the species to the *Dryiniæ*, but without feeling at all sure that this is its real position.

**1. Mantibaria anomala**, sp.n. (Pl. XIV, Figs. 5, 5a.)

Long. corp. 2.5 mm.

Black above, very finely punctured; antennae, legs, face, and sometimes a ring round the eyes, testaceous or rufo-testaceous; tip of abdomen and sometimes the incisions more or less reddish.

Five specimens from Flying Fish Cove, August, 1897. Parasitic on *Mantis*, etc.

**2. Ophion flavocephalus**, sp.n.

Long. corp. 14 mm.; exp. al. 22 mm.

*Male and Female.*—Testaceous, head yellow, except the antennae and mouth-parts, which are testaceous, and the very large ocelli, which are black. Thorax, in the male, with three longitudinal brown stripes. Abdomen: first segment with its apical third rather suddenly enlarged; second segment fusiform, thickest beyond the middle, but before the extremity; the abdomen is thickly clothed with short hair, especially towards the extremity, which is brownish, darkest in the male. Wings iridescent hyaline, with piceous nervures; costa of fore wings blackish as

far as the stigma, and, including the latter, yellow beyond. Stigma slightly indented at its base by the cubito-discoïdal cell, below which point are two testaceous specks, enclosed by a curved water-line; the outer extremity of the cubito-discoïdal cell is unusually broad, about two-thirds as broad as its lower extremity; costa of hind wings edged with a blackish line.

Described from one pair, taken near Flying Fish Cove.

### 3. *Lobopelta diminuta*. (Pl. XIV, Fig. 6, ♀)

*Ponera diminuta*, Smith: Cat. Hym. B.M., vi, p. 89, n. 23 (1850).

Nine workers; north part of island, March, 1898. One female (?) without locality; described below.

A common East Indian species, previously recorded from Christmas Island, as well as from Calcutta, Borneo, etc.

Mr. Lister's collection contained four workers from a nest found near the summit of the island, on October 4, 1887.

### *Lobopelta diminuta*, ♀ (?). (Pl. XIV, Fig. 7.)

Long corp. 6 mm.; exp. al. 12 mm.

Dull black, clothed with short grey hairs, especially conspicuous on the abdomen. Antennæ dull reddish, clothed with a very fine pile. Mouth-parts, tegulae, and the last two segments and under-surface of the abdomen, and a narrow border to the segments; the trochanters, base and tip of femora, and the tibiae and tarsi rufous; the hind tibiae brown in the middle. Front coxæ much thickened, front tibiae cultrate, with a very large oblique terminal spine. Petiole large, erect, sloping in front, and truncated behind. Wings fusco-hyaline, with fuscous nervures; stigma blackish; neuration nearly that of *Ponera*.

### 4. *Camponotus melichloros*.

*Camponotus melichloros*, Kirb.: P.Z.S., 1838, p. 551.

“Long. corp. 7–8 mm.

“Worker. Structure nearly that of *C. ligniperdus*, Latr. Thoracic sutures fairly well defined; node of petiole forming a rounded plate. Smooth and shining, sparingly clothed with erect white hairs; thorax honey-yellow; head and tarsi reddish; flagellum paler; abdomen black, with pale sutures; eyes and extreme tips of mandibles black, the latter sexdentate.

“The following label was attached to the bottle: ‘Two forms from same nest in rotten wood, Flying Fish Cove, October 2’

[1887]. The specimens differ little, except that some are rather smaller and paler than others, and with conspicuously smaller head."

A large series of the various forms of this species from Flying Fish Cove, August-October, 1897, and February, 1898; from north coast, December, 1897; and from north part of island, January, 1898. The workers vary from 3-9 mm. in length. The females are 10-11 mm. long and 22-25 mm. in expanse. They are of a rather darker chestnut red than the workers, and the abdomen is black, clothed with short grey hairs. The wings are yellowish hyaline, with yellowish nervures. The males are 7 mm. long and 14 mm. in expanse; the upper part of the head is black, the antennae and front of the head and face reddish. The thorax is reddish, with brown or black markings, and the abdomen is black, with the sutures light reddish. The legs are reddish, with black femora. Workers found in a rotten stump.

