

## Some Ants (Hym. Formicidae) from North-East Asia

By

C. A. COLLINGWOOD

Ministry of Agriculture, Fisheries & Food  
Westbury-on-Trym, Bristol, England

I am indebted to Dr. E. Kjellander of the Naturhistoriska Riksmuseum, Stockholm for the opportunity of examining a rather miscellaneous but interesting collection of ants mainly collected by Drs. R. Malaise, S. Bergman and F. Trybom from North Asia and Burma during the years 1927—1935. There are also a few specimens taken by Dr. D. Hummel during one of Sven Hedin's expeditions to North-West China. A fair number of species are present and their records presented here provide new information of some interest on their ranges in North-East Asia. I have been guided by the list of Asian Formicidae prepared by Chapman and Capco (1951) for data on distribution. Most of the taxonomic literature for this area is scattered in short papers but I have used Bingham (1903) where applicable for detailed information on some of the species since this is still the only available comprehensive work on ants for India and adjacent countries. The species are discussed individually in the main body of the paper but a list is given for convenience, showing their country of capture and previously recorded ranges.

### List of Species

<i>Dorylus</i> ( <i>Alaepone</i> ) <i>orientalis</i> Westwood	Burma India	Indo-Malaya
<i>Aenictus</i> <i>wroughtoni</i> Forel	Burma	India
<i>Aenictus</i> <i>grandis</i> Bingham	Sikkim	Burma
<i>Bothroponera</i> <i>rufipes</i> Jerdon	Sikkim	Indo-Malaya
<i>Diacamma</i> <i>scalpratum</i> Fr. Smith	Burma	Indo-Malaya
<i>Ectomyrmex</i> <i>astutus</i> Fr. Smith	Burma	Indo-Malaya
<i>Odontoponera</i> <i>transversa</i> Fr. Smith	Burma	Indo-Malaya
<i>Euponera</i> ( <i>Trachymesopus</i> ) <i>darwini</i> Emery	Burma Thailand	Indo-Malaya & Papua
<i>Tetraoponera</i> <i>allaborans</i> Walker	Burma	Indo-Malaya
<i>Tetraoponera</i> <i>fergusoni</i> Forel	Burma	India
<i>Crematogaster</i> ( <i>Oxygyne</i> ) <i>aberrans</i> Forel	Thailand	India

*Entomol. Ts. Arg.* 83. H. 2—4, 1962

<i>Leptothorax acervorum</i> Fab.	Siberia	Euro-Siberia
<i>Leptothorax tuberosum</i> Fab.	Siberia	Europe
<i>Paratopula ceylonicus</i> Emery	Burma	Indo-Malaya
<i>Myrmica rubra</i> L.	China	Europe &
	Siberia	North Asia
<i>Myrmica ruginodis</i> Nyl.	China	Europe &
	Siberia	North Asia
<i>Myrmica sulcinodis</i> Nyl.	Siberia	Euro-Siberia
<i>Myrmica bergi</i> Emery	Siberia	East Europe &
		Middle East
<i>Myrmica rugulosa</i> Nyl.	Siberia	Europe
<i>Myrmica angulinodis</i> Ruzsky	Kamchatka	Siberia
<i>Aphaenogaster subterranea</i> Latr.	China	Europe
<i>Aphaenogaster</i> ( <i>Nystalomyrma</i> ) <i>gigantea</i> Sp. N.	Burma	
<i>Carebara lignata</i> Westwood	Thailand	Indo-Malaya
<i>Pheidologeton diversus</i> Jerdon	Burma	Indo-Malaya
<i>Monomorium</i> ( <i>Parholcomyrme</i> ) <i>gracillimum</i> Smith	Burma	Indo-Malaya and
		Middle East
<i>Dolichoderus</i> ( <i>Hypoclinea</i> ) <i>fuscus</i> Emery	Thailand	Burma
<i>Liometopum sinensis</i> Wheeler	Siberia	China
<i>Technomyrmex brunneus</i> Forel	Thailand	India, Sikkim
<i>Bothriomyrmex myops</i> Forel	Burma	India, Sikkim
<i>Cataglyphis birmana</i> Sp. N.	Burma	Local
<i>Proformica deserta</i> Kuznetsov	China	Turkestan
<i>Formica lugubris</i> Zetterstedt	Kamchatka	Europe
<i>Formica fusca japonica</i> Motschulsky	Kuril Is.	North-east Asia
	Siberia	
<i>Formica lemani</i> Bondroit	Kuril Is.	Europe
<i>Formica</i> ( <i>Neoformica</i> ) <i>rufolucida</i> Sp. N.	Burma	Local
<i>Lasius niger</i> L.	Siberia	Holarctic
<i>Lasius sitkaensis</i> Pergande	Kuril Is.	North America
<i>Lasius</i> ( <i>Chthonolasius</i> ) <i>mixtus</i> Nyl.	Siberia	North Europe
<i>Pseudolasius hummeli</i> Stitz	China	China
<i>Pseudolasius minutus</i> Emery	Burma	Indonesia
<i>Pseudolasius</i> sp.	Burma	Holarctic
<i>Camponotus herculeanus</i> L.	Siberia	North Asia
<i>Camponotus japonicus</i> Mayr.	Siberia	
	China	
	Japan	
	Burma	
<i>Camponotus obscuripes</i> Mayr.	Kuril Is.	Kuril, Nth Japan
<i>Camponotus</i> ( <i>Myrmotarsus</i> ) <i>mistura</i> Fr. Smith	Burma	Indo-Malaya
<i>Camponotus</i> ( <i>Orthonotomyrme</i> ) <i>sericeus</i> Fab.	India	India, Ceylon &
		Africa
<i>Camponotus</i> ( <i>Orthonotomyrme</i> ) <i>mutillaria</i> Em.	Burma	Burma
<i>Camponotus</i> ( <i>Tanaemyrmex</i> ) <i>taylori</i> Forel	China	India, China
<i>Camponotus</i> ( <i>Tanaemyrmex</i> ) <i>variegatus</i> Fr. Smith	Burma	Indo-Malaya
<i>Camponotus</i> ( <i>Tanaemyrmex</i> ) <i>mitis</i> Fr. Smith	Burma	Indo-Malaya,
		Papua
<i>Camponotus</i> ( <i>Tanaemyrmex</i> ) <i>irritans</i> Fr. Smith	India	Indo-Malaya



