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V. *The Aculeate Hymenoptera of Barrackpore, Bengal.*
By GEORGE ALEXANDER JAMES ROTHNEY, F.E.S.

[Read March 4th, 1903.]

As it is a somewhat uncommon feature for a definite limited area within the tropics to be worked continuously for a number of years, I have ventured to hope that a thoroughly representative list of the *Aculeate Hymenoptera* collected by me in the cantonment of Barrackpore may prove of some interest to the Society, as this order has of late become so much more popular, and the Indian and Far Eastern fauna in particular has attracted an unusual amount of attention.

My list represents the result of steady collecting from 1872 to 1886, and a flying visit in 1893.

Barrackpore, Bengal, is situated on the east bank of the Hooghly; lat. $22^{\circ} 40' 30''$, long. $88^{\circ} 22' 45''$ and $88^{\circ} 30'$. Area, forty-two square miles, and about sixteen miles north of Calcutta. It is practically contained within a bend of the river, and includes Monirampore, Pulta, Ischapur Park, Tittaghur, Neilgunge, but above all the beautiful Barrackpore Park, one of the most charming spots in Lower Bengal, and one which offers many attractions to the entomologist.

There are practically three seasons in the year—the “cold weather” lasting from the end of October to the beginning of March, the “hot weather” from the middle of March to the middle of June, when the “rains” set in and last till October. Very few *Hymenoptera* (except ants) are about in the cold season. The hot and rainy seasons are the best for the collector, and the choicest time of all, a bright little interval in October, just as the rains are clearing up, and before the mornings and evenings show signs of the coming cold weather. The sun then shines out with beautiful brightness but without the severity of the hot weather, vegetation is unsoiled by dust, and there is everywhere a splendid burst and buzz of insect life.

The most attractive spots for collecting are undoubtedly Barrackpore Park and the jungly ground round the Pulta powder magazine, for curiously, Ischapur Park and Samnagar (with its extensive earthworks, the ruins of an old

fort), Neilgunge and Tittaghur, though apparently possessing equally attractive features, never proved as rich in the number and variety of species, but Monirampore water-works, with its heaps of white sand, used for filtering purposes, was always a sure find for the *Mutillidæ*, and the only spot where they could be looked for with confidence.

The flowers most frequented in the Park are *Duranta plumieri*, *Quisqualis indica*, *Poinciana pulcherrima*, *Mussaenda macrophylla*, *Thevetia nereifolia*, and a tree with a small white hanging blossom (probably a variety of *Duranta*). At Pulta, a species of *Pulicaria* which grew in quantities was very attractive to a variety of species; and a low jungle shrub with a shiny leaf and greeny-white flowers, not unlike the privet (but the name* of which I could never find out), was a still greater favourite, and especially with the larger species of *Hymenoptera*. The Castor-oil plant, *Ricinus communis*, was also much frequented.

The following is a summary of the collection :—

ANALYSIS OF SPECIES.

	Species.	Percentage.	Species.	Percentage.
<i>Chrysididæ</i> .	13	2·78	13	2·78
<i>Formicidæ</i> .	—		—	
<i>Dorylinæ</i> .	3	·64		
<i>Ponerinæ</i> .	15	3·20		
<i>Myrmicinæ</i> .	44	9·40		
<i>Dolichoderinæ</i> .	5	1·07		
<i>Camponotinæ</i> .	25	5·34	92	19·65
<i>Fossores</i> .	—			
<i>Mutillidæ</i> .	54	11·54		
<i>Thynnidæ</i> .	2	·43		
<i>Scoliidæ</i> .	18	3·84		
<i>Pompilidæ</i> .	48	10·26		
<i>Sphegidæ</i> .	128	27·35	250	53·42
<i>Diloptera</i> .	—			
<i>Eumenidæ</i> .	27	5·77		
<i>Vespidæ</i> .	13	2·78	40	8·55
<i>Anthophila</i> .	—			
<i>Colletidæ</i> .	4	·85		
<i>Apidæ</i> .	69	14·75	73	15·60
	—		—	
		Total	468	

* Since writing this, Col. Bingham has very kindly named this plant for me at the Museum Herbarium, *Glycosmis pentaphylla*, Corr. I estimate that 40% of the species of the *Fossores* and *Apidæ* were captured at the flowers of this jungle plant.

From this it will be seen that the *Fossores* are much the strongest group, though it is only fair to state that the number of species of *Mutillidæ*, which help to swell the total, is out of proportion to the specimens, and they have, too, been much more closely collected than other families, for there is always something irresistibly attractive to the collector about *Mutilla*.

Tiphia and *Myzine*, on the other hand, are very poorly represented, and both appear to affect northern, or at least mountain, localities rather than the plains.

The *Scoliidæ*, *Pompilidæ*, and *Sphegidæ* are all well represented, both in numbers and species, many being exceedingly common and familiar objects of the bungalow and compound, as also are several species of *Eumenidæ* and *Vespidæ*.

The *Apidæ* are the poorest both in species and numbers in the Barrackpore district (they distinctly strengthen as you go up-country to the North-West Provinces at Allahabad, and still more so at the Mussoorie Hills); and with the exception of *Xylocopa*, a few species of *Megachile*, *Crocisa*, and *Anthophora*, there are no species sufficiently common to attract general attention; and even with *Xylocopa* it is more their great size, noisy booming ways, and the brilliant effulgence of their wings rather than their actual numbers which makes them so conspicuous.

In the *Formicidæ*, *Camponotus*, *Ecophylla*, *Prenolepis*, *Diacamma*, *Solenopsis*, *Cremastogaster*, and *Sima* are most in evidence, the three commonest species being *Camponotus compressus*, *Solenopsis geminata*, and *Simarufonigra*. *Pheidole* curiously is not so strongly represented as it is in the Bombay and Madras Presidencies. Species of other genera are either local and uncertain in their appearance, or really uncommon and rare.

I never came across any *Ichneumons* in Barrackpore. No doubt they are to be found if carefully sought for, but they must, at least, be exceedingly rare. On the other hand, in hill-stations like Mussoorie and Darjeeling, they are fairly common.