##### 5. *Notogonia alecto* (?).

? *Larrada alecto*, Smith: Journ. Linn. Soc., Zool., ii, p. 103, n. 6 (1858).

Long. corp., ♂ 7, ♀ 10 mm.; exp. al., ♂ 11, ♀ 17 mm.

Black, head and thorax thickly and finely punctured, clothed with a very fine silvery pile, especially on the face, scutellum, and abdomen; middle and hind tarsi more or less reddish in the female, and hind tibiae edged within with silvery pile; scutellum oval, much longer than broad, thickly, coarsely, and very irregularly rugose-punctate, wings brownish hyaline, with brown nervures.

Nine specimens, from Flying Fish Cove, August-October, 1897; east coast, September, 1897; north coast, 1898.

Apparently identical with a specimen marked "*Larrada alecto*, Smith," from Celebes; but as we have no authentic specimens of that species from Singapore, the original locality, I am not certain that the Christmas Island insect is the true *alecto*.

##### 6. *Odynerus polyphemus*.

*Odynerus polyphemus*, Kirb.: P.Z.S., 1888, p. 551.

"Long. corp. 10 mm.; exp. al. 17 mm.

"Black, thickly and closely punctured; head with a yellow spot between the antennae; the orbits opposite the antennae very narrowly edged with yellow; a yellow streak on each side of the base of the clypeus, just below the antennae, and a yellow streak behind each eye, above the middle. Prothorax edged in front with a broad yellow stripe, tapering and interrupted in the middle, and cut squarely off on each side. Tegulae pitchy, with a very

small yellow dot in the middle, a triangular yellow spot above, and another, sub-rotund, on the mesopleura. Scutellum with a broad longitudinal yellow stripe on each side; post-scutellum yellow, metathorax with a broad curved yellow stripe on each side. Abdomen with the first segment yellow above, except in front, a black line, interrupted behind, on the median line above; second segment yellow above, except at the base, and on a wide conical space which extends to three-quarters of its length; on the hinder edge of the segment the yellow colour is continued on the lower surface, but does not form a complete ring, being widely interrupted in the middle; the third segment bordered behind on the upper surface. Wings dirty hyaline, smoky along the costa, and in the radial cell.

"Allied to *O. confluentus*, Smith, from Sumatra, but differing much in colour from any described species."

Thirteen specimens, from Flying Fish Cove, August, 1897; west coast, October, 1897; north part of island, December, 1897, and January, 1898; central part of island, February, 1898.

#### 7. *Polistes balder*.

*Polistes balder*, Kirb.: P.Z.S., 1888, p. 552.

"Exp. al. 28 mm.; long. corp. 13 mm.

"Ochreous-yellow, with linear black markings. Head with a black line just above the antennæ, the ends of which run upwards on each side, and slightly diverge; below the antennæ the clypeal suture is black, and this curve is sometimes connected with the upper one by a black line on each side within the antennæ; a black line crosses the head just behind the ocelli, over which extends a continuous black spot; the tips of the mandibles are also black, as well as the basal parts of the head and prothorax. Thorax with all the sutures more or less black, sometimes not continuously; the central black line is frequently incomplete behind. Pectus and pleura black, the latter marked with four or five large and small yellow spots. Scutellum, post-scutellum, and metathorax yellow; the sutures rather broadly black; groove of the metathorax black. Legs almost entirely yellow, or reddish yellow; the trochanters and the extreme tips of the coxæ and base of the femora black. Abdomen inclining to reddish yellow, but with no distinct markings, except a black spot above at the base of the first segment, and the suture between the first and second segment, which is generally black. Wings smoky hyaline, with brown nervures; costal nervure and costal region yellowish.

"Allied to *P. hebraeus*, Fabr., but smaller and differently coloured. The first segment of the abdomen, too, appears to be a little longer and more gradually widened.

“Two nests accompanied these wasps. They are round, and the smaller one is considerably raised in the middle. The upper surface is grey; the outer portion is inky black towards the base, and whitish on the sides above.

“One of the wasps was taken on October 1, at Flying Fish Cove; a nest, with eggs, larvæ, and cocoons, was found on the under-side of a branch at the same place on October 2; and another nest, with wasps flying round it, on October 5.”