<i>Colobopsis saundersi</i> Emery	Burma	Indo-Malaya
<i>Colobopsis strictus</i> Jerdon	Burma	Indo-Malaya
<i>Colobopsis pubescens</i> Mayr.	Burma	Malaysia
<i>Polyrachis</i> ( <i>Myrmhopla</i> ) <i>dives</i> Fr. Smith	China	Melanesia, China, Japan
<i>Oecophylla smaragdina</i> Fab.	India	Tropical Asia

### Siberia

#### Collecting areas:

Central Siberia — Krasnoyarsk, lat.  $56^{\circ}$ ; Timsk, lat.  $59^{\circ}40'$ ; Nesimovo, lat.  $59^{\circ}35'$ ; Nikilina, lat.  $60^{\circ}25'$ ; Obensis; Novosaljevsk, lat.  $65^{\circ}10'$ ; Tungusk, lat.  $65^{\circ}50'$ ; Fatjanovsk, lat.  $64^{\circ}5'$ ; Antsiverovo; Jeneseisk, lat.  $58^{\circ}20'$ ; Leg. F. Trybom.  
 Eastern Siberia — Kamchatka: Machura, Elizovo, Petropol. Vladivostok: Tigrovaja, Suchan, Sedanka, Leg. R. Malaise.  
 Kuril Islands — Kunashiri: Furukamappu, Tomari, Yeterofu, Chiripoi, Leg. S. Bergman.

#### The species:

*Myrmica rubra* L. 1 ♀ Jeneseisk.  
*Myrmica ruginodis* Nyl. 1 ♀ Tungusk.  
*Myrmica sulcinodis* Nyl. 5 ♂♂ Obensis.  
*Myrmica bergi* Emery. 1 ♀, 5 ♂♂ Timsk, Antsiferovo.  
*Myrmica rugulosa* Nyl. subsp.? 3 ♂♂ Krasnoyarsk. Fig. 1, 2.  
*Myrmica angulinodis* Ruzsky. 1905 1 ♀ Kamchatka — Machura. Fig. 3, 4, 5.

The examples of *M. rubra*, *M. ruginodis* and *M. sulcinodis* all appear fairly typical and have been previously recorded from Siberia. The records for *M. bergi* extend the known range of this south-east European marshland species considerably to the north. Existing records include several localities in Transcaucasia and just north of the Aral sea (Ruzsky, 1905). Sadil (1951) records it from south Czechoslovakia. Recently, Dr. H. Kutter has informed me that he received this species through Dr. A. Jacobson from near Riga in Latvia. Southward it has been recorded as 'var. *fortior*' Crawley from Mesopotamia. Thus, its range from south to north is from about latitude  $33^{\circ}$  to latitude  $60^{\circ}$ . The Siberian examples are rather small but typical in other respects.

The Siberian specimens of *M. rugulosa* differ from the typical European species in having much shorter epinotal spines which are broadly based and splayed outwards. The petiole node also is larger and more rounded so that from above it appears rather oval in outline instead of rectangular. The head and scape characters, general appearance and size are much as in typical European *M. rugulosa* but the spine and petiole characters may well justify a species or subspecies difference should further material confirm their constancy in the Siberian population.

The single alate ♀ *M. angulinodis* taken appears to conform to Ruzsky's description although it is far to the east of Irkutsk, the only previously recorded locality. It is characterised by the high angled petiole node, short broad epinotal spines and the slender but distinctly angled scape which has

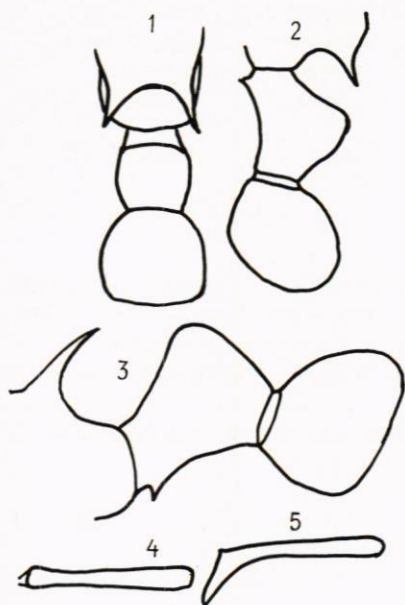


Fig. 1. *Myrmica rugulosa* Nyl. Krasnoyarsk, Siberia. Petiole and epinotal spines from above.

Fig. 2. *Myrmica rugulosa* Nyl. Krasnoyarsk, Siberia. Petiole and epinotal spines in side view.

Fig. 3. *Myrmica angulinodis* Ruzsky, Kamchatka. Petiole and epinotal spine in side view.

Fig. 4. *Myrmica angulinodis* Ruzsky, Kamchatka. Antennal scape from above.

Fig. 5. *Myrmica angulinodis* Ruzsky, Kamchatka. Antennal scape from behind.

a scarcely discernible transverse ridge at the bend. The length is about 4.8 mm. and the head-width/frons width ratio is as 49 : 19. In general appearance, including sculpture and colour, this specimen resembles a small *M. scabrinodis* Nyl. rather than *M. lobicornis* Nyl.

*Leptothorax acervorum* Fab. 2 ♀♀, Krasnoyarsk, Fatyanovsk.

*Leptothorax tuberum* Fab. 1 ♀ Krasnoyarsk.

The abundant Eurasian *L. acervorum* is recorded by Ruzsky (1905) throughout north Russia and Siberia. Emery (1921) includes Central Asia in its range and Kuznetsov (1929) recorded it as far east as Vladivostok. *L. tuberum* is common from the Pyrenees in the west and the Alps and Caucasus to about latitude 62° in Sweden and Finland. Ruzsky (1905) only recorded it from south-west Russia but it seems probable that its range would extend continuously throughout the centre of Russia and Siberia.

*Liometopum sinensis* Wheeler, 1921. subsp.? 1 ♂ Vladivostok.