Several species of *Chrysididæ* are not uncommon.

I am greatly indebted to Colonel C. T. Bingham, for his kindness in revising my list of *Formicidæ*, and to Mr. Peter Cameron for revising the *Fossores* and *Apidæ*, etc.

With very few exceptions, the types of all Mr. Cameron's species are in my collection.

CATALOGUE OF SPECIES.*

CHRYSIDIDÆ.

Chrysis, Lin.

- Perfecta*, Cam. Rare.
Furiosa, Cam. Rare.
Mendicalis, Cam. Rare.
Cotesi, Dubuy. Common.
Disparilis, Cam. Rare.
Oculata, Fab. Common.
Principalis, Sm. Rare.
Orientalis, Guer. Rare.

Stilbum, Fab.

- Splendidum*, Fab. Type, common.
 „ var. *Amethystinum*, Fab.

Parnopes, Latr.

- Viridis*, Bé. Rare.

Hedychrum, Latr.

- Lugubre*, Cam. Rare.
Flammulatum, Dubuysson. Rare.

Family FORMICIDÆ.

Subfamily DORYLINÆ.

- Dorylus orientalis*, Westw. ♂ and ♀ common.
Ænictus pachycerus, Smith. Rare.
Ænictus brevicornis, Mayr. Rare.

Subfamily PONERINÆ.

- Anochetus punctiventris*, Mayr. Rare; found under bricks.
Bothroponera tesserinoda, Mayr. Common.
Platythyrea victoriæ, Forel. Rare.
Diacamma vagans, Smith. Common.
Diacamma sculptum, Jerdon. Rare.

* The number of Aculeata (other than ants) recorded from British India in Colonel Bingham's work published in 1897 is 995, but a considerable number of species have been described since.

Col. Bingham writes:—"I have carefully compared specimens in your collection with Smith's type of *D. versicolor*. *D. versicolor* is not an Indian species. The larger form of *Diacamma* found in India is, according to my ideas, *D. sculptum*.

Brachyponera jerdoni, Forel. Rare.

Ponera confinis, Roger, var. *Aitkeni*, Forel.

Lobopelta ocellifera, Roger. Rare.

„ *chinensis*, Mayr. Common.

„ *minchini*, Forel. Rare.

„ *punctiventris*, Mayr. Rare.

„ *diminuta*, Smith. Rare.

„ *kitteli*, Mayr. Rare.

Lioponera longitarsus, Mayr. Rare.

Stigmatomma rothneyi, Forel. = *Amblyopone rothneyi*.
Rare.

Subfamily MYRMICINÆ.

Cataulacus taprobanæ, Smith. Rare.

Meranoplus bicolor, Guer. Common.

Triglyphotrix striatidens, Emery. Rare.

Holcomyrme scabriceps, Mayr. Common.

Myrmicaria brunnea, Saunders. Common.

Col. Bingham writes me:—" *M. fodiens*, Jerdon = *M. brunnea*, Saunders; latter has priority. *M. subcarinata*, Smith, is a local variety."

Tetramorium obesum, Andre. Rare.

„ *smithi*, Mayr. Rare.

„ *simillimum*, Smith. Rare.

„ *denticulatum*, Forel. Rare.

In Col. Bingham's opinion the latter is only a var. of *simillimum*.

Monomorium salomonis, Linn. Common.

„ *vastator*, Smith = *M. destructor*, Jerdon.
Common.

„ *pharaonis*, Linn. Common.

„ *atomus*, Forel. Rare.

„ *latinoda*, Mayr. Common.

„ *orientale*, Mayr. Rare.

„ *floricola*, Jerdon = *M. speculare*, Mayr. Col.

Bingham writes:—"Jerdon's name has priority." Rare.

Cardiocondyla nuda, Mayr. Rare.

Solenopsis geminata, Fabr. Very common. *S. armata* is only a var. A very variable species.

Pheidologeton diversus, Jerdon = *P. ocellifera*, Mayr. Col. Bingham writes :—"Jerdon's name has priority." Rare.

Pheidologeton affinis, Jerdon = *P. laboriosus*, Smith. Col. Bingham writes :—"Jerdon's name has priority." Common.

Pheidole latinoda, Roger. Common.

„ *rhombinoda*, Mayr. Common.

„ *striativentris*, Mayr. Rare.

„ *indica*, Mayr. Common.

„ *parva*, Mayr. Rare.

„ *javana*, Mayr. Rare.

„ *watsoni*, Forel. Rare.

„ *spathifera*, Forel. Rare.

„ *smythiesi*, Forel, var. *bengalensis*, Forel. Rare.

Cremastogaster subnuda, Mayr. Common.

„ *rabula*, Forel. Rare.

„ *rogenhofferi*, Mayr. Common.

„ *rothneyi*, Mayr. Common.

„ *contemta*, Mayr. Common.

„ *aberrans*, Forel. Rare.

„ *minchini*, Forel. in lit. Rare.

Lophomyrmex 4-spinosus, Jerdon. Rare.

Sima rufonigra, Jerdon. Very common.

„ *nigra*, Jerdon. Common.

„ *allaborans*, Walker = *S. compressa*, Roger. Col. Bingham writes :—"Walker's name has priority." Rare.

Atopomyrmex ceylonicus, Emery, two, ♀.

Oligomyrmex bengalensis, Forel. Rare.

„ *rothneyi*, Forel. Rare.

Leptothorax taylori, Forel. Rare.

Subfamily DOLICHODERINÆ.

Technomyrmex albipes, Smith. Rare.

Iridomyrmex anceps, Roger = *I. excisus*, Mayr. Col. Bingham writes :—"Roger's name has priority." Rare.

Bothriomyrmex wroughtoni, Forel. Rare.

Tapinoma melanocephalum, Fabr. Common.

Dolichoderus taprobanae, Smith = *D. gracilipes*, Mayr.
Col. Bingham writes :—"Smith's name has priority. *D. gracilipes* is only a variety of Smith's insect." Common.