Six specimens, from Flying Fish Cove, August, 1897; and north part of island, December, 1897, and January, 1898.

Makes small hanging nests on trees and bushes, and stings severely.

### 8. *Halictus andrewsi*, sp.n. (Pl. XIV, Fig. 8.)

Long. corp. 6 mm; exp. al. 10 mm.

*Female*.—Face forming a long oval between the eyes, clothed with bronzy-green pile, back of head bronzy green, rarely purplish black, cheeks clothed with long grey hair; antennæ rufo-testaceous, with the scape and following joint black; mesonotum and scutellum bronzy green, the borders of the former sometimes purplish black; post-scutellum broad, depressed, more strongly punctured than the rest of the thorax, and of a darker bronzy green; it is bordered behind and on the sides with long whitish hairs. Abdomen shining bronzy-green, very finely punctured, with the sutures narrowly testaceous. Under-surface mostly bronzy green, but paler than above; legs testaceous, frequently more or less bronzed, especially on the femora; wings iridescent hyaline, with brown nervures; centre of stigma yellow.

Probably allied to *H. buccinus* and *vicinus*, Vachal.

Eleven specimens, those with localities marked “North part of island,” January, 1898.

### 9. *Halictus binghami*, sp.n. (Pl. XIV, Fig. 9.)

? *Halictus proteus*, Bingham: Faun. Brit. Ind., Hym. i, p. 428, n. 737 (1897);  
*nec* Vachal.

Long. corp. 5.5 mm.; exp. al. 10–11 mm.

*Female*.—Head and thorax black, sometimes with a very faint, greenish tint, very finely punctured, an impressed vertical line from between the bases of the antennæ to half the distance from thence to the anterior ocellus; lower part of the face clothed with grey pubescence; tongue testaceous; metanotum longitudinally striated, and bordered with grey pubescence. Abdomen more shining black, the segments not constricted, basal segment polished, smooth, rufous, the segments narrowly bordered behind



with testaceous, and fringed with yellowish-grey pubescence. Legs dark reddish-brown, sometimes with a darker line above, and clothed with long yellowish-grey pubescence. Wings iridescent hyaline, with yellowish-brown venation.

Four specimens, from north part of island, January, 1898.

This insect agrees very well with Lieut.-Col. Bingham's description of the female from Tenasserim, which he doubtfully refers to *H. proteus*, Vachal; but I cannot regard it as Vachal's species, which is described as having the "metanotum (post-scutellum) tomento croceato tectum." It is black in the Christmas Island specimens, bordered with grey pubescence. But it is possible that the male, which Bingham doubtfully refers to the same species, may be Vachal's insect. However, as I have no specimens of these *Halioti* to compare, and as the Christmas Island species would in any case require to be renamed, I have named it after my friend Lieut.-Col. Bingham, whose book on the Aculeate Hymenoptera of India is so useful to all who have occasion to study foreign Hymenoptera.

#### 10. *Megachile rotundipennis*, sp.n.

♂ long. corp. 9 mm.; exp. al. 17 mm. ♀ long. corp. 12 mm.; exp. al. 21 mm.

*Male*.—Head transverse, very finely punctured, fully as wide as thorax; mandibles and lower part of head black; mouth-parts more or less ferruginous in rubbed specimens, but in fresh specimens the face, like the greater part of the head and thorax, is clothed with pale fulvous pubescence. Eyes with their inner orbits obliquely approximating below; abdomen black, the segments banded behind with brighter fulvous pubescence, and the two apical segments densely clothed with the same above. Legs black, clothed with long grey hair, with a slight fulvous shine; front tarsi beneath, and at the tips, ferruginous; middle and hind tarsi thickly clothed with fulvous pubescence beneath, darkest in the latter. Wings hyaline, slightly clouded towards the margins; nervures brown; wings rather broad, and the fore wings obtusely rounded at the tips.

*Female* similar, with the abraded thorax much more coarsely punctured than the head, and the abdomen clothed with fine golden-grey pubescence; the last segment above clothed with thick fulvous pubescence; the abdomen beneath coarsely punctured, and clothed, especially towards the extremity, with long, recumbent, fulvous hair; the greater part of all the tarsi likewise thickly clothed with bright fulvous hair.