This specimen differs from Wheeler's species by the uniform pale rose colour of head, alitrunk and appendages. Wheeler (1921) describes *L. sinensis* as red brown with the femora darker and mandibular border black. In all other respects the specimen corresponds with Wheeler's description. The head is more widely emarginate with the occipital angles more flattened than in the European *L. microcephalum* Panz. and it entirely lacks the characteristic colour pattern of the latter. Kuznetsov (1929) lists *L. microcephalum* from Vladivostok but previously this species had not been recorded further east than the Caucasus (Emery, 1912). It seems more probable, therefore, that Kuznetsov's record should refer to *L. sinensis* rather than to the European species.



*Formica lugubris* Zett. ♀♀ ♂♂ ♀♀ Kamchatka — Petropol, Elizovo.  
*Formica fusca japonica* Motsch. 1 ♂ 2 ♀♀ Vladivostok; Yeterofu; Petropol.  
*Formica lemani* Bondroit. 5 ♀♀ Kuril — Kunashiri, Chiripoi.

Dr. Malaise collected a good series of all castes of *F. lugubris* and as already mentioned (Collingwood, 1961) the specimens had been placed in the Stockholm Museum variously as *F. rufa* and *F. pratensis* more or less according to the colour markings of the ♀ thorax. All, however, are typical *F. lugubris*. Nothing is yet known about this species in Russia or Siberia. There are, however, certain records for eastern Europe and Karelia (Holl-döbler, 1961) and there is little doubt that it will be found to occur more or less continuously throughout the northern coniferous forest zone of north Russia and Siberia as well.

The general appearance of the *F. fusca japonica* specimens is more matt and opaque than in true *F. fusca*. The male is otherwise indistinguishable and has the petiole scale simple as in *F. fusca* and not fringed with long hairs as in most other species in this group. Kuznetsov (1929) only recorded *F. japonica* from Vladivostok but Eidmann (1941) lists both *F. fusca* and *F. japonica* from West China. It is probable that the two should be regarded as independent species rather than as subspecies but further study of this group in Asia is required.

The *F. lemani* examples have the sculpture, more or less shining integument and coarse thoracic bristles as in European specimens. The body colour is unevenly reddish brown instead of evenly dark, and there are patches of sparse pubescence. This variation together with the immense area from the Kuril Islands to Europe from which *F. lemani* has not yet been recorded makes the identification of this form uncertain. However, by analogy with *F. lugubris* which shares very much the same distribution as *F. lemani* in Europe, the eastward extension of the latter through north Russia and Siberia would by no means be unlikely.

*Lasius niger* L. 3 ♀♀ Vladivostok — Suchan, Sedanka.

*Lasius sitkaensis* Pergande. 1 ♀ Kuril — Kunashiri.

*Lasius* (*Chthonolasius*) *mixtus* Nyl. 1 ♀ Vladivostok — Suchan.

The *L. niger* ♀♀ are unusually pubescent compared with European examples and one of them has rather reduced appendage pilosity. The single example of *L. sitkaensis* has the mandibles rather worn but the reduced offset basal tooth, rather flattened clypeal outlined, pale reddish brown colour and scattered appendage pilosity all conform to the north American *L. sitkaensis* and not to *L. niger*. *L. sitkaensis* has the most northwesterly range of the American *Lasius* and occurs in west Alaska to latitude 58°. It is considered by Wilson (1955) to be the most primitive of the *L. niger* species group, nesting mainly in rotting logs or under stones in shaded forest. This is a new record for the palaearctic fauna but it would be desirable to examine much more material from this area of north-east Asia. Confirmed records of *L. niger* exist for Japan, China, Formosa and Kamchatka and it seems probable that *L. sitkaensis* has a quite restricted distribution, perhaps confined to the Kuril Islands.

The *L. mixtus* ♀ almost entirely lacks standing hairs on the body, those on the gaster are extremely short and confined to the anterior face of the



first segment. The whole body is thickly pubescent and the colour is dark brown. The specimen, therefore, represents an extreme variation from *L. umbratus* Nyl. as generally accepted before Wilson (1955), with its copious body and appendage hairs. *L. mixtus* has been recorded throughout northern Eurasia. The Vladivostok example is darker and more pubescent than *L. umbratus* sensu Wilson (1955) in north America and there is no suggestion, therefore, that the European *L. mixtus* varies towards its American counterpart as it extends eastwards. Wilson's synonymy of *L. mixtus* as a form of *L. umbratus* has been challenged by some European authors, E. G. Forslund (1957), and Wilson (pers. commun.) has agreed that there is an element of doubt as to whether these forms are really one and the same species. It seems best, therefore, to continue to record them separately until fresh evidence can be reassembled.

*Camponotus herculeanus* L. 1 ♂, 3 ♀♀, 1 ♀, Tungusk, Novosiljevsk, Timsk, Krasnoyarsk.

*Camponotus japonicus* Mayr. 8 ♀♀, Nikilina, Nesimovo, Krasnoyarsk.

*Camponotus obscuripes* Mayr. 4 ♀♀, Kuril — Kunashiri, Tomasi; Yeteropu, Shana.

Yasumatsu and Brown (1951, 1957) discuss the synonymy and variation of the *C. herculeanus* group of species in Asia in some detail. Their chief concern was to disentangle the two species *C. herculeanus* and *C. japonicus* which have not always been satisfactorily distinguished either from each other or from other similar species in the past owing to colour and to some extent pubescence variations. In the present collection, the *C. herculeanus* examples are all from central Siberia ranging from latitude 56° to 65° 50'. The *C. japonicus* examples from Siberia range to 60° 25' and there is in this region a considerable overlap between the two species. The chief confusion between them has arisen from black forms of *C. herculeanus* which occur here and there sporadically over its whole range, being insufficiently distinguished from *C. japonicus*, a predominantly black species, but also sometimes developing a reddish colour in the ♀ head and thorax. This is well exemplified by three ♀♀ from Krasnoyarsk. The most reliable distinctions include the greater extent of gastric pubescence in *C. japonicus* coupled with the clypeus which projects slightly forward beyond the lateral lobes in this species but not in the others of this group in Asia. Santschi (1914) also refers to the more rounded epinotum in *C. japonicus* when seen in profile. These differences are slight but taken together seem to be quite reliable as far as the present collection goes which includes numerous examples of *C. japonicus* from China, Japan and Burma listed elsewhere in this paper. It is interesting that the Burmese examples show considerably less pubescence than those from further north although they are completely and characteristically black. The single ♂ *C. japonicus* in the collection has the petiole distinctly less emarginate than in species of this group from Europe.