Subfamily CAMPONOTINÆ.

Camponotus compressus, Fabr. Very common.

„ *mitis*, Smith. Col. Bingham writes :—"Var. *fuscithorax* grades into genuine *mitis* when you get a big enough series." Common.

„ *arrogans*, Smith = *C. junctus*, Forel. Col. Bingham writes :—"It stands thus in my book. I have compared your specimens with the type." Rare.

„ *paria*, Emery. Common.

„ *sericeus*, Fabr. Var. *opaceventris*, Mayr. Common.

„ *taylori*, Forel. Rare.

Colobopsis rothneyi, Forel. Rare.

Polyrhachis lævissima, Smith. Common.

„ *bicolor*, Smith. Rare.

„ *argentea*, Mayr. }
„ *acasta*, Smith. } Rare.
„ *tibialis*, Smith. }

„ *spinigera*, Mayr. }
„ *simplex*, Mayr. } Common.

„ *thrinax*, Roger. Rare.

„ *tubericeps*, Forel. Rare.

Ecophylla smaragdina, Fabr. Common.

Prenolepis bengalensis, Forel. Common.

„ *longicornis*, Latr. Common.

„ *indica*, Forel. Rare.

„ *yerburyi*, Forel. Rare.

Plagiolepis longipes, Jerdon. Common.

„ *rothneyi*, Forel. Rare.

Acantholepis frauenfeldi, Mayr. Common.

„ *bipartita*, Smith. Rare.

„ *capensis*, Mayr. Common.

Tribe FOSSORES.

Family MUTILLIDÆ.

- Mutilla sexmaculata*, Swed. For ♂ see Cameron, Ann. and Mag. Nat. Hist., iv (7), 61. Common.
- „ *4-carinata*, Cam. ♂ Rare.
- „ *cona*, Cam. ♂ Rare.
- „ *interrupta*, Lep. Common.
- „ *perversa*, Cam. ♂ Rare.
- „ *dilecta*, Cam. ♂ Rare.
- „ *discreta*, Cam. ♂ Rare.
- „ *sabellica*, Cam. ♂ Rare.
- „ *labiena*, Cam. ♂ Rare.
- „ *funebrana*, Cam. ♂ Rare.
- „ *analís*, Lep. Rare.
- „ *serena*, Cam. ♂ Rare.
- „ *cleonyma*, Cam. ♂ Rare.
- „ *maculicornis*, Cam. ♂ Rare.
- „ *poesia*, Cam. ♂ Rare.
- „ *phænna*, Cam. ♂ Rare.
- „ *idyia*, Cam. ♂ Rare.
- „ *ludovica*, Cam. ♂ Rare.
- „ *illa*, Cam. ♂ Rare.
- „ *erxia*, Cam. ♂ Rare.
- „ *lena*, Cam. ♂ Rare.
- „ *fianna*, Cam. ♂ Rare.
- „ *cara*, Cam. ♂ Rare.
- „ *selma*, Cam. ♂ Rare.
- „ *fortinata*, Cam. ♂ Rare.
- „ *bidens*, Cam. ♂ Rare.
- „ *ædipus*, Cam. ♂ Cf. Cameron, Manchr. Mem., 1898, No. 11, p. 6. One specimen.
- „ *interrupta*, Oliv. Rare.
- „ *funeraria*, Sm. Common.
- „ *argentipes*, Sm. Rare.
- „ *aureo-rubra*, Rad. = *egregia*, Sauss. Rare.
- „ *pulcherina*, Sm. Rare.
- „ *dryta*, Cam. ♀ Rare.
- „ *compactilis*, Cam. ♀ Rare.
- „ *martialis*, Cam. ♀ Rare.
- „ *pamphia*, Cam. ♀ Rare.
- „ *marcia*, Cam. ♀ Rare.

<i>Mutilla gnoma</i> , Cam.	♀	Rare.
„ <i>emancipata</i> , Cam.	♀	Rare.
„ <i>parthenia</i> , Cam.	♀	Rare.
„ <i>lethargia</i> , Cam.	♀	Rare.
„ <i>3-maculata</i> , Cam.	♀	Rare.
„ <i>valida</i> , Cam.	♀	Rare.
„ <i>læta</i> , Cam.	♀	Rare.
„ <i>ariel</i> , Cam.	♀	Rare.
„ <i>durga</i> , Bing. = <i>dives</i> , Cam.		Common.
„ <i>peregrina</i> , Cam.	♀	Rare.
„ <i>cotesii</i> , Cam.	♀	Rare.
„ <i>rothneyi</i> , Cam.	♀	Rare.
„ <i>redacta</i> , Cam.	♀	Rare.
„ <i>agelia</i> , Cam.	♀	Rare.
„ <i>mithila</i> , Cam.	♀	Rare.
„ <i>ocellata</i> , Sauss.		Common.

Family THYNNIDÆ.

<i>Methoca bicolor</i> , Cam.	Rare.
„ <i>orientalis</i> , Smith.	Rare.

Family SCOLIIDÆ.

<i>Tiphia brevipennis</i> , Cam.	Rare.
<i>Plesia (Myzine) dimidiata</i> , Guer.	Rare.
„ <i>bengalensis</i> , Cam.	Rare.
„ <i>petiolata</i> , Sm.	Rare.
<i>Scolia capitata</i> , Guer.	Common.
„ <i>rubiginosa</i> , Fab.	Rare.
„ <i>humeralis</i> , Sauss.	Rare.
„ <i>redtenbacheri</i> , Sauss.	Rare.
„ <i>aureipennis</i> , Lep.	Common.
„ <i>quadripustulata</i> .	Common.
„ <i>indica</i> , Sauss.	Rare.
<i>Elis marginella</i> , Klug.	Common.
„ <i>thoracica</i> , Fab.	Common.
„ <i>annulata</i> , Fab.	Common.
„ <i>hirsuta</i> , Sauss.	Rare.
„ <i>brevipennis</i> , Cam.	Rare.
<i>Liacos analis</i> , Fab.	Rare.
„ <i>fulvopicta</i> , Cam.	Rare.