Described from five males and one female, from Flying Fish Cove, August and September, 1897, and West Coast, October, 1897. On the flowers of forest trees (especially *Grewia*); rather scarce.

This species resembles *M. buddæ*, Dalla Torre (*rufipes*, Smith), more than any other species in the Nat. Hist. Mus. Collection; but the latter species is more brightly coloured, and the costal nervure is fulvous instead of brown.

#### 11. *Megachile nivescens*, sp. n.

♂ long. corp. 10, exp. al. 19 mm.; ♀ long. corp. 14, exp. al. 23 mm.

Much resembles the last species, but the face, except the ferruginous proboscis, is entirely black, and the head, face, thorax, and bands on the abdomen above are clothed with dense silvery-white pubescence. The bands towards the tip of the abdomen are slightly bordered behind with fulvous in very fresh specimens, and the terminal segment is clothed above with rich fulvous; beneath, the abdomen is banded with silvery white, as above, in the male, and clothed with long, recumbent, fulvous hair in the female. The legs are clothed with yellowish-grey hair, the hair on the tarsi being bright fulvous beneath, and more or less above, at least on the middle tarsi.

Twelve specimens, mostly worn females, from Flying Fish Cove, August-October, 1897; west coast, October, 1897; north part of island, December, 1897, and January, 1898. Very common on sea-cliffs, frequenting flowers of *Pemphis* and *Secotia*.

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#### Order 3.—DIPTERA.

[The Diptera unfortunately have not yet been determined. The specimens collected are roughly as follows:—*Tipulida*, 3 or 4 species; *Culicida*, 2 species; *Mycetophilida*, 1 species; *Stratiomyida*, 2 species; *Asilida*, 4 species; *Bombylida*, 1 species; *Dolichopodida*, probably 2 species; *Syrphida*, 1 species; *Muscida*, at least 7 or 8 species; *Micropozida*, 1 species; *Ortalida*, 1 species; *Ochthiphilida*, 1 species; *Hippoboscida*, 2 species. There are also several other specimens, and the collection probably includes between thirty and forty species in all.—C. W. A.]

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Order 4.—COLEOPTERA.

By C. O. WATERHOUSE, F.E.S., C. J. GAHAN, M.A., F.E.S.,  
and G. J. ARROW, F.E.S.

(PLATES X AND XI.)

Family CARABIDÆ.

1. *Morio orientalis*, Dej.

Common in rotten wood.

In the Museum there are specimens from Java, Penang, Audaman  
and Nicobar Islands.

2. *Harpalus*, sp.

Two specimens, which at present are undetermined.

3. *Trechus* (?).

A small species apparently referable to this genus.

Family STAPHYLINIDÆ.

4. *Gyrophæna*, sp.

This and the following we are at present unable to determine.

5. *Philonthus*, sp.

6. *Lithocharis*, sp.

7. *Pæderus listeri*, Gahan, sp.n. (Pl. X, Fig. 1.)