*C. japonicus* has been recorded as far west as Nanga Parbat in the West Himalayas (Eidman, 1942) and the South Urals in Russia (Ruzsky, 1905). It appears to have much the same relationship to *C. herculeanus* in north Asia as does *C. ligniperdus* Latr. to that ant in Europe. According to Yasumatsu and Brown (1951), *C. japonicus* characteristically nests in the ground, just as *C. ligniperdus* in my experience generally nests in stony banks and

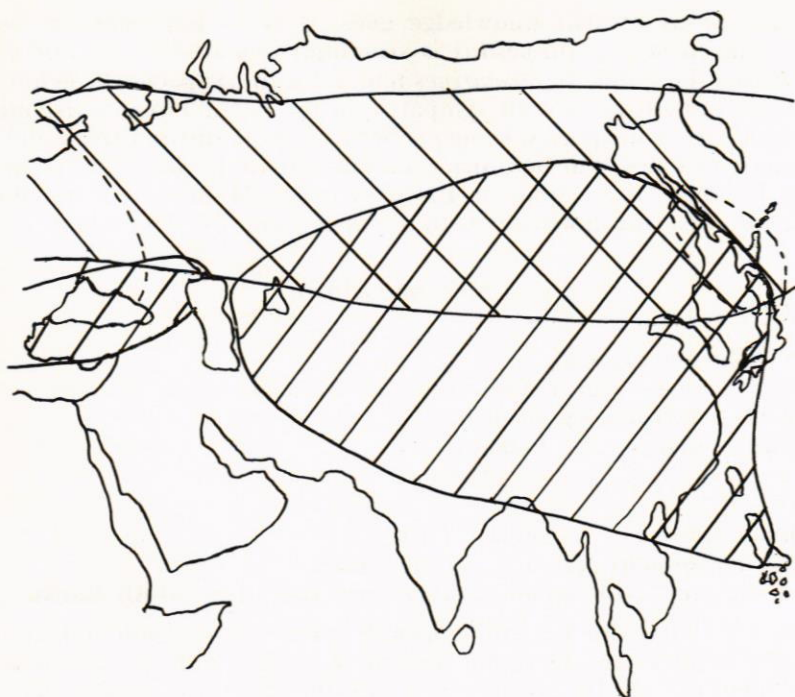


Fig. 6. Map of Asia showing  
 \ \ \ \ Range of *Camponotus herculeanus* L.  
 // // // East. Range of *C. japonicus* Mayr  
 / / / / West. Range of *C. vagus* Scop.  
 - - - - East. Range of *C. obscuripes* Mayr  
 . . . . West. Range of *C. ligniperdus* Latr.

is only found in tree stumps in the more southern part of its range. *C. herculeanus*, on the other hand, typically nests in fir stumps and probably tolerates damper and more shaded conditions than the other two species. Holgersen (1942) records *C. herculeanus* as far north as latitude  $70^{\circ}$  in Norway whereas *C. ligniperdus* ranges no further than about latitude  $62^{\circ}$  in Sweden and Finland although Holgersen (*op. cit.*) has one isolated record from west Norway at latitude  $66^{\circ} 20'$ . *C. ligniperdus* ranges from the Pyrenees to the Caucasus but not apparently further into Russia (Ruzsky, 1905). See Map (Fig. 6).

This European species is very similar to *C. obscuripes* which according to the records summarised by Yasumatsu and Brown (1951) is restricted to north Japan, the Kuril Islands and Sakhalin. The ♀♀ in the present collection differ from European *C. ligniperdus* only in the slightly coarser microsculpture when seen under high magnification and in the greater extent of yellowish red on the first gaster segment. The leg colour from which the specific name is derived is no darker than that of several *C. ligniperdus* examples I have from the Alps and only the vast area between eastern Europe and north-east Asia enforces the assumption that they are separate



species as far as present knowledge goes. It is perhaps curious that the common European *C. ligniperdus* is seemingly replaced by *C. japonicus* in Asia whereas the latter, *C. obscuripes* and yet a third species *C. hemichlaena* Yasumatsu and Brown are all sympatric in the north Japanese islands. The remaining European species, *C. vagus* Schr. is quite distinct from any of the above and occupies warmer, drier habitats than *C. ligniperdus* in south Europe. It ranges from Spain in the west to the Middle East and the Caucasus in the east and northwards to about latitude  $51^{\circ}$  in Poland.

### China and Japan

#### Collecting areas:

Japan — Kobe, leg. I. Trotzig.

North-west China — South Kansu, North-east Szechuan, leg. D. Hummel.

West China — Yarkand, leg. Raquette.

East China — Kiangsu, leg. Kolthoff.

#### The species:

*Myrmica rubra* L. ♂♂ South Kansu.

*Myrmica ruginodis* Nyl. 1 ♂ South Kansu.

*Aphaenogaster (Attomyrma) subterranea* Latr. 1 ♂ South Kansu.

These ♂♂, all from the same locality, were presumably taken by Dr. Hummel during a mating flight. The *M. ruginodis* and *A. subterranea* are in fact mounted on the same pin. Both the *Myrmica* species have been recorded for China but *A. subterranea* is an interesting new record. Ruzsky (1905) did not record this species further east than the Caucasus and the present record, therefore, extends the known species range considerably eastward. The single ♂ of *A. subterranea* collected is quite typical and resembles those I have from Switzerland.

*Proformica deserta* Kuznetzov. ♀ South Kansu.

This ♀ has the *Cataglyphis* like maxillary palps and elongate posterior spiracle characteristic of the species. There are also some ♂♂ in the Naturhistoriska Riksmuseum under the label '*Formica picea*' from south Kansu and south Mongolia taken by Dr. Hummel which probably belong as well to *P. deserta*. In general appearance and size the ♀ is much like *P. nasuta* Nyl. of Europe but like the ♂ and ♀, immediately distinguished by the long posterior spiracle which has the approximate proportions of length to breadth of 7 : 2. This species evidently extends at least from the Amu Darya region of Russian Turkestan and north Afghanistan (Collingwood, 1960) well into north China and may well have been referred to under some other name in the literature on Central Asian ants.

*Pseudolasius hummeli* Stitz (1936). 1 ♀ North-east Szechuan.