Family POMPILIDÆ.

Mr. Cameron informs me that the name *Pompilus* is pre-occupied, and that its use cannot be retained in *Hymenoptera*. I have, however, retained the name here, and in the sense in which it is used by Col. Bingham. The family must hereafter be called *Ceropalidæ*.

Macromeris violacea, Lep. Common.

Pompilus analis, Fab. Common.

„ *zeus*, Cam. Rare.

„ *ariadne*, Cam. Rare.

„ *reflexus*, Sm. Rare.

„ *hecate*, Cam. Rare.

„ *incognitus*, Cam. Rare.

„ *lascivus*, Cam. Rare.

„ *maculipes*, Sm. Rare.

„ *pedalis*, Cam. Rare.

„ *canifrons*, Sm. Rare.

„ *simillimus*, Sm. Rare.

„ *hero*, Cam. Rare.

„ *rothneyi*, Cam. One specimen.

„ *vivax*, Cam. Rare.

„ *unifasciatus*, Sm. Very common.

„ *orientalis*, Cam. Rare.

„ *vagabundus*, Sm. Rare.

„ *incognitus*, Cam. Rare.

„ *vischnu*, Cam. Common.

„ *cellularis*, Cam. Rare.

„ *implactibilis*, Cam. Rare.

„ *perturbans*, Cam. Rare.

„ *ædilis*, Cam. Rare.

Planiceps orientalis, Cam. Rare.

Aporus bengalensis, Cam. Rare.

„ *cotesii*, Cam. Rare.

Pseudagenia deceptrix, Sm. Rare.

„ *ariel*, Cam. Rare.

„ *pedunculata*, Sm. Rare.

„ *cærulea*, Sm. Rare.

„ *blanda*, Guer. Rare.

„ *festinata*, Sm. Rare.

„ *veda*, Cam. Rare.

„ *tincta*, Sm. Rare.

„ *morna*, Cam. Rare.

- Pseudagenia mutua*, Cam. Rare.
Salix flavus, Fab. Very common.
 „ *fulvipennis*, Fab. Common.
 „ *bipartitus*, Sm. Rare.
 „ *fulgidipennis*, Sauss. Rare.
 „ *iridipennis*, Sm. Rare.
 „ *peregrinus*, Sm. Rare.
 „ *rothneyi*, Cam. One specimen.
 „ *excellus*, Cam. = *atropus*, Sm., 1875, non Smith, 1855. Cf. Cameron, Manr. Mem., 1891, 443. Rare.
 „ *madraspatanus*, Sm. Rare.
 „ *mirandus*, Cam. Common.
 „ *electus*, Cam. Rare.

Family SPHEGIDÆ.

- Astata agilis*, Sm. Rare.
 „ *nigricans*, Cam. Rare.
Lyroda argenteofacialis, Cam. Rare.
Piagetia ruficornis, Cam. Rare.
Tachytes monetaria, Sm. A most beautiful species when alive and glistening in the Indian sun. Common.
 „ *modesta*, Sm. Common.
 „ *ornatipes*, Cam. Rare.
 „ *rothneyi*, Cam. Mr. Cameron writes me that this is a different species from that named for him, *sinensis*, Sm., by the late Mr. F. Smith. It is rare.
 „ *brevipennis*, Cam. Rare.
 „ *maculitarsis*, Cam. Rare.
 „ *vicina*, Cam. Rare.
 „ *tarsata*, Sm. Rare.
Tachysphex varihirta, Cam., in litt. Rare.
 „ *argyreus*, Sm. Rare.
 „ *puncticeps*, Cam., in litt. Rare.
 „ *auriceps*, Cam. Rare.
 „ *striolata*, Cam., in litt. Rare.
Larra simillima, Sm. Common.
 „ *tisiphone*, Sm. Rare.
 „ *iridipennis*, Cam. Rare.
 „ *longicornis*, Cam. Rare.

- Larra rufipes*, Sm. Rare.
 „ *erythrogaster*, Cam. Rare.
 „ *nigriventris*, Cam. Rare.
Leptolarra flavinerva, Cam. Rare.
 „ *longitarsis*, Cam. Rare.
 „ *reticulata*, Cam. Rare.
Spanolarra rufitarsis, Cam. Rare.
Cænolarra appendiculata, Cam. Rare.
Notogenia anthracina, Cam., in litt. Rare.
 „ *picipes*, Cam., in litt. Rare.
 „ *fuscistigma*, Cam., in litt. Rare.
 „ *pygmæa*, Cam., in litt. Rare.
 „ *varipilosa*, Cam., in litt. Rare.
 „ *intermedia*, Cam., in litt. Rare.
 „ *fuscipennis*, Cam. Rare.
 „ *bengalensis*, Cam., in litt. Rare.
 „ *striaticollis*, Cam., in litt. Rare.
 „ *pilosa*, Cam., in litt. Rare.
 „ *parva*, Cam., in litt. Rare.
 „ *piliventris*, Cam., in litt. Rare.
 „ *indica*, Cam., in litt. Rare.
 „ *basalis*, Cam. Rare.
 „ *subtesselata*, Sm. Common.
 „ *jaculatrix*, Sm. Common.
 „ *erythropoda*, Cam. Rare.
Liris auratus, Fab. Common. A beautiful species when seen in the sun.
Gastrosericus rothneyi, Cam. Three specimens.
 „ *binghami*, Cam. One specimen.
Miscophus rothneyi, Bing. One specimen.
Pison suspiciosus, Sm. Rare.
 „ *appendiculatus*, Cam. Rare.
 „ *crassicornis*, Cam. Rare.
 „ *rugosus*, Sm. Rare.
 „ *orientalis*, Cam. Rare.
Parapison rothneyi, Cam. One specimen.
Ammophila atripes, Sm. Common.
 „ *dimidiata*, Sm. Rare.
 „ *nigripes*, Sm. Rare.
 „ *punctata*, Sm. Rare.
 „ *basalis*, Sm. Common.
 „ *erythrocephala*, Fab. Rare.
Sceliphron madraspatanum, Fab. Very common.
 „ *coromandelicum*, Lep. Common.