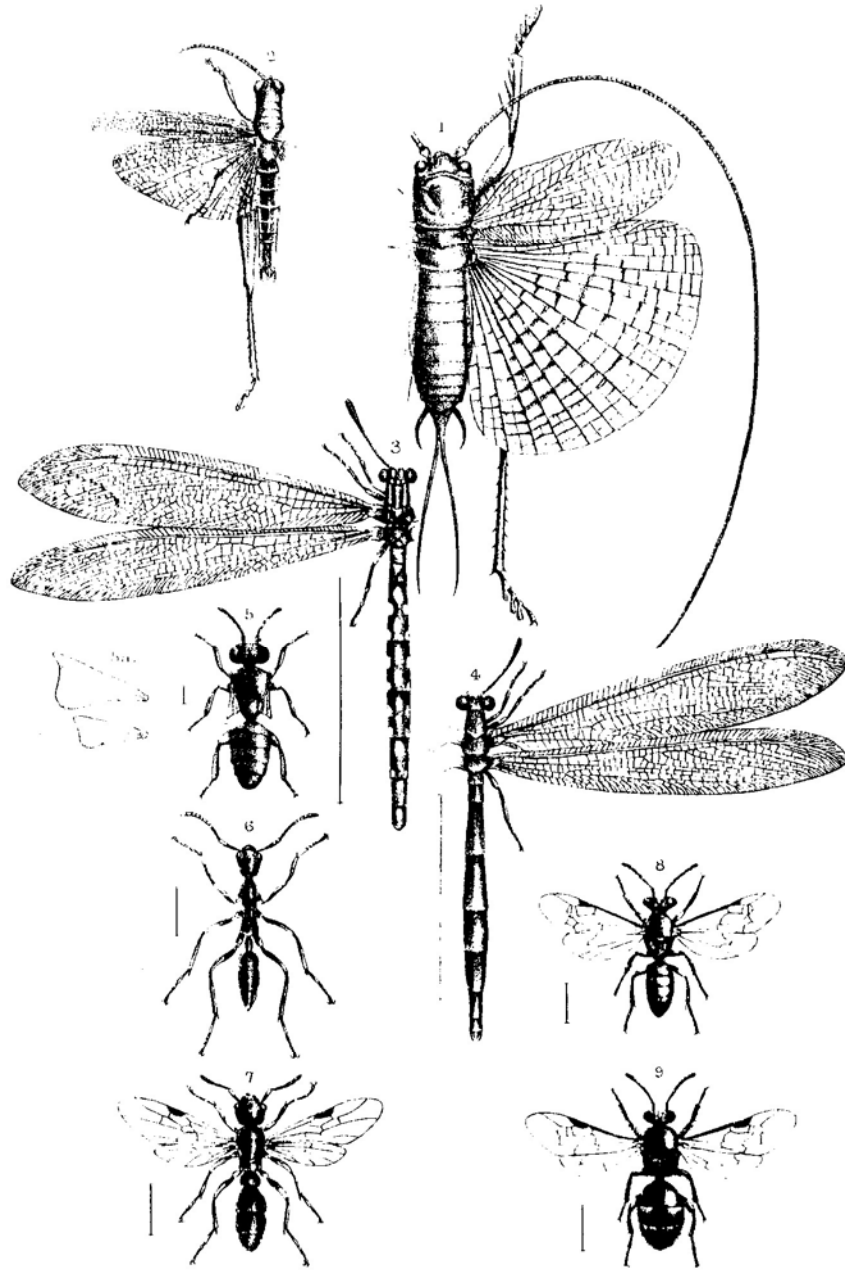
Niger, articulis duobus primis et duobus ultimis antennarum  
fulvis; clytris chalybeato-cyaneis, dense fortiterque punctatis,  
quam prothorace vix brevioribus; tarsis fulvo-testaceis, interdum  
leviter infuscatis. Long. 8-9 mm.

Head and prothorax black and glossy. Antennæ with the first  
two and the last two joints fulvous or testaceous, the intermediate  
joints dark brown. Elytra very slightly shorter than the pro-  
thorax; steel blue or sometimes greenish blue in colour; thickly  
and rather strongly punctured. Abdomen pitchy black; the legs  
of the same colour, with the tibiæ less dark towards the extremity,

PLATE XIV.

ORTHOPTERA, NEUROPTERA, AND HYMENOPTERA.

- FIG. 1. *Gryllacris rufovaria*, Kirby. (p. 148.)  
FIG. 2. *Oxya orientalis*, Kirby. Typical form. (p. 150.)  
FIG. 3. *Forniculeo morpheus*, Kirby, sp.n. (p. 140.)  
FIG. 4. *Myrmeleon iridescens*, Kirby, sp.n. (p. 140.)  
FIGS. 5, 5a. *Mantibarica anomala*, Kirby, sp.n. (p. 82.)  
FIG. 6. *Lobopelta diminuta* (Smith). ♂. (p. 83.)  
FIG. 7. *Lobopelta diminuta* (Smith). ♀. (p. 83.)  
FIG. 8. *Halictus andrewsi*, Kirby, sp.n. (p. 86.)  
FIG. 9. *Halictus binghami*, Kirby, sp.n. (p. 86.)



M. Horman-Fisher del. et lith.

West, Newman imp.

*Orthoptera, Neuroptera,  
and Hymenoptera.*