The general description of this species and that of the widely distributed Indonesian *P. familiaris* Fr. Smith are very similar. Both are of similar size and appearance — pale reddish yellow with thick, silky pubescence. Stitz (1936) does not indicate what the main differences are. However, Emery (1911) keys *P. familiaris* as having the third mandibular tooth clearly smaller than the second which is the reverse in the present species.



*Camponotus japonicus* Mayr. 1 ♀ Japan — Kobe; 1 ♂, 1 ♀, 6 ♀♀ Kiangsu.  
*Camponotus (Tanaemyrmex) taylora* Forel. 1 ♀ Yarkand.

This has the cylindrical scapes and tibiae without spines or outstanding hairs and rather upright thin scale characteristic of the species which ranges widely through India and China.

*Polyrachis (Myrmhopla) dives* Fr. Smith. 6 ♀♀ China no locality.

Other specimens from these Chinese collections have already been dealt with by Stitz (1936). It seems worthwhile, therefore, listing here the additional species that were included in his paper. These are:

- Myrmica schencki* Em. North-east Szechuan.
- Pristomyrmex pungens* Mayr. Kiangsu.
- Pheidole rhombinodis* Mayr. North-east Szechuan.
- Tetramorium caespitum pallida* Stitz. Kiangsu.
- Tetramorium caespitum jacoti* Wheeler. South Kansu.
- Stenamamma owstoni* Wheeler. S. Kansu.
- Tapinoma geei* Wheeler. South Mongolia.
- Tapinoma orthocephalum* Stitz. South Mongolia.
- Camponotus herculeanus* Fu Shu Shi, 2100 m.
- Camponotus japonicus* North-east Szechuan; South Kansu.
- Camponotus (Tanaemyrmex) irritans hongkongensis* Forel. Kiangsu.
- Camponotus (Myrmentoma) kolthoffi* Stitz. Kiangsu.
- Camponotus (Myrmentoma) reticulatus* Roger V. *bedoti* Emery. Kiangsu.
- Polyrachis lamellidens* Fr. Smith Kiangsu.
- Lasius fuliginosus* Latr. South Kansu.
- Lasius niger* L. North-east Szechuan.
- Lasius alienus* Forst. South Mongolia.
- Formica exsecta* v. *fusculi* Stitz (not listed Chapman & Capco (1915)?)
- Formica yessensis* Forel.
- Formica clara* Forel. South Mongolia.
- Formica japonica* Motsch. North-east Szechuan; South Kansu.
- '*Formica picea*' (= *Proformica deserta* Kuznetsov). South Mongolia; South Kansu.

The total list of species here shows an interesting mixture of European, Oriental and local forms. Eidmann (1941) also lists a number of species from the same general area. This author also gives *Formica picea* with the comment that it inhabits stony, grassy steppes and mountain sides to the snowline and I suspect that here, too, there has been a confusion between the boreo-alpine bog inhabiting '*F. picea*' I. E. *F. transcaucasica* Nas. (Yarrow, 1954) and one or other superficially similar *Proformica* species which is more likely to be found in such areas. Eidmann (1941) further lists another shining black species, *Formica gagates* Latr. with the comment that it avoids woodland whereas in south Europe this ant is exclusively attached to oak woods. Here, however, it frequently nests in open situations but always in close proximity to trees. Ten of Eidmann's species are included in those already listed by Stitz above and these two collections together, mainly from west China, total some 61 species — a considerable total but probably a small fraction of those already known to exist in China as a whole.

*Burma, India, Sikkim, Thailand*

## Collecting areas:

Burma: Kambaiti Mountains — altitude about 2,000 m. Tenasserim — Malvedaung; Mekane; Waschaung. South Shan — Taungyi; Sadon; Myitkina; Taungdo; Pekkong; leg. R. Malaise.

India: Madura; Calcutta. Leg. H. Sundberg. Suratgar. Leg. D. Hummel.

Sikkim: Tista Bridge — 200 m. Leg. R. Malaise.

Thailand: Pak Kok; Koon Tan. Leg. Gyldenstolpe.

## The species:

*Dorylus (Alaepone) orientalis* Westwood. 15 ♂♂ Kambaiti; Myitkina.

This is common throughout Indo-Malaya.

*Aenictus grandis* Bingham. 1 ♂, Sikkim.

*Aenictus wroughtoni* Forel. 1 ♂, Taungyi.

These two species appear to be new records for Sikkim and Burma respectively.

*Bothroponera rufipes* Jerdon. 1 ♀, Sikkim.

This is widely distributed through south Asia but is apparently a new record for Sikkim.

*Diacamma scalpratum* Fr. Smith. 1 ♀, Pekkong.

*Ectomyrmex astutus* Fr. Smith. 1 ♀, Taungyi.

*Odontoponera transversa* Fr. Smith. 1 ♀, 2 ♂♂ Malvedaung; Taungyi.

*Euponera (Trachymesopus) darwini* Emery. 4 ♀♀, Thailand; Waschaung; Mekane; Taungyi.

These are all widely distributed through Indo-Malaya. *E. darwini* is a new record for Burma.

There are also five Ponerine ♂♂ belonging to four species which I have no means of identifying. Existing keys to Ponerine ♂♂ are unfortunately very incomplete and ♂♂ of several genera have never been described. Three of the species are slender and testaceous with long filiform antennae. The median and hind tibiae have two spurs; the median spur of the hind tibia is pectinate, the others simple. The claws are each bidentate. The pygidium is spined. The mandibles are very short without teeth. The scape is short and thick, about  $\times 3$  the first funiculus segment, but the two together are much shorter than any of the very long succeeding antennal segments. The mesonotum has widely spaced non converging furrows. This combination does not fit any of the genera keyed by Wheeler (1922 a). All have the body testaceous and shining. The antennae, petiole, epitum and part of the first gaster segment are pubescent and in the two larger species 14 and 10 mm. long respectively, long subdecumbent hairs clothe the posterior gaster segments. The largest species has the petiole longer than wide, triangular in profile with two median forward projecting teeth ventrally and one on each side. The second species is similar but has the petiole shorter and sloping much more steeply to its dorsal crest. The small species, about 4 mm. long, has the gaster missing but the petiole is low, cubical without ventral teeth and evidently belongs to a different genus. These specimens are all from Taungyi.