Sceliphron violaceum, Fab. One of the very commonest species of Barrackpore.

Sphex lobatus, Fab. Very common.

„ *pruiosus*, Ger. = *vicinus* Bing., var. *Rothneyi*, Cam. Cf. Cameron, Man. Memoirs, 1898, 24. Rare.

„ *luteipennis*, Mosc. Common.

„ *cinerascens*, Dbm. = *xanthopterus*, Cam. and Bing. Cf. Cameron, l. c. Rare.

„ *umbrosus*, Christ. Common.

„ *aurulentus*, Fab. Common.

Ampulex compressa, Fab. Very common.

Rhinopsis ruficornis, Cam. Rare.

Trirhogma cærulea, Westw. Rare.

Dolichurus clavipes, Cam. One specimen.

Cemonus fuscipennis, Cam. One specimen.

Passaloecus reticulatus, Cam. One specimen.

Nysson rugosus, Cam. Rare.

„ *erythropoda*, Cam. Rare.

Alyson annulipes, Cam. Rare.

Didineis orientalis, Cam. One specimen.

Gorytes amatorius, Sm. Rare.

„ *pictus*, Sm. Rare.

Stizus calopteryx, Handl. Rare.

„ *blandinus*, Sm. Rare.

„ *rufescens*, Guer. Rare.

„ *melleus*, Sm. Rare.

„ *reversus*, Sm. Common.

„ *lateralis*, Cam. Rare.

Bembex lunata, Fab. Rare.

„ *trepanda*, Dbm. Common.

„ *buddha*, Handl. Common.

„ *orientalis*, Handl. Rare.

„ *pinguis*, Handl. Rare.

„ *indica*, Fab. Rare.

Philanthus depredator, Sm. Two specimens.

Cerceris rothneyi, Cam. One specimen.

„ *orientalis*, Sm. Rare.

„ *humbertiana*, Sauss. Common.

„ *pictiventris*, Dbm. Rare.

„ *flavopicta*, Sm. Rare.

„ *instabilis*, Sm. Very common.

„ *pulchra*, Cam. Common.

„ *vischnu*, Cam. Rare.

- Cerceris viligans*, Sm. Very common.
 „ *tristis*, Cam. Common.
 „ *pentadonta*, Cam. Rare.
Trypoxylon pileatum, Sm. Rare.
 „ *canaliculatum*, Cam. Rare.
 „ *buddha*, Cam. Rare.
 „ *bicolor*, Sm. Rare.
 „ *geniculatum*, Cam. Rare.
 „ *cognatum*, Cam. Rare.
 „ *pygmæum*, Cam. One specimen.
Oxybelus squamosus, Sm. Rare.
 „ *flavipes*, Cam. Rare.
 „ *fulvopilosus*, Cam. Rare.
 „ *canescens*, Cam. Rare.
 „ *robustus*, Cam. Rare.
Crabro buddha, Cam. Rare.
 „ *orientalis*, Cam. Rare.
 „ *odontophorus*, Cam. Rare.
 „ *ardens*, Cam. Rare.
 „ *argentatus*, Lep. Rare.
 „ *bellus*, Cam. Rare.
 „ *nanus*, Cam. Rare.
 „ *nitidus*, Cam. Rare.

Tribe DIPLOPTERA.

Family EUMENIDÆ.

- Eumenes quadrispinosa*, Sauss. Rare.
 „ *architectus*, Sm. Common.
 „ *punctata*, Sauss. Rare.
 „ *buddha*, Cam. Rare.
 „ *petiolata*, Fab. Very common.
 „ *escuriens*, Fab. Very common.
 „ *conica*, Fab. One of the very commonest species.
 „ *flavopicta*, Blanch. Common.
 „ *arcuata*, Fab. Rare.
 „ *ceylonicus*, Sauss. Rare.
Rhynchium hæmorrhoidale, Fab. Very common.
 „ *brunneum*, Fab. Common.
 „ *abdominale*, Illig. Common.
 „ *rugulatum*, Cam. Rare.
 „ *nitidulum*, Fab. Common.
 „ *argentatum*, Fab. Very common.

- Rhynchium clypeatum*, Cam. Rare.
 „ *bengalense*, Sauss. Common.
 „ *basimacula*, Cam. This species is easily separated from *R. flavomarginatum*, Sm. (which does not occur in Bengal), by the different form of the face and clypeus. Cf. Cameron, Ann. and Mag. Nat. Hist., Dec., 1900, p. 532. Rare.

- Odynerus hindostanus*, Cam. Rare.
 „ *antoni*, Cam. Rare.
 „ *sicheli*, Sauss. Common.
 „ *punctum*, Fab. Very common.
 „ *diffinis*, Sauss. Rare.
 „ *bipustulatus*, Sauss. Common.
 „ *ovalis*, Sauss. Common.
 „ *sibilans*, Cam., in litt. Rare.

Family VESPIDÆ.

- Icaria quadrimaculata*, Cam. Rare.
 „ *ferruginea*, Fab. Common.
 „ *artifex*, Sauss. Rare.
Polistes rothneyi, Cam. One specimen only.
 „ *rufolineatus*, Cam. Rare.
 „ *hebræus*, Fab. The commonest species in Barrackpore.
 „ *sagittarius*, Sauss. Rare.
 „ *stigma*, Fab. Very common.
 „ *nigritarsis*, Cam. Rare.
Vespa cincta, Fab. Very common.
 „ *affinis*, Fab. Common.
 „ *basalis*, Sm. Rare.
 „ *orientalis*, Lin. Rare.

Tribe ANTHOPHILA.

Family COLLETIDÆ.

- Prosopis feai*, Vach. Rare.
 „ *strenua*, Cam. Rare.
 „ *absoluta*, Cam. Rare.
 „ *bellicosa*, Cam. Rare.

Family APIDÆ.

- Sphecodes crassiscornis*, Sm. Rare.
 „ *propinquus*, Sm. Rare.