The remaining ♂ has a general resemblance to a *Tetraponera* but has the



antennal scape very short, shorter than the quadrangular swollen first funiculus segment. The remaining eleven segments are elongate. The petiole nodes are broad and flat with coarse, shallow punctures on the dorsal surface. The post-petiole is strongly constricted behind as in *Tetraponera*. The tibiae each have two long finely pectinated spurs. The whole body is clothed in fine long white hairs. The head and thorax are dark brown the rest pale to reddish brown. This specimen, 1 mm long, is from Suratgar.

*Tetraponera allaborans* Walker 1 ♀ Tenasserim.

*Tetraponera fergusonii* Forel 1 ♀ South Shan.

These are widely distributed in south Asia. *T. fergusonii* was described as a subspecies of *T. nigra* Jerdon and is so listed by Chapman and Capco (1951). It is probably a new record for Burma.

*Crematogaster (Oxygyne) aberrans* Forel. 1 ♀, Pak Kok.

*Paratopula ceylonica* Emery. 1 ♀, Taungyi; 1 ♀, Mekane.

*P. ceylonica* is a new record for Burma. Previous records are from India, Ceylon and Formosa with varieties in Sumatra and Bengal. The Taungyi specimen corresponds well enough with Bingham's description but that from Mekane is distinctly narrower and the epinotum is more distinctly carinate above with the keel running forward on each side from the epinotal spines which are also sharper. This may well be a different species but only examination of a large series could decide this.

*Pheidologeton diversus* Jerdon. 1 ♂ Malvedaung.

This is widely distributed throughout Indo-Malaya but has not hitherto been recorded from Burma.

*Carebara lignata* Westwood, 1 ♂, Koon Tan.

*Monomorium (Parholcomyrma) gracillimum* Fr. Smith 12 ♀♀, Kambaiti.

This ant is very widely distributed through Indo-Malaya and north Africa. It is one of several *Monomorium* species that tend to be spread by commerce and Bernard (1960) regards it in Africa as an essentially oriental species that is spreading westward. The Burmese examples are light in colour instead of the more usual brownish black. The species would seem to be truly indigenous in Burma since the specimens were collected in a mountain area.

*Aphaenogaster (Nystalomyrma) gigantea* Sp. Nov. 1 ♀, 1 ♂ Kambaiti Mts.

Fig. 7. 2,000 m. 24/6 /34, leg. R. Malaise.

*Nystalomyrma* Wheeler (1916) as known up to the present includes only a few species restricted to Australia and New Guinea. This record of another species well northward almost into the palaearctic zone is of great interest. *Aphaenogaster* ssp. from New Guinea have recently been reviewed by Marion Smith (1961) and his careful re-description of *Nystalomyrma pythia* Forel shows many structural resemblances to the present species. This, however, is of larger size and coarser sculpture; it has a more flattened petiole node and longer epinotal spines, Type ♀ — Length 7 mm. Head subrectangular, longer than broad. Antennae 12 segmented; scape evenly curved near base, thickening distally, exceeding the occipital border by about  $\frac{1}{4}$  its length. Funiculus segments slightly longer than broad, thickening distally to form an indistinct four segmented club. Prothorax and mesothorax forming

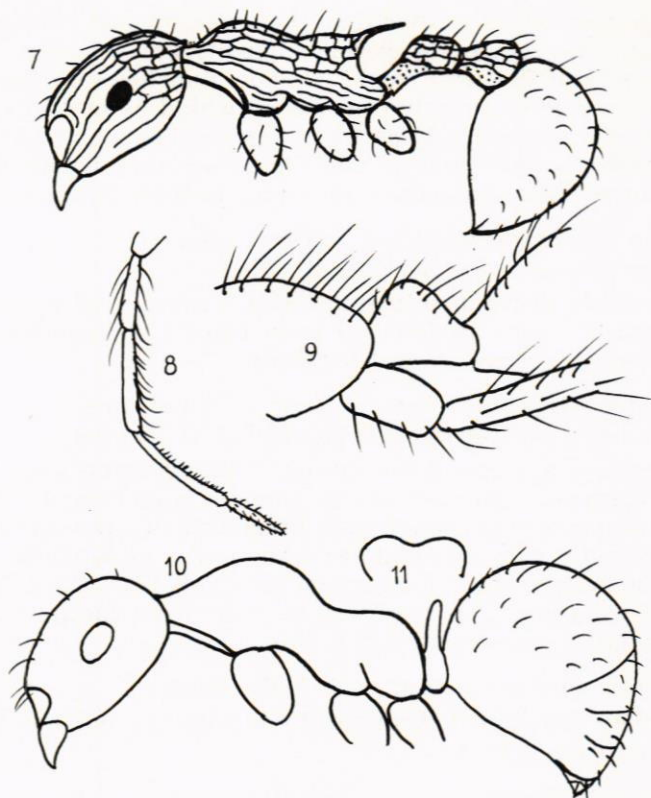


Fig. 7. *Aphaenogaster* (*Nystalomyrma*) *gigantea* Sp. Nov. Side view.

Fig. 8. *Cataglyphis birmana* Sp. Nov. Maxillary palps 1—5.

Fig. 9. *Cataglyphis birmana* Sp. Nov. Epinotum and petiole in side view.

Fig. 10. *Formica rufolucida* Sp. Nov. Side view.

Fig. 11. *Formica rufolucida* Sp. Nov. Upper edge of petiole scale, front view.

an uninterrupted convexity above; meso-epinotal furrow shallow; epinotal spines longer than the distance between their tips, lightly curved downwards and inwards such that they appear subparallel from above and continue the general line of the epinotum in profile. Petiole about twice as long as wide and rectangular in outline from above; rather flattened in profile with the anterior face of the node mildly concave. Postpetiole swelling posteriorly so as to appear almost pyriform both from above and in side view. Head and pronotum very coarsely longitudinally rugulose above; rest of thorax and petiole nodes coarsely transversely rugulose above with coarse longitudinal striae at sides. Long, outstanding hairs are scattered on dorsum of gaster, thorax and head, also below head. Appendages with short adherent pilosity and long subdecumbent hairs. Tibial spurs short and reduced on mid and hind legs. Colour dark yellowish brown to dark brown. Gaster shining.



Cotype ♀ length 11 mm. As above but epinotal spines relatively shorter. Thorax massive with slight mesonotal prominence.

*Dolichoderus (Hypoclinea) fuscus* Emery. 1 ♂ Pak Kok.