- Halictus itinerans*, Cam., in litt. Rare.
 „ *ciris*, Cam. Rare.
 „ *interstitialis*, Cam., in litt. Rare.
 „ *zonatulus*, Cam. Rare.
 „ *bengalensis*, Cam., in litt. Rare.
Nomia elliotii, Sm. Common.
 „ *westwoodii*, Grib. Rare.
 „ *curvipes*, Fab. Common.
 „ *thoracica*, Sm. Common.
 „ *clypeata*, Sm. Rare.
 „ *oxybeloides*, Sm. Common.
 „ *scutellata*, Sm. Rare.
 „ *albofimbriata*, Cam. Rare.
 „ *aureobalteata*, Cam. Rare.
 „ *argenteobalteata*, Cam. Rare.
 „ *frederici*, Cam. Rare.
 „ *lammellata*, Cam. Rare.
 „ *zebrata*, Cam. Rare.
 „ *purpureolineata*, Cam. Rare.
 „ *latipes*, Cam. Rare.
Steganomus nodicornis, Sm. Common.
Nomada adusta, Sm. Rare.
 „ *advena*, Sm. Rare.
 „ *ceylonica*, Cam. Rare.
Megachile bicolor, Fab. Very common.
 „ *lanata*, Fab. Very common.
 „ *umbripennis*, Sm. Rare.
 „ *femorata*, Sm. Common.
 „ *nigricans*, Cam. Rare.
 „ *disjuncta*, Fab. Very common.
 „ *albifrons*, Sm. Rare.
Anthidium rasorum, Sm. Rare.
Parevaspis carbonaria, Sm. Common.
Stelis parvula, Cam. Rare.
 „ *flavomaculata*, Cam. Rare.
Ceratina viridissima, Dall. Common.
 „ *hieroglyphica*, Sm. Common.
Allodape marginata, Sm. Rare.
Caelioxys sexmaculata, Cam. Rare.
 „ *argentifrons*, Sm. Common.
 „ *basalis*, Sm. Common.
 „ *cuneata*, Sm. Common.
 „ *confusa*, Sm. Rare.
 „ *discipiens*, Spin. Rare.

- Cælioxys fuscipennis*, Sm. Rare.
Crocisa emarginata, Lep. Common.
 „ *histrion*, Fab. Common.
Anthophora cincta, Lin. Common.
 „ *zonata*, Lin. Very common.
 „ *fallax*, Sm. Common.
 „ *violacea*, Lep. Very common.
 „ *bicincta*, Fab. Rare.
Xylocopa fenestrata, Fab. Common.
 „ *tenuiscapa*, Westw. Common.
 „ *latipes*, Drury. Common.
 „ *æstuans*, Lin. Common.
 „ *collaris*, Lep. Rare.
 „ *amethystina*, Fab. Rare.
 „ *auripennis*, Lep. Common.
 „ *bryorum*, Fab. Rare.
 „ *dissimilis*, Lep. Rare.
 „ *acutipennis*, Sm. Rare.
 „ *verticalis*, Lep. Rare.
Apis indica, Fab. Common.
 „ *florea*, Fab. Common.
Melipona bengalensis, Cam. Rare.
 „ *iridipennis*, Sm. Rare.

NOTES ON CONSPICUOUS BARRACKPORE SPECIES.

FORMICIDÆ.

Droilus orientalis, Westw.—Nests in the earth, under bricks, stones, or in masonry. The ♂ comes into your bungalows at night, attracted by light, generally at the end of the cold weather, February or early March.

Diacamma vagans, Smith.—Not uncommon; nests in walls or other brickwork, under bricks or stones; not populous; pungent sting; a most intelligent species.

Brachyponera jerdoni, Forel.—Found in some numbers in December amongst the *débris* of stacks of wood; also in the Botanical Gardens under the same conditions.

Lobopelta diminuta, Smith.—Rare in Barrackpore (but common in the Botanical Gardens, Calcutta), marches in long lines two deep.

Meranoplus bicolor, Guér.—Common in the Park; nests in the earth, particularly the bank and ditch separating it from the trunk-road. When built in exposed places, the entrances to the nests are often found covered with the little pink and blue flowers of some weed. Sexes end of May.

Holcomyrrex scabriceps, Mayr.—The Harvesting Ant of the Barrackpore district. Common in the Park. Swarms early in June; nests in roads or hard sun-baked earth, but always on or near grass land; easily found by the mounds of seed husks piled up round the entrances. Ants difficult to find after the rains commence.

Myrmicaria brunnea, Saunders.—Nests or colonies found round the stems of the great banyan tree in the Park by excavating large fosses, the earth being heaped up in mounds like regular fortifications. Swarms July 7th–10th (Note in the Proceedings Entom. Soc. February 24th, 1892, under the name *M. subcarinata*, Emery).

Solenopsis geminata, Fab.; *V. armata*, Forel.—The Red Ant. Very common, nests in the earth, under bricks or stones, or almost anywhere. Swarms several times from March to October.

Pheidologeton laboriosus, Smith = *P. affinis*, Jerdon.—Not uncommon in the Park; nests under bricks, stones, flower-pots, and rock work; occasionally found on the march changing quarters, when they construct elaborate covered ways, in which the huge-headed workers-major take an important and highly-specialized part.

Pheidole rhombinoda, Mayr.—Nests found in the Park where the grass has been worn bare; the ants cover these patches round the entrance to the nests with the leaflets of a species of mimosa; this covering is arranged in the form of a circle, and is apparently for protection from the sun.

Sima rufonigra, Jerdon.—Very common; nests in trees, particularly fruit-trees like the mango, baël and lychee, and a species of fig in the Park had its fruit completely riddled by this ant. Winged ♀ found in May; is armed with the most poisonous sting of any Aculeate with which I am acquainted. Nests frequented by a species of spider, *Salticus*; also by *Ampulex* (*Rhinopsis*) *ruficornis*, Cam., which very closely mimics the ant, and which I have never found in any other situation.

Sima nigra, Jerdon.—Not uncommon in trees; is also mimicked by a *Salticus*.