*Technomyrmex brunneus* Forel. 1 ♂ Pak Kok.

*Bothriomyrmex myops* Forel. 1 ♀ Mekane.

*D. fuscus* and *T. brunneus* are both apparently new records for Thailand. Both were treated as separate species by Bingham (1903) not as subspecies as originally described, of *H. feae* Emery and *T. albipes* Fr, Smith respectively. *B. myops* is apparently a new record for Burma.

*Cataglyphis birmana* Sp. Nov. 1 ♂ Tenasserim — Malvedaung 300 m. 25/11/34 Fig. 8, 9. leg. R. Malaise.

No species of *Cataglyphis* appears to have been recorded from Burma. The present specimen is like a typical large *Cataglyphis* in shape but may be immediately distinguished by the abundant long hairs over the body and all appendage surfaces and the thick short pale grey pubescence. The sixth maxillary palps are wanting — presumably broken off, but the proportions of the remaining palp segments are more in conformity with the subgenus *Cataglyphis* than to *Machaeromyrma* to which the extreme hairiness and pubescence would be more appropriate, Type ♂ — Length 11.5 mm. Head of usual *Cataglyphis* shape, antennae very long with the first three segments of the funiculus long and sub-equal and the rest elongate but perceptibly shortening towards the tip. Thorax slender; petiole longer than wide from above with large rounded node, the anterior face almost vertical and the posterior face curving more gradually towards the gaster. Head and irregular areas of the pronotum and mesonotum above red, the rest including mandibles, scape most of thorax, femora and gaster dark with the funiculus, tibiae and tarsi somewhat paler. Abundant long pale hairs over whole body and appendages; head thinly pubescent, the rest of body, especially the gaster, with thick pale pubescence obscuring the sculpture. General appearance, apart from the head, greyish and furry.

This is a handsome looking insect. The only other species of this subgenus so far recorded in the Indo-Malayan region is *C. setipes* Forel which ranges from Central India through south Afghanistan to South-east Persia (Collingwood, 1960).

*Formica (Neoformica) rufolucida* Sp. Nov. 25 ♂♂ Kambaiti Mts. 1700—2000 m. Malvedaung 300 m. Inle Lake, Taungdo. Fig. 10, 11. 27/3 34—10/10/34. leg. R. Malaise.

No *Formica* species has hitherto been recorded from Burma. The present series of specimens are of exceptional interest in that they are more akin to the American subgenus *Neoformica* than to *Formica* itself. The antennal scapes are long and exceed the distance between occiput and front clypeal border by about a third of their length. The alitrunk is nearly twice as long as the head length as measured above; the epinotum is rounded, rather than angled, seen in side view. The petiole is cordate in front view with the posterior border incised to divide the upper portion into two rounded lobes. Wheeler (1922) refers to a form of the American *F. neogagates* in the Philippines but this is a *Proformica* species with different structural



characteristics. The present species has a superficial resemblance to *Neoformica pallide-fulva* but is immediately distinguished by the wide incised scale. It is more sharply differentiated from members of the *Formica fusca* group by the relatively longer antennae and alitrunk. Comparative ratios with similar sized specimens of *F. cunicularia* Latr. are: *F. cunicularia* head length: scape length — 97 : 100; head length: alitrunk length 100 : 175. *F. rufolucida* head length: scape length — 74 : 100; head length: alitrunk length — 100 : 190.

Type and cotype ♀♀ — Length 5.5–8 mm. Head length from occiput to front clypeal border not longer than maximum head width. Head with occipital angles smoothly rounded, narrowing anteriorly; frontal triangle twice as wide as high. Clypeus keeled with the front border slightly raised. Antennae long with the scape surpassing the occipital border by nearly half its length. Second, third and fourth funiculus segments subequal, together slightly longer than twice as long as the first segment. Prothorax rather domed above and smoothly rounded; epinotum with dorsal and posterior faces subequal, smoothly rounded in profile. Scale wide, incised in the middle so as to form two broadly rounded lobes. Gaster large, smooth and shining. Thorax finely sculptured and shining; head slightly more coarsely sculptured, especially clypeus. Faint pubescence on front of head and on gaster but not obscuring sculpture. Long outstanding hairs on head and gaster, gula and alitrunk bare. Tibiae with a row of suberect bristles on inner face, spurs long and slender. Most of head, tips of antennae, variable patch on pronotum and whole gaster dark brown, the rest including clypeus, cheeks, most of antennae, legs and mandibles yellowish red.

*Pseudolasius minutus* Emery. 1 ♀, Waschaung.

*Pseudolasius* sp. 1 ♀, Taungyi.

The specimen ascribed to *P. minutus* corresponds rather approximately with the description given by Emery (1911). It is 6 mm long, very pubescent, pale yellowish red in colour with the appendages slightly paler. The head is short, wider than long and the maximum widths of head, thorax and gaster are about equal. The thorax is flattened above and the whole body is less massive than in most other species of the genus. *P. minutus* is recorded from Java and Sumatra and if correctly named, is a new record for Burma.

The second specimen is much larger — 9 mm long; the thorax is massive relative to the head. The head and appendages are pale reddish brown; the thorax is unevenly reddish brown; the tip of the funiculus is dusky. The gaster is predominantly brown with a reddish patch to each side on the first segment. All body surfaces including the appendages are clothed in long thick pubescence and yellowish outstanding hairs. The wings are very dark. The only *Pseudolasius* so far recorded from Burma is *P. emeryi* Forel which has different characters.

*Acantholepis* sp. 1 ♂, Kambaiti.

I have no means of identifying this ♂ at present. The length is 3.2 mm. It has pale wings and a narrowed gaster. The body is shining black with all surfaces including the appendages, clothed in long pale hairs. This genus has not been recorded from Burma.



*Prenolepis* sp. 4 ♂♂, Madura.

These are 5.5—6 mm long. The colour is uniformly dark brown with the wings slightly infuscate. The legs have short scattered adherent pubescence. The scale is thick, low and emarginate with long pale dorsal hairs. The rest of the body has scattered long hairs which are more numerous on the gaster.

*Camponotus (Tanaemyrmex) variegatus* Fr. Smith. 1 ♀, 4 ♂♂, Taungyi; 1 ♀, Mekane.