Camponotus compressus, Fab.—The Black Ant. Very common; nests in the earth; swarms in May or early June.

Polyrhachis lævissima, Smith.—Nests in the decayed wood of trees. Swarms June 15th to July 7th.

Polyrhachis thrinax, Roger.—Nest formed by binding together one or two leaves with a few silken threads; very small communities.

Polyrhachis simplex, Mayr.; *P. spinigera*, Mayr.—Nests formed by web-work binding together a few twigs of a spiny shrub.

Ecophylla smaragdina, Fab.—Common in the Park and along the trunk-road; nests in trees; sexes in the rains. The name gives a wrong impression of the colour, the ♀, which is seldom seen, alone answering the description; the workers, which may be seen in thousands, being a brilliant gamboge yellow.

In "Notes on Indian Ants," Trans. Entom. Soc. 1889, III., and 1895, II., I have described the habits of many of the Barrackpore species more fully.

FOSSORES.

Mutilla.—The species of this genus are never found in any numbers (except perhaps the males of *sexmaculata*); single specimens may be picked up anywhere, but the only spot where you could start out collecting with some certainty of finding them was Monirampore, where the heaps of white sand used for the filter-beds of the waterworks (and which in carting was scattered about the paths and roads leading to the grounds) formed a great attraction for these sun- and sand-loving insects. The waterworks are quite of modern date, and it seems very curious that imported sand should in a few years have proved an attraction sufficient to establish a known locality or resort. How can the slow-moving ♀ *Mutilla* discover that sand is to be found within the restricted area (a few acres) of the Monirampore compound?

The courting of the sexes of *sexmaculata* may occasionally be watched on the leaf of a tree or shrub in some secluded spot, and in its phases is almost ludicrous. The ♂ will caress, coax, and pet his lady-love for hours together (the antennæ being the chief means of conveying or expressing his feelings); at last, losing all patience, he will take her

up in his mandibles and shake her, then perhaps feeling ashamed of himself, will redouble his caresses and begin the courting over again. I have several times captured them in their marriage flight.

Scolia.—Common in Barrackpore Park in the rains; they can often be seen flying along the grass at the edge of the roads, the beautiful iridescence of their wings flashing in the sun.

Scolia indica, Sauss., and *S. rubiginosa*, Fab.—Found in the jungle at Pulta. There would come a boom of some large insect, a flash of black and red, and it had disappeared with a thud in the low thick scrub, from which it would take much careful beating to rouse and secure.

Elis marginella, Klug.—Was very common about Pulta in the early rains, preferring shade to sun. I never found it in the Park.

Sceliphron violaceum, Fab.—One of the commonest species in India, frequenting the verandahs of our bungalows, and building its little mud-cells on the walls.

Sceliphron madrasapatani, Fab.—Not so common as *violaceum*, but sufficiently so to attract the attention of any observer.

Sphex lobatus, Fab.—This is one of the most strikingly handsome of all the Indian Aculeates. It is common throughout the hot weather and rains, and makes its nests in the hard ground (being especially fond of bare patches in the grass land of the Park); it provisions its nests with a store of field crickets. Before taking a prisoner in, it will go in and out many times to see that all is secure, and if during this process you remove the cricket a few yards or so from the entrance, it will display great intelligence in finding it by working round and round in gradually increasing circles till the circumference at last crosses the cricket, which is always in too stupefied a state to escape. When the females settle on the ground they come with a clash and a clatter like the clank of cavalry, and in the brilliant sunlight suggest ideas of fifteenth-century knights blazing in plate-armour. The males are very fond of the flowers of the castor-oil plant.

Sphex umbrosus, Christ; *S. aurulentus*, Fab.; *S. luteipennis*, Mosc.—These three species are fairly common about the jungly ground round Pulta, particularly so at the close of the rains.

Ampulex compressa, Fab.—This is a common species,

and is very often met with sunning itself on the trunks of peepul trees. I have found it occasionally in this situation busily engaged with the workers of *Sima rufonigra*, picking them up with its mandibles and tossing them off the tree, but with a sporting air rather than any serious or deadly purpose, for the ants were never in the least injured.

Rhinopsis ruficornis, Cam.—A rare species, only found frequenting the nests of *Sima rufonigra*, which it very closely mimics. For some years I had visited a particular nest of *Sima rufonigra* in the hope of finding the male, and at last I was rewarded with what at first sight looked like an undoubted ♂. I eagerly captured it; it was not an ant at all, but something even more interesting, a clever case of mimicry by a sand-wasp. I also found *Rhinopsis* at a second nest, and Mr. Wroughton at a later date, on discovering *Sima rufonigra* in the Konkan, found its understudy in a similar species, *Rhinopsis constanceæ*, Cam., in considerable numbers, a most convincing proof that this mimicry is genuine, and in no way accidental. The double mimicry by *Rhinopsis* and *Salticus* of a fierce and exceptionally armed ant appears to me to be specially interesting.

Gastrosericus rothneyi, Cam.; *G. binghami*, Cam.; *Nysson rugosus*, Cam.; *N. erythropoda*, Cam.; *Gorytes amatorius*, Smith; *G. pictus*, Smith, were all taken in a bank of fine earth in a little lane near Pulta, so shaded with dense jungle that at noon in the hottest weather it was like twilight and almost cool.

Bembex lunata, Fab.—A rare species. A small colony found in the sandy bank of a nullah at Pulta.

Bembex trepanda, Dbm.—Common in the rains in the low jungle about Pulta.

Bembex buddha, Handl.—Found in the hot weather on sandy patches of ground about Pulta.

Cerceris.—Found most commonly during the rains on flowers. A nullah between Barrackpore racecourse and Pulta overgrown with jungle, vegetation, and flowers was especially rich in this genus.

Eumenes conica, Fab.—One of the commonest and most familiar of Indian Aculeates, building its nests in verandahs and any other convenient spot, provisioning them with an abundant store of caterpillars, mostly geometers.

Rhynchium basimacula, Cam.—A rare species, but one that lends a zest to collecting, as you can never be quite

certain when on the wing if one of the common species may not turn out to be *basimacula*, with its broad white band. On one occasion *basimacula* made its nest in the turret-staircase leading to the roof of my bungalow. The cells were very strongly formed and covered with a particularly sticky kind of cement like shell-lac.

Polistes hebræus, Fab.—The commonest wasp in Barrack-pore, and generally known as the *Yellow wasp*. It will take up its position in a verandah, outhouse, or other building, and go on piling up its nest on nests year after year with a persistence which will take no denial. It varies greatly in size and colour, some specimens being pinched and starved in appearance and of a dirty grey-green colour, while others are really fine insects with a brilliant yellow colouring like fresh gamboge. Season and environment may have something to do with this variation. A most striking instance of this was a colony formed in a little white dome-shaped building which protected a monument to one of the former worthies of the Calcutta Botanical Gardens. It stands in one of the main roads of the gardens, without a particle of shelter or shade from the blazing sun, and here *hebræus* built its nests year after year, the wasps developing to such a size and of such an intense yellow as almost to suggest a new variety.

Vespa cincta, Fab.—This species may be taken as the Bengal hornet; it seldom frequents houses, but is common enough in trees, shrubs, and old out-buildings. For many years a large nest was established in the Chirya Khana (aviary) in the Park. Another, a very curious nest, was built in a large square terra-cotta flower-pot in the Park. A tree of some sort had died, leaving a bare stem about four feet high, and up this the nest was built and added to year after year. I had a great ambition to secure this nest for the British Museum, but the great difficulty of packing it for sea-transport compelled me to give up the idea. This species is very fond of frequenting the date palm when cut by the natives for collecting toddy. They will settle round the stems in thousands to feast on the exuding juice. It is curious that at such times the little grey Indian squirrel (*Sciurus palmarum*) will come and clear the hornets out with its paws, and take its fill of the toddy without being molested in any way, and yet it is not an unknown incident for *cincta* to attack even

elephants, as the following cutting from *The Empress of India* will show :—

“To walk about Gaur is impossible; there are too many swamps and jungles; the only way to get about is on elephants, and even on these one's progress is sometimes checked, as happened when we were trying to force our way through the jungle to the Dakhil Gate. We were in single file, the Lieutenant-Governor and Mr. Hillow, the Rajah of Mymensing's agent, leading, when suddenly orders were passed back to right-about-face, much shouting took place, and we found that the whole line of elephants had been routed by a hornets' nest, an enemy which is by no means to be despised.”—*Empress*, Aug., 1899 (Sir John Woodburn's Tour).

Vespa orientalis, Lin.—Only once have I found this species in the Barrackpore district. A native sweet-seller set up a stall one day under a peepul tree near the church, and with it appeared *orientalis*. After a few weeks sweet-seller and wasp disappeared and were not seen again. Although so rare at Barrackpore, this is about the commonest wasp up-country, and even at Burdwan, fifty miles from Barrackpore, it can be found in hundreds in the native bazar.

APIDÆ.

Nomia curvipes, Fab.—Occurred occasionally in the Park, but more commonly in a grassy lane between the Barrackpore Maidan and Pulta. It likes the long “dudh” grass which grows in damp ditches along hedgerows. At Nischindipore Nuddea it appeared in sufficient numbers to be quite a feature, and the beautiful gold-brown colouring and bright golden bands glittering in the sun as the bees flitted to and fro against the background of emerald green was an entomological pleasure not readily forgotten.

Stegonomus nodicornis, Smith.—Somewhat rare in the Park, its chief habitat being Pulta, where it is common in the hot weather and rains. It is a charming little bee and has a quiet weird little flight of its own, which is very puzzling till you get accustomed to it. The little white flowers of a species of *Pulicaria* are much frequented, and it has a habit of settling drawn up in a little compact ball on the stem beneath the flower, when it is almost impossible to discover it. I have been out collecting with a friend a whole day where this bee was fairly common without

his capturing a single specimen until initiated in their ways.

Nomada adusta, Smith.—You could always find one or two specimens of this little *Nomada* flitting about and settling on blades of grass in the shade of the big trees in Barrackpore Park, near the Vice-regal kitchens.

Parevaspis carbonaria, Smith.—Common in Barrackpore Park on the blossom of *Duranta plumieri* and other flowering shrubs and trees.

Megachile bicolor, Fab.; *M. lanata*, Fab.; *M. disjuncta*, Fab.—Three of the commonest bees in the district, and may be seen at any time anywhere, busy with their leaf-cutting operations.

Crocisa emarginata, Lep.; *C. histrio*, Fab.—Common in the Park on the flowers of various shrubs and trees, particularly the blossom of *Duranta plumieri*.

Anthophora cincta, Lin.; *A. bicincta*, Fab.—Common throughout the hot weather and rains about Pulta, frequenting the flowers of a plant much like our own dead-nettle, which is so attractive to our species in England; indeed, I came across this plant at Pulta one day before I had seen the bee. I felt *Anthophora* should be near, and sure enough in a few minutes *bicincta* and *cincta* appeared. My delight was great, for I had not been long in India and it reminded me of home.

Xylocopa.—Generally common, but more particularly so in both Barrackpore and Ischapur Parks. They form their colonies in the half-decayed trunks of trees, and can be found nearly the whole year round at the flowers of every tree, shrub, or plant. The yellow blossoms of *Thevetia nereifolia* are a constant attraction to them, also *Argyreia nervosa* (elephant creeper) and the always favoured *Duranta plumieri*.

The males of *Æstuans* have a curious habit of frequenting trees of the china-box which grow in the Park and also in the deserted gardens of some ruins at Pulta; they circle round and round the trees high up and well out of reach for hours together, but never settling or resting for a second.

Aphis indica, Fab.; *A. florea*, Fab.—Common in the Park and in one's gardens, but not to the same extent as our own honey bee is at home. The fine bee, *Aphis dorsata*, which is so common "up-country" in the North-West Provinces, Oudh and the Punjaub, I have never met with in the Barrackpore or Calcutta districts.