*Camponotus (Tanaemyrmex) mitis* Fr. Smith. 1 ♀, 1 ♂, Taungyi.

These are common species throughout Indo-Malaya. *C. mitis* is apparently recorded for Burma for the first time. The ♂ is 9.5 mm long. The colour is evenly dark brown. The petiole scale is low and thick. The femora are distinctly channelled. The tibiae are long slender and flattened but have no bristles. The extensor surfaces of the femora have scattered long hairs and the scapes and tibiae sparse short hairs. The clypeus is rounded anteriorly.

*Camponotus (Tanaemyrmex)* sp. 1 ♂, Calcutta.

This is 10 mm. long, uniformly dark. The tibial bristles are well developed and the tibiae somewhat flattened. This could be *C. irritans* but as with so many of the forms of this difficult subgenus, the male of this species has not been described.

*Camponotus (Myrmotarsus) mistura* Fr. Smith. 1 ♀, Tenasserim.

*Camponotus (Orthonomyrmex) sericeus* Fab. 1 ♀, Madura.

*Camponotus (Orthonomyrmex) mutillaria* Emery. 2 ♀♀, Taungyi.

*C. mutillaria* was described as a variety of *C. wasmanni* Emery and is so listed by Chapman and Capco (1951). However, it is well distinguished by the red thorax and distinctive red blotch on either side of the first gaster segment. This colour is quite constant in the Burmese population (Bingham, 1903) and there is no good reason why *C. mutillaria* should not be regarded as an independent species.

*Colobopsis saundersi* Emery, 2 ♀♀, Mekane, Pekkong.

*Colobopsis strictus* Jerdon. 2 ♀♀, Mekane.

*Colobopsis pubescens* Mayr. 2 ♀♀, Mekane.

*Colobopsis* sp. 1 ♀, Mekane.

*C. strictus* and *C. pubescens* are recorded for Burma for the first time. These and *C. saundersi* are all widely distributed through Indo-Malaya. The remaining species is comparatively small, length 5 mm. and resembles the European *C. truncatus* but is considerably darker.

*Oecophylla smaragdina* Fab. 1 ♀, Calcutta.

This is a very pale specimen of the abundant weaver ant of India.

#### References

- BERNARD, F. 1960. Resultats de la concurrence naturelle chez les Fourmis terrioles de France et d'Afrique du Nord. Bull. Soc. Hist. Nat. Afrique Nord. **49**: 332.  
 BINGHAM, C. T. 1903. Fauna of British India — Hymenoptera (2): Ants and Cuckoo Wasps. Taylor and Francis, London.

- CHAPMAN, J. W. and CAPCO, S. R. 1951. A check list of the ants of Asia. Institute Sci. Tech. Manila. Monograph I.
- COLLINGWOOD, C. A. 1960. The 3rd Danish expedition to Central Asia. Zoological results 27 — Formicidae (Insecta) from Afghanistan Vidensk. Medd. fra Dansk naturh. Foren. **123**: 51—79.
- 1961. Ants in Finland. Ent. Rec. **73**: 190—195.
- EIDMANN, H. 1941. Zur Oekologie und Zoogeographie der Ameisenfauna der West China und Tibet. Z. Morphol. Ökol. Tiere **38**: 1—43.
- 1942. Zur Kenntnis der Ameisenfauna des Nanga Parbat. Syst. Ökol. Geol. Tiere **75**: 239—255.
- EMERY, C. 1911. Ann. Soc. Ent. Belg. **55**: 216—219.
- 1912, 1921. Wytsman's Genera Insectorum — Hymenoptera, Formicidae 137 Dolichoderinae; 174 Myrmicinae. Desnet-Verteneuil, Bruxelles.
- FORSSLUND, K. H. 1957. Catalogus Insectorum Sueciae XV — Hymenoptera, Formicidae. Opusc. Entom. Lund **22**: 70—78.
- HOLGERSEN, H. 1942. Ants of Northern Norway (Hym., Form.). Tromsø Museums Årshefte **36** (1940); 1—35.
- HOLLDÖBLER, K. 1961. Systematische Klarstellungen zur Ameisenfauna des nordostkarelischen Urwald. Z. ang. Ent. **48** (2): 186—7.
- KUZNETZOV-UGAMSKIJ, N. N. 1929. Die Ameisen des Süd Ussuri Gebietes. Zool. Anzeiger **83**: 16—33.
- RUZSKY, M. D. 1905. Formicarii Imperii Rossici, I. Arb. naturf. Ges. Kais. Univ. Kasan **38**.
- SADIL, J. V. 1951. A revision of the Czechoslovakian forms of the genus *Myrmica* Latr. (Hym.). Acta Entom. Mus. Pragae **27**: 233—278.
- SANTSCHI, F. 1914. Fourmis d'Indo-Chine. Ann. Soc. Ent. Belg. **50**: 173.
- STITZ, H. 1936. Schwedische-Chinesische Wissenschaftliche Expedition nach den Nord-westlichen Provinzen Chinas. Ark. f. Zool. **27**: 1—7.
- SMITH, M. R. 1961. A study of New Guinea ants of the genus *Aphaenogaster* (Hymenoptera Formicidae). Acta Hymenopterologica I (3): 213—237.
- WHEELER, W. M. 1921. Bull. Mus. Comp. Zool. Harvard **64**: 540.
- 1922. Ants of the genus *Formica* in the tropics. Psyche **29**: 203—211.
- 1922 a. Ants of the American Museum Congo Expedition VII — Keys to the genera and subgenera of ants. Bull. Amer. Mus. Nat. Hist. **45**: 631—710.
- WILSON, E. O. 1955. A monographic revision of the ant genus *Lasius*. Bull. Mus. Comp. Zool. **113** (1): 1—199.
- YARROW, I. H. H. 1954. The British ants allied to *Formica fusca* L. (Hym., Formicidae). Trans. Soc. Brit. Ent. **11**: 29—44.
- YASUMATSU, K. and BROWN, W. L. 1951. Revisional notes on *Camponotus herculeanus* Linné and close relatives in palearctic regions (Hymenoptera: Formicidae). Journ. Fac. Agric. Kyushu University **10** (1): 29—44.
- 1957. A second look at the ants of the *Camponotus herculeanus* group in Eastern Asia. Journ. Fac. Agric. Kyushu University **11** (1): 45—51.